AUGUST 1958 / 50c

AIR FORCE

The Magazine of AMERICAN AIRPOWER / Published by the Air Force Association

Anniversary Issue

AIR FORCE 1958 ALMANAC

ADVANCED Sikorsky HSS anti-submarine helicopters feature automatic flight stabilization using Hamilton Standard electronic components. More than 50 types of turbine or rocket powered aircraft and missiles also use Hamilton Standard equipment, propellers, or electronic devices because of Hamilton Standard's leadership in design and production.

WHEREVER MAN FLIES

HAMILTON STANDARD

Propellers • Starters • Air Conditioning Systems • Fuel Controls • Valves • Pumps • Electronics

HAMILTON STANDARD, WINDSOR LOCKS, CONNECTICUT

B. F. Goodrich Fabric Tread Dimple Tire proved "far superior" in F-106 tests

Ordinary high-performance tires used on the F-106 built by Convair, a division of General Dynamics Corporation, just couldn't take the punishment. The stress of high-speed takeoffs and landings literally tore them to pieces.

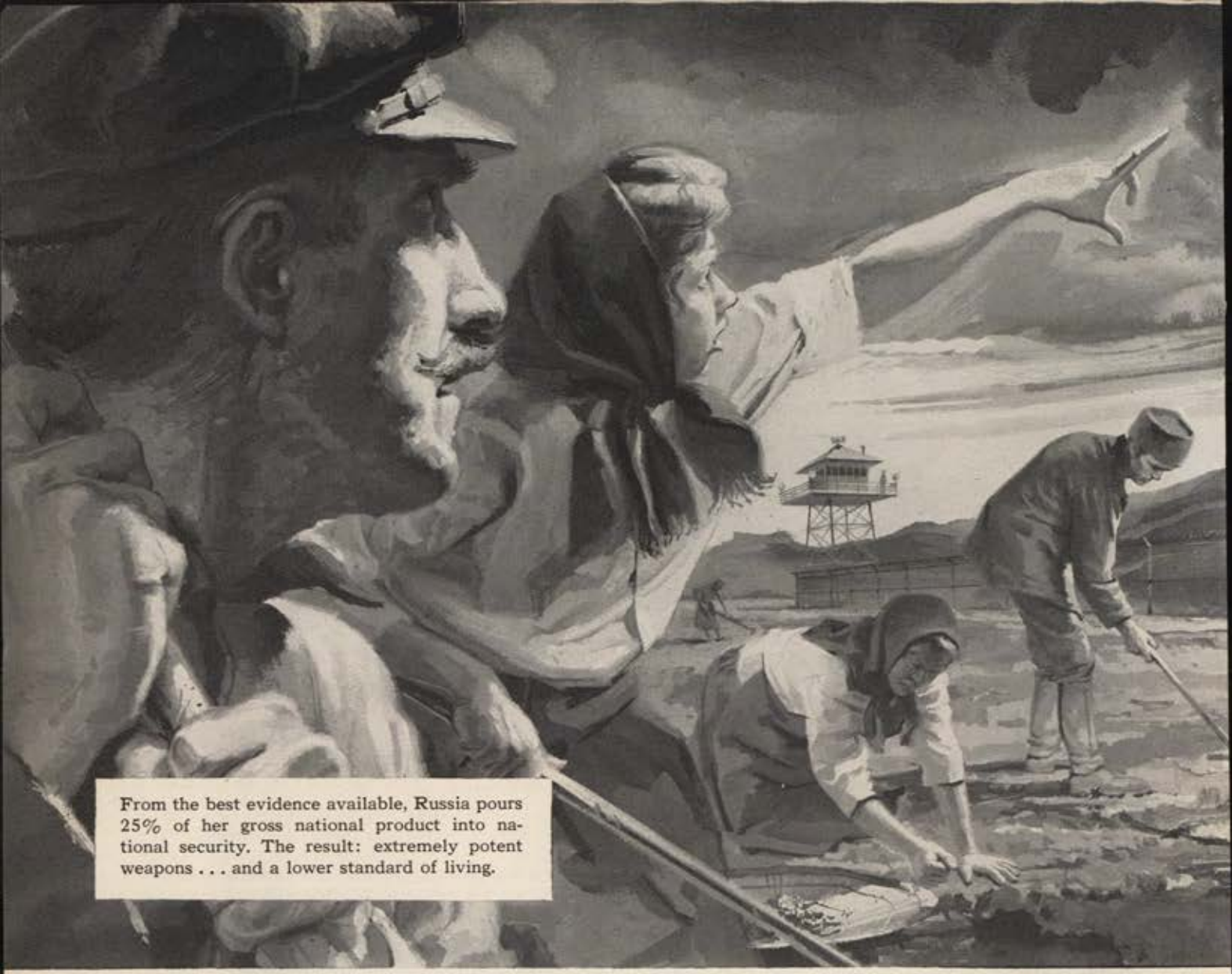
Then B.F.Goodrich submitted its revolutionary new Fabric Tread Dimple Tire for testing. Even under severe operating conditions, including repeated RTO situations, the tire proved that it could out-perform and out-wear any jet tire known today. As a result, the B.F.Goodrich Fabric Tread Dimple Tire is standard equipment on the F-106 Delta Dart, world's fastest and highest flying all-weather interceptor.

The amazing performance of the B.F.Goodrich Fabric Tread Dimple Tire is made possible by two exclusive features. Plies of nylon cord are built right into the rubber tread stock to equalize the modulus between tread and carcass. This cuts the amount of heat normally generated by flexing between the two elements of the tire. In addition, the special Dimple Tread design eliminates stress points in the tread and therefore provides greater resistance to cutting and chipping.

B.F.Goodrich Fabric Tread Tires mean safer takeoffs, more landings, for supersonic aircraft of all kinds. Available with either Dimple or Sineweave Tread design. For more information, write B.F.Goodrich Aviation Products, a division of The B.F.Goodrich Company, Akron, Ohio.

Cross-section of B.F.Goodrich Fabric Tread Tire shows how nylon laminates are built into rubber tread stock. This unique construction provides extra resistance to tread separation—checks the formation of disastrous high-speed shock waves. The Dimple Tread design is more stable—helps reduce flexing and therefore provides greater wear.

B.F.Goodrich aviation products



From the best evidence available, Russia pours 25% of her gross national product into national security. The result: extremely potent weapons . . . and a lower standard of living.

Must "More Defense" Mean Rich Weapons . . . Poor Citizens?

Not for the U.S.: if we continue the effort to put defense on a businesslike basis. As General Electric sees it, we can achieve security with solvency.

Russia's Sputnik successes dramatically emphasize Soviet military progress . . . and the dilemma America faces because of that progress.

For the third time in 18 years, our free enterprise system is being tested against a slave-state system. While we cannot risk a "second best" defense establishment, neither can we increase defense spending to the point where we destroy our dynamic, expanding economy. And, certainly, we cannot adopt the very methods of dictatorship against which we are defending ourselves.

What then is the answer? One approach is to continue to aim for *more defense per dollar spent*—better aircraft, missiles, radar, engines—within the framework of reasonable budgets by . . .

- **ELIMINATING STOP-AND-GO DEFENSE PROGRAMS** . . . planning and budgeting well ahead so that the defense effort is stabilized.
- **PROVIDING PROPER INCENTIVES TO PERMIT INDUSTRY** to invest more private funds in defense and to make dynamic new technological contributions.

The problem is to put defense on the most businesslike basis.

Our military-industrial team is working hard to solve this problem. But its complete solution will be possible only if long-range defense is understood —and supported—by U.S. citizens. Survival is everybody's business. 695-1B

This public information message also appears in current issues of NEWSWEEK and FORTUNE.

GENERAL ELECTRIC

ROBERT PAXTON
President
General Electric Company

How can industry help to achieve more businesslike defense?

"We must step up our national productivity which has leveled off at the very time an increase is most needed. It has been estimated that, regardless of a recession, our level of productivity is as much as 20% below its present potential. With present facilities and work force—and the same number of working hours—we should be able to increase our gross national product more than $80 billion.

"Working for this goal means the elimination of needless waste and costly 'featherbedding'; greater cooperation between labor and management in introducing technological advances; and more purposeful, more efficient, and more imaginative work from everyone."

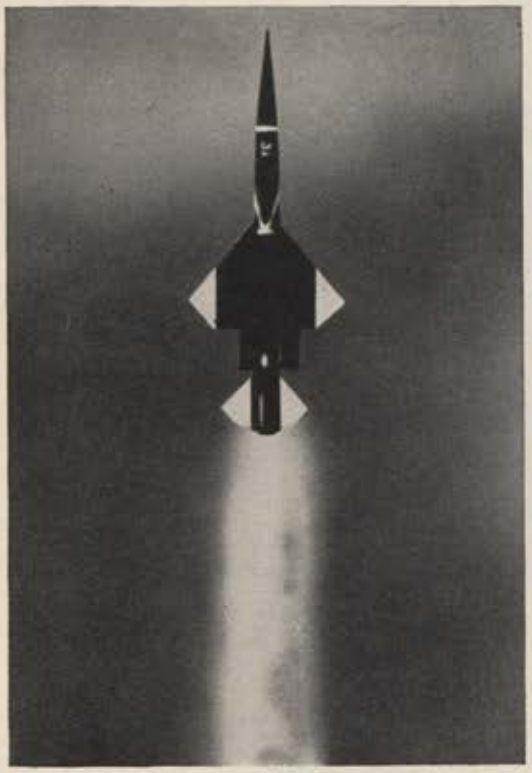
At General Electric, defense development is an operating business.

SURFACE-BASED ELECTRONIC SYSTEMS... including detection, location, control, missile guidance and detection . . . are developed and produced by the Heavy Military Electronics Equipment Department, Syracuse, N. Y.

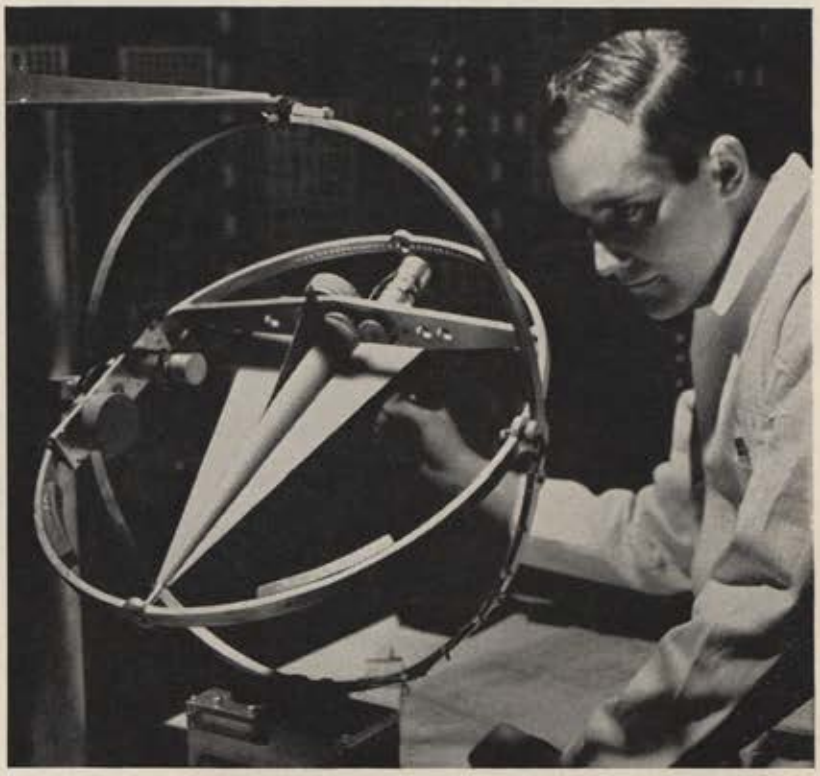
NOSE CONES FOR ATLAS AND THOR missiles are being developed and tested by the Missile and Ordnance Systems Department, Philadelphia, Pa. Nose cone (above) is being packed in its carrier case.

POWERFUL J79 TURBOJET ENGINE (above), product of the Aircraft Gas Turbine Division, Cincinnati, Ohio, recently powered the F-104 "Starfighter" to new world's speed and altitude records.

FLYING MISSILE LAUNCHER. Longest-range jet in the world, the advanced Boeing B-52 will carry two supersonic air-to-ground missiles in addition to its regular bomb load. It will give the Strategic Air Command's defense forces the combined advantages of accurate long-range guidance, mission recallability and supersonic weapons delivery. The new B-52 global jet bomber will, on a single retaliatory mission, be able to destroy several targets thousands of miles apart.



PILOTLESS SKY FIGHTER. Supersonic Boeing Bomarc defense missile is designed to seek out and destroy enemy bombers and air-breathing missiles long before they reach vital targets. Advanced Bomarcs will have a range of more than 400 miles.



SPACE AGE RESEARCH. Research at Boeing is pushing back the frontiers of scientific knowledge. Projects include studies of orbital glide vehicles, celestial mechanics, space trajectories, and drag and heating effects in high speed space flight and re-entry. Solid state physics and propulsion forces of the future are among programs directed by the Boeing Scientific Research Laboratories.

LONG-DISTANCE CHAMPION. The Boeing KC-135 jet transport-tanker has set a series of new records, including a nonstop, 10,228-mile flight from Tokyo to the Azores, longest jet flight ever without refueling. On this flight, time between Tokyo and Washington, D. C. was 13 hours, 35 minutes, cutting 18 hours off the old mark. In addition, these swift, swept-wing Boeing jets are establishing new records for minimum maintenance and maximum reliability.

BOEING

AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

Volume 41, Number 8 • August 1958

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AIR FORCE ALMANAC • ANNIVERSARY ISSUE, 1958

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DEPARTMENTS

Electra

The Lockheed high-priority prop-jet transport for

SPECIAL AIR MISSIONS

Meeting the exacting requirements of the U. S. Air Force and the Military Air Transport Service, the Lockheed ELECTRA offers unequalled safety, comfort, jet-age prestige and performance for this most vital service.

SUMMARY OF SAFETY AND OPERATIONAL FEATURES:

HIGH PERFORMANCE: The ELECTRA has exceptional power-to-weight ratios, safely takes off from short fields, climbs fast even on two engines at high gross weights.

IMMEDIATE POWER RESPONSE: The ELECTRA's four constant-speed Allison Prop-jet Engines respond at once—no delay for engine speed and power build-up.

COMFORT: Spacious pressurized, air-conditioned cabin and vibration-free smoothness of synchrophased prop-jet power makes the ELECTRA outstandingly quiet and comfortable on long or short flights.

LARGE FUEL CAPACITY: Special fuel provisions permit non-stop flights of over 3250 nautical miles with 32 passengers and baggage, including fuel reserves for an additional 2½ hours.

RAPID DESCENT: Efficient Fowler flaps and high drag from flight-idle propeller position enables the ELECTRA to descend very rapidly from cruise altitudes.

POSITIVE REVERSE THRUST PROPELLERS: Make short-runway airports available for routine operations even under adverse snow and ice conditions.

FAIL-SAFE STRUCTURAL DESIGN: Optimum structural integrity built into all components assures maximum safety under all flight conditions.

EXCELLENT VISIBILITY: The ELECTRA's "front office" establishes new standards of visibility for pilots of transport aircraft.

SPEED: The ELECTRA flies 100 knots faster than present special mission transports.

ECONOMY: Efficient operation at low as well as high altitudes, yields economy even on shortest flights.

LOCKHEED *means leadership*

Lockheed Aircraft Corporation CALIFORNIA DIVISION, *Burbank and Palmdale, California*

GPE _ technological bumbershoot

Covering the advanced needs of industry and defense is today's biggest technological job.

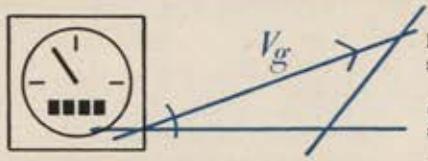
GPE has brought together, under one umbrella, broad physical resources plus a remarkably creative group of scientists, engineers and technicians. Its co-ordinated skills, knowledge, experience and producing facilities cover more than a dozen industries.

Each company in General Precision Equipment Corporation works close to the frontiers of science in its specific fields. Working together, they have rolled up an impressive record of achievement in new and often uncharted technological areas.

If your needs are in controls, systems engineering or automation, you'll find some eye-opening answers in this highly integrated research, design, engineering and manufacturing group.

GENERAL PRECISION EQUIPMENT CORPORATION

Index to Advertisers



Ground Speed & Drift Angle
Any Time, Anywhere, Any Weather

One look and the pilot KNOWS. In a glance he reads actual ground speed and drift angle.

This vital data, never before available, is displayed on the flight panel automatically and continuously.

The dials "read" the key unit in GPL's revolutionary Doppler auto-navigation systems. Other phenomenal units in these systems tell where you are and how to get where you're going. The systems operate entirely without ground aid or celestial fixes, have proved themselves globally in millions of operational miles.

GPL's auto-navigators were developed in conjunction with the Air Force (WADC). They are the result of GPL's harnessing of the Doppler-effect to air navigation — an achievement comparable in magnitude to the breaking of the sound barrier.

RADAN—jet-age windsock

Spotting and dodging headwinds, riding time-saving tailwinds, are easy now for both the military and civilian pilot.

The reason is RADAN.*

RADAN navigators are members of the famed GPL family of self-contained Doppler systems. RADAN gives the pilot accurate ground speed and drift angle, two facts that add up to accurate knowledge of the wind at *his* position and *his* altitude!

RADAN systems provide military pilots with continuous velocity, second by second, help to accomplish successful missions. To the civilian pilot, they provide pinpoint navigation, savings of precious jet fuel, a priceless margin of safety.

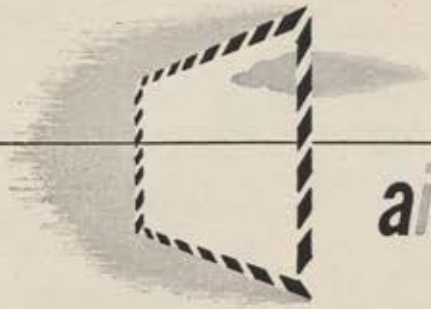
RADAN systems, recently released for civilian use, are now in quantity production . . . ready and available to everyone.

GPL — GENERAL PRECISION EQUIPMENT CORPORATION

GENERAL PRECISION LABORATORY INCORPORATED, Pleasantville, N. Y.

*Trademark

ENGINEERS — GPL achievements have opened up some unusual research and development opportunities. Send resumé to Personnel Manager.



air mail

More on the Space Cultists

Gentlemen: I have just read your editorial for July ["Scientists, Not Cultists Will Conquer Space"]. Congratulations and God bless you for your well-chosen words. Let us debunk the selfish, self-serving, pseudo-scientists and industrialists who would milk our defense appropriations for their own enrichment.

We must maintain a deterrent force of maximum strength and lethal efficiency consistent with our ability to support. Nothing is more corrosive in a free-enterprise economy than the unnecessary expenditure of our resources on unneeded or obsolete weapons, with the inevitable inflation that will certainly destroy our freedom and savings and deliver us into the hands of a bureaucratic dictatorship, if permitted to continue unchecked.

Lincoln's words to the effect that we are engaged in a great struggle to determine whether our concept of liberty can long endure upon this earth are just as appropriate today as they were in the days of our War Between the States. The enemies of our country are not all Kremlin termites. We have our own breed who call themselves patriots but are only interested in getting more than their share of the hard-earned tax money we contribute to our defense.

Keep up the good work, my friends.

George B. Gelly
Vice President-Marketing
Hoffman Laboratories Division
Hoffman Electronics Corp.
Los Angeles, Calif.

Gentlemen: The line which you are taking stresses the vital necessity of placing this transition period in the aircraft industry in the proper prospective.

At Aeronca, we are now referring to ourselves as "pioneers in the fabrication of high-temperature aircraft structure." By this phrase we are not arrogating to ourselves capabilities and activities which are merely in the thinking stage, but are speaking of things which we have done and are actually doing. We say this because we feel that the members of the aircraft industry of today must very definitely clarify their thinking and begin to plan, think, and work far in advance of any remnant of past years.

We believe that those who read AIR FORCE and who analyze the muddled condition in the industry will be successful. Those who are unable to do so will fail.

We feel that you of AIR FORCE are doing an exceptional job in presenting these facts and in making the future of the industry more clear to those who have a tendency to neglect the facts of today. In our industrial affiliation with the Air Force Association we find much of value to us as a corporation and to the executives who receive your material.

May we urge that you continue the outstanding work that you have so well under way.

Edward M. Fickett
Aeronca Manufacturing Corp.
Middletown, Ohio

Gentlemen: Thank you for your July editorial. It is extremely well written and to the point. You are to be commended on its quality.

Robert M. Stanley
Stanley Aviation Corp.
Denver, Colo.

Gentlemen: I want to personally congratulate you on the splendid editorial of July.

The dissemination of this basic and true information is a very useful and helpful contribution at the present time. I am glad to find that AIR FORCE Magazine has taken a positive stand that is spelled out so clearly in your article.

I am sure that the aviation industry and all of us who serve it will applaud this workmanlike job.

Robert W. Martin, Jr., Publisher
Aviation Week
New York, N.Y.

Gentlemen: It is rare indeed that I take the cover off this typewriter to clack out a note of compliment to a colleague for a particularly good piece of writing.

Your editorial in the July issue, however, certainly merits such a cover removal. It is a piece of brilliantly clear thinking on a subject which has induced such a potpourri of muddled comment, and it is written in a simple style that I am sure will guarantee wide readership.

It is also an important piece because, unfortunately, the concept of a space program and a space industry separate from the more immediate considerations of defense technology seems to be gaining momentum, and such a schism, should it ever come about, could only compound the confusion that now exists.

James J. Haggerty, Jr.
Washington, D.C.

Gentlemen: I appreciated the space editorial by John Loosbrock. I am certain the philosophy expressed is shared by many, and it is good to know that AIR FORCE Magazine continues to reflect and stimulate a practical and realistic approach to our future defense needs.

J. H. Sidebottom
Executive Vice President
International Aerocoustics Corp.
New York, N.Y.

On Engineer Manpower

Gentlemen: A vital field of defense reorganization which might well be advanced by AFA is that of standardizing the means of presentation of engineering information, i.e., the standardization of engineering drafting and design manuals. Of some twenty-six or more major prime contractors of aircraft in this country, no two use the same manual.

Daily and Sunday newspapers across the nation abound with ads attempting to woo design engineers from one company to another. Since design manuals outline an engineer's "language," it follows that for a given engineer's talents to be immediately useful to any or all of the major companies, he would need to know at least twenty-six different "languages." This unhappy condition results in extreme confusion in the production of our defense items.

(Continued on page 13)

"...your old men shall dream dreams, your young men shall see visions."

JOEL 11:28

AIR MAIL——CONTINUED

The newly hired engineer must spend a lengthy period familiarizing himself with his new employer's manual. This holds true for the experienced designer as well as for the recent engineering graduate. During this period of reorientation the new employee may turn out a perfectly competent and technically excellent design, and then be required to redo the entire job merely to satisfy the trifling differences of opinion set forth in his new employer's manual. This system—or, rather, lack of system—promotes a terrible waste of our limited pool of technically trained manpower. For several years I have attempted to draw this problem to the attention of Congress, and have been met with nothing but promises.

A standardized drafting room manual, its use an inherent requirement of every defense contract, would:

- Reduce our manpower requirements and cut production lag time.
- Thus afford more modern defense items at a much lower cost.
- Make it easier to place subcontracts with many smaller vendors at greatly reduced cost, since the vendor would not have to raise his price to cover time spent in familiarizing himself with several widely varying types of design information.
- In the event of enemy attack, promote the relocation of personnel in other existing facilities without the necessity of their having to learn a new "language."
- Make it easier, under emergency conditions, for several companies to produce a single defense item, without the necessity of reworking all the original manufacturer's drawings.
- Ensure the immediate usefulness to the industry of graduates of engineering colleges and technical schools, simply by allowing them to study the standardized system in their undergraduate days.

The *creation* and *mandatory use* of a standardized system is long overdue, and any further delay can only compound the expensive misuse of engineering manpower.

L. E. Webb
Westfield, Mass.

It's Austin, All Right

Gentlemen: I read with interest the article "11,000-mph Missile Slowed to a Crawl," and paid particular attention to the photo with the caption "Snaking around a corner in Mobile," on page 81 of your June issue. It seems to me that the photo is of Congress Avenue in *Austin*, Tex., not Mobile,

(Continued on following page)

AIR MAIL—CONTINUED

Ala. At the left can be seen the Scarbrough Building; at the right the Austin Hotel and the Paramount Theater; and in the center, the Texas State Capitol. Perhaps the missile was snaking around Congress Avenue to East 1st Street and then heading out to Bergstrom AFB to nest there for the night.

J. A. del Castillo
Brownsville, Tex.

● *Yours is one of several notes from eagle-eyed readers. We tagged the photo incorrectly, thereby making Austin more mobile than the Atlas.*—THE EDITORS

Nominee Correction

Gentlemen: By this time you have probably received fifteen telegrams and sixty-five telephone calls advising that the July issue, on page 46, erroneously reports that Curt Christensen was nominated as Regional Vice President for the Far West Region, whereas the fact is that the nominee for this office is Harvey McKay of Glendale, Calif.

Julian B. Rosenthal
New York, N. Y.

● *Our apologies to Harvey McKay, who was indeed nominated as Regional Vice President for the Far West Region. And there were sixty-six calls.* —THE EDITORS

Now Hear This:

Gentlemen: Re the first paragraph of Mr. Schenk's editorial in the June issue of AIR FORCE Magazine:

Let's give the AFA members the real truth on the Navy's "civilian arm," the Navy League.

Membership is open to all citizens of the United States *except members of the armed forces* on active duty. Corporate memberships comprise less than one percent of the 22,000 Navy League members.

The Navy League is truly a "civilian" organization and a "booster" for the Navy and thus justly named "The Civilian Arm of the Navy."

Charles M. Featherstone, Jr.
Washington, D. C.

● *The editorial to which Reader Featherstone refers called the Navy League "the Navy's 'self-styled' civilian arm." His letter would seem to confirm and reaffirm this assertion. We at Air Force Association work close to the Navy League, its headquarters being in the same building but one more floor above sea level than AFA.*—THE EDITORS

GO ... NO-GO

Automatic checkout equipment is a project of J. G. Ferguson, Senior Staff Engineer, Stavid Engineering, Inc.

Mr. Ferguson has specialized in the development of frequency standards for Loran and other navigation systems, field transmission measuring apparatus, cathode ray tube displays, and many other test and measuring devices for electronic equipment. His current work at Stavid is to develop equipment for reliability studies and automatic testing of electronic systems. Mr. Ferguson is one of a team of Stavid scientists and engineers who are applying their knowledge ... from concept through production ... to projects of major importance to the defense and progress of our country.

In Stavid's objective engineering atmosphere, scientific, development and manufacturing teams are producing a wide range of electronic systems for all branches of the military. A typical project is the development of an Airborne Search, Bombing and Terrain Clearance Radar System.

OTHER STAVID PROJECTS INCLUDE:

- Shipboard and Submarine Antenna Systems
- Electronic Countermeasures Equipment
- Anti-Missile Systems
- High Power Air Search Radar System
- Radar Toss Bombing System
- Missile Guidance Systems
- LANCE Weapon System

STAVID Engineering, Inc. Plainfield, New Jersey

Imaginative Electronics ...

Modern defense in action:*

PAINTING BY CHESLEY BONESTELL

The threat...mass bomber attack across the

You are on radar duty at America's Dew Line—near the top of the world — and spot a mass of bombers approaching at supersonic speed. Another Pearl Harbor?

Not likely! Your warning signal alerts a defense system which is in being now. Fighter planes streak out in a matter of minutes, armed with rockets like the Air Force *Genie*— a Douglas built missile which can down an entire bomber formation with one blast.

In addition, our Army is ready for any aircraft that filter through with ground-based Nike Ajax and the still more potent, nuclear-armed Nike Hercules—both produced by Douglas. Radar-guided, these missiles can take out fast aircraft despite all evasive action.

It is no accident that we are now ready for attack from

*Defensive systems—Military leaders cannot afford to wait until an enemy strikes. Plans must be in being to meet any contingency . . . any type of attack. And the physical means of meeting this attack . . . vehicles, weapons and trained men . . . must be ready, too!

North Pole

Search radar antenna mounts 24 hour guard at edge of Arctic Circle . . . flashes immediate warning to defense centers

across the North Pole. Such problems were anticipated by our Army, Navy and Air Force planners years ago. Industry became their partner in finding a solution. Douglas, for example, was asked to develop Nike in 1945, and has been working on rockets since before Pearl Harbor—in 1941. This same forethought is in action right now, perfecting the systems of defense needed against tomorrow's aggressors.

Depend on

DOUGLAS

first in Missiles

THE HISTORY OF FORD MOTOR COMPANY IN AVIATION

THE PATTERN OF WAR

It started in September of '39 when Poland was blitzed, and ended on the battleship Missouri in Tokyo Bay in 1945. Six years of hell —and much of it fought in the clouds. This was the new battleground. This was the pattern of the war—bombs whistling down—rows and rows of bombs delivered by hundreds of heavy bombers like the B-24.

It was early '41 when Ford Motor Company cleared the first tree from Willow Run. Little more than one year later the first B-24 rolled off the line. At war's end, 8800 had been built—as many as 462 in a single month.

Heavy bomber production helped turn the tide of war in our favor, and Ford Motor Company is proud to have done its share—just as today we are helping to maintain our nation's defensive force by building the J-57 turbojet engine used in some of the nation's latest jet aircraft.

AE DIVISION

AIRCRAFT ENGINE DIVISION • FORD MOTOR COMPANY

BUILDERS OF THE DEPENDABLE J-57 TURBOJET ENGINE

7401 SO. CICERO AVENUE • CHICAGO 29, ILL.

An Editorial

Force in Being

John F. Loosbrock, Editor

THERE was an invisible umbrella of airpower over the Lebanese beaches when the Marines landed there last month, a fact largely ignored in the torrent of words written and printed concerning the implications of US military intervention in the bubbling Middle East cauldron. The Strategic Air Command dropped no bombs. In fact, as of this writing, no SAC bomber has entered the Middle East air space. But there is little doubt that SAC's marshaled might, on an alert status at bases throughout the Free World, has played and is playing a big role in the calculations of Moscow and Cairo.

Were the Kremlin unconvinced of SAC's current ability to pulverize the Soviet Union it is highly doubtful that the Marine landing force would have been met at the beaches solely by holidaying sun worshippers. Indeed, were it not for the threat of SAC, the landing would have been a suicidal gesture on the part of our own government, an open invitation to begin a war that we surely would lose.

The Middle East crisis serves to point up a fact that is easy to ignore or avoid. These are dangerous times. And our ability to react effectively, diplomatically as well as militarily, in such times of crisis is determined almost one hundred percent by the current condition of our force in being. And the effectiveness of that force, in turn, must be gauged by our ability to put bombs on target regardless of enemy opposition and by our demonstrated willingness to do so should the situation so dictate. Without this ability and this willingness our other forces lose their effectiveness, and we face the Soviet chess masters with only a handful of pawns.

If our action in the Middle East serves merely to focus attention on the problem of the force in being it will have accomplished a most useful purpose. For the force in being has suffered serious erosion, both in relative quantity and relative quality since the end of the Korean War. The nub of it is money, or the lack of it, exacerbated by an unwillingness to make hard-and-fast decisions between competing and expensive weapon systems. The latter, we trust, will be alleviated to some extent by adoption of the major features of the President's Pentagon reorganization plan. At least the machinery will be there, even though wisdom and decisiveness are two qualities that cannot be legislated. And wise decisions can make the money stretch farther.

But the basic problem must be resolved in a bolder approach to defense financing than is now being evidenced on either side of the Potomac.

Secretary of the Air Force James H. Douglas outlined the situation almost two years ago, when he told the American Legion National Security Commission:

"There have seldom been more difficult problems for military judgment than that of phasing new missile systems into a modern Air Force."

Since that statement much has happened to confirm this assessment although little has been done to solve the problem.

Large Soviet satellites and small American ones have orbited overhead. Test missiles have thundered from their launching pads in Florida and in the Soviet Union. Our initial missile units are becoming operational. There have been brave statements that, "New weapons make it possible to reduce the size of the force."

Unfortunately, the real truth is that the *prospect* of new weapons—tomorrow, next year, the year after that—is being used to reduce the force in being of today. In the flash and roar from Cape Canaveral it is difficult for many of our national planners, let alone the bulk of the American people, to realize that for the next five years at least, *perhaps for the next decade,* our security will be centered in conventional manned aircraft of one type or another.

It is a grave temptation, at this point, to play with futures at the expense of the present. Missiles and rockets, satellites and space capsules, are sexier than B-52s or C-133s. And, from a government planner's point of view, they are cheaper than today's weapons, since, beyond development costs, they do not have to be paid for today. What isn't said, of course, is that the development costs go down the drain if the "new" weapons are never bought in quantity.

There are several current examples. The Navaho project was canceled—without an operational missile ever being produced—at a cost of some $700 million. About a billion has been spent on the Snark—truly intercontinental and very nearly operational—but we will wind up with only a handful of a weapon which admittedly depends on mass employment for its effectiveness. The Bomarc program is in jeopardy, on the dubious ground that the antimissile missile is "in the mill."

Granted, there are better weapons in the mill than Navaho, Snark, and Bomarc. But it is equally reasonable to assume that there are also better weapons in the mill than Atlas, or Titan, or Polaris, or Nike-Zeus, or even Minuteman. There will always be better weapons in the mill, even if we're talking about an intercontinental death ray.

This is how the vicious cycle of dealing in futures erodes the combat strength of today. If the trend continues we will never have an adequate force in being, and national security, like 1932 prosperity, will always be "just around the corner."

There are no cheap and easy solutions. The need for superior force in being is a continuing one because the threat is continuous and growing. Even now, Mr. Khrushchev is brandishing his intercontinental ballistic missile, or the threat of its possible existence, as a diplomatic weapon. If, through erosion of our own force in being, we cannot reply to such threats with conviction and determination, this nation will be finished as a major power, and the Free World will go down the drain, with or without open conflict.

We cannot make a choice between today's weapons and tomorrow's. We need today's weapons today and tomorrow's weapons tomorrow. And if the cost of living under these circumstances seems high, there's a cheap alternative—the death of free institutions everywhere in the world.—END

AIRPOWER in the news

Gen. Lauris Norstad, Supreme Allied Commander, Europe.

PARIS

■ USAF's Gen. Lauris Norstad, Supreme Allied Commander in Europe, wears his wings with pride and has unmitigated confidence in airpower. He recognizes that the Strategic Air Command is *the* deterrent. He believes limited war in Europe is highly improbable so long as NATO keeps its shield up and the SAC sword is on the alert.

At the same time, it is impossible to listen to this exceptional officer without wondering how he would make out in a rough-and-tumble debate that challenged his faith in NATO. General Norstad does not anticipate any technical changes or weapon system advances by the enemy that would make SAC ineffective in the next five to ten years. Asked whether he is more concerned about Russian defensive capability than he was a year ago, the SHAPE commander replied: "Not substantially."

The question was put at SHAPE Headquarters outside Paris during an hour-and-a-half press conference with a group of US reporters who had just concluded a 12,000-mile tour of the NATO line from Oslo to Istanbul. We had heard the Danish Foreign Office explain why no IRBM launching sites can be located in that country. We were in Paris the night that De Gaulle came to power, raising both hopes that France will now be able to do more for NATO and fears that she may do less. We visited the Italian and Turkish Air Forces, where the enthusiasm seemed more plentiful than the proficiency. We heard rumblings around the continent about the ferment in Lebanon, most evident at bases in Germany where C-124s had been mobilized for a possible airlift to the Middle East. There was the usual talk about the incompatibility of the Greeks and the Turks. And staggering estimates of the military strength behind the Iron Curtain came into the conversation every time there was mention of Great Britain's cutbacks, the French diversion of troops from NATO to Algeria, or the lag in West Germany. We spent a weekend at the Brussels Fair. The Russians had a Sputnik on display in a gross exhibit that also included sausages, fur coats, and television sets.

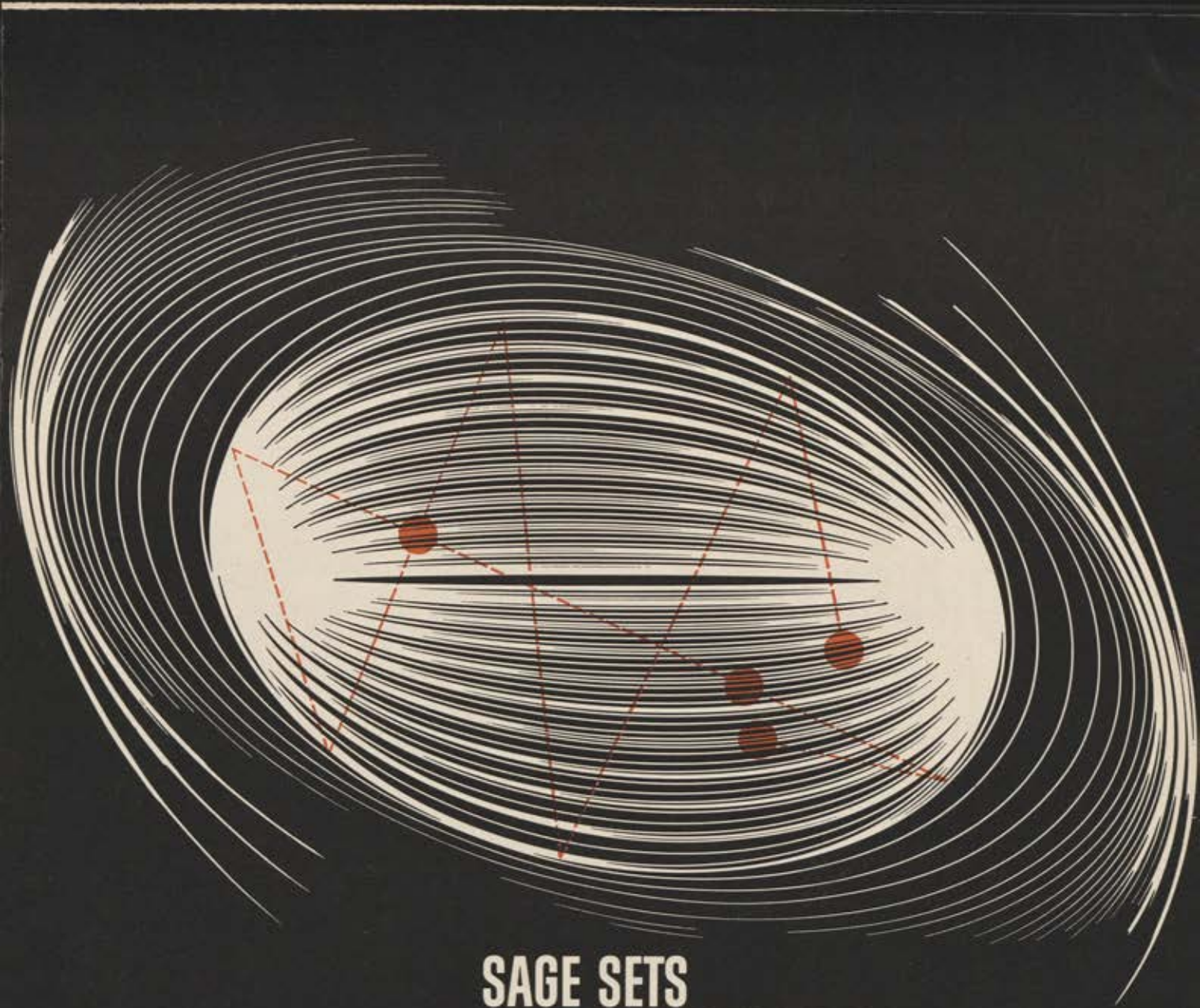
This does not mean the background for General Norstad's impressive briefing negated what he had to say about NATO as the hope of the Western World. Also in Germany we entered the burrow occupied by the Advanced Operations Unit (ADVON) of US Air Forces in Europe, where you realize that Gen. Frank F. Everest's command is combat-ready, unintimidated by the fact that it faces a three-to-one disadvantage in sheer numbers of aircraft that stand minutes away across the Red border.

In Naples, Lt. Gen. Richard C. Lindsay, USAF, Commander of Allied Air Forces Southern Europe, may be on the hottest military seat in the world. He is not squirming a bit; but he wishes he had more modern weapons distributed among the Italian, Turkish, and Greek squadrons now surrounding the lower side of Russia and the Middle East cauldron. The command extends from Vicenza, Italy, to Izmir, Turkey, where the Greeks packed their bags and went home, abandoning their NATO job at that base, because of tension over the serious Cyprus situation. General Lindsay, it should be added, is something of a realist; he believes Russia will have an operational IRBM "soon" and says they are fast improving their defensive capability in terms of both aircraft and electronic equipment.

Against this setting, General Norstad's evangelical approach probably makes political sense, despite the fact that it wrinkles a lot of military brows. In the past three years, this reporter has heard the briefing at SHAPE Headquarters three times and has traveled about 35,000 miles around the territory General Norstad holds under his stewardship. Without his annual summation of the situation, and his reiteration that this unity of fifteen nations is the most important thing in the world, it would be easy to scoff and join the horde that fears NATO is doomed. A year ago the ramps at Izmir were crowded with Turkish F-86s that were aircraft out of commission for parts. In 1958 the situation is vastly improved, but there is no denying that Turkey has a staggering rate of illiteracy and there is small chance that any great number of its aircraft mechanics will ever be able to maintain really modern weapon systems. One reporter rode in two different Ankara taxicabs on which the horns did not work. In each case the driver, baffled by the complexity of reconnecting the button on the wheel, touched two loose wires together whenever he wanted to give a highway alarm. To an American, there is something implausible about the idea of these people firing an IRBM or operating a B-58.

At the same time, does it not lend plausibility to General Norstad's almost mystic faith in NATO as a "partnership of sovereign nations"? The partnership, he pointed out, really is about nine years old, and the people of Europe, in his opinion, no longer see war as an immediate threat. They no longer ask: "When will the war start?" On top of this, the General says, there is European prosperity.

(Continued on page 25)



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AFA Business Sessions	Adolphus
Reserve Forces Seminar	Baker
Ladies Fashion Show	Neiman-Marcus
Reserve Forces Workshop	Baker
Panorama Preview	Auditorium

FRIDAY—SEPTEMBER 26

Space Symposium	Auditorium
Airpower Panorama	Auditorium
Space Age Luncheon	Auditorium
Western Wing Ding	Auditorium

SATURDAY—SEPTEMBER 27

AFA Business Sessions	Adolphus
Briefings for Industry	Auditorium
Luncheon for Industry	Auditorium
Airpower Panorama	Auditorium
Awards Banquet	Auditorium

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(SEE PAGE 244 FOR HOTEL RESERVATIONS)

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In the silent world of electronic defense, there are two ways to move and observe—unobserved. One involves the airborne jamming equipment LMEE is currently producing for the B-52. The other is the new Anti-Jamming techniques LMEE is currently developing for the Air Force to give future weapons systems a high degree of countermeasures immunity. Tomorrow's airborne weapons systems will need secure detection and reliable countermeasures. LMEE is intimately experienced in both. For brochure: "Moves and Countermoves in an Unending Struggle for the Electronic Spectrum," **write Dept. 5A.**

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He cites to visitors the industrial expansion, the new construction. The NATO nations, he says, are moving at a pace "that's damned near American." He traces the beginning of this boom back nine years to the start of the alliance.

Militarily, SHAPE maintains that its forces are three times stronger than they were in the beginning, and whatever lag there may be in our power to deliver the deterrent will be overcome by the IRBM, first slated for operation out of England late this year. Other airpower still is being improved. In the beginning, there were twenty-one NATO airfields, left over from World War II, none able to take jet aircraft. Now there are 160, and sixty more are to be added. There are 9,000 kilometers of new pipelines to serve them with fuel. When General Eisenhower was in charge nine years ago, it took him eight hours to call Oslo on the telephone. Now a call can be made in moments.

These are the concrete things that must be done to keep NATO potent. The power must be maintained, SHAPE's commander says, to keep the Reds from a campaign to "piecemeal us to death." At the same time, there must be a determination to use the power if it should be needed.

WASHINGTON, D. C.

■ On July 15, the day US Marines landed in Lebanon and occupied the Beirut airport, the Air Transport Association demanded that Congress force USAF's Military Air Transport Service to stop competing with the airlines. A few hours later, Gen. Curtis E. LeMay, Vice Chief of Staff, said the Middle East crisis had demonstrated the importance of military airlift and that it was MATS alone that made fast action possible. He said C-124 Globemasters had been ordered to Europe before there was an announcement of US intentions.

"The military airlift system—its capacity and its responsiveness—are essential elements of our military strength," General LeMay said. "Any measure of policy that would impair the combat readiness of MATS would jeopardize the continued security of the United States."

There has been a raging argument over MATS on Capitol Hill for about three years. It has grown hot in the past three months. If our excursion into Lebanon serves no other purpose, it has at least shed some light on the airlift problem.

In the first place, the airplanes sent to Europe with so much dispatch are part of the 146 heavy troop carrier transports transferred to MATS from the Tactical Air Command in July of last year. In the twelve months they have been under MATS, their mission has not changed, and we have heard no growls from the airlines about unfair competition from the troop carrier units. On the other hand, if we understand ATA's brief correctly, the regular carriers are challenging the scheduled MATS runs on what they call the "Government Airline." They charge this effort has grown into the biggest air transport business in the world, overshadowing the commercial lines and hauling traffic that properly belongs to the regular carriers.

"MATS," says Stuart G. Tipton, President of ATA, "has many important military functions which it performs and to which its attention should be devoted, yet it persists in spending a substantial amount of its time, its personnel, and its funds in carrying on an airline type of operation."

There are few people, if any, who will argue that improvement is impossible in the MATS operation. The evil

USAF's Military Air Transport Service, facing stern criticism in Washington, demonstrated the value of readiness with fast Army deployment in C-124s to Middle East.

thing is that the changes may not come about as a result of military necessity, designed to improve our wartime logistics and instigated by the men who know what is needed. After all, MATS has its size and standard of capability fixed by the Joint Chiefs of Staff. At this writing, there appears at least a threat that JCS requirements may face a modification dictated by Congress, which has been getting its information from the commercial airlines.

In a presentation to the Senate Interstate and Foreign Commerce Committee, which staged one of the half-dozen MATS investigations held in Washington this spring, Mr. Tipton made mountains out of a number of molehills. He is critical of the fact that MATS passenger flights have stewardesses, inflight meals with paper napkins, baby services, and other devices similar to commercial airlines.

More important, to the Air Force, is the fact that there is an experienced crew in the cockpit getting utilization out of the airplane. MATS represents airlift in being—airplanes and crews and ground support and bases available even before needed.

The question of how well these particular aircraft, now used for the MATS airline that has ATA in a state of high excitement, will fit into a real wartime logistics system has not been debated. It should be debated, and stewardesses and paper napkins have nothing to do with the argument. AIR FORCE Magazine has emphasized for years that air logistics needs the same kind of imaginative thinking we have put into delivery systems for bombs. In December of 1954, the Air Force Association held a Logistics Conference, attended by 500 of its Industrial Associate members. What was needed, the conference was told, was a transport that will carry 100,000 pounds from the US to overseas bases. Although the aircraft had no designation, it was the C-132 we were talking about, and Donald Douglas, Sr., himself made the presentation. We still don't have the C-132, a victim of last year's Pentagon economy effort. The airlines don't want the C-132. But even Mr. Tipton, who wants MATS to get out of the airline business for selfish reasons, says MATS should "concentrate on correcting the deficiency in heavy cargo airlift capability."

Lt. Gen. William Tunner, boss of the Berlin Airlift—"Tunner Means Tonnage"—is taking over as commander of MATS this month. He is a competent officer with a claim to fame in the field of air logistics. If Congress handicaps him by handing down restrictive rules dictated at least in part by the commercial carriers, airpower will suffer.

(Continued on following page)

■ After a wave of near hysteria, in which the Air Force was accused of "criminal negligence," "hot rodding," and having pilots of "no military use" because they are more than thirty-four years old, a semblance of common sense has been restored to discussions about air safety. A major contribution was made by Gen. Curtis E. LeMay, Vice Chief of Staff, who told the National Press Club that the Air Force wants safe flying, that its flying is essential to defense and, most important, that the airways are *federal* airways, not *civilian* airways. As a result of midair collisions, something is being done about traffic control. A new Federal Aviation Agency is being set up with a single administrator, who will have a military deputy. For once, it looks as if there will be a boss who has both responsibility and authority. He will start his job with an air traffic control system that can handle 17,000 out of 200,000 airplane flights each day.

■ If there is going to be an end to critical reports on the research and development situation, nobody has heard about it. The newest dissertation on What's Wrong with R&D, joining the shelf with volumes signed by Riehlman, Ridenour, Doolittle, Lovelace, Hoover, *et al*, was compiled by an *ad hoc* committee headed by H. Guyford Stever, the MIT professor who once served as Chief Scientist for USAF. The study was made for the Scientific Advisory Board on orders from Gen. Thomas D. White, Chief of Staff.

The results are highly commendable but the penetrating reader, if he has any current Pentagon background, is going to wonder how the document ever got loose without censorship. Policy censorship, that is, the kind that results from the Murray Snyder Thought-Control Program. For here, in forty compact pages, is a blistering attack on the budget limitations and administrative controls imposed on Air Force R&D programs since early 1953. If a four-star general wrote these things in a speech he never would be allowed to get on the podium. Here are the heresies:

- Decision to cut costs by putting greater reliance on modern weapons and technology required higher R&D budgets, but they were reduced.
- Strict administrative controls have bogged down all decision-making machinery.

"The committee is convinced," the report said, "that a principal reason for the long development cycle . . . is this failure of each echelon and organization to trust lower echelons and other organizations, and [the refusal] to discipline itself to do its own job well and not to meddle with others. . . .

"R&D managers must be selected with competence as the first criterion, they must be given the required authority and resources, they must be supported in their decisions, and they must be trusted to do the job."

And then: ". . . the committee wishes to underscore its belief that the *needed reforms must begin at the very top in the legislative and executive branches of the government*, as well as within the Air Force itself."

The Stever committee's assignment actually was aimed at updating the Ridenour report that resulted in the formation of the Air Research and Development Command on January 23, 1950. Both General White and Lt. Gen. Samuel E. Anderson, present ARDC commander, are expected to endorse the new findings. They will carry out the recommendations as far as possible within Air Force capability to set its own house in order.

But there are other changes that must be made, outside the Air Force bailiwick. Here the problem is monumental, as was testified with vehemence—long before the Russians launched their first Sputnik—by a man named Trevor Gardner.

■ The Defense Department budget for fiscal 1959 is being combed by Congress. The pace set by the House Appropriations Committee indicates there will be increases for some items, not cuts alone. The Senate was doing serious work on the subject when the Lebanon crisis came to a head, creating an atmosphere that may make economies look less important than security. In the lower house, the committee added $75 million to the requested USAF funds for Minuteman, the solid-fuel ICBM, and $48 million to speed equipment of the Strategic Air Command with the Hound Dog air-to-ground missile. The committee eliminated an item of $21.8 million for ten jet executive-type airplanes and slashed $200 million off the budget request for USAF spare parts. Meanwhile, at the Pentagon, there is an effort under way to dispel fears of a stretchout or failure to pay the bills, as was experienced a year ago. Fighting a war in the Middle East would so upset all programs that admonitions, like plans, would have to be forgotten.

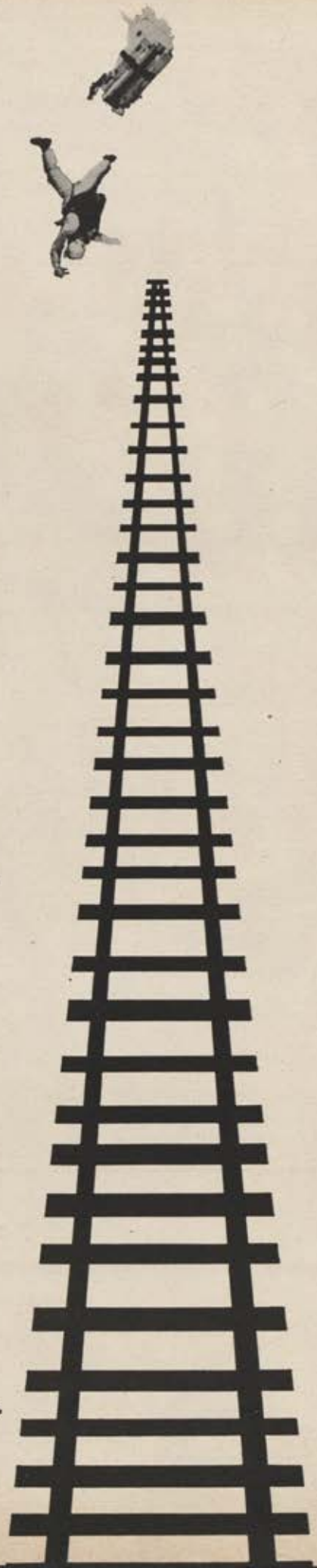
■ The National Aeronautics and Space Administration has started its career. It stands to the credit of Congress that it turned a deaf ear to the cultists who wanted to drop the National Advisory Committee for Aeronautics with a loud thud. NACA, our biggest and only complete repository of talent, facilities, and knowledge, will be the foundation block for the new agency.

For industry, feature of the final law is a fully acceptable provision to guarantee that an inventor or his employer will retain rights and interests when it is fully justified. At the same time, government rights are protected when an invention results from work which has been done on a contract. There are incentives and cash rewards provided for those who make significant contributions to the space program.

There will be a nine-man National Aeronautics and Space Council, the very name of which recognizes that space is an extension of atmosphere. Like the National Security Council, it will be advisory to the President. In addition to the President, members will be the Secretaries of State and Defense, head of the Atomic Energy Commission, three outstanding civilians, one other appointee from government, and the NASA administrator. The administrator is expected to be Dr. Hugh L. Dryden, longtime boss of NACA.

■ The Administration's Defense Reorganization Act apparently will fall short of what the White House wants, but it will make it clear that the Secretary of Defense runs the show. The Air Force Association's two-year-old argument for a single service may have made a little headway, but it is hard to measure. The Senate Committee on Armed Services suggests that the law provide for an Army, Navy, and Air Force that are "separately organized." These words would be substituted for "separately administered." The committee hopes this will help make it clear that the services have to do as they are told. The most recent draft also guarantees continued existence of the Marines and Navy aviation. Despite presidential objections, Congress seems intent to keep what Mr. Eisenhower calls "legalized insubordination." They are giving the service Secretaries full freedom to bring their gripes direct to Capitol Hill, insuring that freedom in the law.

—CLAUDE WITZE



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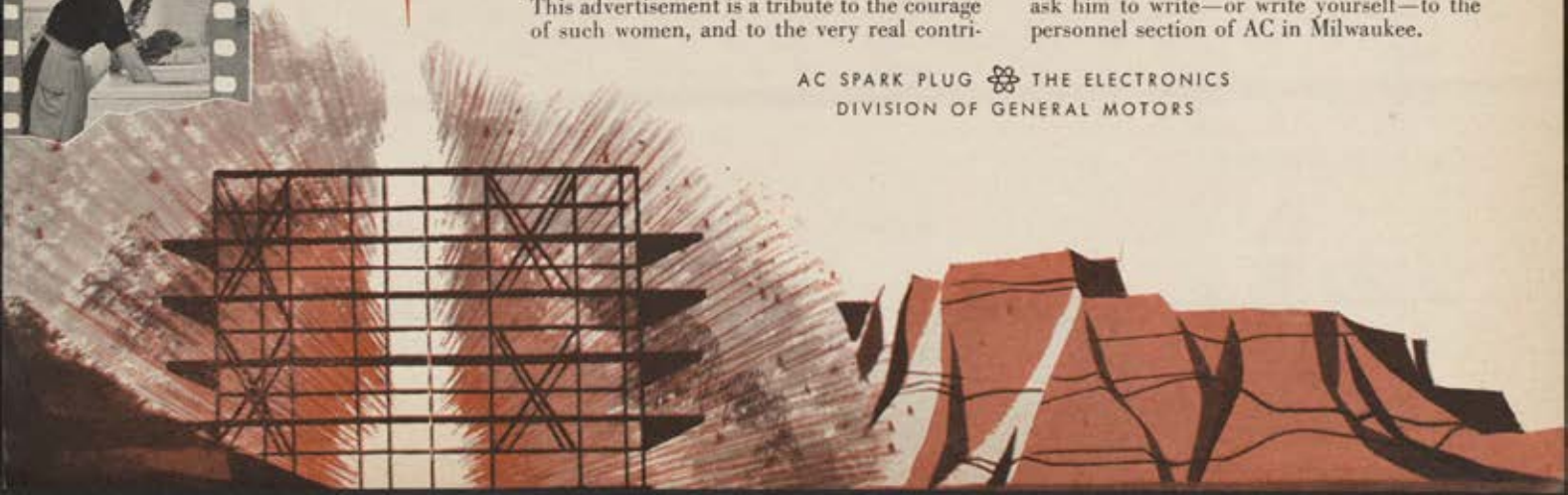

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SHOOTING THE BREEZE

WITH THE EDITORS OF AIR FORCE MAGAZINE

The tragic crash of the KC-135 at Westover AFB, Mass., in June, took the lives of fifteen persons, two representatives of the National Aeronautics Association, several members of the Air Force, and six newsmen. Among the latter were two good friends, Bob Ginsburgh of *US News & World Report* and Bob Sibley of the Boston *Traveler*. Like everyone else on the ill-fated aircraft, they were doing a job, and died in the doing of it, in the finest tradition of their profession. Gen. Thomas D. White, Chief of Staff of the Air Force, put the tragedy in context in a moving statement of the Air Force's feelings, which was read at memorial services conducted at Westover's chapel after the crash:

"The mission on which these men had embarked was a routine one in every respect, except that it was also a demonstration: it was a demonstration of a new capability of the United States Air Force as one of the principal guardians of world peace. In order that people of the United States and of other nations may know and understand the steps by which we are diminishing the time and space that separate the nations of the Free World, we have often shared these notable experiences with men who are trained to observe and report them. As we share with these men the conquests of time and space, they share with us the dangers of that conquest.

"This unfortunate accident serves as a reminder to all of us that the men who observe and report the achievements of science and skill that are so necessary to our survival, are partners in these achievements. They are also partners in the sacrifices that sometimes are the price of progress. The men who represent the world's need to know, and who in peace and in war share the dangers and the fate of our men in uniform, are equally worthy of the nation's gratitude."

We agree entirely.

☆

This is the first opportunity we've had on these pages to welcome aboard AFA's new Director of Military Relations, Ed Wilson, who joined the Association in that post in mid-July. In his assignment, Ed will be also serving as Assistant for Reserve Forces to AFA Executive Director Jim Straubel.

Ed comes to AFA with a solid background in aviation and military affairs. A native of New Jersey, he flew B-24s with the Fifteenth Air Force in the ETO, serving as squadron and group operations officer. During the Korean conflict, he was squadron commander and deputy group commander of B-26 night intruder units. He piled up an excellent combat record, including a Silver Star, two DFCs, and eight Air Medals during active service.

Before and after his Korean duty, Ed served in the Pentagon for a total of seven years in the legislative liaison field, where he developed high skills in Air Force policy. As Director of Military Relations, Ed will be closely following matters in Air Force areas. He retired from the Air Force last year as a full colonel and senior pilot.

☆

Thirty years of distinguished service to the nation and the Air Force came to an official end on June 30 when Lt. Gen. Donald L. Putt retired as Deputy Chief of Staff, Development. We hate to see him go, a good friend and one-time contributor to this magazine. His four-part series, "The Four Freedoms of the Air Force," which ran in AIR FORCE from November 1951 through February 1952, is still a basic document for people interested in the vital business of research and development.

General Putt has the inquiring mind of the true scientist, and he put that intellect to work effectively in such Air Force posts as Vice Commander, later Commander, of the Air Research and Development Command, as Military Director of the Air Force's Scientific Advisory Board, and, of course, in the post from which he retired. He received

(Continued on following page)

Ice is nice but the high-powered air conditioner pretty Judy Mowbray is demonstrating is far more effective in keeping the crewmen of Air Force B-52s comfortable as they streak through the stratosphere. The conditioner, which does the work of many, many piles of ice, is manufactured by the Stratos Division of Fairchild Engine & Airplane Corp. Judy is one of the folks who build the coolers.

many honors during his distinguished career, the latest an hononary fellowship in the Canadian Aeronautical Institute. He is spending the first two months following retirement as special consultant to the National Science Foundation with the Woods Hole Study Group sponsored by the foundation in conjunction with the Scientific Advisory Board. We hope it will be the first of many such assignments.

Lt. Gen. Donald L. Putt, retiring Deputy Chief of Staff, Development

☆

As one friend left, we were pleased to note the return to Washington of another old friend, John A. McCone of Los Angeles, who succeeds Adm. Lewis Strauss as Chairman of the Atomic Energy Commission at a time when that important agency faces new and grave challenges.

Mr. McCone has proved in the past to be a public servant of the highest caliber as well as a businessman of demonstrated acumen, and if his record is any indication, the country is fortunate to gain his services.

Although a Republican, he served the Truman Administration with distinction, first as a member of the Airpower Policy Commission under Thomas K. Finletter and later as Under Secretary of the Air Force under the same boss. As long ago as 1950, he recommended that the nation's then-puny missile program be put under one head with "absolute power over the entire effort."

It's still a good idea.

☆

"Demonic but beautiful" maidens who soared high over the battle, watching the struggle, were the "Valkyrie" in Norse mythology. The name was chosen for the new Air Force B-70 chemical bomber in a SAC contest, in which 20,000 airmen took part. T/Sgt. Francis W. Seller, March AFB, Calif., was winner.

☆

Back in 1952, T/Sgt. Samuel L. Pate began his Air Force career. The father of three sons and three daughters, he never dreamed then that in a few years his would be about as near as you can get to an all-Air Force family.

Today, two sons are airmen (the third is in school and planning to join the Air Force) and all three daughters are married to airmen.

Since 1942, it's been nip and tuck for Sergeant Pate, who's in food service at England AFB, La., to follow the Air Force travels of his brood. Son David joined up in 1945, later experienced the dubious pleasure of pulling KP under his dad. Son Lloyd enlisted in 1951. Not long after, he joined dad's squadron, then in Japan.

Meanwhile, in the years since his girls have been wedded to Air Force men—stationed overseas—the Sergeant, still keeping the troops well fed, is worried (only mildly) about one item: both his Air Force sons are close to the day when they'll outrank dad. Pappa Pate, in a frozen career field, muses that somehow it isn't right to "raise 'em and then get outranked by them too."

☆

It's fun to note this zany, yet restrained, item from the RCAF's *Roundel:*

THE STAFF MAN

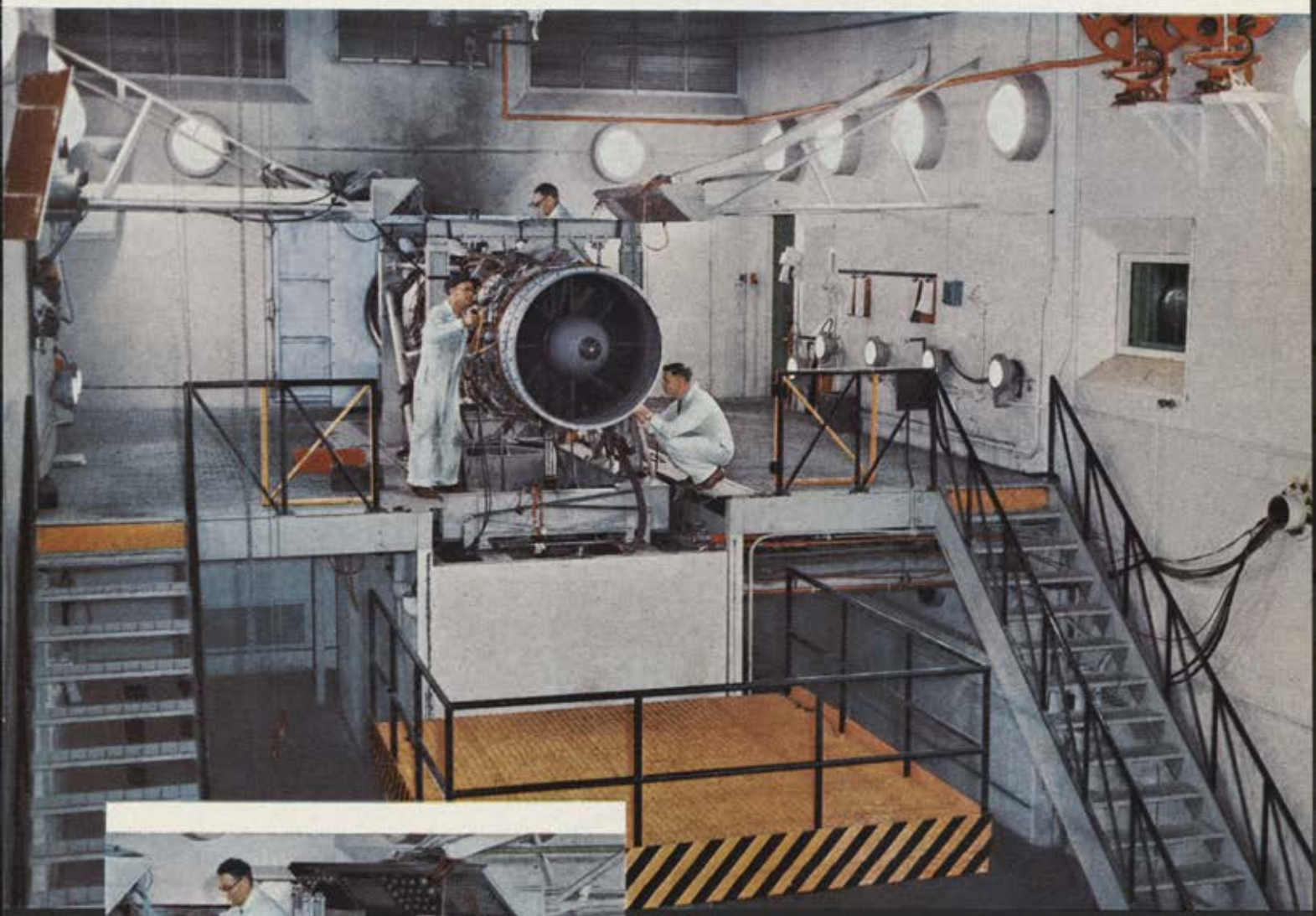
If he talks on a subject—he is trying to run things.
If he is silent—he is dumb and has lost interest.
If he is usually at the office—he should get out more.
If he is out when you call—he isn't on the job.
If he is at home at night—he is neglecting outside contacts.
If he is not at home at night—he must be out carousing.
If he agrees with you—he lacks originality.
If he does not agree with you—he is ignorant.
If he seems too busy for casual talk—his job has gone to his head.
If he engages in casual talk—that's all he has to do.
If he can't give you an immediate answer—he's incompetent.
If he can give you an immediate answer—that's what he's paid for.
If he appears cordial—he's playing politics.
If he appears aloof—he should be trimmed down to size.
If he has an opinion—he is bull-headed.
If he explains both pros and cons—he's pussyfooting.
If he is on the job a short time—he lacks experience.
If he has been on the job a long time—he lacks new ideas.
If he is well dressed—he thinks he's a big shot.
If he isn't well dressed—he's not a proper representative.
If he takes a vacation—he has been on one all year.

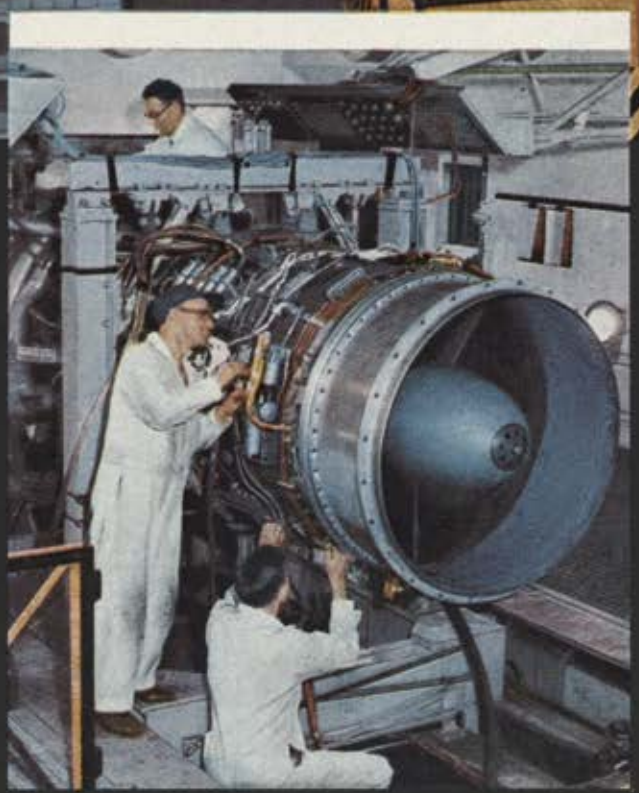
☆

REUNIONS . . . If you're a **'33 Kelly Field grad,** drop a note to Col. B. R. Baldwin, Hq., Fourteenth AF, Robins AFB, Ga. He's planning a reunion to be held in Dallas, Tex., during the AFA 1958 Convention there, Sept. 25-28. . . . Annual reunion, **Rich Field Veterans Association,** Aug. 15-16, Rice Hotel, Houston, Tex. Write William E. Beigel, 312 Northcrest Dr., Kansas City 16, Mo.—END

"Sarge, did you ever have one of those days when nothing seems to go right?"

Rehearsal for Mach 3 at 100,000 feet





IROQUOIS development engines have completed over 5,000 hours of bench running in these test cells at Malton and in flight tests.

Over 100 hours were accumulated during a recent series of test runs at the NACA Lewis Flight Propulsion laboratory, Cleveland, Ohio.

Further tests will be conducted in Orenda's new high altitude facility to investigate IROQUOIS performance over the widest range of speed and altitude.

IROQUOIS test results at NACA Lewis Flight Propulsion laboratory, Cleveland, U.S.A.

1. Probably highest dry thrusts recorded in North America for turbojets.
2. Successful operation under sustained high inlet temperatures.
3. Normal relights up to 60,000 feet, the limit of the tunnel, proved effectiveness of Orenda patented method.
4. Altitude handling improvements incorporated within two months.
5. Thrust/weight 5:1.
6. Thrust—in the 20,000 lb. class (without afterburner).

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AIR FORCE
AUGUST 1958

AIR FORCE MAGAZINE

Proudly presents

in its 1958 Anniversary Issue

AN

AIR FORCE ALMANAC

Dedicated to

THE FORCE IN BEING

and the devoted Air Force personnel who man it

TODAY'S Air Force is a vast organization, so complex that its scope and variety of tasks are difficult to comprehend. In this Anniversary Issue of AIR FORCE Magazine we have attempted to cover the manifold activities of the Air Force of today—the force in being on which this nation's security depends—in compact, easy-to-follow fashion. Nowhere else, to our knowledge, is so much information on the Air Force to be found in one place. We wish to take this opportunity to acknowledge the splendid cooperation received from Headquarters USAF and the headquarters of the major Air Force commands, which have made possible this Air Force Almanac.—THE EDITORS.

THE AIR FORCE JOB AND HOW WE'RE DOING IT

By Gen. Thomas D. White
CHIEF OF STAFF, UNITED STATES AIR FORCE

LAST October, when the Soviet Union launched the first of its several satellites, reactions in this country were mixed. They ranged from surprise and embarrassment to consternation and panic. In some quarters, confusion seemed to be the order of the day. Common sense and intelligent evaluation were discarded and emotion took over. For example, articles soon appeared in newspapers and magazines throughout the United States to the effect that the flying Air Force was finished and the capability to engage in "push-button" war was around the corner. Other self-appointed "savants" expressed the opinion that our modern military forces were no longer of deterrent value and that the Free World was doomed. Actually, the great Soviet technical achievement was a challenge—one that knocked the props out from under any existing complacency in this country. It did not negate the strength of this nation's modern military airpower, but it did serve notice that additional effort was required if United States airpower was to remain a strong guardian of freedom.

The last ten months have given us the opportunity to further assess the situation. As this is being written, the Army's Explorers and the Navy's Vanguards are in orbit. Admittedly, they are not as large as the Russian satellites, for they are but small tokens of the scientific know-how that exists in this country. It is pertinent, however, to point out that the United States satellites are scientific products designed in accordance with plans for the International Geophysical Year. They are not the result of intense military application.

Some people wonder why the USAF has not placed a satellite in orbit. The answer is quite simple. The Secretary of Defense decided that Air Force efforts, experience, and capabilities should be oriented entirely toward the development of military capabilities which will assure that we can extend our air superiority into space. The triad of science, industry, and the Air Force is doing just that.

The Air Force, of course, is interested in "pure" science and the benefits that new discoveries in space could bring to everyone. But, the Air Force mission in space is first a military mission—one which requires us to develop and produce militarily useful vehicles. Obviously, fulfilling this requirement will take added time and effort and will lag behind the purely scientific exploratory vehicles.

The primary threat facing the free nations is Soviet airpower, which is being expanded rapidly, into aerospacepower. To counter this threat, our country needs an Air Force second to none—and one which is capable of effectively performing eight major tasks. We must:

1. Maintain a deterrent to general war.
2. Maintain sufficient power to defeat the enemy if general war should be forced upon us.
3. Maintain a deterrent to local wars.
4. Possess a local war capability.
5. Participate in the cold war.
6. Employ our airpower for peaceful purposes.
7. Keep our forces modern.
8. Expedite research and development for our forces of the future, including those vehicles required for our future in space.

Each one of these tasks requires close coordination with the other services, with industry, and with government as well as the understanding and support of all Americans. Furthermore, each task represents a continuing requirement which must be accomplished concurrently with each of the other tasks.

General War

There is no threat to the security of the United States that can remotely compare with the ever-present possibility of general war. Nuclear weapons coupled with advanced delivery systems emphasize that general war would be a struggle for survival in near absolute terms.

(Continued on following page)

The military posture of the Communist bloc is a clear example of dedication to the principle of overwhelming force. They have a large air-nuclear capability—modern and effective—backed up by very sizable conventional forces. They can mount a two-sided offensive in peacetime. Their air-nuclear striking power can be used for atomic blackmail, and Communist bloc conventional forces can be used as pawns in lesser conflicts.

Various arguments have been advanced to the effect that the general war threat is lessening. One argument is that relative nuclear parity between the great powers will act as a constraint on general war. There is constraint on general war, and in fact on all conflict, when nuclear weapons are clearly understood to be involved. But this constraint, derived from strong nuclear capabilities, is a far cry from "mutual deterrence."

When it comes to the use of aggression as a national instrument, there is no similarity between the United States and the Communist bloc. We will not enter into conflict except in defense of ourselves or the Free World. The Communist bloc will aggress whenever and wherever the opportunity looks profitable. We did not aggress while possessing nuclear monopoly or while we had clear superiority. Communist aggression in Korea and Hungary demonstrated to the entire world that they are under no such moral restraint.

There should be no doubt in anyone's mind that, ever since World War II, the United States Air Force with its long-range nuclear striking power has served as the Free World's deterrent to general war. It so serves today and will continue to do so if it is given proper support and kept modern.

The primary deterrent power of the United States exists in our Strategic Air Command. This is truly a formidable force. Its medium and heavy bombers supported by its tankers and a worldwide system of air bases are capable of carrying nuclear weapons of varying yields anywhere on the globe. The Strategic Air Command's main offensive punch is contained in its B-47s and B-52s. The B-36s are being phased out of the operational inventory as B-52s become available. Our first supersonic bomber, the B-58, is now in production and undergoing operational evaluation tests.

The capability of the Air Force's Tactical Air Command and theater air forces is another important element of United States deterrent power. The ability of these forces to react quickly with great flexibility and mobility, plus possession of high-performance aircraft with nuclear capabilities, gives them tremendous punch.

If deterrence fails, for any reason, and general war does occur, I have confidence in today's capability to win the air battle. There are many reasons for this. As I have mentioned, our offensive forces are formidable. We are dispersing our strategic forces and constructing special alert facilities to improve reaction time. Our goal is to have a physical setup whereby one-third of the strategic forces can become airborne and on their way to enemy targets with fifteen minutes of initial warning. This is a big improvement from the long time it took to launch, assemble, and send on their way the huge B-17 and B-24 formations of World War II. Coupled with this physical setup is the fact that our offensive forces know their job, know their equipment, and possess a background of long experience in the conduct of strategic air warfare. Close control and coordination of the attacks of both strategic and tactical forces will permit the concentration or dispersion of effort as required. The wide range of tactics which could be employed and the variety of our nuclear delivery capabilities would present an enemy defense with some serious problems.

Closely allied to the reaction capability of our offensive forces is the air defense buildup now under way. The main portion of our Distant Early Warning Line (DEW Line) was completed July 1, 1957. The Aleutian extension to this line is under construction, and contracts for constructing the eastern extension have been accomplished. This early-warning network, in combination with the North American radars and our Semi-Automatic Ground Environment (SAGE) system, will provide an excellent warning and control system for defense against jet aircraft. Prompt congressional action on our fiscal year 1958 supplemental budget request also has enabled us to expedite the development of our ballistic missile early-warning system. Adequate warning will enable us to launch a heavy retaliatory strike and precludes our forces' being caught on the ground. Thus, adequate warning is also a key element of deterrent capability.

Our manned interceptor force now contains F-86Ls, F-89Js, and the supersonic F-102s and F-104s. All of these aircraft are responsive to the SAGE electronic-equipped control system. The first sector of SAGE became operational July 1, 1958. Effective air-to-air missiles are available for use in air defense against manned jet bombers. The Falcon radar-controlled and the Falcon infrared missiles, the Genie or MB-1 nuclear weapon, and the Sidewinder, which was developed by the Navy, and which the Air Force is using, are now in our combat units. Another very important air defense weapon soon to be added to the Air Force arsenal will be the Bomarc. This is a long-range surface-to-air missile which has attained excellent accuracy, high altitudes, and extended ranges in tests.

The constant readiness of our offensive forces, our improved alert and dispersal posture, the erection of an effective warning and control system, and the employment of high-performance air defense weapon systems are all important segments of our total airpower strength. A necessary ingredient of each of these segments is well-trained and dedicated people.

Personnel have been, are, and always will be the Air Force's most precious asset. As all of us know, weapon systems are no better than the people who develop, maintain, and operate them; and the United States Air Force has made great strides along the road to a truly professional force of high caliber. It is my earnest hope that the military pay adjustment legislation recently enacted will result in better retention rates, increased interest in career military service, and over-all improvement in our efficiency and effectiveness.

The question of what effect the integration of missiles will have on the makeup of our forces is frequently raised. The value of missiles as an important adjunct to the piloted force should be obvious. Reliable missiles will enable the Air Force to do certain jobs better because of their alert potential, quick reaction time, and their reduced vulnerability to enemy attack. As the missile systems are proven out, they will be used to augment our piloted forces. When we learn more about them, they will undoubtedly replace a portion of the manned systems as we know them today. It is difficult, however, to forecast what percentage of our forces will be missile equipped. Many factors have to be considered, such as reliability, accuracy, warhead weight, carrying capability, reaction time, cost, and the type of targets to be attacked. As far into the future as I can see, I feel we will have forces composed of both piloted and unpiloted delivery and reconnaissance systems. Such forces will add much to our flexibility and effectiveness and complicate the enemy's task greatly.

In looking into the future of offensive forces, I feel that real promise lies in the development of long-range airborne missiles which can be launched against targets from bomber aircraft. Successful development of such missiles with ranges on the order of 1,000 miles and the use of high-performance, long-endurance chemical or nuclear-powered bombers could give us the capability to maintain a constant patrol of the Free World skies. Such aircraft could fly at long distances from enemy territory, but still provide almost instantaneous reaction to aggression. A constant airborne patrol augmented by ICBMs and IRBMs launched from land and sea bases would represent a truly flexible force that would be practically impossible to neutralize, even in a surprise attack.

As far as air defense is concerned, missiles such as the Bomarc, which I previously mentioned, show great promise. However, range is still a most important factor. The ultimate in air defense would be to destroy the enemy forces before they get off the ground. The next best air defense is to attack the enemy forces immediately after they have been launched or at least as far from the target area as possible. To do this, we need very long-range missiles and very long-range interceptors. Both are under development. The F-108, now under development by North American, will be our first truly long-range interceptor. The F-108 will far exceed anything we have previously known in speed, altitude, and range.

Local War

There is no way of knowing how successful Air Force deterrence of local wars really is. Deterrence—when successful—is never spectacular. The number of local wars which may have been deterred and the number of local wars which may have been prevented from developing into general war—because of the existence of strong United States airpower—will always remain an unknown quantity.

Actually, it is very difficult to define a local war. In fact, anything less than a general war has been given many names such as local, limited, small, brush fire, and police actions. The Air Force has never claimed that it possesses the power to deter every type of localized incident. We know what our capabilities are—and so do potential aggressors. And in a potential aggressor's knowledge of our capabilities and our national determination to use them, if necessary, lies a great part of the deterrent.

A primary Air Force deterrent to local wars is contained in our tactical forces—the Tactical Air Command and theater air forces. While the planned reduction in our over-all force structure to 105 wings by the end of fiscal year 1959 is mainly a reduction in the size of these tactical forces, I feel that their over-all combat strength will be at least equivalent to current strength. This is because higher-performance aircraft will be available, firepower capabilities have increased, and inflight refueling techniques have been brought to a point where greater flexibility and mobility is a reality.

One of the most important features of our tactical force's usefulness as a deterrent, as well as its capabilities in a local war situation, is its ability to react quickly. We have developed a procedure to provide composite air strike forces from our tactical forces which are capable of extremely fast reaction. Weapons available for these composite strike forces include all types in Tactical Air Command's arsenal. Such a force might contain tactical bombers and fighters, transport aircraft, and reconnaissance aircraft, although the composition could vary widely in accordance with the situation and objectives. These forces are equipped and supplied to operate promptly upon arrival at destinations far distant from the United States.

There must be a calculated expectation of probable success in any aggressive move. If a composite air strike force can get to a trouble spot fast enough, there is a good possibility that the aggressor either might not make a move *or* might discontinue further aggression—because the probability of his success will have diminished. Should fighting be involved, however, a small group of men and aircraft, acting under a central control, can deploy and strike with tremendous effect against selected targets. The employment of such forces represents true application of the principle of "economy of force."

The composite force concept has been subjected to extensive and realistic training for several years. In many practice exercises and deployments our tactical fighters and bombers have demonstrated the speed with which they can deploy their heavy firepower capability to remote spots in the world. For example, flights of F-100s have landed in Europe and North Africa within eight hours after leaving Langley AFB, Va., and B-66s have flown nonstop from George AFB, Calif., to the Philippines in less than eighteen hours.

Backing up the local war deterrent capability of the Tactical Air Command and theater air forces is the Strategic Air Command. The Strategic Air Command plays a large part in local war deterrence just by being in existence. I feel that Korea was a good example of this. The war in Korea remained a localized conflict primarily

(Continued on following page)

because of the demonstrated and in-being capability of our Strategic Air Command. SAC forces can be used in a local war situation as was demonstrated in Korea. This doesn't mean, of course, that the entire force has to be utilized. Any part of the strike capability can be employed, depending on the situation and national objectives. Thus, a great part of our local war deterrent and our local war capability exists in our general war capability. If we don't maintain the latter, we cannot possibly have the capacity to handle local situations.

A large part of our local war deterrent strength and our local war capabilities is also tied into the ability to operate in conjunction with the other services. In addition to performing its first-priority counterair function, our tactical air forces are responsible for attacking tactical ground targets, interdiction operations, reconnaissance, support of ground operations, and short-range airlift of Army troops. The tactical airlift function is one which is not generally understood. The troop carrier aircraft possessed by our tactical forces are relatively short-range transport aircraft. They are the ones that are used to airlift troops over comparatively short distances and which can be used in paratroop and resupply operations. The troop carrier forces contained in the Air Force Reserve units, like those in the Tactical Air Command, are all short-range transport aircraft.

Transoceanic or strategic airlift, necessary to move troops and heavy equipment over long distances, is a job for the Military Air Transport Service (MATS). Backing them up is the emergency airlift capability we have in the Civil Reserve Air Fleet (CRAF). To airlift large numbers of troops and equipment over long distances takes a fantastic amount of airlift. An airborne division, with its equipment, totals many thousands of tons. A little imagination and some simple arithmetic shows that it would take literally hundreds of our largest aircraft to airlift such a division and its equipment simultaneously. It also should be remembered that airlift is not solely a question of numbers of aircraft and crews, but of route capabilities measured in terms of landing fields, fuel storage, refueling units, and operations and maintenance facilities.

In recent years, there has been a great deal of discussion concerning the amount of airlift which the USAF can provide in an emergency. This is understandable because all forces and all commanders are concerned about support and, in many cases, airlift is the quickest and most economical means to transport men and equipment. An unlimited amount of airlift would certainly be desirable, but not very practicable. For very obvious reasons, there has to be a limit on all types of forces. These limitations, in turn, require the exercise of judgment as to where, when, and how the available airlift will be employed. There were many examples of this during World War II. Perhaps the most outstanding occurred in France during the summer of 1944, when commanders in Field Marshal Montgomery's 21st Army Group on the north and General Bradley's 12th Army Group to the south were all clamoring for airlift support. Gen. Dwight D. Eisenhower, in his book, *Crusade in Europe,* wrote:

"When action is proceeding as rapidly as it did across France during the hectic days of late August and early September every commander from division upward becomes obsessed with the idea that with only a few more tons of supply he could rush right on and win the war. . . . As we dashed across France and Belgium each commander, therefore, begged and demanded priority over all others and it was undeniable that in front of each were opportunities for quick exploitation that made the demands completely logical."

In this case, a top-level decision had to be made as to where to best use the available airlift. There was not enough to furnish major support to all.

Cold War

Air Force capabilities have also proven very useful in the cold war. There have been many examples. The Berlin Airlift was one. Another was the action our government took when a large group of Moslems, making a pilgrimage to Mecca, was stranded in Beirut in 1952. Moslems look forward all their lives to making this very important pilgrimage. In this particular year, an unusually large number was waiting at the Beirut airport with insufficient planes to go around—and time was running out. The Air Force sent fourteen C-54 aircraft from Germany to Beirut and transported 3,763 Moslems to within a few miles of their holy city. There is no doubt that these flights made many friends in the Middle East. In fact, the Beirut press observed: "We are glad to acknowledge this humanitarian mission made possible through the American government. . . . God, the Almighty, will certainly recompense this mission."

Another example of the Air Force's cold war capability is evidenced in the deployment training of its composite air strike forces which I mentioned earlier. These flights show the whole world how quickly such forces could reach emergency areas anywhere in the world. I feel sure that the existence of this capability bolsters the morale of free nations and raises their confidence in the strength and ability of the United States to fulfill its commitments.

Airpower for Peaceful Purposes

When the Air Force is discussed, its capabilities for promoting peace are not normally recognized as readily as are its capabilities for deterring war. However, over the years, the Air Force has employed its airpower as a constructive instrument for peace in many ways. There are many examples. For instance, people in the United States, and in many foreign countries, benefit from the work of the Air Weather Service through the international exchange of information used in forecasting storms and other weather conditions. Our weather reconnaissance aircraft fly about 15,500,000 miles a year all over the Free World. A single one of our units made 135 typhoon penetrations in 1957. Another good example, of course, is the Air Force's Air Rescue Service. Time and time again, this organization has assisted people of many nations throughout the world.

The assistance which the Air Force is able to render in

time of peacetime disasters is another instance of the constructive use of airpower. Many people will recall when the Air Force went to the aid of western ranchers in 1949. For more than a month, feed was airdropped to sheep and cattle on snowbound ranches that could not be reached by other means. Our airpower also has been used to demonstrate the innate friendliness of Americans and their concern for the welfare of people of foreign nations. Typical was the action taken in Pakistan in 1954, when floods threatened a national disaster. The United States responded immediately and Air Force planes flew in supplies, medical teams, and other badly needed aids. That same year in Laos, our planes reacted quickly to airdrop tons of rice in famine-stricken mountainous areas which could not be reached by any other means.

There is no doubt that airpower can be a powerful affirmative influence as well as a powerful deterrent influence in the quest for secure peace. Disaster operations, mercy missions, supply flights, and storm reconnaissance are all evidence of readiness and strength. But although great strength is evidenced, the acts themselves hold no direct threat to anyone. They are benign shows of strength, which impress the friendly and unfriendly alike. In the past, the United States has made good use of its airpower for peaceful purposes—but, we have not made optimum use of it. I believe that more can be done if we use our imagination and take advantage of opportunities as they occur.

Modernization and the Future

So far I have been discussing Air Force concepts and current capabilities. Obviously, if we are to continue to do our job, our forces must be kept modern. All services, of course, are faced with this problem. But in the Air Force, the problem is much more critical. Our forces must not only be combat-ready but on constant alert. Yet we must remain flexible enough to integrate continuously new weapons as they are proved.

Rapidly changing technology in recent years has complicated our problem in this respect by reducing the time interval between development—first line—obsolescence—and antiquity. On land and sea there has been relatively little change in basic equipment—but in the air, great technical advances have resulted in sweeping changes in performance capabilities.

You may remember that the Army's famous 1903 Springfield rifle was used during both World War I and World War II. The Wright brothers' original airplane, which was born the same year, would not have stood a chance in either war. In fact, the first-line aircraft of World War II—our P-38s, P-51s, B-17s, and B-24s—would be sitting ducks today. A current example of the situation that faces us is that not one fighter aircraft we considered first line during the Korean War will be in our combat units at the end of this calendar year. Another illustration is the fact that, under current plans, a complete conversion of air defense interceptor aircraft will have been accomplished within a three-year period. Furthermore, our warning and control system is being given a complete overhaul, and our strategic striking force will soon see the last of the B-36s. Such continuing modernization is necessary if we are to survive in air and space.

In addition to keeping our forces modern, we must keep an eye on the far-distant future so that one day we won't wake up to find our weapons completely outdated by new discoveries. That is why continuous research and development is so essential to the Air Force. Research and development has given us increased thrust and improved structures which have resulted in the high performance we know today. Better thrust and better structures are coming, if we maintain our research and development as a very high-priority program.

Air Force progression from the very low altitudes and low speeds we flew in the early 1900s to the recent high altitudes and high speeds flown by the F-104, has been evolutionary—and natural development and extension of speed, altitude, and sustained flight. These qualities have been our stock in trade throughout the fifty years of Air Force history. We have strived continually to fly faster, to fly higher, and to remain airborne longer. This evolutionary process which has brought the Air Force to its present high state of development is not going to change in direction because there are additional challenges in space. The continuation of USAF operations beyond the reaches of the earth's atmosphere is a natural development.

The missiles and unmanned satellites we are developing are literally "raw recruits" in our forces of tomorrow. They will get better. But we have a long way to go to make them fully effective, reliable, accurate, and proven weapons. Complementing the unmanned vehicles of the future is the need for manned systems, because man's skills and judgment will continue to give us capabilities which are nonexistent in machines. Accordingly, we are continuing our work on the B-70, a chemically powered bomber in the 2,000-mile-an-hour class, on nuclear-powered bombers which will have almost unlimited endurance, on long-range interceptors, and on the X-15, the Dyna-Soar, and piloted satellites. All of these developments include the use of man. The Air Force of the future, like the Air Force of today, will require well-trained, skilled, and dedicated personnel.

Progress in space is essential to our ultimate national security. The vital role played by airpower in the past twenty years resulted largely from the fact that the modern airplane gave man direct access to all points on land and at sea. Flight in space will in due course provide access, not only to the land, sea, and atmosphere of the earth, but to outer space and other planets as well. Vehicles that can travel in air and space will clearly exceed the capability of those now limited to the earth's surface and the lower atmosphere. As such they will, in turn, become a dominant factor in the military strength of our country.

The space era opens up a wide realm of possibilities—both for the deterrence of war and the promotion of peace. The projects now in work, and a vital and continuing research and development program, are required for the United States to win and maintain the capability to control space. The Air Force is pledged to exert every effort to win and maintain that capability.—END

Men of the US Air Force. Color guard symbolizes readiness of thousands of men, and women, of the force in being.

Force in Being

THE PEOPLE

DURING the past year several significant decisions had a marked effect upon the Air Force manpower program. The force objective projected for the end of fiscal year 1958, originally 128 wings, was changed to 117 wings, and the manpower levels reduced accordingly—from 925,000 to 875,000 military; from 341,000 to 322,213 direct-hire civilians; and from 82,404 to 67,746 contract-hire indigenous foreign civilians.

In its program for fiscal year 1959, the Air Force has once again reduced its objectives to 105 wings—850,000 military and about the same number of civilians as before. Air Force officials candidly admit that the 850,000 ceiling is marginal and they would probably need at least 10,000 more men.

The manpower ceiling becomes even more serious in the light of shifting emphasis in the combat forces. The SAC dispersal plan, for example, the fifteen-minute alert concept, and an increased tanker program, requires more men. Missile units require more men. New air defense early-warning and control facilities are coming into opera-

tion, requiring more men. And numbers alone are not the paramount consideration. As General White put it: "Our greatest problems occur in training our people to the high-skill levels the weapon systems demand and in the retention of those people once they are trained."

At the same time, the Air Force is trying to cut its strength with the least personal hardships and disturbance to programs. Thousands of airmen and officers who were near the end of their enlistments or obligated tours are being released early. Procurement quotas have been reduced and retirement of officers has been speeded up.

The Air Force is restricted to fifty-five percent of its airmen in the top four grades, although it actually needs a higher percentage to match the technical and managerial responsibilities called for by today's complexities. Many airmen must serve in grades lower than their duties call for, and promotion quotas are not big enough to take care of all qualified and deserving airmen.

Another problem is that of increasing the ratio of combat and combat-support people to indirect-support people. There are still many overages in the nontechnical indirect-support areas and a continuing shortage in the technical skills. Steps being taken to fill vacancies in the highly skilled areas and experience ladders include enlistment and training of new airmen, cross-training, and reenlisting and upgrading junior airmen serving in the direct support skills.

Retirements of many World War II officers over the next few years will relieve the "hump" problem which has held temporary field-grade promotions to a reduced level.

Increasing the obligated tour for new pilots from three years to five should help. The extra two years permits reduction of the pilot-training program, boosts the prospects of retaining them to about sixty-five percent instead of the current thirty-five percent, and gives the AF better utilization of its pilots.

Retention and Recruitment

The impact of missiles and more complex aircraft has been felt throughout the personnel structure. The proportion of technically trained officers and airmen is growing, with corresponding reductions in the semitechnical fields. This trend is naturally accompanied by an increased requirement for personnel in the higher mental, skill, and educational levels.

For example, in a B-52 wing, approximately fifty-five percent of the nonflying officers are in technical fields, compared with approximately seventy-five percent in an intercontinental ballistic missile unit. Enlisted airmen requirements show a like change, from approximately fifty-two percent in the technical fields in a B-52 wing to more than sixty-two percent in a missile unit.

It has been said that the Air Force was performing its missions with transients. This is uncomfortably close to the truth. For example, in 1957 the Strategic Air Command lost more than 24,000 of its 200,000-man force through voluntary separations; the Air Defense Command lost 16,000 of 100,000. At this rate, SAC and ADC combined would lose the equivalent to 700 combat-ready crews in 1958. The dollar loss is great and the loss of combat capability serious.

Officer Retention

Problems of command, management, operation, and maintenance increasingly demand highly qualified officers. A great many have to be brought to active duty each year to offset the loss of those returning to civil life. Major officer procurement source is the ROTC program, but of these only one of ten nonrated and less than four of ten rated officers remain on active duty after their obligated tours. Some turnover, of course, is desirable to prevent stagnation of the force and to furnish qualified officers for Reserve units. However, the Air Force feels this turnover should be the result of selective retention of officers with most critical skills. Such legislation as the Regular Officer Augmentation Act and the Dependents' Medical Care Act have improved the attractiveness of a service career, but losses are due to continue at a high rate. In 1956 the Air Force lost 16,600 trained officers; in 1957, about 15,500. In 1958 and 1959 the Air Force would lose more than 12,000 trained pilots and navigators, mostly young men, just when the Air Force could "cash in" on their costly training.

Many incentive programs to entice the young officer toward a service career are already in being:

- Distinguished graduate program of ROTC, aviation cadets, and OCS graduates, giving all individuals an opportunity to compete for a Regular appointment.
- An augmentation program encouraging Reserve officers to seek a Regular commission.
- An in-service education program giving younger officers a chance to further their education.

Officers may indicate their area of choice and desired type of duty and duty station when due for reassignment, and the Air Force honestly tries to cooperate.

Public Law 20 provides for no more than one permanent change of station during a fiscal year without the express approval of the Secretary of the Air Force.

The overseas manning program tries to pick men with the fewest dependents for overseas assignments. This also reduces the need for dependent facilities, schools, etc.

The new Air Force Regulation 30-5 stipulates that adequate facilities must be available prior to the assignment of personnel for duty at an Air Force installation.

The so-called Medicare program has been improved.

A more liberal policy on extensions of overseas tours gives an individual greater stability, reduces frequency of movements from overseas to the Zone of Interior, and gives overseas commanders greater continuity of operation.

Many graduates of technical and professional schools are being reassigned directly overseas upon completion of their training.

Officer personnel now can be selected and notified from sixty to 120 days before reporting to the aerial port facility, allowing time to resolve problems associated with dependents or household goods.

The dependents assistance program relieves emergencies and hardships, but particularly in the absence of the military member of the family. This program is particularly important to members of combat crews subject to frequent temporary duty.

Graduates from basic flying training courses who signed career Reserve statements are given a choice of assignments based on their standing in the class.

In short, the officer retention program is vitally concerned with all motivating factors bearing on an officer's career intentions. These include personal and family security, job satisfaction, adequacy of leadership and supervision, career progression opportunities, increased officer prestige, training and educational opportunities, improved living conditions, and self-improvement activities.

Airman Retention

Retention of skilled airmen is the other half of the most important problem confronting the Air Force.

The problem is not just retention, but selective retention in the critical-skill areas.

Most efforts are concentrated on young airmen completing their first enlistments. There has been some im-

(Continued on following page)

Increasing efforts, some as advanced as this single family unit, are under way to make Air Force family life easier.

provement in this area since 1955, but the reenlistment rate for technical skills, however, is far short of the need, with the lowest reenlistment rate in the more critical skills and, conversely, the highest number in the least critical skills. Capable men, those whose aptitudes had warranted the most extensive training, are still leaving the service. This is why the Air Force strongly supported a revised compensation system for military personnel.

Pay

New military pay legislation was approved in its final form by both houses of the Congress on May 12 and was sent to President Eisenhower. The bill became effective on June 1, 1958.

In its final form the pay bill provided the following benefits:

- More pay for virtually everyone with more than two years of active service, with six percent the minimum increase.
- Two new, higher enlisted grades for career noncommissioned officers.
- Proficiency pay aimed at retaining highly skilled enlisted technicians in critical career fields.
- Special pay for captains, majors, lieutenant colonels, and colonels serving in positions of unusual responsibility of a critical nature.
- A separate pay scale for commissioned officers with more than four years of active enlisted service.
- A six percent cost-of-living increase for retired military members. Personnel retiring after the new pay's effective date will be able to compute their retirement pay at the new rates.

The new pay, including increases for retired personnel, will cost $576,438,000 in fiscal year 1959. However, savings through better personnel retention rates and reduced training requirements should more than offset the higher payroll in future years.

The two new enlisted grades of E-8 and E-9 pay considerably higher than the master sergeant (E-7) grade. The legislation calls for a maximum of two percent of enlisted strength in E-8 and one percent in E-9 grades, open only to NCOs with at least eight and ten years of service, respectively.

The enlisted proficiency pay may take one of two forms, whichever a service Secretary selects. In one, personnel may be advanced to pay grades higher than their military rank and be paid the higher grades' pay, allowances, and special or incentive pay. In the other, proficiency pay will be paid at monthly maximum rates over base pay as follows: P-1, $50; P-2, $100; and P-3, $150.

Selected officers in positions of unusual responsibility may be paid at the following rates: captain, $50; lieutenant colonel, $100; and colonel, $150. Up to five percent of the captains and ten percent of the majors, lieutenant colonels, or colonels may receive this special pay.

The separate pay scale for officers with four years of prior enlistment service provides an incentive for qualified enlisted personnel to strive for commissioned service. It provides additional recognition of the experience and skills gained during their enlisted service.

The enactment of Public Law 422, 85th Congress, was, in the Chief of Staff's words, "a major milestone."

Housing

The Air Force has accelerated its family housing program, with 70,484 units scheduled to be built in the next two years at a cost of about $1 billion.

The family housing program has been strengthened by the 1958 Emergency Housing Legislation, expanding and amending Title VIII of the National Housing Act, to make it easier to finance AF family housing programs.

The 70,000-plus units were scheduled for the AF under three programs. A total of 56,820 are planned under Title VIII and use of annual military construction funds. Of this number, 4,576 units were completed by April and 16,339 units were under construction.

An additional 13,664 units are to be built under Surplus Commodity and Rental Guaranty Programs in overseas areas where AF organizations are stationed. Of these, 4,898 were completed during the year, 3,742 under construction.

In May, the Air Force acquired its first Wherry Housing

Project, to be rehabilitated under the Family Housing Act of 1956. The first unit was at Chanute AFB, Ill.

The law provides a revolving fund for the Department of Defense to finance all costs incident to the acquisition, including initial rehabilitation and improvement of the housing units.

In another action, military families may now occupy inadequate government quarters at costs lower than their quarters allowance.

Flying Safety

Since 1947, the Air Force has gone through a period of growth characterized by faster planes, higher speeds, and higher altitudes. The Air Force could have well expected its major aircraft accident rate to shoot up.

But instead, the aircraft accident rate has dropped steadily. It declined from forty-eight major aircraft accidents for every 100,000 hours of flight in 1947, to forty in 1948, and year by year after that to thirty-three in 1951, the first year of the Korean conflict, when it could have been expected to rise, but did not. The rate dropped again to twenty-nine in 1952 and finally to an all-time record of only fourteen major aircraft accidents for every 100,000 hours flown in 1957.

Behind these facts and figures is an underlying philosophy of aircraft accident prevention spearheaded by the Directorate of Flight Safety Research under Maj. Gen. Joseph D. Caldara. In General Caldara's book, all accidents are preventable and the objective is no accidents at all.

Within the Air Force, Continental Air Command, composed of both Regular Air Force and Reserve units, received the Daedalian Trophy for 1957 for the most effective aircraft accident prevention program of all major AF commands which flew more than 100,000 flying hours. CONAC had only one fatality in an aircraft accident during 1957, and achieved a fifty-two percent improvement over its 1956 aircraft major accident rate.

The Air Force's Air Attaché System was also honored for 75,000 flying hours—almost six years—without an accident. Their achievement was even more noteworthy in view of the fact that radio facilities, weather forecasts, navigational aids, traffic control, instrument landing systems, refueling, ground handling equipment, and technical assistance are often nonexistent or inadequate where the attachés fly their C-47s. Add unfamiliar local regulations, language barriers, and lack of local maintenance and supply depots and it is quite an accomplishment.

Tied in with the Air Force flying safety problems was the fact that touchdown speeds upwards of 185 miles an hour require better methods of stopping aircraft. Malfunctions and failures of brakes, drag chutes, wheels, and tires caused 150 major accidents in a recent two-year period. In addition, such failures contributed to 135 other mishaps in the same period.

Ground Safety

The National Safety Council presented its award of Honor to the Air Force for the eighth consecutive year in April.

The award was given for a reduction of more than ten percent in ground accident rates in 1957 as compared to the 1955-56 average. Accident losses included total costs, injuries, and fatalities to military and civilian personnel, and government vehicle accidents. While improvements were made in all categories, the most significant were reductions of thirty-three percent in civilian employee fatalities and of fourteen percent in the government vehicle accident rate.

Also in April, Air Training Command, for the second consecutive year, was presented the Doolittle Tokyo Raiders Trophy for traffic safety.

Accidents among Air Force drivers of both government and privately owned vehicles dropped off sharply in 1957, with 4,058 accidents, 449 fewer than in 1956.

During the same reporting period, 4,541 AF drivers of privately owned vehicles were involved in accidents, a reduction of 411 from the 1956 figures of 4,952. AF deaths in private cars totaled 586 in fiscal year 1957, twenty-six less than the fiscal year 1956 figure of 612.

Air Force Chaplains

Chapel attendance of Air Force personnel and their families topped the 12,000,000 mark during fiscal year 1957 for the fourth consecutive year. The year's attendance figures included 10,517,300 at services conducted by Air Force chaplains and 1,638,800 at services conducted at Air Force chapels by civilian clergymen serving as auxiliary chaplains.

Attendance at Sunday School and other religious education classes increased by more than one million over the previous high year of 1956. The classes were attended by 4,408,000 in 1957.

Air Force chaplains also performed 6,993 marriages, more than 17,700 baptisms, and conducted 2,401 funerals.

Protestant Preaching Missions conducted by guest clergymen at AF installations in the US and overseas totaled 1,384, with 11,951 attending. Catholic Preaching Missions numbered 2,559 with 228,021 attending, and eighty-one Jewish Torah Convocations were held with 2,201 present.

Medical Care

The Dependents' Medical Care Program, popularly known as "Medicare," completed its first year of operation on December 7, 1957. In that year more than 300,000 civilian physicians' bills, totaling $22 million, and more than 200,000 civilian hospital charges, totaling $21 million, had been paid for the medical care of dependents of members of the uniformed services. The Dependents' Medical Care Program has provided for admissions of more than 125,550 dependents to civilian hospitals.

The AF leads the other services, with forty-one percent participation in the program. The Navy was second, with thirty-two percent; Army, third, with twenty-five percent; and the Public Health Service, two percent.

About 3,000,000 dependents are eligible for Medicare, but as a practical matter, the potential patients are some 2,500,000 dependents who live in the continental United States, Alaska, Hawaii, and Puerto Rico.

Information gathered during the first year's operation of the program supported an earlier estimate that about forty percent of all dependents were separated from their sponsors because of the exigencies of service and that, inferentially, most of this group apparently had no uniformed service medical or hospital facilities available to them. Actually, several studies showed that of the persons receiving care, some forty-three percent were separated from their sponsors.

Medicare has made available facilities which the government could not have provided in any other reasonable manner.—End

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21 **Chief Scientist, USAF**
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Ass't Comptroller of the Air Force
Maj. Gen. Robert O. Cork

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Ass't for Field and Internat'l Relations
Col. Millard A. Libby

30
Auditor General
Maj. Gen. William P. Farnsworth

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Brig. Gen. Robert J. Friedman

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Deputy Chief of Staff, Personnel
Lt. Gen. Emmett O'Donnell, Jr.

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Ass't Deputy Chief of Staff
Maj. Gen. Robert B. Landry

37
Ass't for Ground Safety
Will L. Tubbs

38
Director, WAF
Lt. Col. Emma Jane Riley

39
Chief of AF Chaplains
Maj. Gen. Terence P. Finnegan

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Director of Development Planning
Maj. Gen. Leland S. Stranathan

47
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Maj. Gen. Donald J. Keirn

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Maj. Gen. Charles H. Anderson

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Brig. Gen. Frederic H. Miller

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Brig. Gen. Laurence B. Kelley

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Maj. Gen. Donald R. Hutchinson

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Maj. Gen. John B. Cary

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Director of Military Personnel
Maj. Gen. Raymond J. Reeves

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Director of Civilian Personnel
John A. Watts

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Maj. Gen. Lloyd P. Hopwood

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Director of Requirements
Maj. Gen. James Ferguson

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Director of Research and Development
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Maj. Gen. Harold W. Grant

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Director of Manpower and Organization
Maj. Gen. Harold R. Maddux

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Director of Operations
Maj. Gen. Maurice A. Preston

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Director of Maintenance Engineering
Maj. Gen. Albert G. Hewitt

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Maj. Gen. Charles J. Bondley, Jr.

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Brig. Gen. Raymond L. Winn

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Maj. Gen. William T. Thurman

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Col. Robert G. Ruegg

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Ass't for Coordination
Brig. Gen. Noel F. Parrish

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Ass't for Long-Range Objectives
Col. Robert C. Richardson, III

76
Ass't for National Security Council Affairs
Col. Royal B. Allison

An **AIR FORCE** Magazine Photochart
(Corrected as of July 15, 1958)

The MAJOR COMMANDS

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Air Defense Command
Lt. Gen. Joseph H. Atkinson
Hq., Ent AFB, Colo.

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Air Training Command
Lt. Gen.
Frederic H. Smith, Jr.
Hq., Randolph AFB, Tex.

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Air Research and Development Command
Lt. Gen. Samuel E. Anderson
Hq., Andrews AFB, Md.

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Air Materiel Command
Gen. Edwin W. Rawlings
Hq., Wright-Patterson AFB, Ohio

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Military Air Transport Service
Lt. Gen. William H. Tunner
Hq., Scott AFB, Ill.

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Headquarters Command
Maj. Gen. Reuben C. Hood, Jr.
Hq., Bolling AFB,
Washington, D.C.

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Alaskan Air Command
Brig. Gen. Kenneth H. Gibson
Hq., Elmendorf AFB, Alaska

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Caribbean Air Command
Maj. Gen. Truman H. Landon
Hq., Albrook AFB, Balboa, C.Z.

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Air University
Lt. Gen. Walter E. Todd
Hq., Maxwell AFB, Ala.

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Superintendent, USAF Academy
Maj. Gen. James E. Briggs
Colorado Springs, Colo.

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AF Finance Center
Col. Edward J. Hopkins
Denver, Colo.

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USAF Security Service
Maj. Gen. Gordon A. Blake
Hq., San Antonio, Tex.

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Strategic Air Command
Commander in Chief
Gen. Thomas S. Power
Hq., Offutt AFB, Neb.

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USAFE
Commander in Chief
Gen. Frank F. Everest
Hq., Lindsey AB, Wiesbaden, Germany

100

Pacific Air Forces
Commander in Chief
Gen. Laurence S. Kuter
Hq., Hickam AFB, Oahu, T.H.

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Tactical Air Command
Gen. O. P. Weyland
Hq., Langley AFB, Va.

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Continental Air Command
Lt. Gen. William E. Hall
Hq., Mitchel AFB, N. Y.

The OPERATIONAL FORCES

90 **2d Air Force**
Maj. Gen.
John P. McConnell
Hq., Barksdale AFB, La.

91 **8th Air Force**
Maj. Gen.
Walter C. Sweeney, Jr.
Hq., Westover AFB, Mass.

92 **15th Air Force**
Maj. Gen.
Archie J. Old, Jr.
Hq., March AFB, Calif.

93 **1st Missile Division**
Maj. Gen. David Wade
Hq., Cooke AFB, Calif.

94 **16th Air Force**
Maj. Gen. Henry K. Mooney
Hq., Torrejon, Spain

95 **3d Air Division**
Maj. Gen. Charles W. Schott
Hq., Anderson AFB, Guam

96 **7th Air Division**
Maj. Gen.
William H. Blanchard
Hq., South Ruislip, England

98 **3d Air Force**
Maj. Gen. Ernest Moore
Hq., South Ruislip, England

99 **17th Air Force**
Maj. Gen. Henry R. Spicer
Hq., Wheelus AB, Tripoli, Libya

101 **5th Air Force**
Maj. Gen. Robert W. Burns
Fuchu Air Station, Japan

102 **13th Air Force**
Maj. Gen.
Thomas S. Moorman
Hq., Clark AFB, Luzon, P.I.

103 **315th Air Division (Combat Cargo)**
Brig. Gen.
Charles H. Pottenger
Hq., Tachikawa AB, Japan

105 **9th Air Force**
Maj. Gen. David W. Hutchison
Hq., Shaw AFB, S. C.

106 **12th Air Force**
Maj. Gen. Chester E. McCarty
Hq., Waco, Tex.

107 **19th Air Force**
Maj. Gen. Henry Viccellio
Hq., Seymour Johnson AFB, N. C.

109 **4th Air Force**
Maj. Gen. Sory Smith
Hq., Hamilton AFB, Calif.

110 **10th Air Force**
Maj. Gen. Robert E. L. Eaton
Hq., Selfridge AFB, Mich.

111 **14th Air Force**
Maj. Gen. John W. Persons
Hq., Robins AFB, Ga.

Air Force Commanders in Special Assignments

112 **Supreme Allied Commander, Europe**
Gen. Lauris Norstad
Hq., Paris, France

113 **North American Air Defense Command Commander in Chief**
Gen. Earle E. Partridge
Hq., Ent AFB, Colo.

114 **Alaskan Command Commander in Chief**
Lt. Gen. Frank A. Armstrong
Hq., Elmendorf AFB, Alaska

Force in Being

THE WEAPONS

By Col. Robert C. Richardson, III

IN THE preceding article, General White has discussed the role of the Air Force in peace and war. The discharge of this role depends to a great extent on the effectiveness of Air Force weapons. Weapons plus men comprise military capability. One without the other is of little use in war. Now that airpower constitutes the greater share of military power, the outcome of a major war will depend almost wholly on the relative effectiveness of aerospace weapon systems available to either side.

In fiscal year 1958, slightly less than one-half of all funds devoted to US defense ($17,750.2 million) went to meet Air Force requirements. Of the remainder, allocated to the Army and Navy, a sizable share went to the support of Army and Navy air activities.

Thus, US security, in this age, rests primarily on airpower; and the US Air Force is responsible for developing and maintaining the bulk of this capability. The weapons and weapon systems developed and operated by the Air Force will determine whether or not the US can *survive*, let alone win, a major war.

Air Force weapons consist of two main elements: delivery vehicles that travel through air or space, and the munitions they carry. Delivery vehicles now in hand, or under development, provide the Air Force with the most effective means of access to all potential targets. The munitions we design complement the vehicles by enabling us to destroy the target once it has been reached.

One of the oldest works on geopolitics in the English language, *The Principal Voyages of the English Nation*—Hakluyt, 1598—notes that the control of accessibility is the master card in conflict, since without accessibility resources are valueless. Before airpower became a factor, seapower was the principal means of controlling access. Once on shore, access was over land, and landpower was required to deny or assist movement.

The airplane provided a new means of access which could not be controlled by surface forces. Even while operating ranges and payloads were limited, the dominant role of the air vehicle was clearly recognized. Airpower became the primary means of controlling accessibility; it became the master card in power politics.

The pursuit of improved means of military access has led, in recent years, to air vehicles with global ranges. Air refueling techniques, greater performance, and increased payloads have freed our aircraft from the need for close-in bases to reach distant targets. With the B-36 and B-52, the Air Force achieved global accessibility.

Now, operations in *outer space* appear to offer the ultimate control over accessibility. Spacecraft should eventually have access to all points on earth, and to other bodies in space. Thus, the future master card would seem to be *aerospacepower*, or the extension of airpower's capability to include the control and military utilization of space.

Air Weapons and Munitions

Access to any point on earth has little military value unless it can be used for delivering destruction, or otherwise carrying the war to the enemy. Fortunately, the development of munitions has more than kept pace with the development of long-range aerospace weapon systems. The Air Force now has atomic bombs with large enough yields, and in small enough packages, to destroy almost any target with one weapon and from the onset of hostilities.

The fact that a country can have at hand on D-day all the destruction it deems necessary to defend itself or win, and also have a ready delivery force, suggests that future major wars will be short, and that the initial atomic phase will be decisive. We cannot await post-D-day production of weapon systems, either to deliver, or to counter the delivery of, the stocks of nuclear munitions.

Today's Air Force atomic delivery systems combine maximum performance with maximum destructive power. They are complex and expensive. Fortunately, the results that we can obtain, with atomic munitions, warrant the cost. Were it not for atomic munitions, the cost of destruction delivered by ICBMs or B-52s would be prohibitive. Thus, any concept of delivering conventional munitions in spacecraft is obviously unrealistic.

In another sense, the advent of atomic munitions has changed the application of the classical principle of mass. Mass can no longer be measured in terms of manpower or vehicles, such as airplanes and tanks, but must be measured in terms of kilotons and megatons.

When mass is measured in kilotons and megatons, *destruction* becomes the decisive factor in battle, and both capture and maneuver became secondary considerations.

In classical "hard bomb" wars, both the artillery and the Air Force prepared the way by generally disrupting and softening up the opposition to allow the land forces to move in, capture, and occupy. In the future, this will not be true. With atomic munitions there will be no organized military force left to capture, and no real military purpose in military occupation as the term has been understood in the past. Thus, in an atomic war where mass is measured in destructive power, the aerospace nuclear delivery force will generally be able to achieve decisive results *per se*, and with a minimum support from surface forces.

The primary basis for determining Air Force weapon systems is the threat at any given time. We must seek to have weapon systems that can give us the advantage in accessibility. Maintaining superior access while denying it to others divides our weapon needs into two principal categories:

- Offensive aerospace forces, or the vehicles and munitions that seek access to the vitals of the enemy military and/or civil complex, and
- Defensive aerospace forces, and measures, or the forces which deny his airpower access to ours.

Within the offensive aerospace forces we have both the long-range strategic delivery force, and the shorter-range tactical air delivery systems which are designed to deal with situations short of general war as well as doing an essential job in general war.

By the end of June of this year, the Air Force had 117 wings. These included eighty-nine wings of offensive forces (forty-four strategic wings, forty-five tactical wings) and twenty-eight air defense wings.

The B-52 is the backbone of the strategic offensive force, now ably seconded by the B-47. Both are considered capable of penetrating Soviet defenses for some time to come. Both have an air refueling capability which can extend their range indefinitely, by squadrons of strategic tankers, including the jet KC-135 tanker. The strategic reconnaissance role is now provided by RB-47 and RB-57 wings. Eventually the satellite developments should make an invaluable contribution to this task.

The predominant characteristics of our strategic long-range weapon systems are: readiness to act in minutes against an attack, and relative security from destruction by surprise attack (efforts are under way to make them even more secure); and ability to penetrate to the target and destroy it.

The responsiveness of our strategic systems relates their capability to react under single control to the national will and direction. This requires that they be based as far as possible *in the US*, or in US territory, and that they have adequate refueling tanker aircraft, preferably jets, to get to their targets and back to selected post-strike bases. The entire organization and equipment of our strategic effort is designed to guarantee this essential responsiveness.

The security of the strategic forces is provided through a variety of measures. These include readiness of takeoff, dispersal, base hardening, mobility, air defense, strategic warning measures, and others. No single measure can be fully relied upon. Ordinarily, a combination of several measures is provided to ensure the best possible returns in security. During the past year, great steps were made in this field. Increasing numbers of dispersal bases are being developed and will shortly be ready for occupancy. The force has greater mobility. And increased reaction time through such measures as dispersal, improved alert facilities, and the introduction of missiles into the strategic force, have also contributed to their security.

Finally, the operational effectiveness of the retaliatory weapon system must be judged by its capability to penetrate enemy defenses and destroy assigned targets. The B-52 now has this capability both quantitatively and qualitatively. In due course the force must be modernized with the introduction of the B-70 "chemical" bomber and, eventually, with nuclear-propelled aircraft. In the near future the strategic effort will be augmented by the addition of B-58 wings with greater performance, in both speed and altitude, than the B-52, and less vulnerability.

Strategic air forces also employ decoys and air-to-surface missiles. The Quail is a decoy missile to be carried and released by B-47s and B-52s. Since its reflection on enemy radar screens looks like that of a bomber, the Quail increases the bomber's chances of getting its atomic warhead to the target. Another effective decoy missile is the ground-launched Goose. Decoys are supplemented by other penetration aids, including electronic countermeasures.

In the field of air-to-surface missiles, the Rascal is designed to be fired from the B-47. Guided from the bomber, this supersonic missile has a good chance of getting to the most strongly defended targets. The capability of the B-52 will be greatly increased by Hound Dog, a missile which can be launched hundreds of miles from the target. It will, in effect, give the B-52 a supersonic penetrating capability.

Aerospace Long-Range Offensive Missiles

As the intercontinental missile improves in reliability and accuracy, it will tend to replace the manned bomber as the major strategic weapon system. There is no prospect, however, of the missile wholly replacing manned aircraft in our time. Under the best conditions, the ballistic missile has certain inherent limitations. Foremost is its inability to exercise judgment in selecting the target and the fact that, once launched, ballistic missiles cannot be recalled.

To effectively attack an objective with missiles, we must know fairly accurately the geographical location of the objective and, generally speaking, what it consists of. While this information exists with respect to preplanned target systems and fixed objectives, it will be increasingly difficult to obtain should hostilities continue and the situation become fluid. This suggests that missiles will be most useful against large, soft, preplanned targets whose location is accurately known.

Since the US will not assume the initiative in total war, the ability of our forces to survive a surprise attack is almost as important as their ability to deliver. Now the one absolutely secure place is in the air over friendly territory. There are no weapons now known that can deal with airborne dispersal. The positive control system employed by our manned bombers provides a means of exploiting any warning, or even tension, no matter how equivocal, whereas missiles must either be en route to their objectives, without prospect of recall, or remain exposed to attack at the launch site, unless the sites are effectively hardened.

Thus, there will continue to exist a requirement for manned bombers in our offensive inventory, though on a reduced scale. We need them for use against mobile and inexactly located targets; for reconnaissance and bomb damage assessment; to oblige the enemy to maintain a diversified defense; and where very large payloads or a high degree of accuracy is required. We also need manned vehicles to decrease our vulnerability to initial attack through air dispersal.

The first generation of Air Force strategic missiles will come into the operational inventory next year. The earliest development in the family of long-range missiles is the Northrop intercontinental Snark. Although this missile is a subsonic air-breather, it represents a highly useful capability in being and has already shown up well in tests.

In the ballistic missile field the Thor IRBM, and its Army cousin, Jupiter, are now in production. The Thor has a range of between 1,500 and 2,000 miles at hypersonic speeds. This limitation in range means it must be initially deployed outside the continental US.

The first of the ICBMs is Atlas, to be followed by Titan. Both are truly intercontinental in range.

The development of second-generation missiles, such as the Air Force Minuteman, is moving rapidly. This generation of missiles, generally speaking, employs solid propellants. The solid propellant will be easier to handle, will reduce costs, will permit faster reaction. In addition to its primary strategic role, the Minuteman can be developed

(Continued on following page)

into a family of middle- and short-range ballistic missile systems, with the possibility of saving money through greater standardization.

Short-Range Offensive Aerospace Systems

The Air Force offensive aerospace weapon systems, in the tactical field, consist primarily of high-performance jet fighter-bombers and tactical missiles such as the Matador. These weapon systems are designed to deliver munitions from forward bases either against selected predesignated targets or in support of the tactical situation as it develops. These tactical weapon systems are, generally speaking, highly mobile by comparison with other forces.

Fighter forces deployed in Europe, and in the Far East, can attack with atomic weapons at ranges of 500 to 1,000 miles and at speeds greater than 800 miles per hour. They can approach either at high altitude or at treetop level. They can disperse to, and operate from, many more strips and bases than can heavy bombers.

In an emergency, the fighter can utilize zero-launch techniques or operate from selected stretches of highways. Thus the destruction of their bases would not necessarily stop these forces from continuing the fight.

The backbone of today's fighter delivery force is the North American F-100D Super Sabre. This aircraft is currently supported in its mission by the McDonnell F-101 Voodoo, which has demonstrated excellent atomic strike capabilities with high performance to and from the target.

This year, Lockheed's F-104s and Republic's F-105s are being introduced into our tactical fighter delivery systems. The F-104 is primarily designed for forward air defense but will be able to carry atomic weapons in due course. The F-105 is an advanced fighter-bomber now undergoing intensive flight tests. It can carry nuclear weapons farther than its predecessors, and has a growth potential which will permit development of an all-weather capability.

In the short-range missile field the Martin Matador is being replaced by an improved version called Mace. The tactical delivery forces also have an air-to-surface missile called Bull Pup, a Navy development which the Air Force has adapted to its aircraft.

In brief, our Air Force offensive weapon systems are designed to provide maximum flexibility of operation under all possible contingencies. In addition, great consideration has been given to their ability to absorb atomic attack and survive. While missiles sites will be easier than air bases to disperse, hide, and/or harden, fighter delivery systems have the best sustained survival prospects of any manned aircraft. For some years to come it appears that heavy bombers, while they can get off before the initial attack, will not be able to count upon retaining secure and undamaged bases for later-phase operations.

In a short, all-out war, the ability of fighter systems to use many diversified off-base sites may not be important. In lesser wars, however, fighter systems on hand can operate from provisional sites, removed from targets known to the enemy missilemen, by using zero-launch devices, vertical takeoff, and other means which promise to free the fighter delivery system from fixed bases.

Aerospace Defense Systems

An effective US air defense is vital, not only to protect centers of population and industry, but also to ensure the survival of our strategic counterattack forces. If the initial enemy attack should destroy our strategic capability the enemy could then pick off civil and industrial centers on a leisurely, selective basis, without fear of retaliation. On the other hand, failure to destroy our ability to counterattack means that he will remain exposed to annihilation at home, regardless of the amount of damage he inflicts on America.

If the Air Force is to control access, by enemy bombers and missiles, to vital US targets we must have a ready, and effective, active defense system. Passive means, such as dispersal, mobility, and base hardening, will help our forces to survive under attack, but at best they are poor substitutes for stopping the attack before it is delivered. Unfortunately, the advantage enjoyed by offensive weapons precludes our relying solely on active defense systems. This offensive advantage results largely from the fact that air defense has four major problems to solve in series as compared with the one problem of the attacking bomber, fighter, or intercontinental missile.

Active defense systems must first be able to determine that a vehicle is en route and that it is hostile—detection deployed. Assuming we have both effective early-warning system. Next, we must have an intercepting vehicle, a fighter or missile, which can identify and attack the enemy vehicle at some point along its course. This requires that our air defense forces have adequate range and be properly deployed. Assuming we have both effective early-warning and an intercepting aircraft or missile properly deployed, we still must guide the interceptor, or antimissile missile, to its target. This requires both ground and airborne guidance systems. Lastly, the intercepting vehicle must have a "kill" capability when it reaches the vicinity of the enemy aircraft, spacecraft, or missile. In this age, this means air-to-air, or ground-to-air missiles, preferably with atomic warheads.

The useful range of our interceptors will vary with our radar coverage. Intercept guidance systems have to work with the vehicles they are to guide, and the armament must in turn be designed around the vehicle's size and performance. In brief, air defense weapon systems must solve these four problems, all of which cannot be dealt with simultaneously, since the solutions to the latter two, guidance and armament, is dependent on how we solve the former—radar coverage and vehicle performance.

On the other hand, the attacker must solve only one major problem—to get to the target. From this comparison alone, one would correctly surmise that the offensive will tend to maintain a clear advantage over the defense for the foreseeable future. All the offense has to do is to improve its delivery techniques rapidly enough to prevent the longer defense development cycle from keeping up.

For instance, as soon as an anti-ICBM missile becomes effective, the offense needs only to produce a maneuvering ICBM warhead to send the defense back to the drawing board. Likewise, by the time ground-to-air missiles make the penetration of aircraft too costly, there will be boost-glide orbital bombers, satellites, and other spacecraft that will introduce a new order of magnitude into the defense problem.

The obvious conclusion is that in air and in space the best defense is still an offense. Active defense, however, taken together with passive measures such as dispersal and base hardening, combine to provide the greatest possible security. Based on a clear recognition of this fact, the Air Force now maintains, and is developing, the following active air defense weapon systems.

Today the North American Air Defense Command relies primarily on manned interceptors. While ground-to-air missiles are now in the inventory, and deployed around key targets, their range is limited to the vicinity of the target. The prospect of large nuclear explosions near populated

areas, even if prematurely detonated on the fringes of the target area and at bomb-delivery height, is not as attractive as their destruction over the ocean or the arctic wastes.

The Convair F-102, with an all-weather capability and carrying Falcon, Sidewinder, or Genie air-to-air rockets, is the backbone of active air defense at this time. It is already being assisted by the Lockheed F-104, an aircraft that has set a speed record of 1,404.19 mph and climbed to 91,249 feet, for an altitude record for operational-type aircraft.

In due course the F-102 should be replaced by its new big brother, the F-106. At a still later date the North American F-108 will become available. All of the new interceptors coming along have extensive range built into them in furtherance of the Air Force's conviction that a far-out defense is preferable.

Ground-to-air missile systems are also being developed to conform with the concept that a distant, *area* defense, will provide greater security at less over-all cost than a point defense system. While the Army's Nike provides point defense, the Air Force is developing the Bomarc to meet attacking forces hundreds of miles out.

The air defense systems are gradually becoming more and more of a missile force. However, when it comes to identifying unknown aircraft, particularly in peacetime, the eyeball is still superior to any mechanical device. Until this fact can be changed, we will have to retain a manned interceptor capability.

In 1958 the advent of better radars, the activation of the first SAGE sector, and the introduction of Texas Towers, higher-performance aircraft, and improved missiles all added up to a better air defense capability than ever before. This does not, nor will it ever, add up to one hundred percent effective air defense.

Nevertheless, our air defense systems are vital to our national security. We need them to complicate the attacker's problems and reduce his effectiveness. We need them to complement and supplement the passive measures adopted to protect our retaliatory forces from destruction by surprise attack, and above all we need them if they can contribute, even in a small way, to protecting vital US centers, and the American people from nuclear destruction in future war.

Transport Systems

The Air Force's transport fleet consists of two main elements. One is the Tactical Air Command's troop carrier wings. These are primarily trained and equipped for tactical airlift operations in overseas theaters and under combat conditions. The other is the long-range inter-theater airlift in the Military Air Transport Service.

Obviously, there is some degree of overlap between the two. While MATS is neither trained nor equipped to make combat airdrops in battle, the C-130s and C-123s in Tactical Air Command have both the cargo capacity and range to move a substantial amount of personnel and equipment from the US to overseas areas. In general, the troop carrier airlift can augment the strategic airlift, whereas the converse is not necessarily true.

Our air transport forces now have a vital role in our strategic and tactical counterattack effort. The need for immediate response to attack, with nuclear weapons, demands that those general war forces not already in place be moved to combat bases and supported logistically as rapidly as possible. They must have overriding priority on any airlift they need to accomplish their missions.

The Air Force has been able to rely increasingly on intercontinental bombers, such as the B-52, for the strategic bombing mission. In view of this the requirement for immediate deployment of air forces to overseas bases by air has decreased to some extent. As a result, military air transport forces may soon be able to devote greater attention to airlift of other components of the armed services.

We must look, however, to the air transport capabilities of the Civil Reserve Air Fleet (CRAF) to augment our lift capacity in general war, and possibly in the event of more limited conflicts. Unfortunately, economic considerations tend to limit the availability of civil transport aircraft equipped to carry heavy cargo. Since there is little or no foreseeable commercial demand for air transport for heavy and outsized cargo, the Air Force has to look to its own military transport sources for lift of this nature. This accounts for the need for heavy transports such as the C-133 and C-124.

At present our three assault troop carrier wings are equipped with C-123 aircraft. The C-119 aircraft were phased out of the medium troop carrier wings this year, to be replaced by the Lockheed C-130 turboprop transports. The Air Force now has four wings of C-130s. Most of the C-119s have been reassigned to the fifteen Air Reserve troop carrier wings.

In MATS, the Douglas C-133s came into use this year. The backbone of the force will, however, remain equipped with C-124s for heavy cargo, and with C-118s and C-121s for passenger purposes. The Navy provides three wings of R6Ds and two wings of R7Ds.

Looking Forward

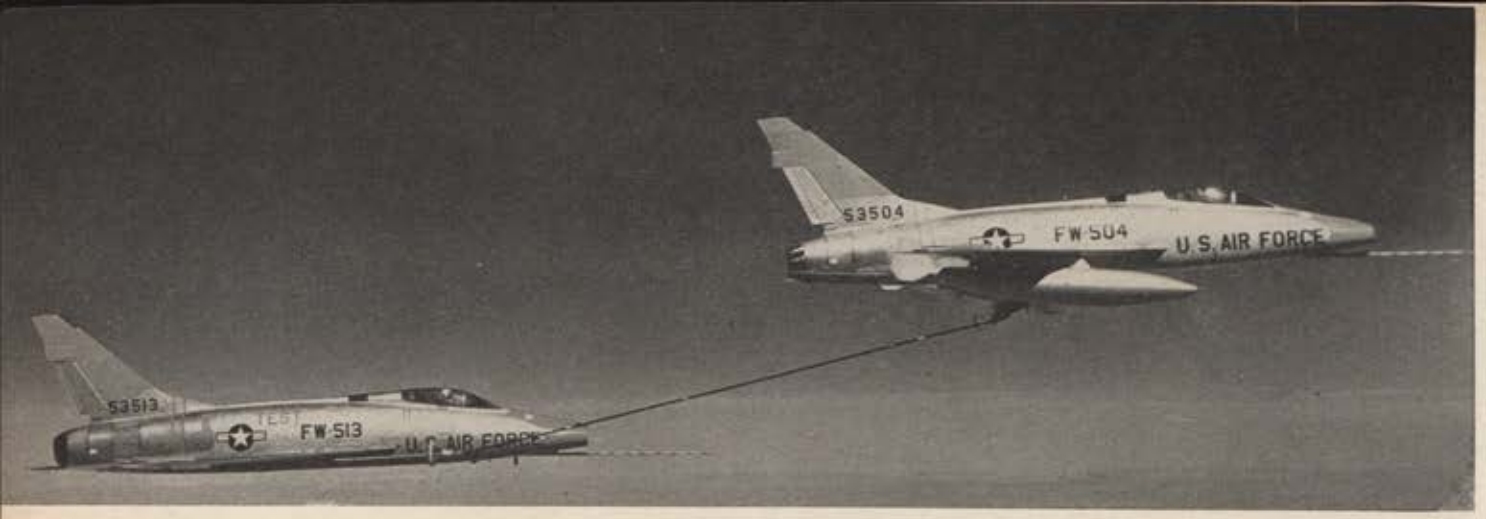
In due course our aerospace weapon systems will be augmented and/or modernized with higher-performance, more modern aircraft. Bombers powered by "exotic" fuels, and possibly atomic-powered aircraft, will complete the transition from manned aircraft to manned spacecraft. Second- and third-generation intercontinental missiles will complement and supplement both systems.

Military space systems are being explored from two directions simultaneously. While we pursue an active satellite program, we are also developing aerospacecraft that employ the boost-glide principle in transition between operations in air and in space.

First among these is the X-15. This pure research craft will be able to leave the aerodynamically navigable atmosphere and reenter. It is scheduled to fly in 1959 and constitutes an important step toward manned spaceflight. Another development of interest is the Dyna-Soar project.

The Dyna-Soar aircraft, or spacecraft, will be launched in much the same way as an ICBM, with each booster stage being used and discarded in turn, until finally the manned airplane stage has been boosted to a speed and altitude that will permit it to glide, without power, for thousands of miles.

All the military applications of space, and attendant weapon systems are by no means clear as yet. What is quite clear, however, is the dominant role that flight in space will play in furtherance of the mission of aerospacepower. Space will provide the Air Force with the greatest degree of accessibility ever achieved by man. This fact alone guarantees its military importance. We hope that the United States will be the first to exploit the military potential of spaceflight. The balance of power between the East and West during the second half of this century may well depend on who can first succeed in the development of space weapon systems and sound concepts for their use to further our national security.—END



F-100 in midair refueling operation with another Super Sabre.

Gallery of USAF Weapons

THE FIGHTERS

REPUBLIC F-84F THUNDERSTREAK

F-84F—Fighter-bomber; powered by Wright J-65-3 turbojet; speed, over 650 mph; ceiling, 45,000 ft.; range, over 2,000 mi.; equipped for inflight refueling. Armament, 6 .50-cal. machine guns. Payload, over 6,000 lb., including nuclear weapons. Earlier models were straight-wing. RF-84F is recon version. Span, 33 ft. 6 in.; length, 43 ft. 4 in.; height, 14 ft. 4 in.; gross weight, 25,000 lb.

NORTH AMERICAN F-86 SABRE

F-86D—All-weather interceptor; ADC; powered by General Electric J-47-17B or -33 turbojet; armed with rockets. Speed, over 650 mph; ceiling, over 45,000 ft.; range, 1,000 mi. Span, 37 ft. 2 in.; length, 40 ft. 4 in.; height, 15 ft.; gross weight, 18,000 lb.

F-86H—Fighter-bomber; TAC; powered by GE J-73-3. Armament, 6 .50-cal. machine guns.

F-86K—All-weather interceptor; made in Japan and in Italy and Canada for NATO countries; powered by GE J-47. Longer fuselage houses fire-control system; and 4 20-mm cannon instead of rockets.

F-86L—All-weather interceptor; similar to K; most are converted Ds; in use by NATO countries.

NORTHROP F-89 SCORPION

F-89D—All-weather interceptor; ADC; powered by 2 Allison J-35-35 turbojets; speed, 600 mph; ceiling, 45,000 ft.; range, over 1,000 mi. Armament, fire-control system and 104 folding-fin rockets. Span, 57 ft. 10 in.; length, 53 ft. 10 in.; height, 17 ft. 6 in.; gross weight, 40,000 lb.

F-89H—Similar to D model but carries 42 rockets and 6 GAR-1-4 Falcon missiles.

F-89J—Being produced by converting earlier models; contains Hughes MG-12 fire-control system, 42 rockets, 6 GAR-1-4 Falcons, 2 MB-1 Genie nuclear-warhead rockets.

LOCKHEED F-94C STARFIRE

F-94C—All-weather interceptor; being phased out of ADC operations; powered by Pratt & Whitney J-48-5 turbojet; speed, over 600 mph; ceiling, over 45,000 ft.; range, 1,000 mi. Armament, 24 FFAR in nose, wing pods optional with additional rockets. Span, 37 ft. 4 in.; length, 44 ft. 6 in.; height, 14 ft. 11 in.; gross weight, 20,000 lb.

NORTH AMERICAN F-100 SUPER SABRE

F-100A—Supersonic day fighter; powered by Pratt & Whitney J-57-7 turbojet. Several hundred delivered by end of 1954. Armed with 4 20-mm cannon, air-to-air missiles.

F-100C—Produced during 1955-56 with more powerful P&W J-57-21 engine. Inflight refueling capability; can carry extra tanks or bombs on underwing racks; can be zero-length launched.

F-100D—Autopilot and auto-fire-control system added. Both internal and external tanks can be inflight refueled.

F-100F—Two-place fighter-bomber, tandem seating. Powered by P&W J-57-21; speed, over 1,000 mph; ceiling, 50,000 ft.; range, with maximum payload, 1,000 mi.; nuclear capability. Can be equipped as tanker for buddy refueling, as illustrated above. Span, 39 ft.; length, 50 ft.; height, 16 ft.; gross weight about 33,000 lb.

McDONNELL F-101 VOODOO

F-101A—Originally planned as SAC escort-fighter; now TAC all-weather, multipurpose aircraft with versatile heavy armament; powered by 2 Pratt & Whitney J-57-13 turbojets. Armed with 4 20-mm cannon and rotary bomb door that can accommodate 3 GAR-1-4 Falcon missiles; nuclear capability; inflight refueling capability. An F-101A set a 1957 speed record of 1,207.6 mph.

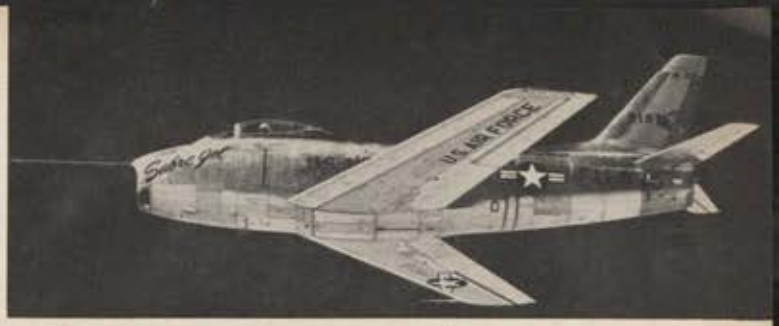
F-101B—All-weather interceptor; for ADC; two-place; powered by 2 P&W J-57-55s; speed, over 1,000 mph; ceiling, over 50,000 ft. Can carry various weapon loads, including 2 MB-1 Genie nuclear-warhead rockets. Span, 39 ft. 9 in.; length, 67 ft. 5 in.; height, 18 ft.; gross weight, 40,000 lb.

CONVAIR F-102 DELTA DAGGER

F-102A—Supersonic, all-weather interceptor; ADC; powered

F-102A Delta Dagger.

F-86D Sabre.



F-86H Sabre.

by Pratt & Whitney J-57-23 turbojet; speed, about 800 mph; ceiling, more than 50,000 ft. Contains Hughes MG-10 fire-control system. Armament, 6 GAR-1-4 Falcon missiles (infrared and radar) and 24 rockets. About 1,000 F-102s delivered. TF-102A is two-place, side-by-side seating trainer. Span, 38 ft. 1½ in.; length, 68 ft. 3½ in.; height, 21 ft. 2½ in.

LOCKHEED F-104 STARFIGHTER

F-104A—Ultrasonic day fighter; powered by General Electric J-79 turbojet; currently holds speed record of 1,404.19 mph and altitude record of 91,249 ft. Can climb as fast as it can fly level. Configuration includes stubby, razor-edged wing, and T-tail. First production fighter with boundary layer control, enabling short-distance landings; downward-ejection seat for pilot. Armed with T-171 multibarrel 20-mm cannon; designed to carry missiles, rockets, nuclear weapons. Span, 21 ft. 11 in.; length, 54 ft. 9 in.; height, 13 ft. 6 in.; gross weight, 17,000 lb. with full fuel or 22,000 lb. maximum.

F-104B—Two-place version, tandem seating.

REPUBLIC F-105 THUNDERCHIEF

F-105—Supersonic day fighter-bomber; TAC; powered by General Electric J-75-5 turbojet; speed, about 1,300 mph. Intended to deliver nuclear weapons and conventional bombs and rockets at extremely high speed over long ranges; inflight refueling capability. Armament includes 1 20-mm cannon, rockets, Sidewinder missile. Projected models include F-105C, tandem-seat trainer; F-105D, single-seat, day fighter-bomber with extra radar; and F-105E, two-place, all-weather fighter-bomber, all powered by GE J-75-10. Span, 34 ft. 11 in.; length, 63 ft. 1 in.; height, 19 ft. 8 in.; gross weight, about 30,000 lb.

CONVAIR F-106 DELTA DART

F-106A—Supersonic all-weather interceptor; completely redesigned F-102; powered by Pratt & Whitney J-75-9 turbojet; speed, about 1,200 mph; other performance classified. Armament, assortment of GAR-1-4 Falcon missiles, MB-1 Genie nuclear-warhead rockets, spin-stabilized rockets; will be used in close coordination with SAGE system. Span, 38 ft. 1½ in.; length, 70 ft. 9 in.; height, 20 ft. 4 in.

F-106B—Two-place version, tandem seating; retains armament of A model.

NORTH AMERICAN F-108

F-108—Mach 3 long-range interceptor; under development; will be powered by two General Electric J-93 turbojets with "high-energy" fuel; speed, about 2,000 mph; cruise altitude, about 70,000 ft.; range, about 1,100 mi. F-108 is designed to shoot down enemy bombers before they reach within 1,000 mi. of US soil, beyond range of SAGE system. Two-man crew have downward-ejection escape capsules. Armament, 3 Hughes GAR-9 atomic-warhead Falcons in weapon bay. Span, about 58 ft.; length, about 80 ft.; height, about 22 ft.; gross weight, about 100,000 lb.—End

F-84F Thunderstreak.

F-89D Scorpion.

F-94C Starfire.

F-101A Voodoo.

F-106A Delta Dart.

F-105 Thunderchief.

F-104A Starfighter.

B-52 Stratofortress, spearhead of SAC.

Gallery of USAF Weapons

THE BOMBERS

B-58 Hustler, showing multipurpose pod.

CONVAIR B-36 PEACEMAKER

B-36J—Heavy bomber; SAC; powered by 6 Pratt & Whitney R-4360-53 reciprocating pusher engines and 4 General Electric J-47-19 turbojets; speed, over 435 mph; ceiling, over 45,000 ft.; range, 10,000 mi. with 10,000-lb. bombload dropped midway; crew of 15. Armament, 16 20-mm cannon, central fire-control system; nuclear capability. Pressurized 80-ft. tunnel connects crew compartment; fuel capacity over 30,000 gallons. Being replaced in SAC by B-52s. Span, 230 ft.; length, 162 ft.; height, 46 ft. 8 in.; gross weight, 370,000 lb.

BOEING B-47 STRATOJET

B-47E—Medium bomber; SAC; powered by 6 General Electric J-47-25 turbojets; speed, over 600 mph; ceiling, over 40,000 ft.; range, over 3,000 mi.; inflight refueling capability; crew of 3. Armament, 2 20-mm cannon in tail. Payload, more than 20,000 lb.; nuclear capability. Some 1,500 B-47s are in USAF service; other versions include RB-47E, recon aircraft; ETB-47E, multipurpose trainer and radar aircraft; B-47K photo and weather recon aircraft; and DB-47E, which can launch GAM-63 Rascal air-to-ground missile. B-47s are now undergoing modification to strengthen them for further service in low-altitude and toss-bombing missions. Span, 116 ft.; length, 107 ft.; height, 28 ft.; gross weight, 200,000 lb.

BOEING B-52 STRATOFORTRESS

B-52D—Heavy bomber; SAC; powered by 8 Pratt & Whitney J-57 turbojets; speed, more than 650 mph; ceiling, over 50,000 ft.; range, more than 6,000 mi.; inflight refueling capability; crew of 6. Armament, 4 .50-cal. machine guns in tail. Payload, over 20,000 lb.; nuclear capability. B-52s are the spearhead of SAC; other versions include B-52C, heavier than earlier models and convertible from bomber to recon mission; B-52E, improved systems; B-52F, new systems, more powerful engines. Span, 185 ft.; length, 156 ft. 6 in.; height, 48 ft. 2 in.; gross weight, more than 400,000 lb.

B-52G—Heavy bomber; SAC; powered by 8 P&W J-57-43s; speed, over 400 knots; ceiling, over 48,000 ft.; range, "significantly more than earlier models." Has revised structure and control surfaces, shorter fin than earlier models, remote-controlled tail turret. Can carry GAM-77 Hound Dog missiles under wings. Has all-weather capability, increased penetration capability.

MARTIN B-57 CANBERRA

B-57B—Light bomber; TAC; powered by 2 Wright J-75-5 turbojets; speed, over 600 mph; ceiling, over 45,000 ft.; range, more than 2,000 mi.; crew of 2, tandem seating. Armament, bombs and rockets, either carried under wings or internally on rotary bomb door; nuclear capability; wing-mounted guns are optional and include 4 20-mm cannon or 8 .50-cal. machine guns. B-57 is USAF version of English Electric Canberra. Other versions include RB-57, recon aircraft; B-57C, dual-control trainer; B-57D, high-altitude test bed; and B-57E, tow-target aircraft. Span, 64 ft.; length, 65 ft. 5 in.; height, 16 ft.; gross weight, over 50,000 lb.

CONVAIR B-58 HUSTLER

B-58—Supersonic medium bomber; SAC; powered by 4 General Electric J-79 turbojets; speed, believed about 1,500 mph; ceiling, over 50,000 ft.; range, classified; crew of 3, tandem seating. B-58 carries pod adaptable to a variety of missions; pod contents may be: nuclear device, fuel, electronic countermeasures, infrared and optical surveillance and recording equipment, or defensive equipment. Armament, T-171 multibarrel 20-mm cannon. Span, 56 ft. 10 in.; length, 96 ft. 10 in.; height, 31 ft. 5 in.; gross weight, with pod, 150,000 lb.

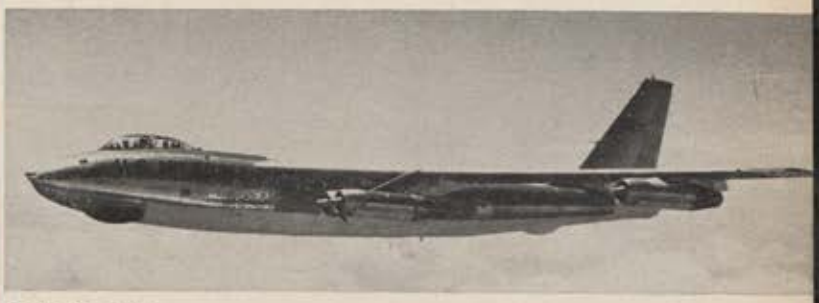
DOUGLAS B-66 DESTROYER

B-66B—Light bomber; TAC; powered by 2 Allison J-71-13 turbojets; speed, 600-700 mph; ceiling, over 45,000 ft.; range, over 1,500 mi.; inflight refueling capability; crew of 3. Armament, 2 20-mm cannon in tail turret. Designed to permit wide selection of bomb combinations; nuclear capability. Originally derived from US Navy's A3D; other versions include RB-66B, night and photo-recon aircraft; RB-66C, for all-weather electronic recon; and WB-66D, with room for 2 weather equipment operators. Span, 72 ft. 6 in.; length, 75 ft. 2 in.; height, 23 ft. 7 in.; gross weight, up to 83,000 lb.

NORTH AMERICAN B-70 VALKYRIE

B-70—Strategic bomber, under development for Mach 3 capability for SAC; to replace B-52s; powered by 6 General Electric J-93 turbojets with "high-speed" fuel, using boron base; speed, over 2,000 mph; ceiling, may be 80,000 ft.; range, over 7,000 mi. at altitude; crew of 4. The so-called chemical bomber; WS-110A. Missiles carried in recess under engine pack, to be either glide-bombing type or air-to-surface missiles. Span, over 185 ft.; length, over 158 ft.; gross weight, about 600,000 lb.—End

B-36 Peacemaker.



B-47 Stratojet.

B-57 Canberra.

B-58 Hustler.

B-66 Destroyer.

THE MISSILES

SM-65 Atlas.

NORTHROP SM-62 SNARK

SM-62—Surface-to-surface, near sonic, strategic intercontinental cruise bombardment missile; SAC. Nuclear warhead. Range, 5,500 nautical mi. Zero-length launched by 2 solid-propellant boost rockets; powered in flight by Pratt & Whitney J-57-17 turbojet. Length, 67 ft. 3 in.; span, 42 ft. 3 in. Guidance, Northrop all-inertial. First Snark squadron activated at Patrick AFB, Fla., December 1957, for training prior to assignment at operational site, Presque Isle AFB, Me.

CONVAIR SM-65 ATLAS

SM-65—Intercontinental ballistic missile (ICBM); SAC. Nuclear warhead. Range, 5,500 nautical mi. Launched vertically; executes programmed roll to desired azimuth and programmed pitch-over to desired flight attitude. Length (est.), 75 ft.; diameter (est.), 10 ft.; stage-and-a-half airframe with liquid-propellant sustainer; thrust about 60,000 lb.; two liquid-propellant boosters in flared-base skirt, each 150,000 lb. thrust; launch weight, over 200,000 lb. WS-107A-1; airframe, Convair; systems engineering, Ramo-Wooldridge; propulsion, North American Rocketdyne; guidance, General Electric and Burroughs; nose cone, General Electric MOSD; warhead, Atomic Energy Comm.; fuze, Sandia Corp.; power supply accessories, American Machine & Foundry. Nonrigid tank section pressurized to provide structural rigidity; guidance now radio-inertial, subsequently all-inertial. Deployment to Cooke AFB, Calif., in 1959; Warren AFB, Wyo., in 1960; and to a third site to be named.

MARTIN SM-68 TITAN

SM-68—Intercontinental ballistic missile (ICBM); under development for SAC. Nuclear warhead. Range, 5,500 nautical mi.; speed, 15,000 mph. Launched vertically; executes programmed roll to desired azimuth and programmed pitch-over to desired flight attitude. Length (est.), 90 ft.; diameter (est.), 10 ft.; 2-stage airframe; launch weight, 200,000 lb.; first-stage engine, liquid propellant, 300,000 lb. thrust; second-stage, 60,000 lb. thrust. WS-107A-2; airframe, Martin; systems engineering, Ramo-Wooldridge; propulsion, Aerojet-General; guidance, American Bosch Arma, Western Electric, and Sperry Rand; nose cone, Avco; warhead, Atomic Energy Comm.; fuze, Sandia Corp.; support equipment, Aerojet-General. Guidance, radio-inertial. By design, Titan is potentially superior to Atlas in range and payload; first flight tests to be late in 1958. First Titan squadron to be deployed to Denver area.

FAIRCHILD SM-73 GOOSE

SM-73—Surface-to-surface diversionary missile, under development for SAC. Range, believed over 500 mi. Designed to help penetrate enemy defenses in case of hostilities.

DOUGLAS SM-75 THOR

SM-75—Intermediate-range ballistic missile (IRBM); SAC. Nuclear warhead. Range, 1,500 nautical mi. Launched vertically; executes programmed roll to desired azimuth; inertial guidance takes over for final pitch to target. Length (est.), 65 ft.; diameter (est.), over 8 ft.; single stage; launch weight, under 100,000 lb.; liquid-propellant rocket, 2 verniers. WS-315A; airframe, Douglas, systems engineering, Ramo-Wooldridge; propulsion, North American Rocketdyne; guidance, AC Spark Plug; nose cone, General Electric MOSD; warhead, Atomic Energy Comm.; fuze, Sandia Corp. In assembly-line production. Deployment, to United Kingdom, late 1958.

CHRYSLER-ABMA SM-78 JUPITER

SM-78—Intermediate-range ballistic missile (IRBM); SAC. Nuclear warhead. Range, 1,500 nautical mi. Launched vertically; autopilot turns to ballistic trajectory where inertial guidance takes over. Length, 58 ft.; diameter, 8 ft. 9 in.; single stage; Army-developed for USAF employment. Airframe, Chrysler; propulsion, North American Rocketdyne; guidance, Sperry Rand; nose cone, Goodyear Aircraft. In production. Deployment, to United Kingdom, late 1958.

MARTIN TM-61 MATADOR

TM-61C—Tactical missile; conventional or nuclear warhead. Powered by Allison J-33-37 turbojet; ground-launched with rocket booster from roadable launcher; can be controlled electronically in flight. Span, 28 ft. 8 in.; length, 39 ft. 8 in.; speed, 650 mph. C model has greater range; guidance system improved over earlier TM-61. Matador in operational units since March 1954, with units in Europe, one on Formosa.

MARTIN TM-76A MACE

TM-76A—Tactical missile (formerly TM-61B); conventional or nuclear warhead. Powered by Allison J-33-41 turbojet; speed, over 650 mph; ceiling, over 40,000 ft.; range, over 650 nautical mi.; ground-launched with booster over 100,000-lb. thrust. Span, 22 ft. 10 in.; length, 44 ft. 3 in. Has self-contained navigation system; B model all-inertial; guidance, Goodyear Aircraft, AC Spark Plug. Developed as successor to Matador. Deployment, to US and allies.

BOEING IM-99 BOMARC

IM-99—Ground-to-air interceptor missile; ADC. Rocket-launched from vertical position by Aerojet-General liquid-propellant booster; cruises on twin Marquardt ramjets; supersonic to Mach 3; range, 200-400 mi.; ceiling, over 68,000 ft.; launch weight, 15,000 lb. IM-99B will be launched by solid propellants. Guidance, ground-controlled through SAGE system and by self-contained Westinghouse Electric homing radar. Span, 18 ft. 2 in.; diameter, 35 in.; length, 46 ft. 10 in. First training unit activated January 1958, Eglin AFB, Fla.; deployment to McGuire AFB, N. J., 1959; other sites to be in Maine, Massachusetts, and New York.

HUGHES GAR-1-2-3-4 FALCON

GAR-1-4—Supersonic, guided, airborne rockets; ADC. Launched by fighter aircraft (F-89H, F-89J, F-101B, F-102); powered by Thiokol solid-propellant rocket. GAR-1 and -3 have semiactive pulse radar guidance; GAR-2 and -4 have passive infrared guidance. Weight, 100 lb.; length, 6 ft. 6 in.; diameter, 6½ in. Designed for internal or under-wing installation. Operational since March 1956.

SM-73 Goose.

SM-78 Jupiter.

SM-75 Thor.

IM-99 Bomarc.

GAR-1 Falcon.

GAR-8 Sidewinder.

NAVAL ORDNANCE GAR-8 SIDEWINDER

GAR-8—Supersonic air-to-air rocket; US Navy development for fleet air defense; programmed for USAF use on F-100D, F-100F, F-104A, and F-105; ADC. Powered by solid-propellant rocket; Philco and General Electric LMEE are among prime contractors; guidance, infrared heat-seeker. Weight, 155 lb.; length, 9 ft. 4 in.; ceiling, over 50,000 ft.

DOUGLAS MB-1 GENIE

MB-1—Air-to-air rocket; ADC. Nuclear warhead. Powered by Aerojet-General rocket. Developed by ARDC for air defense. Became operational January 1957; launched by F-89J in Operation Plumbob, July 1957, at Nevada test site. Formerly called Ding Dong.

BELL GAM-63 RASCAL

GAM-63—Air-to-ground guided missile; in production for SAC. Designed to be carried by strategic bombers (B-47s), released at long range from target; nuclear warhead. Liquid-propellant rocket; guidance components by RCA, Texas Instruments, American Bosch Arma. Length, 32 ft.; diameter, 4 ft.

McDONNELL GAM-72 QUAIL

GAM-72—Air-launched decoy to confuse enemy defenses; undergoing test. Powered by General Electric turbojet; equipped with various countermeasures; can be carried by B-47s, B-52s.

NORTH AMERICAN GAM-77 HOUND DOG

GAM-77—Air-to-ground guided missile, under development for SAC; supersonic. Nuclear warhead. Designed for B-52s. Powered by Pratt & Whitney J-52 turbojet; inertial guidance. Range, several hundred miles. Deployment for SAC in 1960.—END

SM-62 Snark.

TM-61 Matador.

TM-76 Mace.

B-50 test bed drops GAM-63 Rascal.

THE TRANSPORTS

BOEING C-97 STRATOFREIGHTER

C-97C—Transport; powered by 4 Pratt & Whitney R-4360-35A reciprocating engines; speed, over 350 mph; ceiling, 35,000 ft.; range, 4,300 mi.; crew of 5. Cargo capacity, 68,500 lb. or 130 troops. Span, 141 ft. 3 in.; length, 110 ft. 4 in.; height, 38 ft. 3 in.; gross weight, 175,000 lb.

DOUGLAS C-118 LIFTMASTER

C-118A—Transport; powered by 4 Pratt & Whitney R-2800-CB-17 reciprocating engines; speed, over 360 mph; ceiling, over 25,000 ft.; range with maximum payload, 3,393 mi.; crew of 5. Cargo capacity, 25,500 lb. or 76 troops. Span, 117 ft. 6 in.; length, 106 ft. 6 in.; height, 28 ft. 8 in.; gross weight, 107,000 lb.

FAIRCHILD C-119 FLYING BOXCAR

C-119G—Transport; powered by 2 Wright R-3350-85 reciprocating engines; speed, 250 mph; ceiling, over 30,000 ft.; range, 2,000 mi. with 10,000 lb.; crew of 5. Cargo capacity, 30,000 lb. or 62 troops. Span, 109 ft. 4 in.; length, 86 ft. 6 in.; height, 26 ft. 3 in.; gross weight, 75,000 lb.

LOCKHEED C-121 SUPER CONSTELLATION

C-121—Transport; powered by 4 Wright R-3350 turbo compound engines; speed, 370 mph; ceiling, over 25,000 ft.; range, over 4,000 nautical mi.; crew of 5. Cargo capacity, 40,000 lb. or 106 passengers. Span, 123 ft.; length, 116 ft.; height, 23 ft.; gross weight, 125,000 lb.

FAIRCHILD C-123 PROVIDER

C-123B—Transport; powered by 2 Pratt & Whitney R-2800-99W reciprocating engines; speed, 208 mph; cruise speed, 186 mph; ceiling, over 25,000 ft.; range, about 1,000 mi. with normal payload; maximum range, 2,400 mi.; crew of 2. Cargo capacity, 16,000 lb. or 60 troops. Span, 119 ft.; length, 76 ft. 3 in.; height, 34 ft. 1 in.; gross weight, 60,000 lb.

C-130 Hercules.

C-131 Samaritan.

DOUGLAS C-124 GLOBEMASTER

C-124C—Transport; powered by 4 Pratt & Whitney R-4360-63 reciprocating engines; speed, over 300 mph; ceiling, over 30,000 ft.; range, up to 4,000 mi. with lighter loads; crew of 5. Cargo capacity, 74,000 lb. or 200 troops. Span, 174 ft. 2 in.; length, 130 ft.; height, 48 ft. 4 in.; gross weight, 158,000 lb.

LOCKHEED C-130 HERCULES

C-130A—Transport; powered by 4 Allison T-56-1A turboprop engines; speed, 354 mph cruising; maximum speed, 369 mph; ceiling, over 30,000 ft.; range, 1,730 mi. with payload, 2,800 mi. with maximum fuel; crew of 4. Cargo capacity, 36,900 lb. or 90 troops or 70 litter patients. Span, 132 ft. 7 in.; length, 97 ft. 9 in.; height, 38 ft. 9 in.; gross weight, 108,000 lb.

CONVAIR C-131 SAMARITAN

C-131B—Transport; powered by 2 Pratt & Whitney R-2800-103W reciprocating engines; speed, over 300 mph; ceiling, over 20,000 ft.; range, 1,900 nautical mi.; crew of 2. Cargo capacity, 48 passengers. Span, 105 ft. 4 in.; length, 79 ft. 3 in.; height, 28 ft. 1 in.; gross weight, 47,000 lb.

DOUGLAS C-133 CARGOMASTER

C-133A—Transport; powered by 4 Pratt & Whitney T-34-7W turboprop engines; maximum speed, 357 mph; ceiling, 27,600 ft.; service ceiling, 38,700 ft.; range, 1,500 nautical mi. with maximum payload; 3,700 nautical mi. with maximum fuel; crew of 4. Cargo capacity, 41,700 lb. for 3,500 nautical mi. or 95,000 lb. for 1,500 mi. Span, 179 ft. 8 in.; length, 157 ft. 6 in.; height, 48 ft. 3 in.; gross weight, 275,000 lb.—End.

C-97 Stratofreighter.

C-118 Liftmaster.

C-121 Super Constellation.

C-123 Provider.

(Above) C-133 Cargomaster. (Below) C-124 Globemaster.

Gallery of USAF Weapons

THE TANKERS

BOEING KC-97 STRATOFREIGHTER TANKER

KC-97G—Tanker version of C-97C; powered by 4 Pratt & Whitney R-4360-59B reciprocating engines; speed, over 350 mph; ceiling, over 35,000 ft.; range, over 2,000 mi.; crew of 5. Aircraft can carry cargo while in tanker configuration; equipped with flying boom. Span, 141 ft. 3 in.; length, 117 ft. 5 in.; height, 38 ft. 4 in.; gross weight, 175,000 lb.

BOEING KC-135 STRATOTANKER

KC-135—Jet tanker; military version of Boeing 707 Jetliner; powered by 4 Pratt & Whitney J-57-43W turbojets; speed, more than 600 mph; ceiling, 42,000 ft.; range, more than 4,000 mi.; crew of 4. KC-135's primary mission is to refuel B-52s; also has capability of carrying up to 145 passengers or 50,000 lb. of freight; designed as replacement for KC-97s; equipped with high-speed flying boom refueling equipment. Span, 130 ft. 10 in.; length, 136 ft. 3 in.; height, 38 ft. 5 in.; gross weight, over 250,000 lb.—END

KC-97G Stratofreighter.

B-52 with KC-135 Stratotanker.

Gallery of USAF Weapons

RECON AIRCRAFT

REPUBLIC RF-84F THUNDERFLASH

RF-84F—Modified F-84F; same performance characteristics as fighter version. Tri-metrogen camera in nose.

McDONNELL RF-101 VOODOO

RF-101—Modified F-101A; same high-performance characteristics as fighter version. Longer nose contains automatic camera gear; no guns.

BOEING RB-47 STRATOJET

RB-47K—Photo and weather recon; same performance characteristics as bomber. Longer nose, more windows, air-conditioned camera compartment instead of bomb bay.

BOEING RB-50 SUPERFORTRESS

RB-50—B-50s have been widely used in photo recon, weather recon (WB-50), and as tankers (KB-50); powered by 4 Pratt & Whitney R-4360-35 reciprocating engines; speed, over 400 mph; ceiling, over 40,000 ft.; range, over 6,000 mi.

MARTIN RB-57 CANBERRA

RB-57D—Recon version of B-57B; for use over 55,000 ft.

DOUGLAS RB-66 DESTROYER

RB-66—Recon version of B-66B; various versions.

LOCKHEED RC-121C SUPER CONSTELLATION

RC-121C—Early-warning version of C-121.—END

RF-84F Thunderflash.

RB-47K Stratojet.

RB-57 Canberra.

RB-66 Destroyer.

WB-50 Superfortress.

RC-121C Super Constellation.

Gallery of USAF Weapons

THE TRAINERS

NORTH AMERICAN T-28

T-28A—Primary and basic trainer; powered by Wright R-1300-1A reciprocating engine; speed, 245 knots; ceiling, over 25,000 ft.; range, 900 nautical mi.; gross weight, 7,000 lb.

CONVAIR T-29 FLYING SCHOOLROOM

T-29D—Navigation trainer; powered by 2 Pratt & Whitney R-2800-99W reciprocating engines; speed, 260 knots; ceiling, 24,000 ft.; range, 1,500 nautical mi.; capacity, 6 students, 2 instructors. Span, 91 ft. 10 in.; length, 74 ft. 8 in.; height, 27 ft. 4 in.; gross weight, 40,000 lb.

LOCKHEED T-33 SHOOTING STAR

T-33—Jet trainer; powered by Allison J-33-35 turbojet; speed, 600 mph; ceiling, over 45,000 ft.; range, over 1,000 mi.; tandem seating. Span, 35 ft. 6 in.; length, 37 ft. 8 in.; height, 11 ft. 7 in.; gross weight, 16,000 lb.

BEECH T-34 MENTOR

T-34A—Primary trainer. One Continental 0-470-13A reciprocating engine; speed, 190 mph; ceiling, 20,000 ft.; range, 975 mi.; tandem seating. Span, 32 ft. 10 in.; length, 26 ft.; height, 9 ft. 8 in.; gross weight, 2,900 lb.

CESSNA T-37

T-37A—Primary jet trainer; powered by 2 Continental J-69-T-9 turbojets; speed 350 mph; ceiling, 34,400 ft.; range, 520 nautical mi.; side-by-side seating. Span, 33 ft. 10 in.; length, 29 ft. 4 in.; height, 9 ft. 5 in.; gross weight, 6,465 lb.

NORTHROP T-38

T-38—Jet trainer; under development for high-speed subsonic and supersonic pilot training; intended to succeed T-33 as standard USAF trainer; believed to be powered by either 2 General Electric J-85 or 2 Fairchild J-83 turbojets; speed, believed about 850 mph; ceiling, over 55,000 ft.; range, over 1,000 nautical mi.; tandem seating. Designed for supersonic techniques, multijet handling, aerobatics, night flying, instrument training, or cross-country navigation. Span, 25 ft. 4 in.; length, 43 ft. 5 in.; height 11 ft. 11 in.; gross weight, about 11,000 lb.—END

Convair T-29.

Lockheed T-33.

Beech T-34.

Cessna T-37.

Northrop T-38.

Gallery of USAF Weapons

RESCUE AIRCRAFT

SIKORSKY H-19

H-19—Powered by Pratt & Whitney R-1340-57 reciprocating engine; speed, over 100 mph; range, 500 mi. "B" and "D" versions have R-1300-3 engine, improved performance. Capacity, 10 passengers or 2,500 lb.

VERTOL H-21 WORKHORSE

H-21B—Powered by Wright R-1820-103 engine; speed, 140 mph; range, more than 600 mi.; can carry 12 litters or 20 troops.

KAMAN H-43

H-43B—Powered by Lycoming T-53 turbine engine; speed, about 145 mph; ceiling, 26,000 ft.; range, 150 nautical mi.; seats eight.

GRUMMAN SA-16 ALBATROSS

SA-16—Search and rescue amphibian; powered by 2 Wright R-1820-76A engines; range, 2,500 mi.; 10 passengers.—END

EXPERIMENTAL

LOCKHEED X-7

X-7—Supersonic ramjet test vehicle, designed and built for Air Research and Development Command by Lockheed's Missile Systems Div.; powered by Marquardt Aircraft ramjet. Launched at altitude from B-29; rocket-boosted to speed at which ramjet takes over to accelerate to designed speed; supersonic in level flight at altitude. X-7 also used as test bed for development of other missile components.

NORTH AMERICAN X-10

X-10—Supersonic test vehicle, developed in connection with now-defunct Navaho SM-64 missile program (canceled in July 1957). Powered by two turbojets; supersonic. X-10 designed as a parachute-recoverable vehicle for testing advanced aerodynamic design and electronic systems.

RYAN X-13 VERTIJET

X-13—Jet-powered vertical-takeoff-and-landing (VTOL) research aircraft, to explore possibility of VTOL as one answer to problem of providing adequate runway facilities for modern high-speed jets. X-13 rises vertically on exhaust column for ground-service trailer, makes transition to high-speed horizontal flight, returns to vertical hovering at zero air speed, and hooks onto trailer again for landing.

BELL X-14

X-14—Jet-powered vertical-rising aircraft, using system known as thrust-diverter to enable X-14 to rise vertically, transition to horizontal flight, and land in limited areas while still in horizontal attitude. Engines remain stationary through all stages of flight; transition made by system of vanes and deflecting tailpipe to divert thrust flow downward for vertical flight. Stability control during takeoff and low-speed flight provided by ejection of compressed air from wing-tip nozzles and tail. Span, 34 ft.; length, 25 ft.

NORTH AMERICAN X-15

X-15—Hypersonic reentry-research rocket plane; under development; to be powered by Reaction Motors liquid-propellant engine; designed for initial flights above 100-mi. altitude and at speeds of about 3,600 mph (one mi. a second). Project of USAF and NACA, with financial support from US Navy. Advanced flight instrument system, developed by Sperry Gyroscope Co., designed to help X-15 pilot control X-15 as the rocket plane reenters denser atmosphere. Instrument system for X-15 to be tested in McDonnell F-101 Voodoo test beds.

LOCKHEED X-17

X-17—Three-stage, solid-propellant missile used in reentry tests; developed and built by Lockheed Missile Systems Div. X-17 weighs more than 12,000 lb., has reached speeds of 9,000 mph. Launched vertically. Height, 40 ft.; payload, 75-lb. instrument package.—END

Lockheed X-7.

Ryan X-13.

Bell X-14.

Lockheed X-17.

North American X-10.

Sikorsky H-19.

Vertol H-21.

Grumman SA-16.

Force in Being

THE BASES

IN THE past the primary military air weapon, the aircraft, stood on its own. Specifications were laid down by operational experts, and industry was expected to come up with a vehicle to do the job. As demonstrated during World War II and before, it made little difference whether the planes operated from grass, steel planking, or lightweight strips. Although maintenance was performed preferably in a hangar or protective shelter, physical facilities had little or no effect on the weapon's operational capability.

The design and location of the air base structure, its construction, its maintenance, and, to a great extent, its operation are problems which are rapidly increasing in complexity. They place additional demands on the installation engineer who is responsible for this portion of the weapon system.

Now, B-52s, weighing some 350,000 pounds, operate from runways of concrete, varying from sixteen to twenty-two inches in thickness. These giant bombers require heavy-duty parking aprons and modern airfields designed to move them quickly to takeoff position. Automatic fueling and auxiliary power systems are a necessity.

Missiles are completely dependent on ground support. Where the earlier aircraft were wheeled from the hangar, the missile hangar, or shelter, is part of the weapon. Automatic doors, electrically controlled hydraulic lifts to raise the missile into launching position, complicated auxiliary systems to furnish liquid oxygen, helium, and compressed air are actual components of the missile system. If any one fails, the missile fails.

The installations engineer daily plays a more important part in Air Force planning.

His scope of activity has been broadened. The demand for increased, superior technical knowledge on his part has grown with the increasing complexity of the weapon system.

The Air Force base complex has grown in value from $8.5 billion in mid-1957 to an estimated $10 billion today. Active bases number 274 major operational, training, logistic, and research installations—172 in the US and territories and 102 in thirty foreign countries.

Construction of new major Air Force installations has reached a plateau and, with the current authorization of 117 wings, officials anticipate little change during the next few years. But a major change in air base utilization is taking place. In the past, it was common to associate a base with a specific command—ADC, SAC, TAC, etc. Today a typical SAC base may house also an air defense squadron. A Research and Development or Air Materiel Command base may support SAC bombers and a tanker fleet. More and more the bases will have several missions and support the operations of more than one Air Force command.

Air Force base construction continues to cost more than $1 billion a year. Most of the money now goes into projects on the North American continent and in US territories. For fiscal year 1959 only seventeen percent of the funds asked of Congress is for construction outside the United States. Of this, $74 million, or only six percent, is for projects in foreign countries. This reduction in foreign construction is attributed to the growth of the long-range bomber fleet and contributions of our allies to their own defense.

With completion this year of major projects at four Spanish bases, the last of the large Air Force bases currently planned for Europe, future expenditures in foreign lands will, for the most part, cover modernization of the air defense network, operational and support facilities at SAC staging bases, and installations for additional tactical and intermediate-range missile units.

In the US, the most important current programs are in these five areas:

- Dispersal of SAC bombers and supporting tankers;
- Missile installations;
- Air defense warning systems;
- Air Force Academy;
- Personnel facilities and family housing.

Dispersal and speed of reaction of Air Force long-range bombers are increasingly important. In 1956, the Air Force initiated a dispersal program to preclude destruction of our bomber force by surprise attack. Under this plan, the Air Force's programmed thirty-three B-52 squadrons will be dispersed on the basis of one squadron to a base. Through last year construction was programmed for twenty-seven B-52 bases, and Congress early this year approved funds to begin the other six bases in the program. The Air Force also wants to deploy medium bombers on the basis of one wing to a base. Construction of Richard Bong Air Force Base, Wis., a medium bomber wing installation, was well under way this year. Aerial tankers will move with B-47 and B-52 units to new or revamped facilities.

Closely coupled with dispersal is the need for quick response. The Air Force in 1956 began to modify existing airfields so that portions of the heavy bomber fleet could take off in minimum time. More recently the Air Force announced its objective to keep one-third of its bomber forces ready to take off within fifteen minutes after warning of enemy attack. To implement this program, redesigned parking aprons and taxiways were needed. In addition, more support equipment, utilities, and facilities where crew members can eat and sleep became a necessity. Construction of these facilities at fourteen bases was authorized early this year. The Air Force plans to build more during 1959.

New facilities for strategic and defensive missiles are also under way. Cooke Air Force Base, a 64,000-acre reservation in central California, is rapidly approaching an operational capability. Facilities at Cooke will include some 200 buildings for storing, servicing, and launching the massive Atlas missile and supporting several thousand missilemen. Because of its nearness to the Pacific Ocean, Cooke, besides being an operational ICBM base, will be used for research and development and also as a training base for Thor squadrons.

Ground was broken at Francis E. Warren Air Force

(Continued on page 69)

"TAC" . . . aerial firebreak against brush fire wars

In spite of the tremendous retaliatory action our Air Force can take in case of attack, the United States Army bears the burden of stamping out the brush fire wars which might ignite the holocaust of World War III. In this heavy responsibility our GIs are backed by the Tactical Air Command which is ready around the clock to provide the Army with the air support without which modern foot soldiers cannot survive. But fire fighting in Kansas or Korea is a dangerous business and TAC will go all out to give its pilots every protection, including Kaman H-43 local crash rescue helicopters.

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NUCLEAR DIVISION • ALBUQUERQUE, NEW MEXICO

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CECO

SYSTEMS | CONTROLS

Base, Wyo., this spring for a missile-launching complex and plans have been announced for additional intercontinental ballistic missile installations at Fairchild Air Force Base, Wash., and Offutt Air Force Base, Neb. The fiscal year 1959 construction program will provide another Atlas base at an unannounced location and facilities in the Denver area for development of the Titan.

The Air Force's first Atlas units are scheduled to become operational in 1959. The initial bases must be ready by that time and construction has been accelerated. Whereas original plans called for Atlas facilities at Francis E. Warren AFB to be completed first, it has now been decided to proceed simultaneously with facilities at Offutt and Fairchild.

Four Bomarc installations are now under way in the northeastern sector of the country. Bases at Dow AFB, Me., McGuire AFB, N. J., Otis AFB, Mass., and Suffolk Country AFB, L. I., N. Y., will house the new air defense missile. Bomarc crews will be trained with production-line missiles at Elgin AFB, Fla., and will move to the new installations during 1959. The ultimate cost of each Bomarc installation is expected to be thirty percent less than initial estimates.

A typical Bomarc installation will consist of a launcher, control facilities, and missile site support area requiring about 100 acres. Much of the support equipment is mobile. The launchers, maintenance shop, and fuel storage are the principal permanent installations. Gas storage containers, compressors, refrigeration systems, and other components are to be consolidated. The Bomarc launchers are a series of shelters each about the size of a garage. If an alert signal is received, a movable roof section moves to the side and a hydraulically activated lift raises the Bomarc to firing position.

To save money, the Bomarc installations, wherever possible, are being built on or adjacent to Air Force bases which will house and support the missile crews.

A major contribution to the air defense of the North American continent was the completion of the DEW Line, an early warning radar network stretching some 3,000 miles from Alaska to the eastern coast of Canada. Its more than fifty main, auxiliary, and intermediate stations were constructed at a cost of nearly $300 million.

Air Force planners are now ready to begin construction of a Ballistic Missile Early Warning System to augment the DEW Line's capabilities. Early this year, Congress provided substantial funds for construction of this new complex of isolated installations.

Complementing and providing control of the warning and interception systems is SAGE (Semi-Automatic Ground Environment System), designed to track enemy intruders and vector interceptors toward them on a collision course. The first SAGE center, a four-story structure of concrete and steel, was dedicated in June at McGuire Air Force Base, N. J. During fiscal year 1959, additional centers are expected to become operational. Eventually the SAGE network will encompass some twenty-nine strategically located direction centers.

In September more than 1,200 Air Force Academy cadets will move into new quarters north of Colorado Springs. The quarter-mile-long rectangular quarters building and academic complex are the major projects nearing completion. Soon to follow this year are the administration building, base exchange, physical education facilities, and a social center. Twelve hundred family housing units are under construction. A 135-bed hospital and an interdenominational chapel are planned. Airfield construction is deferred pending additional funds from Congress.

The dining hall encloses 9,000 square feet of space on one level. The clear-span steel roof was prefabricated on the ground and raised to position by hydraulic jacks. The dining hall, as well as the theater, will accommodate 3,000 persons.

The Academy, one of the largest construction projects in the US, is now approximately seventy-five percent complete and work on remaining structures is progressing at a rate of $7 million a month. When current work is completed, the new Academy will represent an investment of over $134 million and reflect the skill and know-how of some 200 prime and 400 subcontractors. More than 4,000,000 square feet of facilities will be under roof.

Family housing and personnel facilities continue to be a major concern. Construction of medical, recreational, community facilities, and housing, both for airmen and families, now have a priority equal to that of operational facilities. During 1959, 16,656 airmen will move into modern quarters. Dining halls to accommodate 20,000 people are scheduled for completion. Also under way are thirty-one service and NCO clubs, ten gymnasiums and recreation workshops, and seventeen chapels. Most of the funds are being spent at ZI installations such as Robins AFB, Ga., where ground has been broken for a dining hall, service club, gym, and four 200-man dormitories with semiprivate rooms.

The Air Force will have under contract ninety-five percent of its current active Capehart Housing program by July 1959. Air Force is also seeking authorization to build family quarters for lower grade airmen but needs congressional approval.

At current count, the Air Force has provided 103,800 family units through Military Construction Funds, the National Housing Act, barter agreements with foreign governments, and rental guarantee programs overseas.

Capehart Housing built under Title VIII of the National Housing Act has been enthusiastically received at eight bases where 4,191 family units have been completed; 49,183 additional quarters are in various stages of approval, design, or construction.

The Air Force is providing family housing at remote aircraft control and warning stations. Over 430 units have been built, with 1,914 authorized. With congressional approval, 777 additional quarters will be built during 1959 with appropriated funds. Most of these are planned for overseas.

Modernization and refinements of weapon systems have complicated the day-to-day job of the Air Force's professional corps of 5,000 military and civilian installation engineers. A concerted effort is now being made to interest engineers currently assigned to other duty and engineering graduates of the Air Force ROTC program in the installation engineer field. Qualified personnel may attend resident installation engineering courses offered under the USAFIT training program. Although some forty-six percent of the Air Force's IE officers possess engineering degrees, there is a continuing program to upgrade their professional qualifications.

What type bases will these men plan, build, and maintain ten years from now?

Although it is the objective of Air Force planners to design on the basis of "what we will need tomorrow," they acknowledge that constant advances in technology pose many problems. However, they believe that multimission bases, coupled with satellited off-base stations, will economically and efficiently satisfy the changing requirements and expansion needs of the foreseeable future.—END

Guide to Air Force Bases

WHERE THEY ARE

WHAT THEIR JOBS ARE • HOW THEY WERE NAMED

AERONAUTICAL CHART & INFORMATION CENTER, Mo., 2d and Arsenal Sts., St. Louis. Maps and charts, MATS.

ALLEN AFB. (See Ethan Allen AFB.)

ALTUS AFB, Okla., 2 mi. E of Altus. Heavy bomber base, 2d AF, SAC. Named for city.

AMARILLO AFB, Tex., 14 mi. SE of Amarillo. 3320th Technical Training Wing; jet mechanics and airframe repair schools, ATC. Named for nearby city.

ANDREWS AFB, Md., 1 mi. E of Camp Springs, 11 mi. SE of Washington, D. C. Hq., ARDC; fighter-interceptor base, EADF, ADC. Formerly Camp Springs AAB, renamed for Lt. Gen. Frank M. Andrews, airpower pioneer, CG of US forces in Europe, killed in aircraft accident, Iceland, 1943.

ARDMORE AFB, Okla., 16 mi. NE of Ardmore. Troop carrier base, 9th AF, TAC. Named for city.

ARNOLD ENGINEERING DEVELOPMENT CENTER, Tenn., 10 mi. E of Tullahoma. Hq., AEDC, ARDC. Named for Gen. H. H. "Hap" Arnold, WW II AF CG.

BAINBRIDGE AB, Ga., 7 mi. NW of Bainbridge. Primary contract pilot training, ATC. Named for city.

BAKALAR AFB, Ind., 3 mi. N of Columbus. Reserve training, 10th AF, CONAC. Formerly Atterbury AFB, renamed for Lt. John E. Bakalar, WW II fighter pilot, killed in France, September 1944.

BARKSDALE AFB, La., 1 mi. S of Bossier City, 6 mi. E of Shreveport. Hq., 2d AF, SAC; strategic bomber base. Named for Lt. Eugene H. Barksdale, WW I pilot killed near Wright Field, Ohio, August 1926, while testing observation-type plane.

BARTOW AB, Fla., 5 mi. NE of Bartow. Primary contract pilot training, ATC. Named for city.

BEALE AFB, Calif., 11 mi. SE of Marysville. Aircraft operational area under construction for SAC mission, 15th AF, SAC. Formerly Camp Beale, named for Brig. Gen. Edward F. Beale, California Indian agent before the Civil War.

BERGSTROM AFB, Tex., 7 mi. SE of Austin. Tactical fighter base, 12th AF, TAC. Formerly Del Valle AAB, renamed for Capt. John A. E. Bergstrom of Austin, killed at Clark Field, P. I., December 1941, during Japanese bombardment.

BIGGS AFB, Tex., 6 mi. NW of El Paso. Heavy bomber base, 15th AF, SAC. Named for Lt. James B. Biggs, WW I fighter pilot, killed in an accident in France, October, 1918.

BLYTHEVILLE AFB, Ark., 3 mi. NW of Blytheville. Air base squadron. 2d AF, SAC. Named for nearby city.

BOLLING AFB, 3 mi. S of Washington, D. C. Hq. Command, USAF. Named for Col. Raynal C. Bolling, Asst. Chief of Air Service, died saving life of a 19-year-old private near Amiens, France, 1918.

BONG AFB. (See Richard Bong AFB.)

BROOKLEY AFB, Ala., 3 mi. SSW of Mobile. Air Materiel Area, AMC; foreign clearing station, MATS. Formerly Bates Field, renamed for Capt. Wendell H. Brookley, test pilot, killed in BT-2B crash near Bolling Field, February 1934.

BROOKS AFB, Tex., 7 mi. SSE of San Antonio. Reserve training, 10th AF, CONAC; Hq., Air Evacuation, MATS. Formerly Gosport Field, renamed for Lt. Sidney J. Brooks, Jr., of San Antonio, killed in air crash near Hondo, Tex., November 1917, on final day of cadet training and commissioned posthumously.

BRYAN AFB, Tex., 6 mi. WSW of Bryan. ATC. Named for city.

BUNKER HILL AFB, Ind., 2 mi. E of Bunker Hill. Air refueling base, 8th AF, SAC; fighter-interceptor base, EADF, ADC. Former naval air station. Named for city.

BURLINGTON MUNICIPAL AP, Vt., 3 mi. E of Burlington. Fighter-interceptor base, EADF, ADC. Named for city. Housing at Ethan Allen AFB, Vt.

CAMPBELL AFB, Ky., 14 mi. S of Hopkinsville. Air base squadron, 8th AF, SAC. Formerly Fort Campbell. Named for Gen. William Bowen Campbell, 19th century Tennessee governor, Indian fighter, and public figure.

CANNON AFB, N. M., 7 mi. W of Clovis. Tactical bomber base, 12th AF, TAC. Formerly Clovis AFB, renamed for Gen. John K. Cannon, TAC Commander from 1950-54, who was Commander of Allied AFs in the Mediterranean in WW II.

CARSWELL AFB, Tex., 7 mi. WNW of Fort Worth, 2d AF, SAC; heavy bomber base. Formerly Tarrant Field, renamed for Maj. Horace S. Carswell, Jr., of Fort Worth, WW II B-24 pilot and winner of CMH, killed in China, October 1944.

CASTLE AFB, Calif., 7 mi. NW of Merced. Heavy bomber base, 15th AF, SAC; fighter-interceptor base, WADF, ADC. Formerly Merced Field, renamed for Brig. Gen. Frederick W. Castle, WW II B-17 pilot and winner of CMH, killed over Germany, 1944.

CHANUTE AFB, Ill., 1 mi. SE of Rantoul. Aircraft maintenance and weather schools, home of 3499th Field Training Wing, ATC. Named for Octave Chanute, aviation pioneer and navigation engineer, died in US, 1910.

CHARLESTON AFB, S. C., 10 mi. N of Charleston. Air transport base, EASTAF, MATS; fighter-interceptor base, EADF, ADC. Named for city.

CHELI AF STATION, Calif., 1 mi. WSW of Maywood. Specialized depot, AMC. Named for Maj. Ralph Cheli, CMH winner, died March 6, 1944, while a Japanese prisoner.

CLINTON CO. AFB, Ohio, 2 mi. SE of Wilmington. Reserve training, 14th AF, CONAC. Named geographically.

CLINTON SHERMAN AFB, Okla., 1 mi. W of Burns Flat. Under construction for 2d AF, SAC mission. Formerly Clinton NAS.

COLUMBUS AFB, Miss., 9 mi. N of Columbus. Air base squadron, 2d AF, SAC. Named for city.

CONNALLY AFB. (See James Connally AFB.)

COOKE AFB, Calif., 10 mi. NW of Lompoc. Hq., 1st Missile Div., SAC. Former Army post. Named for Philip St. George Cooke, distinguished American soldier, explorer, Indian fighter, and author.

CRAIG AFB, Ala., 5 mi. SE of Selma. Instructor pilot training, ATC. Named for Bruce K. Craig, flight engineer for B-24 manufacturer, killed during B-24 test flight in US, 1941.

DALLAS NAS, Tex. (Hensley Field), 11 mi. SSW of Dallas. Reserve training, 10th AF, CONAC; joint use with Navy. Named for Maj. William N. Hensley, airpower pioneer, died in US, 1929.

DAVIS FIELD, Okla., 6 mi. S of Muskogee. Reserve training; fighter-bomber base, 10th AF, CONAC. Named locally.

DAVIS-MONTHAN AFB, Ariz., 4 mi. SE of Tucson. Medium bomber base, 15th AF, SAC; fighter-interceptor base, CADF, ADC. Formerly Tucson Municipal Airport, renamed for Lt. Samuel H. Davis, killed in US, 1921, and Lt. Oscar Monthan, bomber pilot who was killed in Hawaii in 1924.

DOBBINS AFB, Ga., 2 mi. SE of Marietta. Reserve training, 14th AF, CONAC, EADF, ADC, joint use. Formerly Marietta AFB, renamed for Capt. Charles M. Dobbins, killed transporting paratroopers over Sicily, July 1943.

DONALDSON AFB, S. C., 7 mi. SSE of Greenville. EASTAF, MATS; troop carrier base. Formerly Greenville AFB, renamed for Maj. John O. W. Donaldson, US ace in WW I, killed in flying accident near Philadelphia, September 1930, during performance at aerial circus.

DOVER AFB, Del., 3 mi. SE of Dover. Air transport base, EASTAF, MATS; fighter-interceptor base, EADF, ADC. Named for city.

DOW AFB, Me., 2 mi. W of Bangor. Air refueling base, 8th AF, SAC. Formerly Bangor AB, renamed for 2d Lt. James F. Dow of Oakfield, Me., killed in crash near Mitchel Field, June 1940.

DULUTH MUNICIPAL AP, Minn., 7 mi. NNW of Duluth. Fighter-interceptor base, CADF, ADC. Formerly Williamson-Johnson AP.

DYESS AFB, Tex., 6 mi. SW of Abilene. Medium bomber base, 15th AF, SAC. Formerly Tye Field, Abilene Municipal Airport, and Abilene AFB, renamed for Lt. Col. William E. Dyess of Albany, Tex., WW II fighter pilot in South Pacific, killed in P-38 crash in December 1943 in California.

EDWARDS AFB, Calif., 2 mi. S of Muroc. Hq., AF Flight Test Center, ARDC. Formerly Muroc AFB, renamed for Capt. Glen W. Edwards, test pilot, killed at Muroc Field, June 1948, in crash of YB-49 "Flying Wing."

EGLIN AFB, Fla., 2 mi. SW of Valparaiso. Hq., Air Proving Ground Center; ARDC. Named for Lt. Col. Frederick I. Eglin, killed in US, 1937.

EGLIN AF AUXILIARY FIELD #9 (Hurlburt Field), Fla., 6 mi. W of Fort Walton. Missile training, ADC. On Eglin AFB reservation.

ELLINGTON AFB, Tex., 16 mi. SE of Houston. Air Reserve, 10th AF, CONAC. Named for 2d Lt. Eric L. Ellington, killed during training flight near San Diego, 1913.

ELLSWORTH AFB, S. D., 8 mi. NE of Rapid City. Heavy bomber wing, 15th AF, SAC; fighter-interceptor base, CADF, ADC. Formerly Rapid City AFB, renamed for Brig. Gen. Richard E. Ellsworth, killed in B-36 crash in Newfoundland, March 18, 1953.

ENGLAND AFB, La., 6 mi. NNW of Alexandria. Tactical fighter base, 12th AF, TAC. Formerly Alexandria AFB, renamed for Lt. Col. John B. England, WW II ace killed in air crash in France, November 17, 1954.

ENT AFB, Colo., Colorado Springs, Hq., ADC. Named for Maj. Gen. Uzal G. Ent, CG, 2d AF, recipient of DSC, died in 1948.

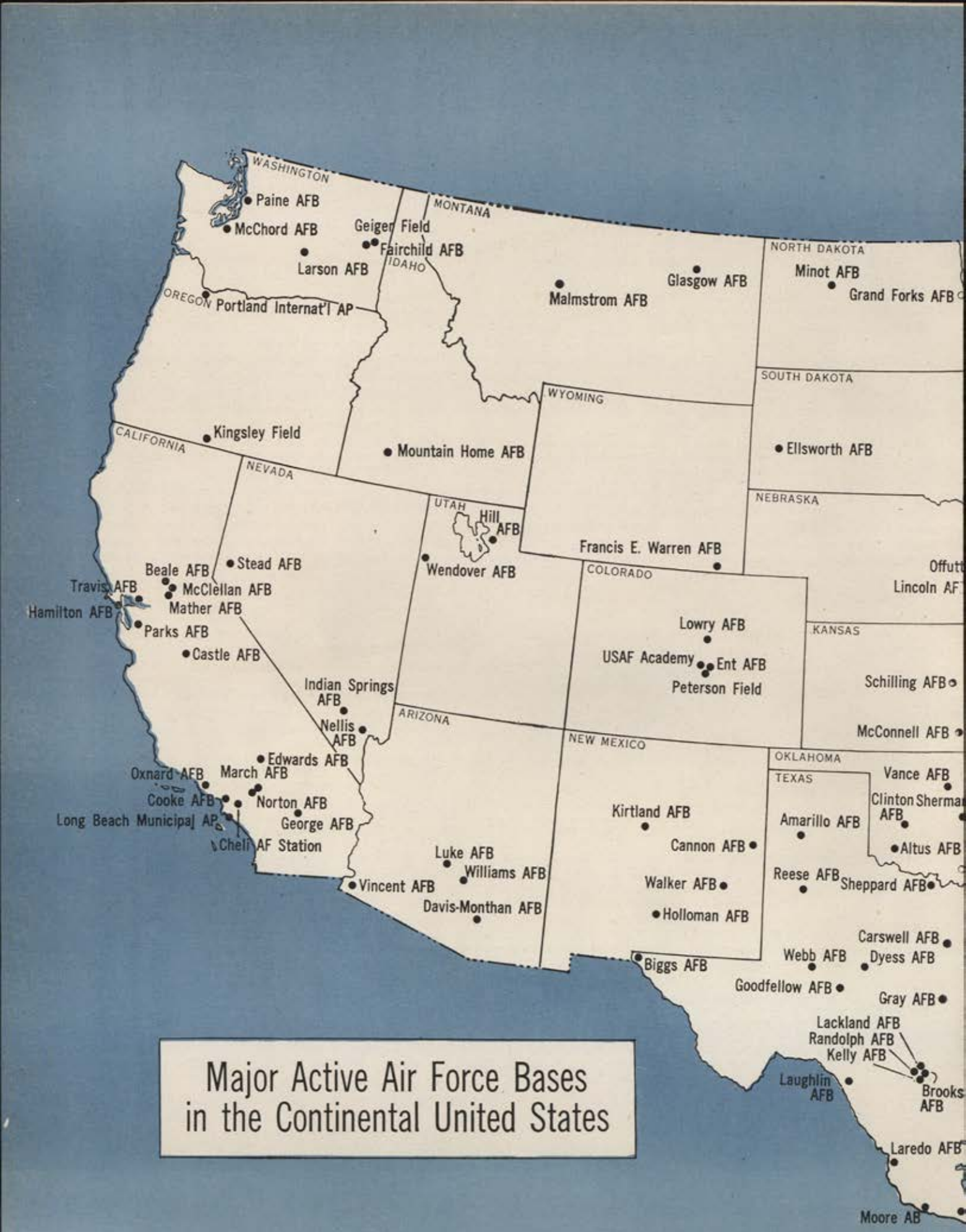
ETHAN ALLEN AFB, Vt., 2 mi. E of Winooski. Housing and administration for Burlington Municipal AP, EADF, ADC. Named for the famed Revolutionary War leader of the Green Mountain Boys.

FAIRCHILD AFB, Wash., 11 mi. WSW of Spokane. Heavy bomber base, 15th AF, SAC. Formerly Spokane AFB, re-

(Continued on page 75)

Glossary of Terms Used in Guide to AFBs

AAB	Army Air Base
AB	Air Base
ADC	Air Defense Command
AEDC	Arnold Engineering Development Center
AF	Air Force
AFB	Air Force Base
AFROTC	Air Force Reserve Officers Training Corps
AMC	Air Materiel Command
AP	Airport
ARDC	Air Research and Development Command
ATC	Air Training Command
AU	Air University
AWS	Air Weather Service
CADF	Central Air Defense Force
CG	Commanding General
CMH	Congressional Medal of Honor
CO	Commanding Officer
CONAC	Continental Air Command
DFC	Distinguished Flying Cross
DSC	Distinguished Service Cross
EADF	Eastern Air Defense Force
EASTAF	Eastern Transport Air Force, MATS
MATS	Military Air Transport Service
NAS	Naval Air Station
OCS	Officer Candidate School
SAC	Strategic Air Command
TAC	Tactical Air Command
USAF	United States Air Force
WADC	Wright Air Development Center
WADF	Western Air Defense Force
WAF	Women in the Air Force
WESTAF	Western Transport Air Force, MATS
WW I	World War One
WW II	World War Two



Major Active Air Force Bases in the Continental United States

AN *AIR FORCE* MAGAZINE MAP
(Corrected as of July 15, 1958)

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named for Gen. Muir S. Fairchild, WW I bomber pilot, Vice Chief of Staff, USAF, died of heart attack, Washington, D. C., March 1950.

FORBES AFB, Kan., 7 mi. S of Topeka. Medium strategic recon base, 8th AF, SAC. Formerly Topeka AAB, renamed for Maj. Daniel H. Forbes, Jr., WW II bomber pilot, killed at Muroc Field, Calif., in the crash of the YB-49 "Flying Wing," June 1948.

FOSTER AFB, Tex., 5 mi. NE of Victoria. Tactical fighter base, 12th AF, TAC. Named for Lt. Arthur L. Foster of Georgetown, Tex., killed in air crash near Brooks Field, February 1925.

FRANCIS E. WARREN AFB, Wyo., 2 mi. W of Cheyenne. Under construction for missile facility, SAC. Named for first US Senator from Wyoming, first elected governor in the state, Civil War winner of CMH, died in US, 1929.

GADSDEN AF STATION, Ala., 3 mi. S of Gadsden. Storage branch, AMC. Named for city.

GEIGER FIELD, Wash., 6 mi. WSW of Spokane. Fighter-interceptor base, WADF, ADC. Formerly Sunset Field, renamed for Maj. Harold Geiger, WW I dirigible expert, killed in crash landing at Olmsted Field, Pa., May 1927.

GENERAL MITCHELL FIELD, Wis., 6 mi. S of Milwaukee. Reserve training, 10th AF, CONAC. Also known as Milwaukee County AP. Named for Gen. Billy Mitchell, pioneer flyer whose defiant faith in airpower brought about his court-martial, died in US, 1936.

GENTILE AF STATION, Ohio, 2 mi. SE of Dayton. Specialized depot, AMC. Named for Maj. Don S. Gentile, WW II fighter ace, credited with shooting down twenty-three German aircraft. Killed in an aircraft accident near Andrews AFB, Md., on January 28, 1951.

GEORGE AFB, Calif., 6 mi. NW of Victorville. Tactical fighter base, 12th AF, TAC; fighter-interceptor base, WADF, ADC. Formerly Victorville AAB, renamed for Brig. Gen. Harold H. George, WW I ace, commander of US Air Forces in Australia in WW II, killed in Australia, April 1942.

GLASGOW AFB, Mont., 18 mi. NNE of Glasgow. Under construction for ADC mission. Named for city.

GOODFELLOW AFB, Tex., 2 mi. SE of San Angelo. Basic multiengine pilot training, ATC. Named for Lt. John J. Goodfellow, Jr., of San Angelo, killed in fighter combat, in France, 1918.

GRAHAM AB, Fla., 5 mi. NE of Marianna. Primary contract pilot training, ATC. Formerly Marianna Air Base.

GRAND FORKS AFB, N. D., 14 mi. W of Grand Forks. Under construction for ADC mission. Named for city.

GRAY AFB, Tex., 6 mi. SW of Killeen. Special activities base, AMC. Formerly Camp Hood AAB, renamed for Capt. Robert M. Gray, pilot on first Tokyo bombing mission of WW II, killed in India, 1942.

GREATER PITTSBURGH AP, 5 mi. SW of Coraopolis. Air Reserve, 14th AF, CONAC. Named for nearby city.

GREENVILLE AFB, Miss., 6 mi. NE of Greenville. Basic single-engine pilot training school, ATC. Named for city.

GRENIER AFB, N. H., 4 mi. S of Manchester. Reserve training, 14th AF, CONAC. Named for 2d Lt. Jean D. Grenier of Manchester, killed in US, 1934, while in snowstorm during airmail test run.

GRIFFISS AFB, N. Y., 2 mi. NE of Rome. Hq., Rome Air Development Center, ARDC; Rome AF Depot, AMC; fighter-interceptor base, EADF, ADC. Formerly Rome AB, renamed for Lt. Col. Townsend E. Griffiss of Buffalo, recipient of DSC, killed in flight from Russia to England, February 1942.

GUNTER AFB, Ala., 5 mi. NE of Montgomery. Extension Course Institute, USAF (AU); School of Aviation Medicine, USAF (AU). Named for William A. Gunter, mayor of Montgomery for 27 years, ardent exponent of airpower, died in 1940.

HAMILTON AFB, Calif., 6 mi. NNE of San Rafael. Hq., WADF, ADC; Hq., 4th AF, CONAC. Formerly Marin Meadows, renamed for 1st Lt. Lloyd A. Hamilton, recipient of DSC, killed in fighter combat, France, August 1918.

HANSCOM FIELD. (See Laurence G. Hanscom Field.)

HARLINGEN AFB, Tex., 3.5 mi. NE of Harlingen. Navigator training, ATC. Named for city.

HILL AFB, Utah, 6 mi. S of Ogden. Hq., Air Materiel Area, AMC. Named for Maj. Ployer P. Hill, killed near Wright Field while testing one of first B-17s, October 1935.

HOLLOMAN AFB, N. M., 8 mi. SW of Alamogordo. Hq., Holloman Air Development Center, ARDC. Formerly Alamogordo AAB, renamed for Col. George V. Holloman, guided missile pioneer, killed in air crash in Formosa, March 1946.

HOMESTEAD AFB, Fla., 5 mi. NNE of Homestead. Medium bomber base, 2d AF, SAC. Named for city.

HUNTER AFB, Ga., 3 mi. SW of Savannah. Medium bomber base, 2d AF, SAC. Named for Maj. Gen. Frank O'D. Hunter, WW I ace; recipient of DSC, four clusters; past AFA Director.

INDIAN SPRINGS AFB, Nev., 1 mi. NW of Indian Springs. Special weapons testing base, ARDC. Named for city.

JAMES CONNALLY AFB, Tex., 7 mi. NNE of Waco. Navigator training, ATC. Formerly Waco AFB, renamed for Col. James T. Connally of Waco, killed on B-29 mission over Yokohama, Japan, May 1945.

JOHNSON AFB. (See Seymour Johnson AFB.)

KEESLER AFB, Miss., 2 mi. WNW of Biloxi. Technical schools, ATC. Named for Lt. Samuel R. Keesler, Jr., of Greenwood, Miss., aerial observer, killed on special bombing mission near Verdun, France, October 1918.

KELLY AFB, Tex., 6 mi. WSW of San Antonio. Hq., Air Materiel Area, AMC. Named for Lt. George E. M. Kelly, pioneer Army pilot, killed in the US, 1911.

KINGSLEY FIELD, Ore., 5 mi. SE of Klamath Falls. Fighter-interceptor base, WADF, ADC. Formerly Klamath Falls Municipal Airport, renamed in honor of 2d Lt. David R. Kingsley, killed in Ploesti raid in June 1944.

KINROSS AFB, Mich., 3 mi. SE of Kinross. Fighter-interceptor base, EADF, ADC. Named for nearby city.

KIRTLAND AFB, N. M., 4 mi. SSE of Albuquerque. Hq., AF Special Weapons Center, ARDC; fighter-interceptor base, CADF, ADC. Formerly Albuquerque AAB, renamed for Col. Roy S. Kirtland, aviation pioneer and former CO of Langley Field, died in 1941.

K. I. SAWYER AP, Mich., 16 mi. S of Marquette. Fighter-interceptor base, EADF, ADC. Origin of name unknown.

LACKLAND AFB, Tex., 7 mi. WSW of San Antonio. Basic training, OCS, WAF training, pilot-observer preflight, USAF Recruiting School, USAF Chaplain School, ATC. Formerly San Antonio Aviation Cadet Center, renamed for Brig. Gen. Frank D. Lackland, former Commandant of Kelly Field flying school, died in 1943.

LAKE CHARLES AFB, La., 3 mi. E of Lake Charles. Medium bomber base, 2d AF, SAC. Named for city.

LANGLEY AFB, Va., 3 mi. N of Hampton. Hq., TAC; fighter-bomber and tactical fighter base, TAC; fighter-

(Continued on following page)

interceptor base, EADF, ADC. Named for Samuel P. Langley, pioneer aeronautical scientist, died in 1906.

LAREDO AFB, Tex., 3 mi. NE of Laredo. Single-engine jet pilot training, ATC. Named for city.

LARSON AFB, Wash., 6 mi. NNW of Moses Lake. Troop carrier base. WESTAF, MATS; fighter-interceptor base, WADF, ADC. Formerly Moses Lake AFB, renamed for Maj. Donald A. Larson, native of Yakima, Wash., WW II ace, killed on fighter mission over Ulzen, Germany, August 1944.

LAUGHLIN AFB, Tex., 7 mi. E of Del Rio. Strategic recon base, 2d AF, SAC. Named for Lt. Jack T. Laughlin, pilot killed in action in Far East, 1942.

LAURENCE G. HANSCOM FIELD, Mass., 1 mi. SSW of Bedford. Hq., AF Cambridge Research Center, ARDC; fighter-interceptor base, EADF, ADC. Formerly Bedford AFB, renamed for Laurence Hanscom, Boston and Worcester newspaperman, Army Reserve pilot, killed near base, 1941.

LINCOLN AFB, Neb., 5 mi. NW of Lincoln. Medium bomber base, 8th AF, SAC. Named for city.

LITTLE ROCK AFB, Ark., 15 mi. NE of Little Rock. Medium bomber, strategic recon base, 2d AF, SAC. Named for city.

LOCKBOURNE AFB, Ohio, 11 mi. SSE of Columbus. Medium bomber base, 8th AF, SAC; fighter-interceptor base, EADF, ADC. Named for nearby city.

LONG BEACH MUNICIPAL AP, Calif., 3 mi. NE of Long Beach. Reserve training base, 4th AF, CONAC. Named for city.

LORING AFB, Me., 2 mi. NW of Limestone. Heavy bomber base, 8th AF, SAC. Formerly Limestone AFB, renamed for Maj. Charles J. Loring, Jr., CMH winner, killed in Korea in November 1952 when he crashed his damaged F-80 into enemy artillery emplacements, destroying them.

LOWRY AFB, Colo., 5 mi. ESE of Denver. Technical training schools, ATC. Named for Lt. Francis B. Lowry of Denver, recipient of DSC, killed in photo mission over France, September 1918; only Colorado airman to be killed in WW I.

LUKE AFB, Ariz., 20 mi. WNW of Phoenix. Combat crew training, TAC. Named for Lt. Frank Luke, Jr., "balloon-busting" WW I ace, winner of CMH and recipent of DSC, killed in France, September 1918.

MacDILL AFB, Fla., 8 mi. SSW of Tampa. Medium bomber base, 2d AF, SAC. Named for Col. Leslie MacDill, fighter pilot, killed in air crash at Anacostia, Md., 1938.

MALDEN AB, Mo., 4 mi. N of Malden. Primary contract pilot training, ATC. Named for city.

MALLORY AF STATION, Memphis, Tenn. Specialized depot, AMC. Named for Maj. William N. Mallory, WW II intelligence officer with the 1st Tactical AF, killed returning home in 1945.

MALMSTROM AFB, Mont., 4 mi. E of Great Falls. Air refueling base, 15th AF, SAC; fighter-interceptor base, CADF, ADC. Formerly Great Falls AFB, renamed for Col. Einar A. Malmstrom, killed in airplane accident near Great Falls, August 21, 1954.

MARCH AFB, Calif., 9 mi. SE of Riverside. Hq., 15th AF, SAC; medium bomber base, SAC. Named for Lt. Peyton C. March, Jr., son of WW I Army Chief of Staff, killed in air crash in US, 1918.

MATAGORDA ISLAND AF RANGE, Tex., 9 mi. SSW of Port O'Connor. Training installation, 2d AF, SAC. Named for island in Gulf of Mexico.

MATHER AFB, Calif., 10 mi. E of Sacramento. Navigator training, ATC. Named for Lt. Carl S. Mather, killed near Ellington Field during training flight, 1918, five days after receiving commission.

MAXWELL, AFB, Ala., 1 mi. WNW of Montgomery. Hq., Air University; Air War College; Air Command and Staff College; Hq., AFROTC Research Studies Institute. Named for 2d Lt. William C. Maxwell of Natchez, killed on Luzon, Philippines, August 1920.

McCHORD AFB, Wash., 8 mi. S of Tacoma. Fighter-interceptor base, WDAF, ADC; Air Transport Base, MATS. Named for Col. William C. McChord, killed in US, 1937.

McCLELLAN AFB, Calif., 10 mi. NE of Sacramento. Hq., Air Materiel Area, AMC; (aircraft early warning and control), ADC. Named for Maj. Hezekiah McClellan, pioneer in Arctic aeronautical experiments, killed in test flight of new plane, US, 1936.

McCONNELL AFB, Kan., 5 mi. SE of Wichita. Medium bomber crew training, 2d AF, SAC. Formerly Wichita AFB, renamed for the two McConnell brothers of Wichita, Thomas L., killed July 10, 1943, in the South Pacific, and Fred M., Jr., killed in 1945 in a private plane crash in Kansas.

McCOY AFB, Fla., 7 mi. S of Orlando. Medium bomber base, 2d AF, SAC. Formerly Pinecastle AFB, renamed for Col. Michael N. W. McCoy, B-47 wing commander, killed in aircraft accident October 1957 near city of Orlando.

McGUIRE AFB, Fort Dix, N. J., 1 mi. SE of Wrightstown. Hq., EASTAF, MATS; fighter-interceptor base, EADF, ADC. Formerly Fort Dix AAB, renamed for Maj. Thomas B. McGuire, Jr., of Ridgewood, N. J., 2d ranking WW II ace, P-38 pilot, winner of CMH, recipient of DSC, killed over Leyte, 1945.

MEMPHIS MUNICIPAL AP, Tenn., 6 mi. SSE of Memphis. Reserve training, 14th AF, CONAC. Named for city.

MIAMI INTERNAT'L AP, Fla., 5 mi. NW of Miami. Reserve training, 14th AF, CONAC. Named for city.

MINNEAPOLIS-ST. PAUL INTERNAT'L AP, Minn., 7 mi. SSE of Minneapolis. Reserve training, 10th AF, CONAC. Formerly Wold Chamberlain Field.

MINOT AFB, N. D., 11 mi. N of Minot. Under construction for CADF, ADC mission. Named for city.

MITCHEL AFB, N. Y., 2 mi. NE of Hempstead, L. I. Hq., CONAC. Named for Maj. John P. Mitchel, first Fusion mayor of New York City, fighter pilot, killed in an air crash in Louisiana, July 1918.

MITCHELL FIELD. (See General Mitchell Field.)

MOODY AFB, Ga., 12 mi. NNE of Valdosta. Interceptor crew training, ATC; weapons training center, ADC. Named for Maj. George P. Moody, fighter pilot, killed in US, 1941.

MOORE AB, Tex., 14 mi. NW of Mission. Primary contract pilot training, ATC. Named for 2d Lt. Frank Murchison Moore, WW I pilot, killed in September 1918.

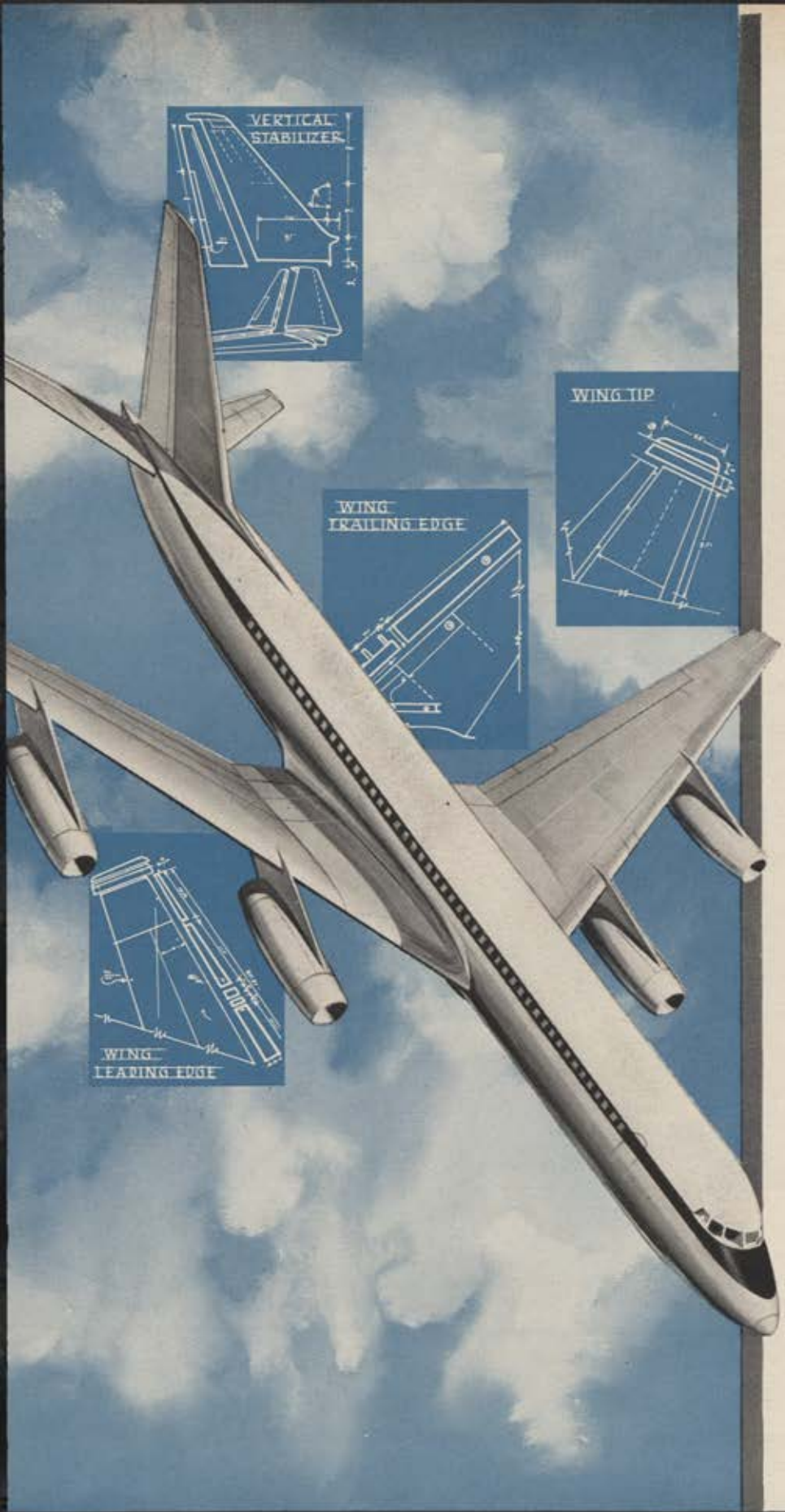
MOUNTAIN HOME AFB, Idaho, 11 mi. WSW of Mountain Home. Medium bomber base, 15th AF, SAC. Named for city.

MYRTLE BEACH AFB, S. C., 3 mi. SW of Myrtle Beach. Tactical fighter base, 9th AF, TAC. Named for city.

NELLIS AFB, Nev., 8 mi. NE of Las Vegas. Fighter-bomber crew training, fighter weapons, TAC. Formerly Las Vegas AFB, renamed for Lt. William H. Nellis of Las Vegas, fighter pilot, killed in action over Luxembourg, December 1944.

NIAGARA FALLS MUNICIPAL AP, N. Y., 4 mi. E of Niagara Falls. Fighter-interceptor base, EDAF, ADC; Reserve training, CONAC. Named for city.

(Continued on page 79)



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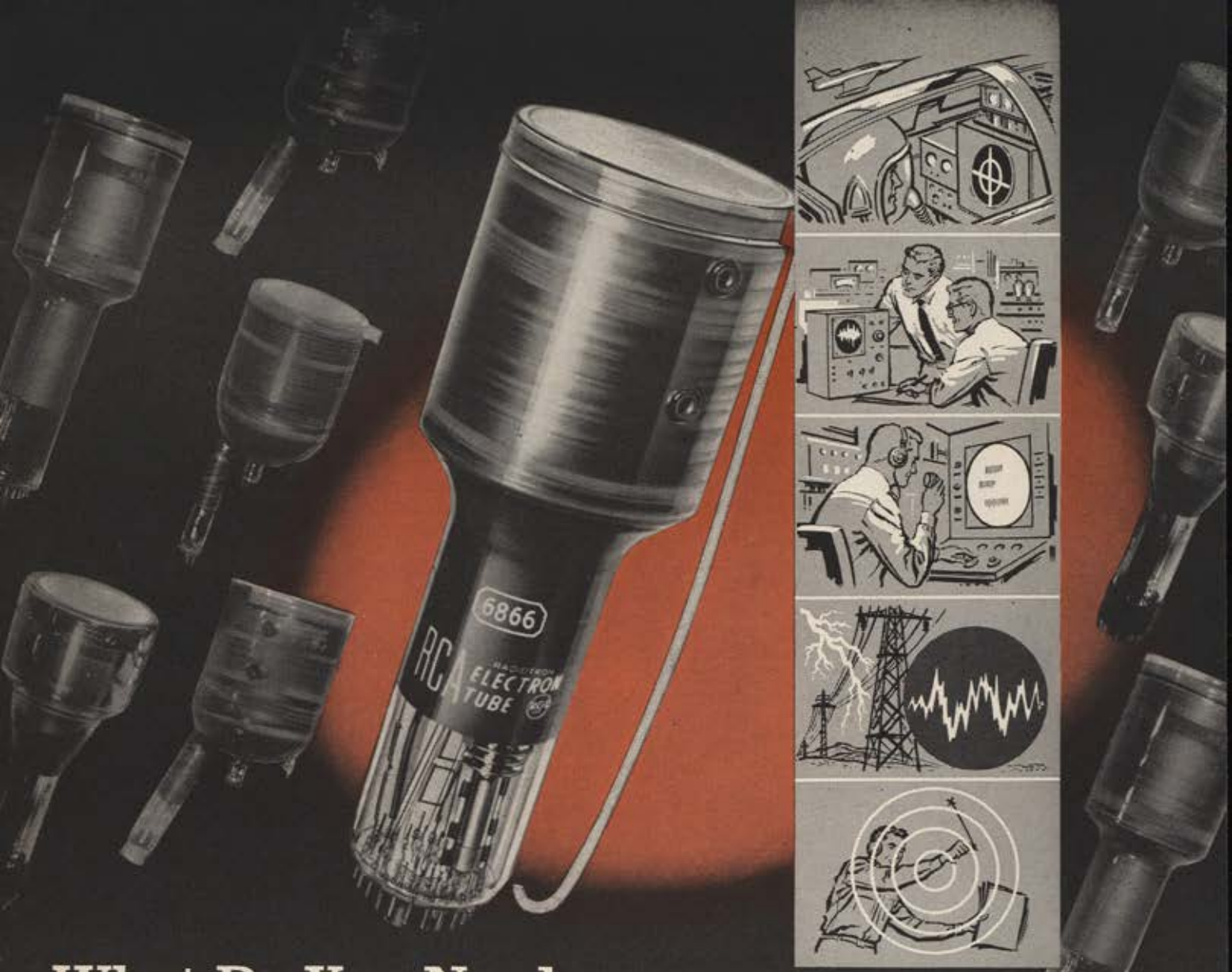
For further information on Crosley's airframe and other capabilities write to the Vice President—Customer Relations, Avco Manufacturing Corporation, Crosley Division, 1329 Arlington Street, Cincinnati 25, Ohio.

Avco // Crosley



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NORTON AFB, Calif., 5 mi. ENE of San Bernardino. Hq., Air Materiel Area, AMC; air division hq., WDAF, ADC. Formerly San Bernardino Air Depot, renamed for Capt. Leland F. Norton, bomber pilot, killed in aircraft accident near Amiens, France, May 1944.

OFFUTT AFB, Neb., 9 mi. S of Omaha. Hq., SAC. Named for 1st Lt. Jarvis Jennes Offutt, killed in fighter action, France, 1918.

O'HARE INTERNAT'L AP, Ill., 15 mi. NW of Chicago. Fighter-interceptor base, EADF, ADC; Reserve training. Formerly Douglas Airport, renamed for Lt. Cmdr. Edward H. O'Hare of Chicago, Navy pilot in WW II, winner of CMH, killed in action near Tarawa in the Pacific, 1943.

OLMSTEAD AFB, Pa., 1 mi. NW of Middletown. Hq., Air Materiel Area, AMC. Formerly Middletown Air Depot, renamed for Lt. Robert S. Olmsted, balloon pilot, killed when his balloon was struck by lightning over Belgium, September 1923.

ORLANDO AFB, Fla., 2 mi. E of Orlando. Hq., Air Photographic and Charting Service; Hq., Air Rescue Service, MATS. Named for city.

OTIS AFB, Mass., 9 mi. NNE of Falmouth. Fighter-interceptor base, EADF, ADC. Named for Lt. Frank J. Otis, killed in air crash in US, 1937.

OXNARD AFB, Oxnard, Calif. Fighter-interceptor base, WADF, ADC. Named for city.

PAINE AFB, Wash., 6 mi. S of Everett. Fighter-interceptor base, WADF, ADC. Named for 2d Lt. Topliff O. Paine, airmail pilot, killed in US while mapping airmail routes, 1922.

PALM BEACH AFB, Fla., 2 mi. W of West Palm Beach. Air transport base, EASTAF, MATS. Formerly Morrison Field, renamed for city.

PARKS AFB, Calif., Pleasanton, 28 mi. E of Oakland. Formerly Camp Shoemaker (Navy), renamed for Adm. Charles W. Parks, naval engineer.

PATRICK AFB, Fla., 12 mi. SE of Cocoa. Hq., AF Missile Test Center, ARDC. Formerly Banana River NAS, renamed for Maj. Gen. Mason M. Patrick, Chief of Army Air Service during and after WW I, died in US, January 1942.

PEASE AFB, N. H., 3 mi. W of Portsmouth. Medium bomber base, 8th AF, SAC. Formerly Portsmouth AFB, renamed for Capt. Harl Pease, Jr., CMH winner, WW II pilot missing over Rabaul, New Britain, on August 6, 1957.

PERRIN AFB, Tex., 6 mi. NNW of Sherman. Fighter-interceptor training, ATC. Named for Lt. Col. Elmer D. Perrin of Boerne, Tex., killed testing a B-26 near Baltimore, June 1941.

PETERSON FIELD, Colo., 6 mi. E of Colorado Springs. Administrative flying, ADC. Named for 1st Lt. Edward J. Peterson, killed in US, in airplane crash, 1942.

PITTSBURGH AP. (See Greater Pittsburgh AP.)

PLATTSBURGH AFB, N. Y., 1 mi. NE of Plattsburgh Medium bomber base, 8th AF, SAC.

POPE AFB, Fort Bragg, N. C., 12 mi. NW of Fayetteville. Troop carrier base, 9th AF, TAC. Named for 1st Lt. Harley H. Pope, killed while making a forced landing in a Jenny in South Carolina, January 1919.

PORTSMOUTH AFB, N. H., 3 mi. W of Portsmouth. Medium bomber base, 8th AF, SAC. Named for city.

PRESQUE ISLE AFB, Me., 1 mi. NW of Presque Isle. Fighter-interceptor base, EADF, ADC. Named for city.

RANDOLPH AFB, Tex., 15 mi. ENE of San Antonio. Transport pilot training, light bomber training, Hq., ATC; Hq., School of Aviation Medicine, USAF (AU). Named for Capt. William M. Randolph of Austin, fighter pilot, killed in aircraft accident in Texas, 1928.

REESE AFB, Tex., 12 mi. W of Lubbock. Multiengine pilot training, ATC. Formerly Lubbock AFB, renamed for Lt. Augustus F. Reese, Jr., of Shallowater, Tex., killed on bomber mission over Cagliari, Italy, May 1943.

RICHARD BONG AFB, Wis., vicinity of Kansasville. Under construction for SAC mission. Named for top all-time US ace, P-38 pilot Richard I. Bong, of Poplar, Wis., CMH winner who downed forty Japanese planes in WW II, killed in crash of P-80 near Los Angeles, Calif., August 6, 1945.

RICHARDS-GEBAUR AFB, Mo., 16 mi. S of Kansas City. Hq., CADF, ADC. Formerly Grandview AFB, renamed for Lt. John F. Richards II, of Kansas City, first area pilot to die in combat in WW I; and for Lt. Col. Arthur W. Gebaur, Jr., killed in action over North Korea in 1952.

ROBINS AFB, Ga., 14 mi. SSE of Macon. Hq., Air Materiel Area, AMC; Hq., 14th AF, CONAC. Named for Brig. Gen. Augustine Warner Robins, Chief of Materiel Division, Air Corps, who devised system of cataloging in 1920s, still used; died in 1940.

SAWYER AP. (See K. I. Sawyer AP.)

SCHILLING AFB, Kan., 4 mi. SW of Salina. Medium bomber base, 8th AF, SAC. Formerly Smokey Hill AFB, renamed for Col. David C. Schilling, WW II fighter ace and pioneer of inflight refueling techniques who led first nonstop transatlantic flight of jet fighters, killed in automobile accident, in England, August 1956.

SCOTT AFB, Ill., 6 mi. ENE of Belleville. Hq., MATS; Hq., AWS; Hq., AACS; fighter-interceptor base, CADF, ADC. Named for Cpl. Frank S. Scott, first enlisted man to die in an air accident, killed at College Park, Md., 1912.

SELFRIDGE AFB, Mich., 3 mi. E of Mount Clemens. Fighter-interceptor base, EADF, ADC; Hq., 10th AF, CONAC. Named for Lt. Thomas E. Selfridge, killed in 1908 while on flight with Orville Wright to demonstrate Wright plane for government.

SEWART AFB, Tenn., 3 mi. N of Smyrna. Troop carrier base, 9th AF, TAC. Formerly Smyrna AAB, renamed for Maj. Allan J. Sewart, Jr., bomber pilot, recipient of DSC, killed in action over the Solomons, November 1942.

SEYMOUR JOHNSON AFB, N. C., 2 mi. SSE of Goldsboro. Tactical-fighter base, 9th AF, TAC; fighter-interceptor base, EADF, ADC. Named for Lt. Seymour A. Johnson, Navy pilot of Goldsboro, killed in 1942.

SHAW AFB, S. C., 7 mi. WNW of Sumter. Hq., 9th AF, TAC; tactical recon. Named for 1st Lt. Erwin D. Shaw of Sumter, killed during recon flight over German lines, July 1918, while serving with Royal Flying Corps.

SHEPPARD AFB, Tex., 6 mi. N of Wichita Falls. Aircraft maintenance school, ATC. Named for Morris E. Sheppard, US Senator from Texas, chairman of Senate Military Affairs Committee, died in 1941.

SHERMAN AFB. (See Clinton Sherman AFB.)

SIOUX CITY MUNICIPAL AP, Iowa, 10 mi. S of Sioux City. Fighter-interceptor base, CADF, ADC. Named for city.

SPENCE AB, Ga., 5 mi. SE of Moultrie. Primary contract pilot training, ATC. Named for Lt. Thomas L. Spence of Thomasville, Ga., WW I pilot, killed in aircraft accident at end of war.

STEAD AFB, Nev., 10 mi. NW of Reno. Survival training, helicopter training, ATC. Named locally.

(Continued on following page)

STEWART AFB, N. Y., 4 mi. NW of Newburgh. Hq., EADF, ADC; fighter-interceptor base, ADC. Named for Lachlan Stewart, sea captain whose father provided the original land for the base.

SUFFOLK CO. AFB, N. Y., 3 mi. N of Westhampton Beach, L. I. Fighter-interceptor base, EADF, ADC. Named for geographical area.

TINKER AFB, Okla., 8 mi. ESE of Oklahoma City. Hq., Air Materiel Area, AMC; tactical fighter, 12th AF, TAC. Named for Maj. Gen. Clarence L. Tinker, a Pawhuska Indian, bomber and fighter pilot, CG, 7th AF, killed in raid on Wake Island, June 1942.

TOPEKA AF STATION, Kan., 7 mi. S of Topeka. Specialized depot. AMC. Named for city.

TRAVIS AFB, Calif., 6 mi. ENE of Fairfield and Suisun. Hq., WESTAF, MATS; heavy bomber base, 15th AF, SAC; air transport base, MATS; fighter-interceptor base, WADF, ADC. Formerly Fairfield-Suisun AFB, renamed for Brig. Gen. Robert F. Travis, bomber pilot, recipient of DSC, killed in B-29 crash in US, August 1950.

TRUAX FIELD, Wis., 1 mi. E of Madison. Fighter-interceptor base, EADF, ADC. Named for 1st Lt. Thomas L. Truax of Madison, pilot, killed in training flight in US, November 1941.

TURNER AFB, Ga., 4 mi. ENE of Albany. Tactical fighter base, 9th AF, TAC. Named for Lt. Sullins Preston Turner of Oxford, Ga., killed in aircraft accident at Langley AFB, May 1940.

TYNDALL AFB, Fla., 8 mi. SE of Panama City. Weapons employment center, ADC. Named for Lt. Frank B. Tyndall of Port Seward, Fla., WW I fighter pilot, killed in air crash, in 1930, first Florida military flyer to be killed.

USAF ACADEMY, Colo., 6 mi. N of Colorado Springs. Under construction for acceptance of first class of cadets at this permanent site in the fall of this year.

VANCE AFB, Okla., 4 mi. SSW of Enid. Basic single-engine pilot training, ATC. Formerly Enid AAB, renamed for Lt. Col. Leon R. Vance, Jr., WW II winner of CMH, lost in hospital aircraft forced down at sea off Iceland, 1944.

VINCENT AFB, Ariz., 7 mi. SE of Yuma. Weapons training center, ADC. Formerly Yuma County Municipal AP, renamed for Brig. Gen. Clinton D. Vincent (immortalized by cartoonist Milton Caniff as "Gen. Shanty Town" in "Steve Canyon" comic strip), who died of a heart attack at Colorado Springs, Colo., on July 5, 1955.

WALKER AFB, N. M., 6 mi. S of Roswell. Medium and heavy bomber base, 15th AF, SAC. Formerly Roswell AAB, renamed for Brig. Gen. Kenneth N. Walker a native of New Mexico, CG, 5th Bomber Command, WW II winner of CMH, killed in Southwest Pacific while leading a bombing attack, 1943.

WARREN AFB. (See Francis E. Warren AFB.)

WEBB AFB, Tex., 1.8 mi. SW of Big Spring. Basic single-engine pilot training, ATC. Formerly Big Spring AFB, renamed for 1st Lt. James L. Webb, Jr., F-51 pilot, killed off Japanese coast, 1949.

WENDOVER AFB, Utah, 1 mi. S of Wendover. Gunnery range, AMC. Named for city.

WESTOVER AFB, Mass., 3 mi. NNE of Chicopee Falls. Hq., 8th AF, SAC; heavy bomber base; air refueling base, SAC; fighter-interceptor base, EADF, ADC. Named for Maj. Gen. Oscar Westover, Chief of Air Corps, killed in air crash near Burbank, Calif., September 1938.

WHITEMAN AFB, Mo., 3 mi. S of Knobnoster. Medium bomber base, 8th AF, SAC. Formerly Sedalia AFB, renamed for 2d Lt. George A. Whiteman of Sedalia, killed in action at Pearl Harbor on December 7, 1941.

WILKINS AF STATION, Ohio, 1 mi. N of Shelby. AF specialized depot, AMC. Named for Maj. Raymond H. Wilkins, CMH winner, killed November 2, 1943, over Rabaul, New Britain, after destroying two enemy ships.

WILLIAMS AFB, Ariz., 10 mi. E of Chandler. Crew training for fighter-bomber pilots, TAC. Formerly Higley Field, renamed for Lt. Charles L. Williams, native of Arizona, bomber pilot, killed in Hawaii, July 1927.

WILLOW RUN AP, Mich., 22 mi. WSW of Detroit. Support flying, ADC. Named for aircraft plant located there during WW II.

WRIGHT-PATTERSON AFB, Ohio, 2 mi. ENE of Dayton. Hq., AMC; WADC, ARDC; Air Force Institute of Technology (AU); fighter-interceptor base, EADF, ADC. Formerly separate areas including Fairfield Air Depot, Wilbur Wright Field, McCook Field, and Patterson Field, renamed for Orville and Wilbur Wright; and for Lt. Frank S. Patterson, killed in air crash near this base during early firing tests of synchronized machine gun, June 1918.

WURTSMITH AFB, Mich., 3 mi. NW of Oscoda. Fighter-interceptor base, EADF, ADC. Formerly Camp Skeel, later Oscoda AFB, renamed for Maj. Gen. Paul B. Wurtsmith, CG, 13th AF, killed in B-25 crash in North Carolina, 1946.

YOUNGSTOWN MUNICIPAL AP, Ohio, 10 mi. N of Youngstown. Fighter-interceptor base, EADF, ADC. Named for city.—END

Official U.S. Navy photograph

Air-to-air intercept far at sea...

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The Edge of SPACE

By William Leavitt
ASSOCIATE EDITOR

AS OF mid-1958, the US Air Force, in a logical extension of its mission, stands on the threshold of space. Conquest of the void beyond the earth's thin air envelope is an enormously complicated but natural step in the process that has taken airmen and their craft higher and higher through the layers of the earth's atmosphere in the fifty-five years since the flight of the Wright brothers.

The Air Force today is moving toward manned spaceflight against the tense background of a technological war with a persistent opponent. On USAF's shoulders rests the mission of spearheading the Free World's space effort. At the same time, the USAF must keep at required strength the substantial force in being needed to deter aggression by its principal opponent. This is no mean task in a relatively "peacetime" economy.

Edge-of-space efforts by the Air Force, under development or high-priority study, at this writing, include:

● **Three lunar probes.** This program calls for such probes to be fired to the vicinity of the moon to obtain data on the space environment. The probe project, which will be carried out by the Ballistic Missile Division as authorized by the Defense Department's Advanced Research Projects Agency, will use a combination of the Thor and Vanguard rockets, called Thor-Able. Exact date of the Air Force moon launchings has not been announced, but the first is expected by the end of summer.

● **The North American X-15.** The X-15, in effect the world's first aerospacecraft, a cigar-shaped vehicle part airplane and part rocketship, will soar to 100-mile-plus altitudes at fantastic speeds exceeding 3,000 mph, then glide home through the atmosphere, carefully decelerating until its pilot can land the craft with aerodynamic controls. The X-15 project will provide invaluable information on pilot capabilities under enormous reentry heat stresses and extended weightlessness, and will be the forerunner of eventual manned satellites and interplanetary vehicles. An Air Force-NACA project with some Navy financial support, the X-15 will be piloted for the Air Force by Capt. Iven C. Kincheloe, Jr., after initial flights by North American test pilot Scott Crossfield.

● **Dyna-Soar—the follow-on project to the X-15.** This development, now under study contract to Boeing and Martin (with associated contractors including General Electric, Ramo-Wooldridge, North American, Chance Vought, Aerojet-General, Bell, American Machine & Foundry, Minneapolis-Honeywell, Goodyear, and Bendix), will be a hypersonic manned boost-glide vehicle rocket boosted to orbit the earth one or more times. After orbiting, it will skip-glide home through the atmosphere, to slow the heating of its surfaces. It will precede the orbital manned bomber with worldwide capability. A similar project is reported under study by the Soviets.

● **Project Man High III.** This is a continuation of the balloon ascension tests which last August took space biologist Lt. Col. David G. Simons to a space-equivalent altitude of 102,000 feet. The new flight will be fully instrumented to allow aeromedical observers on the ground to record the subject's condition at all times. Areas to be studied are psychological, physiological, and psycho-physiological effects (bodily reactions to physical stress) on the subject, whose name has not yet been announced. The subject will be interrogated periodically to obtain his own opinion of his condition. Project officer will be Colonel Simons. The balloon occupant will undergo extensive training including parachute jumps, pressure-suit indoctrinations, twenty-four-hour isolation, and claustrophobia tests in a capsule on the ground before ascent.

● **The USAF reconnaissance satellite.** The (WS-117L) project under development by Lockheed, called Sentry, formerly called Pied Piper, may reach test firing this year, although actual launching of the complete vehicle is probably two years off. The television-equipped satellite is expected to be launched into a polar orbit by an Atlas ICBM motor, supplemented by a second, solid-fuel stage. It will be designed to give a substantial view of the earth's surface and is of obvious scientific and military value.

● **The prespaceflight training research program.** This project, expected to be established at Edwards AFB, Calif., late this year, was described in the May 1958 issue of AIR FORCE. It will subject carefully selected airmen to the expected stresses of manned spaceflight, screening them for physiological and psychological endurance to produce a nucleus of personnel for the first Air Force spacecraft. The training program will run candidates through an approximate two years of tests and is being planned by the Life Sciences Directorate of Air Research and Development Command under the direction of Brig. Gen. Don Flickinger, who is also serving as special adviser on bioastronautics to the Ballistic Missile Division Commander, Maj. Gen. Bernard A. Schiever.

● **First experimental reactor for nuclear rocket propulsion.** Scheduled for ground testing late this year, this advancement is under development by the Atomic Energy Commission for the Air Force as Project Rover. Aims of Project Rover have been described by USAF Maj. Gen. Donald J. Keirn, chief of the joint AEC-USAF Office for

and Beyond

Air Nuclear Propulsion, to the House Select Committee on Astronautics and Space Exploration. Program of his organization, General Keirn told the congressmen, is to develop nuclear boost systems to provide enough thrust to lift large payloads free of the earth's atmosphere and gravitational field. Under a study along with Project Rover is **Project SNAP** (Subsystem for Nuclear Auxiliary Power), started some three years ago. General Keirn has listed *three* basic propulsion systems as necessary for successful exploration of interplanetary space as far out as Mars: the initial boost system, the auxiliary propulsion system for navigation and maneuvering, and the landing system. In his testimony to the House committee, he pointed out that, although there is a very definite need for nuclear systems, chemical fuels have by no means reached the apex of their development. He also discussed Air Force study of low-thrust ion propulsion for use in long space voyages.

General Keirn added that the Air Force's interest in nuclear rocket propulsion was by no means new, and that proposals for its study had been made as far back as 1946. The present program was started in 1955.

The experimental reactor to be used in Project Rover is whimsically called KIWI-A, after the flightless New Zealand bird, and will be tested at the AEC Nevada Test Site according to AEC announcements.

KIWI-A was designed and built at Los Alamos, N.M. The reactor shell and support equipment were designed and built at the South Albuquerque Works, operated for the AEC by ACF Industries.

• **The North American B-70 "chemical bomber."** Scheduled for production, this is the space age successor craft to today's Strategic Air Command mainstay, the B-52. Powered by chemical fuels "hopped up" by boron compounds, the B-70 will cruise at space-equivalent altitudes above 70,000 feet (where a man's blood would boil in the open "air"), fly faster than 2,000 mph, generating friction that could heat airplane surfaces to more than 900 degrees Fahrenheit. The General Electric J-93 turbojet has been selected as powerplant.

The B-70 (WS-110A), popularly named Valkyrie, will carry a four-man crew in a sealed cabin not much different from the compartment envisaged for spacecraft. Ejection seats for emergency escape will be fitted with individual capsules capable of descending earthward by parachute. Its use will mark SAC's next operational step toward manned spaceflight.

(Continued on page 85)

Avco's honeycomb "sandwich" takes pounds off

flying weight. Crosley's honeycombing process is used to build air frames and missile components. After the stainless-steel or aluminum honeycomb is shaped, two metal skins are fitted and joined to it. The resulting metal "sandwich" provides a structure of maximum strength, extremely light in weight.

Avco

It will be comparable in size to the B-52, but will be powered by six engines, rather than eight as in the B-52. Navigation will be by an electronic system taking its course from the stars.

The B-70's significance, both scientifically and militarily, is great. It will be capable of launching hydrogen warhead missiles 1,000 miles from target and could fly to Russia and back without refueling. Some observers have suggested that the B-70 might serve as an effective missile-interceptor, using heat-seeking antimissile missiles that would search out incoming ICBMs by detecting the friction they generate. Planning for the B-70 is a further indication of the Air Force's space age faith in manned weapons as part of the mixed-force deterrent. Manned weapons, the Air Force believes, have the advantage of human judgment and recall capability.

Originally bid for by Convair, Boeing, and North American, the B-70 program was eventually studied by the latter two, with North American getting the go-ahead on development last fall.

As a follow-on to the B-52, the B-70 will be capable of taking off and landing at conventional speeds, shifting at super-altitude to supersonic speeds. This capability will allow it to use runways now accommodating the B-52.

B-70 crews will probably be retrained B-52 men, and will include pilot, copilot, navigator-bombardier-radio operator, and the defense systems operator who will run the electronic countermeasures (ECM) designed to jam enemy communications and electronic systems.

● **The continuing Air Force space medicine program.** Another strong indication of the Air Force's faith in manned systems, Air Force space medicine is the oldest of the service's space efforts. It dates as far back as the establishment of the first aviation medicine center at Mineola, L.I., N.Y., in 1918. From its inception, Air Force aeromedicine has been geared to the increasing problems of flight higher and higher in the atmosphere. For nearly a decade, the Department of Space Medicine of the School of Aviation Medicine at Randolph AFB, Tex., sparked by the famed "father of space medicine," Dr. Hubertus Strughold, has made theoretical studies of the physiological feasibility of manned spaceflight. This has included intensive research in weightlessness through the use of jet planes flying parabolic flight patterns with animal and human subjects aboard, studies of the use of algae to provide oxygen in closed-circuit space cabin systems, and closed-cabin endurance research such as the highly-publicized "flight to the moon" by Airman Donald G. Farrell earlier this year. The Department of Space Medicine, as part of the School of Aviation Medicine, is under the Air University.

Other commands, notably ARDC, have been equally busy for several years on the man-in-space project. As far back as 1946, space biological research was under way at ARDC's Holloman AFB, N.M., with unsuccessful attempts to expose fungus spores to cosmic radiation. Later, in 1947, successful launching to and recovery of fruit flies from an altitude of 106 miles was achieved. Those early projects led to later achievements at the Holloman site by the Aero Medical Laboratory, headquartered at Wright-Patterson AFB, Ohio, personnel of which in 1948 and 1949 launched anesthetized rhesus monkeys as high as eighty-three miles.

These early experiments were marred by unsuccessful recovery of the subjects, who died from impact or cramping in the capsules. First successful recovery of animal subjects was in September 1951 when most of a menagerie of eleven mice and one monkey were recovered safely. Through the years since then—subject to on-and-off funding—space biological research with animals and high-altitude rockets has continued at Holloman. Today the operation is designated as the Aeromedical Field Laboratory and is part of the Missile Development Center at the base, under ARDC.

Concurrently, at Wright-Patterson AFB, Ohio, research in the anticipated stresses of spaceflight has proceeded for several years. Indeed, Wright-Patterson AFB's Wright Air Development Center and Aero Medical Laboratory is a kind of "world's fair" of hardware for space condition simulation.

Areas under study, with complicated equipment and a corps of veteran experts, include: acceleration and increased G-forces; control devices for spacecraft to get the best out of a combination of man's decision capability and machine reaction speed; spacecrew skills, selection and training; monitoring functions; escape devices; pressure suits and sealed cabins; psychological problems, including isolation and confinement; motivation, the "want to" factor in hazardous missions; noise and vibrations; performance under fatigue conditions; cosmic radiation; systems research; heat stresses; water, nutrition, and waste disposal; weightlessness; toxic effects of fuels on missile crews; and space condition effects on metals and oxygen supply.

● **Space Systems section of the Ballistic Missile Division.** As now organized, BMD is geared to concurrent work on missiles and space technology, with its new Space Systems operation, which includes, among other projects in its bailiwick, the Sentry satellite described earlier.

In addition, close liaison in man-in-space aeromedical developments is provided BMD by General Flickinger, ARDC's Director of Life Sciences, who, as mentioned above, is serving as Special Adviser on Bioastronautics to BMD Commander General Schriever.

● **The Air Force Office of Scientific Research.** One of ARDC's several research centers, AFOSR is busily engaged in a contract program under which its many directorates sponsor university, industry, and foundation exploratory research throughout the US and in Europe. AFOSR's research programs number around 700, and several have space technology orientation, notably the well-known Operation Far Side, which recouped some US prestige after Sputnik I, by the successful firing of a balloon carried rocket to seek cosmic-ray data at an altitude exceeding 2,400 miles, although the telemetry equipment failed.

● **Astronautics instruction at the US Air Force Academy.** Airmen moving to the Academy's new site next month will receive instruction from the newly established Department of Astronautics, which will teach the fundamental physics of manned and unmanned spaceflight. Heading the Department of Astronautics will be Col. Benjamin P. Blasingame, formerly project officer for the Titan ICBM.

● **Astronautics instruction in Air Force Institute of Technology programs.** Selected officers, starting in the near future, will receive graduate-level instruction in space sciences and management. The sciences program will be a resident program at the Institute, and a second, astronautics *management*, program will be offered at industrial locations. Graduates can expect placement in ARDC, BMD, or Hq. USAF posts.

All of the above projects—and there are numerous additional approaches suggested by industry—are phases of an orderly Air Force program designed to find reliable answers to the three principal problems of entering what some observers are now calling the "wild *black* yonder."

These problems are: the unmanned exploration of the

(Continued on following page)

Milestones Toward Man in Space

1918—Aviation Medical Research Laboratory opened at Hazelhurst Field, Mineola, L.I., N.Y. Forerunner, USAF School of Aviation Medicine.
1918—Artificial altitude of 34,000 feet reached by Majs. Edward Schneider and James L. Whitney, at Mineola.
1919—School for Flight Surgeons established at Mineola. Medical Research Laboratory moved to Mitchel Field, L.I., N.Y.
1921—US Army Air Corps flew pressure-cabin airplane.
1926—Blind-flying research conducted by Lt. Cols. David A. Myers and William C. Ocker.
1926—School of Aviation Medicine moved to Brooks Field, Tex.
1929—Lt. James H. Doolittle made first all-blind flight at Mitchel Field, L.I., N.Y.
1929—Founding, Aero Medical Association of US.
1931—School of Aviation Medicine moved from Brooks Field, Tex., to Randolph Field, Tex.
1932—Intensity of cosmic rays tested by Air Corps flights.
1934—60,613-foot altitude reached in Air Corps-National Geographic Society balloon flight by Maj W. E. Repner, Capts. Albert W. Stevens, Orvil A. Anderson.
1934—Founding of Aero Medical Laboratory at Wright Field, Ohio.
1939—H. G. Armstrong, J. W. Heim, of Aero Medical Laboratory, studied physiological effects of breathing pure oxygen at high altitude.
World War II—Expansion of School of Aviation Medicine program and facilities.
G-suits, flak vest protection equipment perfected for use in ETO. Col. Malcolm C. Grow cited for contributions.
Lt. Col. William R. Lovelace, Chief, Aero Medical Laboratory, made record parachute jump from 40,200 feet.
1946—Exposure of fungus spores to high-altitude cosmic radiation, at Holloman AFB, N.M.
1947—Fruit flies rocketed to 106-mile altitude at Holloman AFB, N.M. Flies recovered in apparent good health.
1947—Sound barrier smashed by Capt. Charles E. Yeager in Bell X-1 at Lake Muroc, Calif.
1947—Founding of Arctic Aeromedical Laboratory at Ladd AFB, Alaska.
1949—Department of Space Medicine founded at School of Aviation Medicine, Randolph AFB, Tex. Dr. Hubertus Strughold joins staff.
1951—First successful recovery at Holloman AFB of animals rocketed to altitude (236,000 feet) to study subgravity, cosmic radiation. Monkey, mice parachuted to earth safely.
1954—Col. John Paul Stapp, USAF, withstood forty Gs on rocket sled at Holloman AFB.
1957—Capt. Joseph W. Kittinger, Jr., USAF, ascended to record height of 96,000 feet in balloon.
1957—Lt. Col. David G. Simons, USAF, broke Kittinger record, reached 102,000 feet. Stayed aloft thirty-two hours.
1958—A/1C Donald G. Farrell spent seven days in sealed cabin "trip to moon" at Randolph AFB, Tex.
1958—Five USAF officers spent five days in simulated space cabin at Wright-Patterson AFB to test spacecrew operations.
1958—Use of mice for nose-cone rides in ballistic missile tests announced by USAF Ballistic Missile Division.
1958—Spacecrew training program plan announced by USAF ARDC's Directorate of Life Sciences.

void, to determine the safety of man's entering space; the creation of vehicles and propulsion systems capable of carrying man into space with minimum hazard; and the supremely important question of developing foolproof sealed environments in which highly trained crews can operate in relative comfort.

Today, the administrative and directive efforts on space technology in the Air Force are emanating directly from the Pentagon. At that level, the "boss," directly under Chief of Staff, Gen. Thomas D. White, is the Deputy Chief of Staff for Development, Lt. Gen. Roscoe Wilson.

In this position, General Wilson succeeded Lt. Gen. Donald L. Putt, who has spoken strongly to Congress about the grim possibilities of Russian victory in the race for space, and who has gone on record that the space age, rather than making man obsolete, is giving him more complicated expressions for judgment capability.

At the operating level of space technology is the large Air Research and Development Command complex, headed by Lt. Gen. Samuel E. Anderson. And within ARDC is the Ballistic Missile Division, headed by Maj. Gen. Bernard A. Schriever, with its heavy backlog of experience and successful achievement in space weapons. BMD, with its industry-team concept, has created ballistic missiles such as the Atlas, which many experts believe could—supported by additional stages—propel manned ships as far out as Mars.

Also under ARDC is a great portion of the historic space medicine program, represented by the efforts at Wright-Patterson, Edwards, and Holloman AFBs, which in turn exchange information with Air University's Randolph AFB Department of Space Medicine and with the other military services.

In addition to its partnership with industries and educational institutions for research and development, the Air Force has long worked with and continues to work with the National Advisory Committee for Aeronautics, nucleus of the new civilian space agency.

And, under Department of Defense ground rules, the Air Force is cooperating closely with the present Advanced Research Projects Agency, designated to assign projects to the various services, such as the lunar-probe firings.

ARPA director Roy W. Johnson has told Congress that "more than half of ARPA's $520 million program would actually be executed by the US Air Force," and added that man-in-space developments "would be Air Force, very substantially."

ARPA Director Roy W. Johnson has told Congress *re* man in space that "we are proposing and urging a man-in-space program on the grounds that we think it is reasonable to believe there will be a military requirement sometime for man in space, even though we cannot spell it out, and it is better to undertake these things, to have a deliberate program now, than it is to have a crash program later when the requirements can in detail be spelled out."

Perhaps the best summary of the Air Force view on space is contained in the words of Chief of Staff General White, in his preface to the recently published *The USAF Report on the Ballistic Missile*.

"In discussing air and space, it should be recognized that there is no division, *per se*, between the two. For all practical purposes, air and space merge, forming a continuous and indivisible field of operations. Just as in the past, when our capability to control the air permitted our freedom of movement on the land and seas beneath, so, in the future, will the capability to control space permit our freedom of movement on the surface of the earth and through the earth's atmosphere."—End


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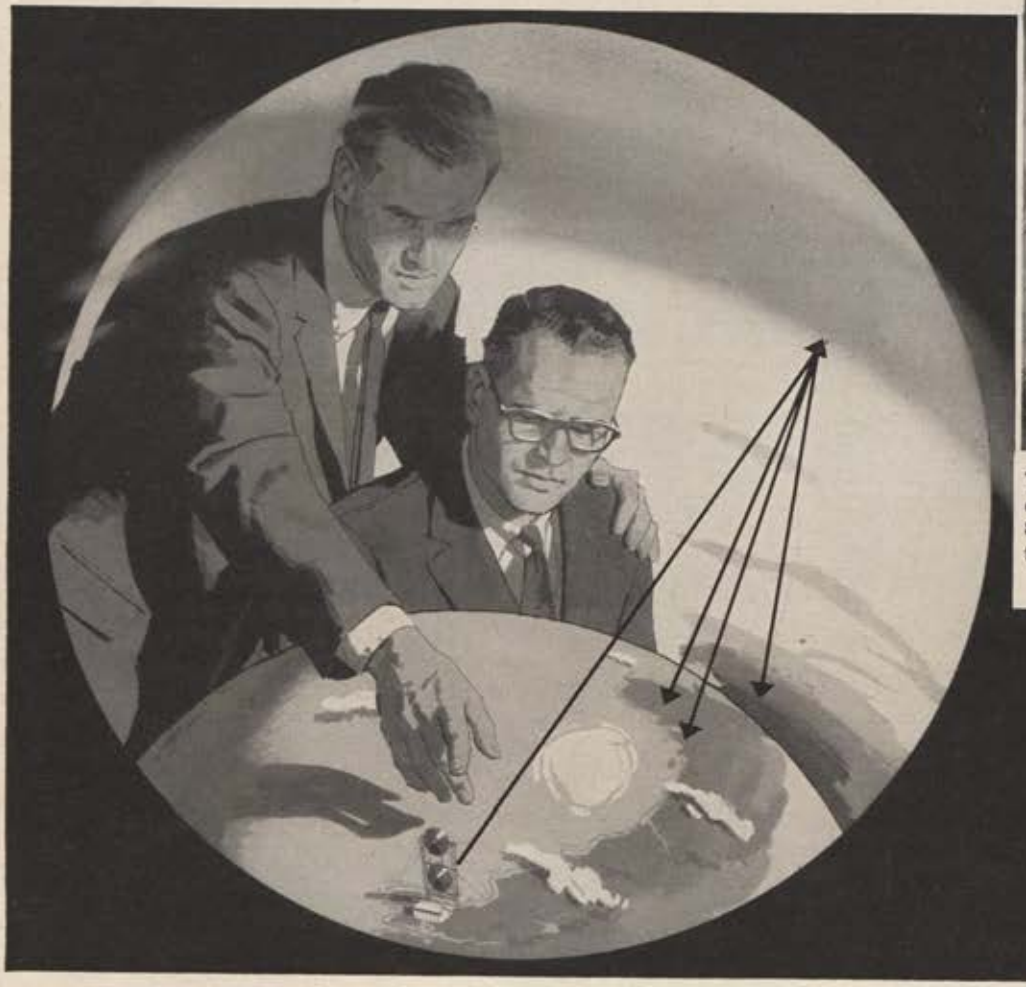

Typical 28 foot paraboloidal antennas as used in a Philco 8,000 mc forward scatter system with diversity.

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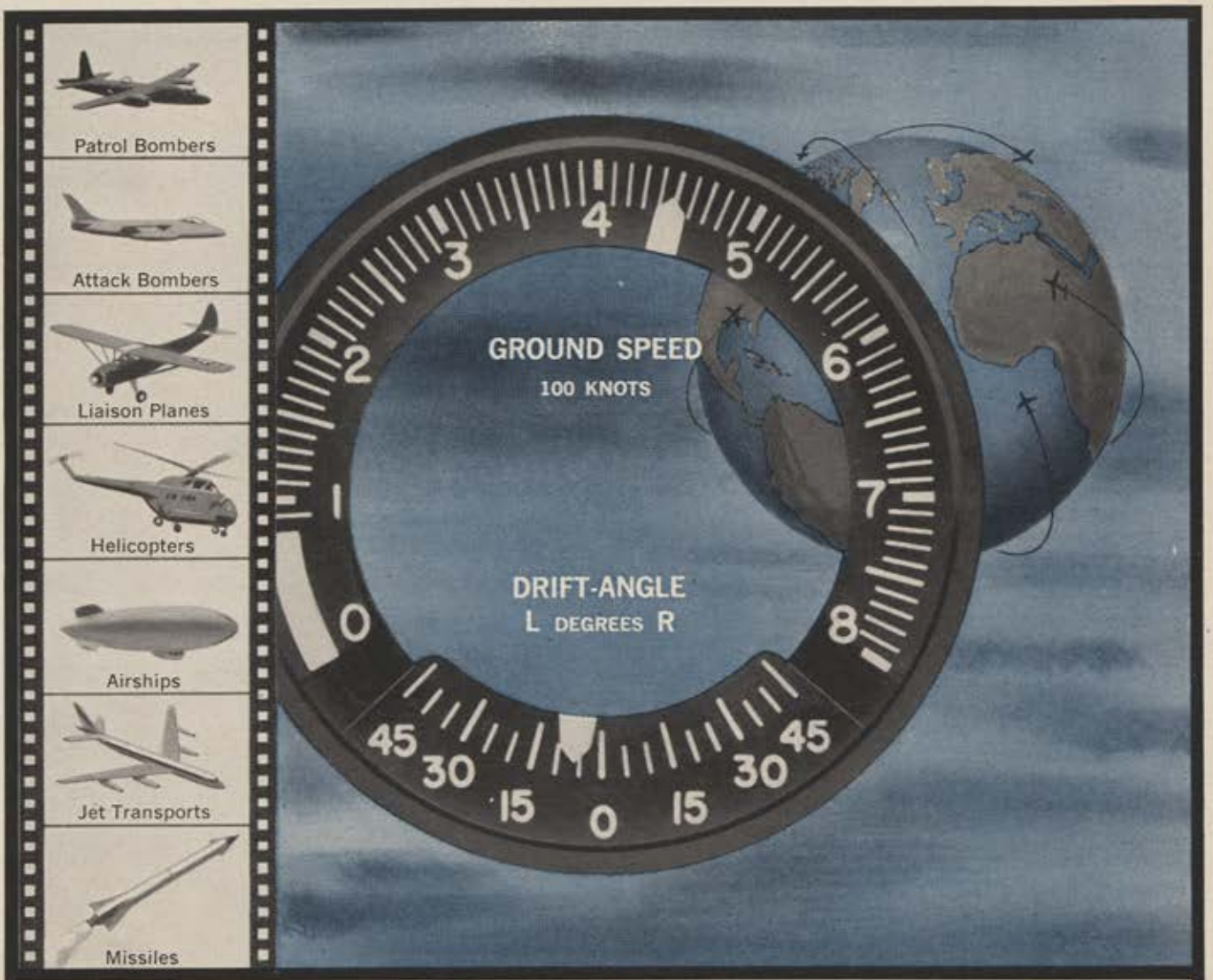

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Through its pioneering work with the Navy and Army, Ryan has demonstrated that continuous wave radar is the best Doppler navigation system for every military and commercial application.

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SIMPLEST—RANAV requires no IF (intermediate frequency) amplifiers or automatic frequency control circuits. Only one microwave generator is used and the systems have less tubes and components.

MOST COMPACT—Inherent simplicity of CW radar systems plus the ingenuity of RANAV design has enabled Ryan to take most advantage of subminiaturization and transistorization, creating compact systems with advanced modular units and etched circuitry.

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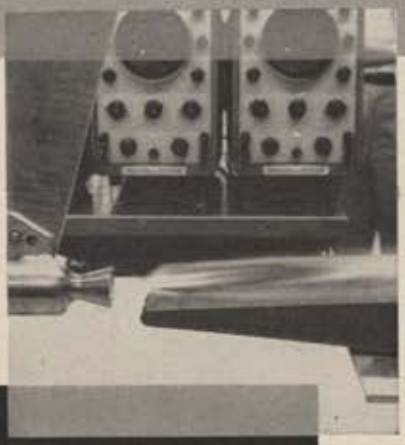

When Temco engineered and developed the aft-fuselage and vertical stabilizer section of Convair's B-58 Hustler . . . the wing section and fuselage panels of Temco's own TT-1 jet trainer . . . the wings of the air-launched "Teal" missile . . . the aircraft industry acknowledged Temco as a leader in development and production of honeycomb sandwich and hi-temperature structures. Missile applications currently programmed are substantial recognition of Temco's stature.

At Temco metal and plastic sandwich structures have been employed in all types of airframe applications, with notable development in the field of stronger, higher heat-resistant metal bondings . . . in improved plastic materials and methods of reinforced plastic honeycomb fabrications.

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• AIR STAFF, USAF HEADQUARTERS

Air Force Nerve Center

IN RECENT months airpower has claimed a major share of public attention. But one vital, contributing factor to airpower—the continuing refinement of the Air Staff's organizational structure and doctrine—has remained very much in the background.

This can be accounted for in part by a natural tendency to assume that Air Staff functions even today fit neatly into the traditional pattern of planning, policy direction, and routine surveillance of operations in the field. Such a notion completely ignores the tremendous impact of the technical revolution on the Air Staff's responsibilities and mode of operation.

The Soviet's rapid conversion of scientific discovery into offensive aerospacepower poses a threat of unprecedented and increasing size, diversity, and immediacy. In this situation the demand for speed and accuracy in all areas of Air Staff activity is sharply increased. And by virtue of capabilities deriving from its assigned missions, the United States Air Force is our nation's primary military instrument for opposing the Soviet threat. Never before in our history has a military headquarters been charged with such direct and immediate responsibility for national survival.

Against this backdrop, the vital relationship between Air Staff organization and Air Force operations in the field can be clearly perceived. The decisions and plans formulated within the Air Staff are simultaneously providing guidance for (1) the maintenance of effective combat elements in being, (2) the modernization of those elements, and (3) the development of improved weapons for the future.

Beginning with the National Security Act of 1947, the Air Force was authorized to develop its organization on the basis of its actual operating requirements. That charter simply stated that there would be a Secretary, Under Secretary, two Assistant Secretaries, and a Chief of Staff. Responsibility for working out the specific and detailed aspects was clearly assigned to the Secretary of the Air Force by law.

As experience indicated a need for more statutory provisions, the Air Force Organization Act of 1951 was passed to provide necessary guidance. It called for the formation of the Air Staff as a professional aide to the Secretary of the Air Force, the Assistant Secretary of the Air Force, and the Chief of Staff. This Act defined certain principal duties of the Air Staff:

"To prepare such plans for the national security—and the use of the Air Force for that purpose both separately and in conjunction with land and naval forces—and for recruiting, organizing, supplying, equipping, training, mobilizing, and demobilizing the Air Force, as will assist the execution of any power vested in, duty imposed upon, or function assigned to the Secretary of the Air Force or the Chief of Staff:

"To investigate and report upon all questions affecting the efficiency of the Air Force and its state of preparation for military operations;

"To prepare detailed instructions for the execution of approved plans and supervise the execution of such plans and instructions;

"To act as the agents of the Secretary of the Air Force and the Chief of Staff in coordinating the action of all organizations of the Air Force establishment;

"To perform such other duties not otherwise assigned by law as may be prescribed by the Secretary of the Air Force."

The Organization Act of 1951 also specified that the executive part of the Air Force would have a Vice Chief of Staff; not more than five Deputy Chiefs of Staff; a general officer to advise on Reserve matters; a Judge Advocate General; three combat commands—TAC, SAC, ADC—and other commands as required, and not more than 2,800 Headquarters USAF officers, except in an emergency. Two more Assistant Secretaries were authorized through an amendment to the Organization Act in 1954.

Air Staff organization and procedures were built around four basic principles: *functionality, flexibility, decentralization, and simplicity*, with primary emphasis on the job to be done. The effectiveness of each organizational element was evaluated almost entirely on the basis of how well it supported and expedited the actual performance of jobs in its functional area.

The principle of flexibility has been indispensable to an effective organizational arrangement. The Air Force is continually "transitioning" to the use of new and improved air weapons and new concepts for their operation. There simply must be enough flexibility in the organization to take these changes in stride.

Through decentralization, the Air Force has delegated the authority and control of functions down to the lowest level having access to the information needed for reaching a sound decision. Decentralization has produced an impressive twofold advantage—the full development and use of experience, initiative, and resourcefulness at all levels; and the opportunity for each echelon to handle problems commensurate with its level of responsibility and authority.

Simplicity in Air Staff organization is essential in meeting the growing demand for speed in reaching decisions

and developing plans. As a measure of its success in applying this principle, the Air Staff can point to clear lines of authority and well-defined relationships between its various elements. The logical grouping of functions and the descriptive and explicit titles identfying each element of the Air Staff greatly facilitate the process of familiarizing newcomers with Air Staff operations.

Command Authority

The Air Force Organization Act of 1951 included a provision that: "Under the direction of the Secretary of the Air Force, the Chief of Staff shall exercise command over the Air Defense Command, the Strategic Air Command, the Tactical Air Command, and such other major commands as may be established by the Secretary . . . and shall have supervision over all other members and organizations of the Air Force."

The Chief of Staff is assisted by a number of principal advisers and assistants who report directly to him: the Surgeon General, the Judge Advocate General, Assistant Chief of Staff for Intelligence, Assistant Chief of Staff for Guided Missiles, Assistant Chief of Staff for Reserve Forces, the Scientific Advisory Board, the Director of Administrative Services, five Deputy Chiefs of Staff, and the Comptroller. The deputies are not in the chain of command. They exercise no direct military command in their own names except in matters specifically delegated to them by the Chief of Staff. However, each deputy, within his immediate sphere of activity, exercises a certain amount of authority for and in the name of the Chief of Staff. In this regard, their responsibility goes far beyond the traditional roles of staff officers under the old G-1, 2, 3, and 4 arrangement. These deputies, although staff officers and not commanders, do much more than give advice to the Chief of Staff; they assist him and act for him. Their authority to speak for the Chief on any matter within their broad fields of responsibility provides him with the assistance of an entire team, not merely the advice of a staff.

The exceptional scope of responsibilities which have been assigned to this executive team requires a full application of the principle of delegation. Only in this way car the Chief of Staff, Gen. Thomas D. White, accomplish many of his tasks involving contacts with top-level agencies —including the President of the United States, the National Security Council, the Defense Policy Board, the Joint Chiefs of Staff—while exercising command of the Air Force. General White's *alter ego*, particularly for Air Force command activities, is the Vice Chief of Staff, Gen. Curtis E. LeMay. General LeMay gives direct attention to problems associated with Air Force programs at his morning staff meeting attended by the deputies and certain assistant chiefs of staff. Matters which require General White's personal attention are presented to him by General LeMay, or by Maj. Gen. J. E. Smart, the Assistant Vice Chief of Staff.

Each principal staff agency is concerned directly or indirectly with all Air Force tasks. Hence, a formal arrangement for coordination is built into the organizational structure of the Air Staff itself. Also, there is an informal working relationship between action agencies at all levels. Under this system, the agency which has primary responsibility for a project will monitor the job with the assistance and concurrence of the other agencies involved at that level. This philosophy extends down through division and branch level.

Air Force Council—Boards and Committees

The Air Force Council advises the Chief of Staff on the major aspects of Air Force policy and courses of action. The Council is also charged with over-all surveillance of the Air Force's capability to perform its task. In this capacity the Council reviews Air Force programs, objectives, and policies and recommends appropriate action to the Chief of Staff.

The Air Force Council includes the Vice Chief of Staff as chairman; the Deputy Chiefs of Staff for Development, Materiel, Operations, Personnel, and Plans and Programs; the Comptroller; and the Inspector General, USAF. One or more of the Assistant Chiefs of Staff for Guided Missiles, Intelligence, or Reserve Forces will sit as Council members when their areas of responsibility are concerned.

Other standing boards and committees of the Air Staff have been assigned to special areas of responsibility that require continuing study. These agencies, on request, give special assistance to the Deputy Chiefs and they submit findings and recommendations on matters of special interest to the Air Council.

Air Staff changes have followed a pattern that demonstrates, in a general sense, the flexibility of the Air Staff.

Principal organizational changes since July 1, 1957, have included:

Deputy Chief of Staff, Plans and Programs—established on July 1, 1957.

Reasons: (a) To spread the heavy Deputy Chief of Staff, Operations, workload over two DCSs, and (b) to establish a time and functional division between day-to-day operations and future plans.

Assistant Chief of Staff, Intelligence—redesignation of Directorate of Intelligence as Assistant Chief of Staff, Intelligence, on July 1, 1957.

Reasons: (a) Intelligence does not fall naturally into either Plans and Programs or Operations, but is an overall Air Staff activity, and (b) Intelligence deals with *both present* and *future*.

Director of Installations—Assistant Chief of Staff, Installations redesignated as Director of Installations on July 1, 1957.

Reason: To achieve more effective coordination of Installations matters with Air Force Operations.

Director of Administrative Services—The Air Adjutant General redesignated as the Director of Administrative Services on December 1, 1957.

Reason: New title more descriptive, more in line with Air Force organizational nomenclature.

Assistant for Weather, Deputy Chief of Staff, Operations—established in April 1958.

Reasons: (a) To coordinate weather policy considerations within the Air Staff, and (b) to render meteorological advice to the Chiefs of Staff of the Air Force and Army.

Assistant for Coordination, Deputy Chief of Staff, Plans and Programs—established on May 9, 1958.

Reason: To provide a focal point within the Air Staff for timely, accurate, and coordinated expression and dissemination of current USAF objectives and policies within Air Staff, throughout Air Force and to appropriate agencies outside the Air Force.

Several important adjustments are scheduled to take effect in the near future, primarily in weapons development and management areas.

Speed and accuracy are critical in defining the essential military tasks and providing the forces to accomplish them. Failure to make timely adjustments imposes an intolerable drain on resources and combat effectiveness.

The major purpose of organizational changes currently proposed will be to produce a clearer definition of the steps required in the decision-making process, a complete understanding of this process by all, a more positive delineation and assignment of responsibilities and authorities, and a greater opportunity for participation of top officers in the *deliberations* leading to decisions.—END

Today's mainstay of SAC and the Free World is the eight-jet B-52 bomber, with inflight-refueled global capability.

• **STRATEGIC AIR COMMAND**

The Global Striking Force

IN THE fall of 1957 the Strategic Air Command put a part of its global strike force on twenty-four-hour alert. SAC bombers were armed and fueled and positioned at the ends of runways. Crews stood by in flying gear. Bombers and men were ready to take off within fifteen minutes of warning.

A few weeks earlier USAF had announced SAC would be responsible for the initial operational capability of intercontinental and intermediate-range missiles. The 1st Missile Division was activated on September 13.

Each of these steps was vital to national security, for the need for each was dictated by the most profound change in strategy and tactics in the annals of warfare: the dramatic reduction in the time required to achieve a military objective.

SAC's mission has not changed, but the factors determining the manner in which SAC must accomplish that mission have changed, and will continue to change. When the Strategic Air Command was activated in March 1946, for instance, on hand were some 250 Boeing B-17 and B-29 heavy bombers and North American B-25 mediums. No global support systems existed, and aerial refueling was a tricky affair, still in the experimental stage. And by tomorrow's standards our present organization may one day be considered obsolete.

For this reason SAC always has been primarily concerned with the future. Yesterday is history, lived and chronicled, and incapable of being changed. Today is already here, and SAC has prepared to the best of its ability to meet full force any exigency which might arise. Further preparation can only be made for the time ahead. Thus, it is the future with which SAC concerns itself, knowing that it must be stronger tomorrow than it is today; that it must be more alert and capable of faster reaction. The lash of its strike force must be able to reach the enemy within minutes instead of hours.

The Soviets' inability to defeat us quickly and decisively hinges mainly on two factors: our retaliatory capability and our ability to keep a significant portion of our strike force alive in the face of a massive surprise attack with bombers or missiles, or both. SAC has been building and strengthening these capabilities day by day for twelve years.

SAC's total deterrent power, feared and respected by the Soviets, is a composite strength of many important elements. SAC's weapon systems, reflecting the latest advances in technology, are supported by a centrally controlled global organization flexible enough to operate any new weapon system or technique, no matter how revolutionary.

This organization is made up of a communications network, logistics and weather services, intelligence and reconnaissance systems, target selection and analysis, and similar activities. All are designed to support both bomber and missile operations.

Centrally controlled from SAC headquarters near Omaha,

(Continued on page 99)

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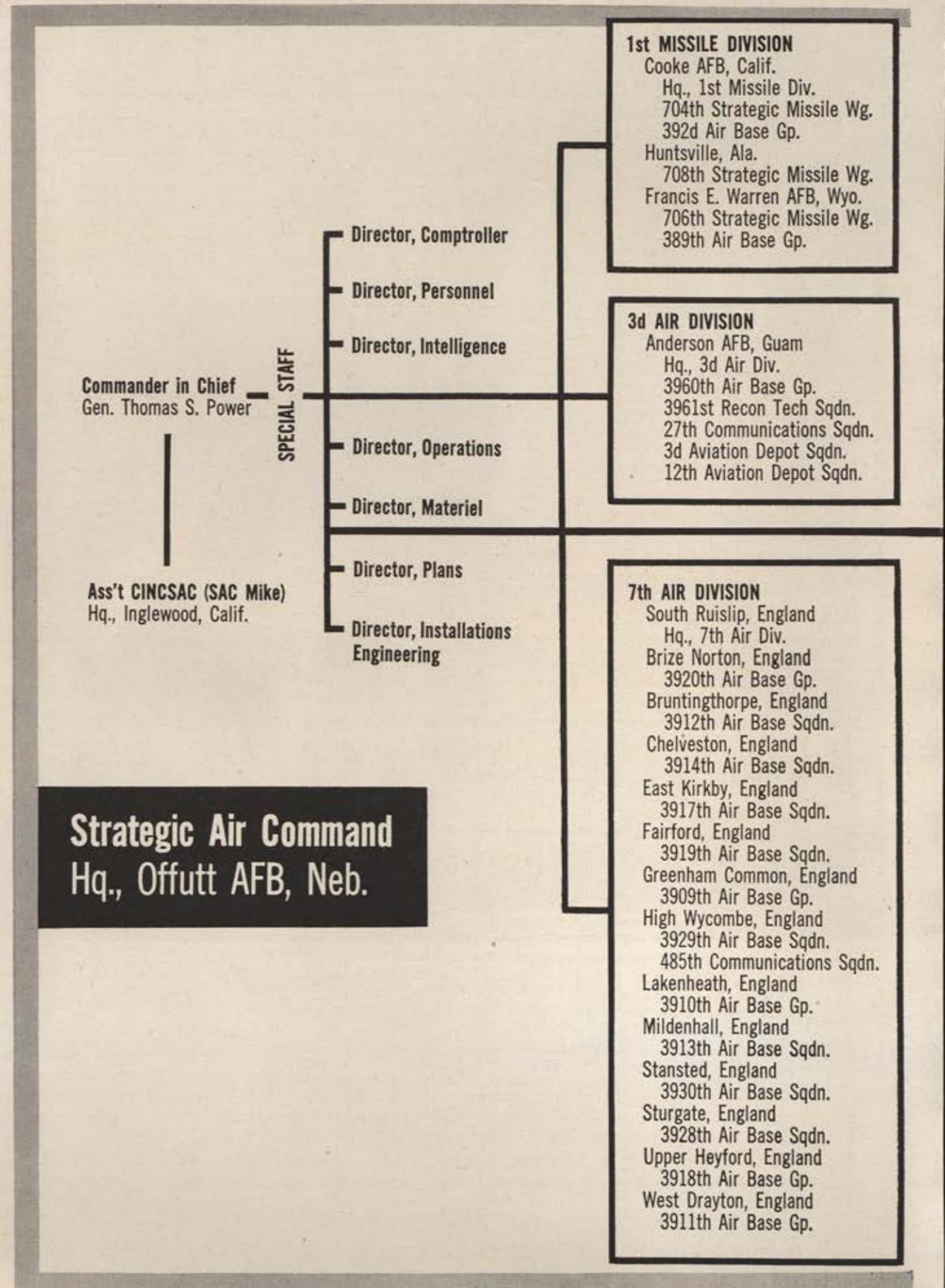
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Gen. Thomas S. Power
Ass't CINCSAC (SAC Mike)
Hq., Inglewood, Calif.
SPECIAL STAFF
Director, Comptroller
Director, Personnel
Director, Intelligence
Director, Operations
Director, Materiel
Director, Plans
Director, Installations Engineering
1st MISSILE DIVISION
Cooke AFB, Calif.
Hq., 1st Missile Div.
704th Strategic Missile Wg.
392d Air Base Gp.
Huntsville, Ala.
708th Strategic Missile Wg.
Francis E. Warren AFB, Wyo.
706th Strategic Missile Wg.
389th Air Base Gp.
3d AIR DIVISION
Anderson AFB, Guam
Hq., 3d Air Div.
3960th Air Base Gp.
3961st Recon Tech Sqdn.
27th Communications Sqdn.
3d Aviation Depot Sqdn.
12th Aviation Depot Sqdn.
7th AIR DIVISION
South Ruislip, England
Hq., 7th Air Div.
Brize Norton, England
3920th Air Base Gp.
Bruntingthorpe, England
3912th Air Base Sqdn.
Chelveston, England
3914th Air Base Sqdn.
East Kirkby, England
3917th Air Base Sqdn.
Fairford, England
3919th Air Base Sqdn.
Greenham Common, England
3909th Air Base Gp.
High Wycombe, England
3929th Air Base Sqdn.
485th Communications Sqdn.
Lakenheath, England
3910th Air Base Gp.
Mildenhall, England
3913th Air Base Sqdn.
Stansted, England
3930th Air Base Sqdn.
Sturgate, England
3928th Air Base Sqdn.
Upper Heyford, England
3918th Air Base Gp.
West Drayton, England
3911th Air Base Gp.
Strategic Air Command
Hq., Offutt AFB, Neb.

2d AIR FORCE

Barksdale AFB, La.
- Hq., 2d Air Force
- 4th Air Div.
- 4238th Strategic Wg.
- 4238th Air Base Gp.

Altus AFB, Okla.
- 11th Bomb Wg. (H)
- 11th Air Base Gp.

Carswell AFB, Tex.
- 19th Air Div.
- 7th Bomb Wg. (H)
- 4123d Strategic Wg.
- 7th Air Base Gp.

Clinton Sherman AFB, Okla.
- 4123d Air Base Sqdn.

Columbus AFB, Miss.
- 4228th Air Base Sqdn.

Homestead AFB, Fla.
- 823d Air Div.
- 19th Bomb Wg. (M)
- 379th Bomb Wg. (M)
- 823d Air Base Gp.

Hunter AFB, Ga.
- 38th Air Div.
- 2d Bomb Wg. (M)
- 308th Bomb Wg. (M)
- 804th Air Base Gp.

Lake Charles AFB, La.
- 806th Air Div.
- 44th Bomb Wg. (M)
- 68th Bomb Wg. (M)
- 806th Air Base Gp.

Laughlin AFB, Tex.
- 4080th Strategic Recon Wg.
- 4080th Air Base Gp.

Little Rock AFB, Ark.
- 825th Air Div.
- 70th Strategic Recon Wg. (M)
- 384th Bomb Wg. (M)
- 825th Air Base Gp.

MacDill AFB, Fla.
- 6th Air Div.
- 305th Bomb Wg. (M)
- 306th Bomb Wg. (M)
- 809th Air Base Gp.

Matagorda Range, Tex.
- 4004th Air Base Sqdn.

McCoy AFB, Fla.
- 321st Bomb Wg. (M)
- 321st Air Base Gp.

Ramey AFB, P.R.
- 72d Bomb Wg. (H)
- 72d Air Base Gp.

8th AIR FORCE

Westover AFB, Mass.
- Hq., 8th Air Force
- 57th Air Div.
- 99th Bomb Wg. (H)
- 4050th Air Refueling Wg.
- 814th Air Base Gp.

Bunkerhill AFB, Ind.
- 4041st Air Base Gp.
- 68th Air Refueling Sqdn.

Campbell AFB, Ky.
- 4002d Air Base Sqdn.

Dow AFB, Me.
- 4060th Air Refueling Wg.
- 4060th Air Base Gp.

Ernest Harmon AFB, Newfoundland
- 4081st Strategic Wg.
- 4081st Air Base Gp.

Forbes AFB, Kan.
- 21st Air Div.
- 55th Strategic Recon Wg. (M)
- 90th Strategic Recon Wg. (M)
- 815th Air Base Gp.

Frobisher Bay, Baffin Island
- 4085th Air Base Sqdn.

Goose AB, Labrador
- 4082d Strategic Wg.
- 4082d Air Base Gp.

Lincoln AFB, Neb.
- 818th Air Div.
- 98th Bomb Wg. (M)
- 307th Bomb Wg. (M)
- 818th Air Base Gp.

Lockbourne AFB, Ohio
- 801st Air Div.
- 26th Strategic Recon Wg.
- 301st Bomb Wg. (M)
- 376th Bomb Wg. (M)
- 801st Air Base Gp.

Loring AFB, Me.
- 42d Bomb Wg. (H)
- 42d Air Base Gp.

Pease AFB, N. H.
- 817th Air Div.
- 100th Bomb Wg. (M)
- 817th Air Base Gp.

Plattsburgh AFB, N. Y.
- 820th Air Div.
- 380th Bomb Wg. (M)
- 820th Air Base Gp.

Schilling AFB, Kan.
- 802d Air Div.
- 40th Bomb Wg. (M)
- 310th Bomb Wg. (M)
- 802d Air Base Gp.

Sondrestrom AB, Greenland
- 4084th Air Base Gp.

Thule AB, Thule
- 4083d Strategic Wg.
- 4083d Air Base Gp.

Whiteman AFB, Mo.
- 340th Bomb Wg. (M)
- 340th Air Base Gp.

15th AIR FORCE

March AFB, Calif.
- Hq., 15th Air Force
- 12th Air Div.
- 320th Bomb Wg. (M)
- 22d Bomb Wg. (M)
- 807th Air Base Gp.

Beale AFB, Calif.
- 4126th Air Base Sqdn.

Biggs AFB, Tex.
- 810th Air Div.
- 95th Bomb Wg. (H)
- 97th Bomb Wg. (M)
- 810th Air Base Gp.

Castle AFB, Calif.
- 93d Bomb Wg. (H)
- 93d Air Base Gp.

Davis-Monthan AFB, Ariz.
- 36th Air Div.
- 43d Bomb Wg. (M)
- 303d Bomb Wg. (M)
- 803d Air Base Gp.

Dyess AFB, Tex.
- 819th Air Div.
- 96th Bomb Wg. (M)
- 341st Bomb Wg. (M)
- 819th Air Base Gp.

Ellsworth AFB, S. D.
- 28th Bomb Wg. (H)
- 28th Air Base Gp.

Fairchild AFB, Wash.
- 92d Bomb Wg. (H)
- 92d Air Base Gp.

Malmstrom AFB, Mont.
- 4061st Air Refueling Wg.
- 4061st Air Base Gp.

Mountain Home AFB, Idaho
- 9th Bomb Wg. (M)
- 9th Air Base Gp.

Travis AFB, Calif.
- 14th Air Div.
- 5th Bomb Wg. (H)
- 5th Air Base Gp.

Walker AFB, N. M.
- 47th Air Div.
- 6th Bomb Wg. (H)
- 509th Bomb Wg. (M)
- 812th Air Base Gp.

16th AIR FORCE

Torrejon AB, Spain
- Hq., 16th Air Force
- Hq., 65th Air Div. (DEF)
- 3970th Air Base Gp.
- 3971st Recon Tech Sqdn.
- 49th Communications Sqdn.

Madrid City AB, Spain
- 3977th Support Wg.

Moron AB, Spain
- 3973d Air Base Sqdn.

Seville City AB, Spain
- 3977th Air Base Gp.

Zaragoza AB, Spain
- 3974th Air Base Sqdn.

Sidi Slimane AB, French Morocco
- Hq., 4310th Air Div.
- 3906th Air Base Gp.

Benguerir AB, French Morocco
- 3926th Air Base Gp.

Boulhaut AB, French Morocco
- 3936th Air Base Sqdn.

INSTRUMENTATION

This new era of electronic missile guidance and identification has emphasized the importance of aircraft instrumentation, a field to which Hayes has made some outstanding contributions.

An example is a remote channel indicator developed by Hayes' native talent. This instrument shows an aircraft pilot the UHF channel to which his radio is tuned although the radio may be in a position difficult for the pilot to see. The first production prototype of Hayes Remote Channel Indicator passed all required tests, operated perfectly without a single change in design. Thousands of these instruments now have been produced by Hayes for the U. S. Armed Services.

Hayes has designed, prototyped, produced and installed thousands of electronic kits for piloted aircraft. Hayes has had experience in research and engineering for a wide range of aviation instrument production. Inquiries are invited.

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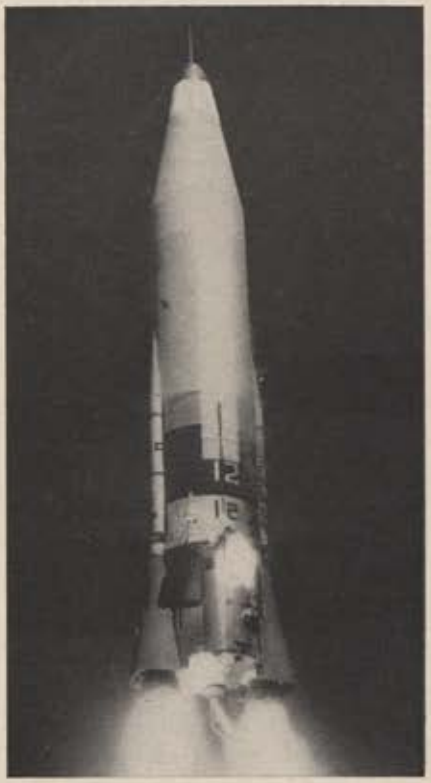
AIRCRAFT CORPORATION
BIRMINGHAM, ALABAMA

ENGINEERS • DESIGNERS • MANUFACTURERS

Deadly birds of a feather in SAC's global deterrent force are these three missiles, each capable of delivering a thermonuclear wallop: the Thor 1,500-mile IRBM, Snark intercontinental 5,500-mile air-breather, Army-developed Jupiter.



At right, the Air Force's mighty Atlas intercontinental ICBM, liquid-fueled 5,500-miler. SAC activated its first two Atlas squadrons back in April 1958.

this combination of weapon systems, men, and organization represents a strategic capability unparalleled in scope and striking power.

To ensure the survival of an adequate amount of its striking power, under any condition of attack, SAC uses both defensive and offensive measures. Defensive measures include protection against sabotage designed to pin our forces down prior to enemy attack; making bases and missile sites less vulnerable to battle damage; and dispersal of the strike force over a large number of bases in the US and abroad. But our most potent protective measure is an offensive one—SAC's alert system.

The enemy, unless held back by such an alert force, could easily make one-sided use of the advantages provided by the dramatic compression of time resulting from recent advances in military technology. But in facing the alert force, the enemy faces a countermeasure providing us with an equally dramatic compression of reaction. The enemy's advantage in being able to strike quicker with his modern weapons is offset by the speed with which SAC's alert force can react and strike back.

Constant checks and practice alerts ensure that the force can launch a counterblow minutes after hostile action against this country has begun. Eventually, one-third of SAC's entire force will be on fifteen-minute alert, if the necessary resources are provided. Unless the enemy can keep SAC's force from taking off, his attack will signal his own destruction.

Through the alert system, SAC today is maintaining its combat-ready status. The command also is preparing for the missile era, carefully programming its transition from a bomber to a mixed bomber-missile force so as to allow no gap in the country's strategic strength. Meanwhile, SAC is carefully watching for any technical advance which might improve its offensive or defensive positions.

That SAC stresses flexibility of operation and quick adaptability to newer and better weapon systems is no accident. Rather it is the result of lessons learned during a dozen years' experience in building and operating the world's first aerial strike force established on a global scale and given a global mission.

The command that began with a handful of men and machines in 1946 today operates more than 2,700 bombers and tankers whose flight paths cover more than half the globe. Between then and now SAC has learned to carry out its global mission with a professional skill never equaled by a military force.

SAC has developed and employed new machines and special equipment, developed radical procedures that have proved their worth, and followed as tough a training program as military men ever have faced.

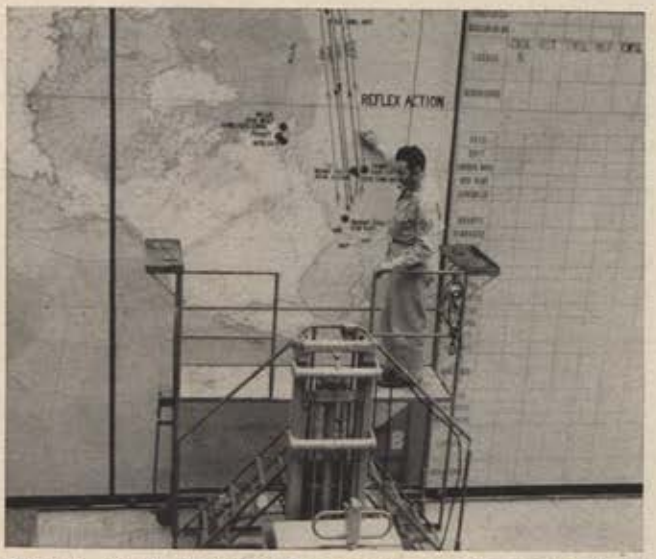
It has brought the art of aerial refueling to the point where it is a routine operation in order to obtain the nonstop combat range needed by a globally operating strike force. Through aerial refueling, the command has successfully bridged the gap between the comparatively short-range bombers of World War II and aircraft of truly global range now on the drawing boards.

SAC's increasingly heavy operational commitments have required continued improvements in aircraft and aircraft equipment. As a result, aircraft and equipment available to both military and civilian users today are far superior to those which would have evolved without the stimulus of SAC's mission.

The Strategic Air Command was created and is now being operated at peak efficiency for but one purpose: the strategic employment of the most advanced weapon systems in the most effective manner possible to maintain an adequate margin of deterrent power.

At present, the manned bomber is still the only operational weapon system which can be employed successfully against strategic targets, regardless of their location, size, and character. The integration of missiles already is under way, but these early missiles are inferior to the bomber with respect to accuracy, payload, and reliability. As the quantity and quality of operational missiles increase, the number of missions they can accomplish will increase. For

(Continued on following page)



Control center at SAC headquarters keeps track of all command operations at all times, ensures alert capability.

This single sideband radio system backs up SAC's world-wide closed-circuit phone system, aids ground-to-air contact.

the foreseeable future, however, missiles will supplement and complement rather than replace the manned bomber. The coordinated employment of both will provide an invaluable flexibility in the choice of weapon systems best suited for each particular strategic mission. To achieve the maximum benefit from this mixed bomber-missile force it will be mandatory to reflect the latest technological advances both in the manned and unmanned weapon systems.

The manned bomber force today consists primarily of six-jet Boeing B-47 mediums and eight-jet B-52 heavies. The total striking power of this force is almost beyond comprehension; any one of these bombers can carry more destructive power in its bomb bays than did all the Allied bombers of World War II. Similarly, the performance characteristics of the B-47s and the B-52s would have been considered fantastic by World War II standards. By today's standards, however, they are approaching obsolescence and must eventually be replaced.

The replacement for the B-47 already is flying. The Convair B-58 Hustler is a supersonic, delta-winged medium bomber powered by four turbojet engines. Its unrefueled range will exceed the B-47's by 3,000 miles, and it is capable of operating at altitudes and speeds far beyond those of any bomber now in existence.

The replacement for the B-52 is on the drawing board. The Air Force has let contracts calling for a heavy bomber able to operate above 70,000 feet at better than 2,000 miles per hour. The new bomber is North American's B-70.

Meanwhile, the "G" model of the B-52 is now in production. The new model, with many improvements in design and production, will be the most formidable bomber yet developed. Its engines will be more powerful and its range, twenty-five percent greater than present B-52s, will enable it to fly round-trip, nonstop, and nonrefueled missions against targets in the Soviet Union. The G model will carry a full load of nuclear weapons in its bomb bay, and under its wings it will carry two North American GAM-77 Hound Dogs which can be released in flight hundreds of miles from targets. The Hound Dog missiles will fly at supersonic speeds and will carry nuclear warheads.

A second air-to-surface missile, the Bell GAM-63 Rascal, already is in operational use with SAC. It is designed for the B-47 and can be released in flight many miles from its target. It is supersonic and carries a nuclear warhead.

Conversion of SAC's existing organization and support functions to mixed bomber-missile operations has been planned and is progressing satisfactorily. The ballistic missile force will be formed into divisions, wings, and squadrons and integrated into the over-all organization. SAC's 1st Missile Division, with headquarters at Cooke Air Force Base in California, occupies a position equal to that of one of SAC's numbered air forces. It is responsible for training and expanding the strategic ballistic missile force.

Nine missiles of various types are currently scheduled for early entry into the combat inventory, and ten operational or training missile wings or squadrons have been activated. Several other missile units will be formed during 1958, and construction of launching sites and support facilities is under way in several states.

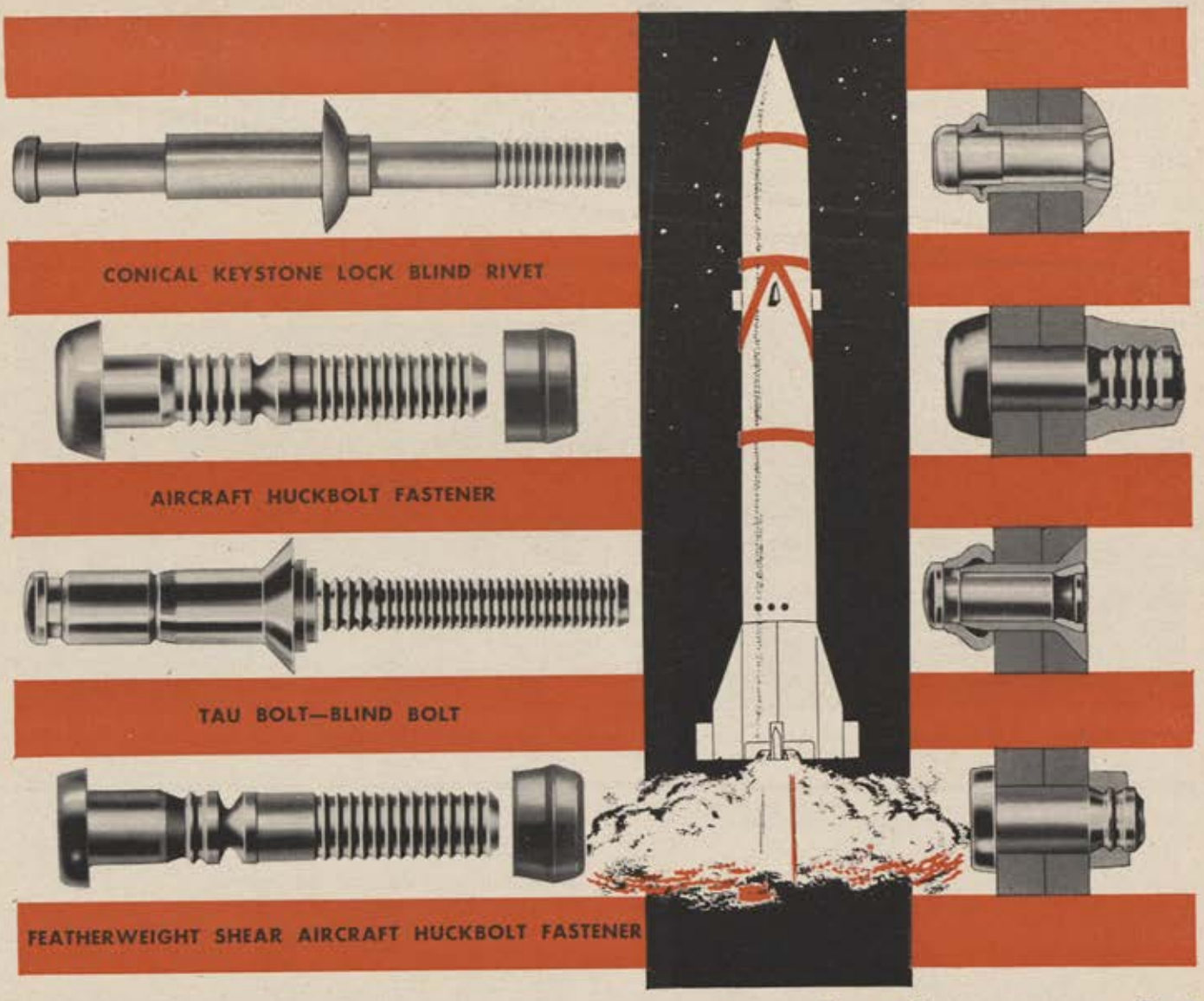
Construction also is planned at SAC headquarters for an addition which will house missile targeting equipment and personnel. This targeting center will supply all SAC ballistic missile bases with trajectory and space data which will be fed into missile guidance systems.

ICBMs presently scheduled for SAC include the Convair Atlas, successfully fired several times, and the Martin Titan. Both have programmed ranges of 5,500 miles. IRBMs in SAC's inventory are the Army-developed Jupiter and the Air Force's Douglas Thor. SAC's first two IRBM squadrons, one for the Jupiter and one for the Thor, are in training and scheduled for overseas deployment late in 1958.

A third missile unit, activated and in training, will be equipped with the Northrop Snark, a near-sonic, pilotless aircraft powered by a turbojet engine.

During SAC's transition from a bomber to a mixed bomber-missile force, much experience will be gained as missile performance improves and their employment increases. But new requirements will arise. Once launched, missiles and their internal systems must operate automatically. Further improvement in areas of automatic control is needed. Future requirements also will demand missiles of greater reliability. Conversion to solid fuels or storable fuels will help in this area and will enhance deployment and quick-reaction capabilities.

Undoubtedly the factors which determine the operation of SAC today, and which are the basis of its planning for the future, will change many times and probably very radically in the years ahead. Possibly even some day the Strategic Air Command may become the Strategic Space Command. If so, SAC intends to be ready.—END



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• NORTH AMERICAN AIR DEFENSE COMMAND

Defending North America

Command post for the air defense of this vast continent. In this nerve center NORAD personnel check air defense data.

"We believe that the defense of North America is so vital, not only to the people of the United States and Canada but to the whole Free World, that we must build the best air defense that seems possible, because it might work—not fail to build it because it might not."
—NORAD BRIEFING

THE JOB of the North American Air Defense Command (NORAD) is to control in wartime all of North America's air defense forces.

In peacetime, its mission is to prepare plans, policies, and procedures for immediate joint air defense action by the separate forces of the United States and Canada in the event of hostilities.

Immediate is the important word.

The national policy of both Canada and the United States is twofold: first, to prevent war if at all possible; and, second, in the event of war to limit the destruction of our national economies to an acceptable level.

For these reasons NORAD believes that, in attacking North America, the enemy's objective would be both to destroy or neutralize our retaliatory capability and to destroy our will and/or ability to sustain the war. The purpose of NORAD must be to thwart the enemy in the attainment of his objectives. It follows that the air defense system must provide adequate defense for both retaliatory forces and the population of the North American continent.

For many years before NORAD was established, it was recognized that the air defense of Canada and the United States must be considered as a single problem. Previous arrangements provided for coordinating separate Canadian and United States air defense plans, but did not provide for authoritative control of all air defense weapons.

The advent of nuclear weapons, great improvements in delivery systems, and the requirements of the air defense control systems demand rapid action to keep pace with the speed and tempo of technological developments. Defensive operations must commence as early as possible, and enemy forces must be kept constantly and increasingly engaged.

It is essential, therefore, to have in existence in peacetime an organization, including the weapons, facilities, and command structure, which could operate immediately at the outset of hostilities in accordance with a single air defense plan approved in advance by both countries.

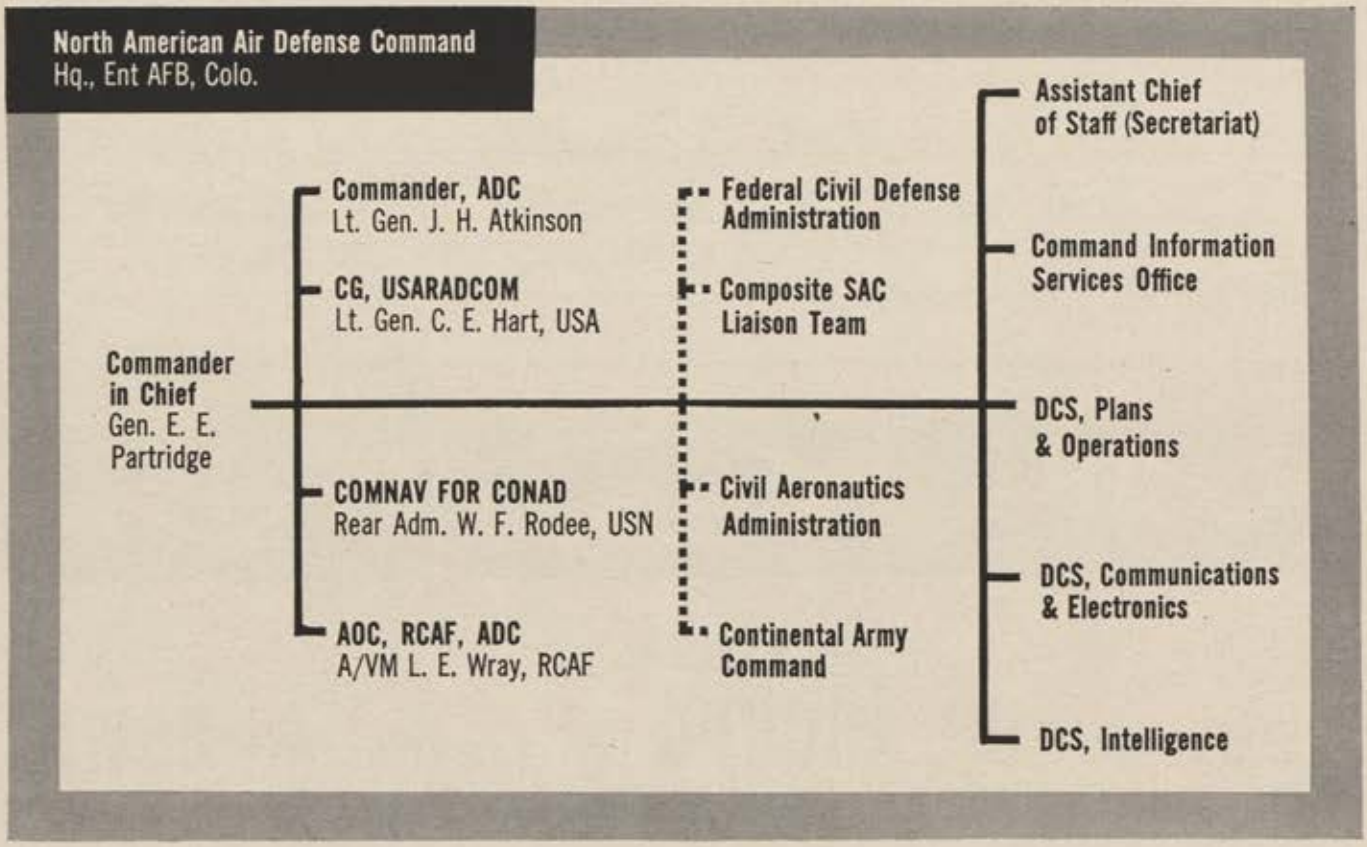
In view of this, an integrated headquarters, the North American Air Defense Command, was established September 12, 1957, on an interim basis at Colorado Springs. Its mission was to exercise operational control over forces made available to it for the air defense of the two countries.

The two governments then agreed on May 12, 1958, to maintain NORAD for ten years or for a shorter period if both countries agreed.

NORAD's Commander in Chief, USAF Gen. Earle E. Partridge, is responsible to the Chiefs of Staff Committee of Canada and to the Joint Chiefs of Staff of the United States, who in turn are responsible to their respective governments.

General Partridge's deputy is Canadian Air Marshal C. Roy Slemon, formerly the Chief of the Air Staff, top man in the RCAF. When General Partridge is away on official trips, command of NORAD passes to Air Marshal Slemon. Under the agreement, the NORAD Commander in Chief and the deputy can never be from the same country.

In addition to being an integrated command, NORAD is also a multiservice organization. Its components include the US Air Force Air Defense Command, under Lt. Gen. Joseph H. Atkinson; the US Army Air Defense Com-



mand, led by Lt. Gen. Charles E. Hart; and US Naval Forces, NORAD, skippered by Rear Adm. Walter F. Rodee. All are headquartered in Colorado Springs adjacent to NORAD Headquarters. The Canadian component is the Royal Canadian Air Force Air Defense Command with headquarters at St. Hubert, near Montreal, Canada.

NORAD has approximately 174,000 military personnel, 115,000 from the Air Force, 35,000 from the Army, 10,000 from the Navy, and 14,000 from the RCAF. Counting National Guard, Reserve, and other augmentation forces, the number is well over 200,000.

The NORAD complex consists primarily of two parts: a vast surface and airborne network of warning and control facilities tied together by a complicated communications network; and air defense weapons for employment within this early warning and control system.

The warning and control network includes:

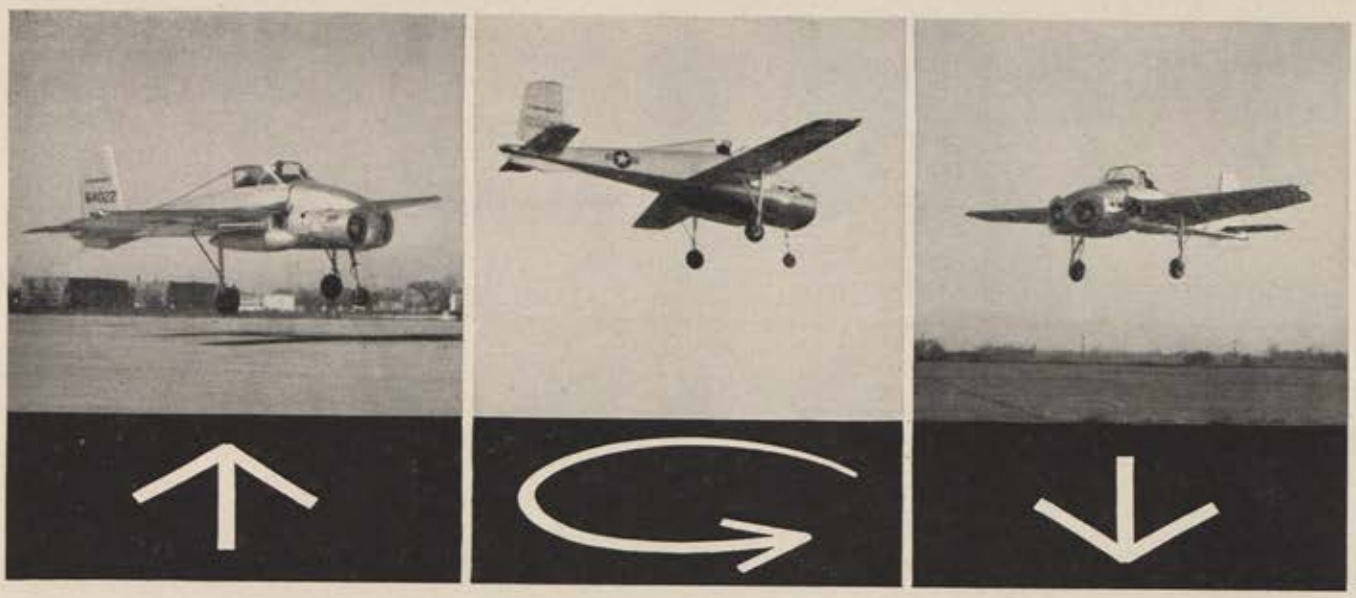
- A 9,000-mile Distant Early Warning (DEW) Line composed of ground radar elements across the "north side" of the continent, with sea and air radar surveillance extending to the Azores and Hawaii.
- A second warning system, the Mid-Canada Line of detection stations across the 55th parallel of Canada.
- An intricate "interior zone" warning and control complex of offshore air and sea radar picket lines, continent-wide network of radar stations, identification and interception centers, ground and air combat commands, extending from Labrador and British Columbia to Florida and Southern California.
- More than eighty all-weather fighter-interceptor squadrons equipped with infrared, air-to-air guided missiles and conventional rockets. Many of these employ atomic air-to-air rockets capable of destroying entire formations of enemy bombers.
- Army missilemen at SAC bases and in and around metropolitan areas, armed with the Army's Nike-Ajax surface-to-air missile for close-in defense of specific target areas. Many of these are now converting to the new Nike-Hercules missile capable of carrying a nuclear warhead.

The nerve center for this complex system is the Combat Operations Center in Colorado Springs where more than 600 miles of internal communications wire feeds information to personnel who plot the air situation over every part of the continent at any given moment on a huge three-story Plexiglas surveillance board.

It is at this center that information on an air attack on the continent would be correlated and the earliest possible warning given to Ottawa and Washington, the Strategic Air Command, the Federal Civil Defense Administration, and to the Pentagon. Regional air defense commanders would be kept abreast of the big picture at the same time that they were taking action to intercept and destroy invading bombers in the air space over their own area of responsibility.

The daily operations of all echelons of the North American Air Defense Command are conducted on the premise that the first warning of an air attack will be generated within its own system—and that the US and Canada would have a maximum of three to four hours of tactical warning.

Finally, as long as NORAD remains an effective air defense force, able to protect SAC bases and other targets, it complements the strategic striking forces in the primary military mission of deterring war. However, if the forces on which the Free World is depending to deter war, do not in fact deter, and if because of miscalculation, by design, or otherwise the Soviets decide to attack anyway, only a strong air defense system stands between survival and annihilation for the people of this continent.—End



Straight **UP, AROUND** and straight **DOWN**

On May 24, for the first time in history, a jet airplane rose straight up in a conventional horizontal attitude, flew around an airport traffic pattern and returned to the starting point to hover and land vertically.

The Bell X-14 can thus report its mission accomplished. It has proved that the minimum take-off requirements of a helicopter can be combined successfully with the high-speed performance of jet aircraft.

An operational military airplane embodying this Bell-pioneered VTOL concept is now in advanced stages of development under Navy and Air Force contract. Bell engineers foresee the day when the same principle will be applied to both military and commercial jet aircraft of all sizes.

Niagara Frontier Division

BELL Aircraft CORP.

BUFFALO 5, N. Y.

Network of Defense

THE present Air Defense Command is the third organization to bear that name since 1940. The first ADC was created to lay the doctrinal basis for the nation's first air defense network, and was inactivated in 1941 after performing its mission. A second ADC was established in 1946 as a major air command, was reduced to an "operational" headquarters under the Continental Air Command in 1948, and was inactivated in July 1950. The third, and present, ADC came into existence on January 1, 1951.

ADC's checkered organizational history has reflected the ups and downs of air defense. During the early months of World War II sketchy radar networks were erected along both coasts, but were progressively demobilized as victory neared. The second ADC, created in March 1946, possessed virtually no air defense facilities or weapons. ADC's primary occupation during those lean years was to plan for the time when funds would be made available. Thanks to our national monopoly of nuclear weapons, however, the vacuum in air defense was not taken seriously—except by ADC and USAF.

In 1948, deteriorating US relations with the Soviet bloc, culminating in the Berlin blockade, caused USAF to order ADC to erect emergency air defenses in the Northwest, the Los Alamos area, and around New York and Washington. AMC depots were raided for survivors of the wartime radar network, and ADC's few lonely fighter squadrons were reinforced by a SAC fighter wing. After a week of intensive around-the-clock operation, the emergency defenses had all but broken down because of inexperienced personnel and inadequate maintenance.

In 1947, USAF had pressed Congress for funds with which to build an adequate air defense radar network, but had been rebuffed. In 1948, USAF again took its case to Congress, this time pleading for a more modest system.

This time Congress acted, and what was to be known as the "Permanent" radar net was approved in March 1949. Delayed appropriations, however, caused the program to move slowly and ground was not broken until the spring of 1950. During this time, still more "mothball" radars were unveiled, better-trained personnel were pumped into the emergency air defense system, and "island-type" defenses were extended into California and the Great Lakes area. During 1949 and 1950 day-type jet fighters were introduced into ADC's inventory, and plans were hurried for the addition of all-weather jets in the near future.

The decision to erect an air defense system was made none too soon, for in the summer of 1949 our nuclear monopoly was broken by the Soviets.

During the Korean War the Permanent radar net became operational and extensive additions were programmed. High-level scientific study groups recommended construction of a line of radars across the top of the continent, a proposal quickly approved by the Canadian and American governments. An extension of the radar net into southern Canada was also achieved during 1952-53, resulting in the jointly financed and operated Canadian-American Pinetree chain, in which ADC was given the task of manning and operating a number of radar stations.

Meanwhile, the offensive threat was increasing. Soviet aircraft were capable of higher altitudes and speeds, demanding more powerful and discriminating radars. To plug the gaps in low-altitude radar coverage, the Ground Observer Corps, organized in 1950, was enlarged to operate twenty-four hours a day in key areas (Operation Skywatch). ADC also extended its radar coverage out to sea by creating two wings of Airborne Early Warning and Control aircraft (AEW&C), equipped with Lockheed RC-121 Super Constellations carrying search and height-finding radar, and augmented by Navy picket vessels—both patrolling the coasts far out to sea. In 1956 weird-looking radar platforms, called "Texas Towers," were built off the eastern shore. Plans for the use of interceptors owned by ADC's sister USAF commands, the Air National Guard and the Navy, were implemented, adding many potentially useful weapons to the air defense armory.

This intricate and ever-growing mass of weapons, facilities, and men was in danger of foundering in a morass

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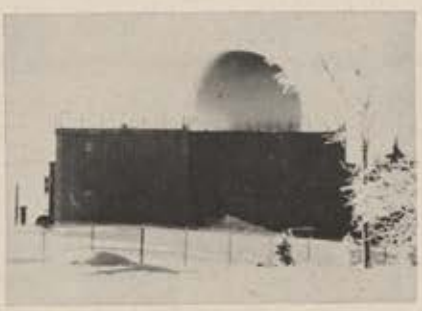

At left, the dome of a Pinetree Line outpost in Canada, southernmost radar fence. Center, one of the RC-121s, loaded with detection equipment, which guard the Atlantic and Pacific seaboards against sneak attack. At right, Texas Tower, another radar fence protecting US shores, so named because of resemblance to oil derricks in Lone Star state.

Air Defense Command
Hq., Ent AFB, Colo.

64th AIR DIVISION (DEFENSE)
Hq., Pepperell AFB,
Newfoundland

Commander
Lt. Gen. Joseph H. Atkinson

73d AIR DIVISION (WEAPONS)
Hq., Tyndall AFB, Fla.

EASTERN AIR DEFENSE FORCE
Stewart AFB, N. Y.
Hq., Eastern Air Defense Force
Roslyn AFS, N. Y.
26th Air Div.
Willow Run AFS, Mich.
30th Air Div.
Syracuse AFS, N. Y.
32d Air Div.
Dobbins AFB, Ga.
35th Air Div.
Truax Field, Wis.
37th Air Div.
Wright-Patterson AFB, Ohio
58th Air Div.
Andrews AFB, Md.
85th Air Div.
Otis AFB, Mass.
551st Airborne Early Warning & Control Wg.

CENTRAL AIR DEFENSE FORCE
Richards-Gebaur AFB, Mo.
Hq., Central Air Defense Force
20th Air Div.
Malmstrom AFB, Mont.
29th Air Div.
Snelling AFS, Minn.
31st Air Div.
Oklahoma City AFS, Okla.
33d Air Div.
Kirtland AFB, N. M.
34th Air Div.

WESTERN AIR DEFENSE FORCE
Hamilton AFB, Calif.
Hq., Western Air Defense Force
Geiger Field, Wash.
9th Air Div.
McChord AFB, Wash.
25th Air Div.
Norton AFB, Calif.
27th Air Div.
Hamilton AFB, Calif.
28th Air Div.
McClellan AFB, Calif.
552d Airborne Early Warning & Control Wg.

of tactics and procedures which had not matured far beyond those of World War II. It was apparent that an automatic control, dissemination, and display system was needed to coordinate the components of the system into a quick-reacting whole. By the early 1950s, research and development on such a system had produced a promising digital-computing device which was to be the future nerve center of the air defense system. The proposed network of digital computers, their ancillary transmitters and receivers, and the peripheral detection system was named the Semi-Automatic Ground Environment, or more popularly, SAGE. The first of the SAGE sectors, in the New York area, became operational on July 1, 1958.

Though ADC carried the burden of national air defense during the early postwar years, both the Army and the Navy entered the air defense "business" in earnest in the early 1950s, making coordination of the tri-service effort necessary. The problem of integration was partially solved in 1954 by the creation of the Continental Air Defense Command (CONAD) as an agency of the Joint Chiefs of Staff, with Gen. Benjamin W. Childlaw, ADC's Commander, also serving as CONAD Commander in Chief. In October 1956, a further step toward more effective coordination was taken when CONAD (subsequently renamed NORAD) and ADC were split into two distinct headquarters, at a common location at Ent Air Force Base in Colorado Springs. Gen. Earle E. Partridge, who had succeeded General Childlaw in 1955, assumed duties of CINCONAD, while ADC was turned over to Lt. Gen. Joseph H. Atkinson.

ADC is "organized primarily to discharge Air Force responsibilities for the air defense of the United States." It is a major USAF command and also the Air Force component of NORAD. ADC's Commander, General Atkinson, is CINCNORAD's chief USAF adviser, and a key member of NORAD's battle staff.

Officially, all of the USAF air defense weapons and facilities are assigned to the Air Defense Command. These are made available to CINCNORAD for operational employment in actual or simulated air defense operations. Specifically, ADC's mission is to "organize, administer, equip, train, and prepare for combat, units and combat crews of the Air Force assigned to ADC," and to place under the operational control of CINCNORAD such elements when combat ready. ADC is authorized to recommend development and procurement of air defense weapons and equipment for use in air defense; to accomplish detailed planning for the employment, logistical support, and training of forces of other major air commands made available for air defense; to recommend training needs for the Air National Guard, assist in ANG premobilization training, and assume command of the ANG upon mobilization; and to organize, administer, and equip the Ground Observer Corps.

Organizationally, ADC's history has been influenced by two apparently conflicting objectives: to integrate its air defense system so that each combat element is immediately responsive to the central authority; and to permit maximum freedom to the local air defense commander to conduct the air battle overhead from his unique vantage point.

At the present time the lowest level to which the air battle may be decentralized is the air defense sector. The sector is an area containing all of the air defense weapons and resources needed to detect and destroy an airborne enemy. The nerve center of the sector is the SAGE Direction Center, where the sector headquarters are also located. Several sectors make up an air division area, the heart of which is the SAGE Combat Center, from which the air battle in the several sectors may be monitored and directed. A number of air division areas are organized into an Air Defense Force region, of which there are three in the continental US: Eastern Air Defense Force (EADF), with headquarters at Stewart AFB, N. Y.; Central Air Defense Force (CADF), with headquarters at Richards-Gebaur AFB, Mo.; and Western Air Defense Force (WADF), with headquarters at Hamilton AFB, Calif. In addition, the 64th Air Division, with headquarters at Pepperell AFB, Newfoundland, has jurisdiction over ADC facilities in eastern Canada and Greenland, and reports directly to ADC headquarters. Superimposed over the air defense territorial hierarchy are ADC headquarters in Colorado Springs.

Bomarc supersonic missile, now in ADC arsenal, is launched vertically. The deadly "bird" is keyed to actions of SAGE.

To provide special facilities for weapons training the 73d Air Division (Weapons) has been established at Tyndall AFB, Fla. It reports directly to ADC headquarters.

The mission of detecting all airborne objects within the continental United States and its approaches is the job of ADC's far-flung surveillance network. Essentially, the surveillance net employs two basic types of detection and tracking techniques: radar and the naked eye.

The radar network includes a variety of installations. There are manned radar stations containing search radars and height-finding radars with data-transmission components which can relay information instantaneously to the sector headquarters. These stations detect and track high-altitude, high-speed aircraft. Complementing the manned radar stations are unmanned gap-filler radar stations, covering low and medium altitudes. Out to sea along the eastern and western seaboards there are constant patrols of RC-121 aircraft, also equipped with high-powered search and height radar. From the Texas Tower platforms off the eastern seaboard high-performance radar supple-

(Continued on following page)

ments the RC-121s. Also on the "deck" are NORAD's Navy-operated radar picket vessels.

Far to the north, along the Arctic Circle, radar and continuous-wave detection stations hold hands to form a chain from the Aleutians to Greenland; the Canadian and Greenland portion of this chain being operated and supported by ADC. Radiating off each end of this Distant Early Warning (DEW) Line are patrols of Navy-operated picket ships and airborne radar platforms, extending our far northern barrier laterally far into the Pacific and the Atlantic.

To provide visual backup for the electronics net, the Ground Observer Corps was organized on a ready-reserve basis. More than 350,000 civilian volunteers, operating approximately 19,000 observation posts, could report their data concerning low-flying aircraft to about sixty Air Defense Filter Centers, operated by ADC and manned by both military and civilian volunteer personnel. The GOC was scheduled to be deactivated later this year, an indication that the electronic fence was nearing completion.

ADC will soon be equipped with today's fastest operational fighter, Lockheed F-104A, "missile with a man in it."

Plans are being implemented for the establishment of exceptionally high-powered radars to be built in the far north as part of the Ballistic Missile Early Warning System (BMEWS) to be manned and operated by ADC.

The nerve centers of the surveillance network are the Direction and Combat Centers of the SAGE System. In these blast-proof blockhouses there are, or will be, housed the digital computers and display scopes, with their thousands of electronic tubes, capable of receiving, digesting, analyzing, storing, and displaying surveillance and combat data from all of the air defense components of a sector. From the SAGE Direction Centers automatic instructions may be given to a fighter or missile in the sky, and the air battle kept under close scrutiny.

Though electronics is the key word, the human element remains indispensable. Trouble-shooting, maintenance, and supply can be performed only by skilled people, both military and civilian. The decisions necessary to assess the battle situation, to determine strategy and tactics, and above all, the critical decision which might plunge the nation into war, are reserved to men. Although the direction of air defense combat operations is the special prerogative of NORAD's battle staff, the mission of supplying combat-ready USAF personnel to NORAD commits ADC firmly to the success of combat operations.

ADC's weapons are a mixture of new and not-so-new interceptor aircraft. The newest is the Lockheed F-104A, which recently set a speed record of 1,404.19 mph and an altitude record of 91,249 feet. Also new is the Convair F-102A, another Century series model capable of supersonic speed and operations at high altitudes. More ADC interceptor units have the F-102A than any other aircraft. As the newer interceptors are made available, the "first generation" all-weather fighters—North American F-86, Northrop F-89, and Lockheed F-94—are removed from first-line operational positions and passed along to the Air National Guard.

Meanwhile, the older models have been modified in order to obtain improved performance. The most important modification is that which changed the F-89D to the F-89J by giving it the ability to fire the Genie rocket with an atomic warhead. Though the performance of the F-89 might fall short of that needed to cope fully with a modern jet bomber, the Genie is a potent "equalizer." The F-86D has been fitted with data-link equipment (in a version known as F-86L) to permit operations in conjunction with the SAGE system.

While the Genie is valuable for its overwhelming explosive power, it is a simple rocket that goes where it is aimed. The Hughes Falcons, however, have sophisticated guidance systems which can "see" the target and make adjustments in trajectory while in flight. One series of Falcons is guided by radar. Another series is guided by the infrared emanations from the target. The infrared Falcon offers such uncanny accuracy that it can fly up the tailpipe of a target drone.

Just ahead are two other Century series aircraft that will constitute the third generation of all-weather interceptors. The McDonnell F-101B and Convair F-106A will fly higher and faster than current interceptors (with the possible exception of the F-104A, essentially a day fighter) and will carry improved armament and improved control mechanisms. The aircrew will still be necessary, but it will have much more automatic assistance than ever before.

To supplement the interceptor force, ADC will soon put to operational use the Bomarc advanced ground-to-air guided missile. Because of its long range, Boeing's Bomarc is an "area defense" weapon while the Nike installations of the Army are "point defense" weapons. In a sense, then, the Bomarc is an unmanned interceptor of superior performance.

Standing behind the interceptor force controlled directly by ADC is the "augmentation force." In an emergency ADC could call upon all Air National Guard units which have an air defense mission. Moreover, nineteen of these ANG squadrons stand alert every day. The alert duty is rotated among the ANG squadrons in order to provide all with an opportunity to practice air defense tactics and procedures. Many ANG squadrons have already been provided with "first generation" interceptors. Others fly jet tactical fighters, although complete conversion to interceptor types is planned. Support is also provided by the fighter aircraft of Tactical Air Command and Air Training Command.

Most ADC bases are located near the national boundaries, with a handful scattered through the interior. ADC also has interceptor units in eastern Canada and Greenland. Initial deployment of Bomarc will be along the east coast. The first four Bomarc sites will be established at McGuire AFB, N. J.; Suffolk County AFB, N. Y.; Otis AFB, Mass., and Dow AFB, Me. Bomarc defenses will later spread across the other probable approaches to the United States.—END

SAGINAW b/b SCREWS

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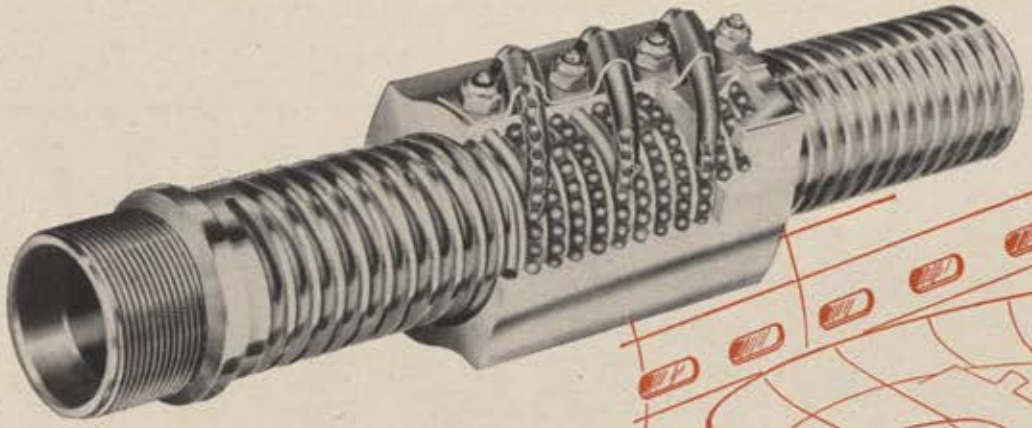

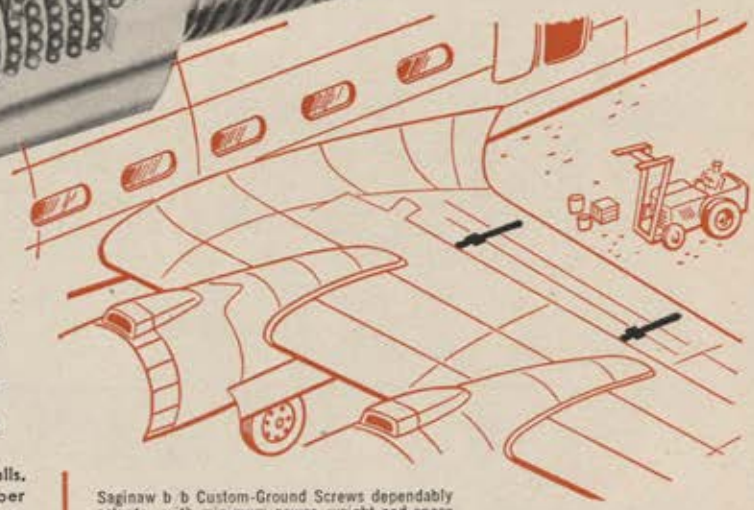

Saginaw b/b Custom-Ground Screws dependably actuate—with minimum power, weight and space—the flaps and speed brakes on latest airplanes.

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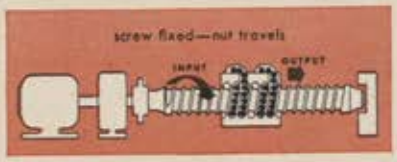

Nut glides on steel balls. Like stripes on a barber pole, the balls travel toward end of nut through spiral "tunnel" formed by concave threads in both screw and mating nut.

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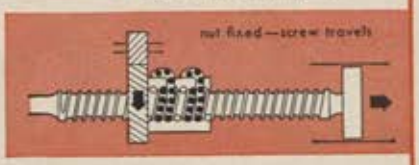

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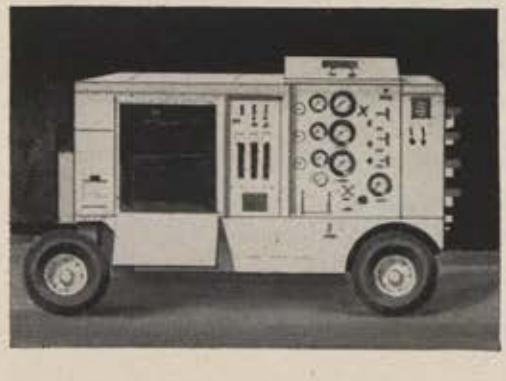

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• TACTICAL AIR COMMAND

Versatile Strike Force

DURING the past year, Tactical Air Command has undergone organizational changes which, with the addition of new aircraft and equipment, have made it a more effective force.

Limited war has been the focal point of much military thinking during the past year. The responsibility for countering such a war was spelled out three years ago in TAC's mission. Specifically, TAC must "maintain a capability and develop plans for the deployment of mobile atomic strike forces for use in tactical air operations in any area of the world independent of or in concert with other air, land, naval, and/or amphibious forces.

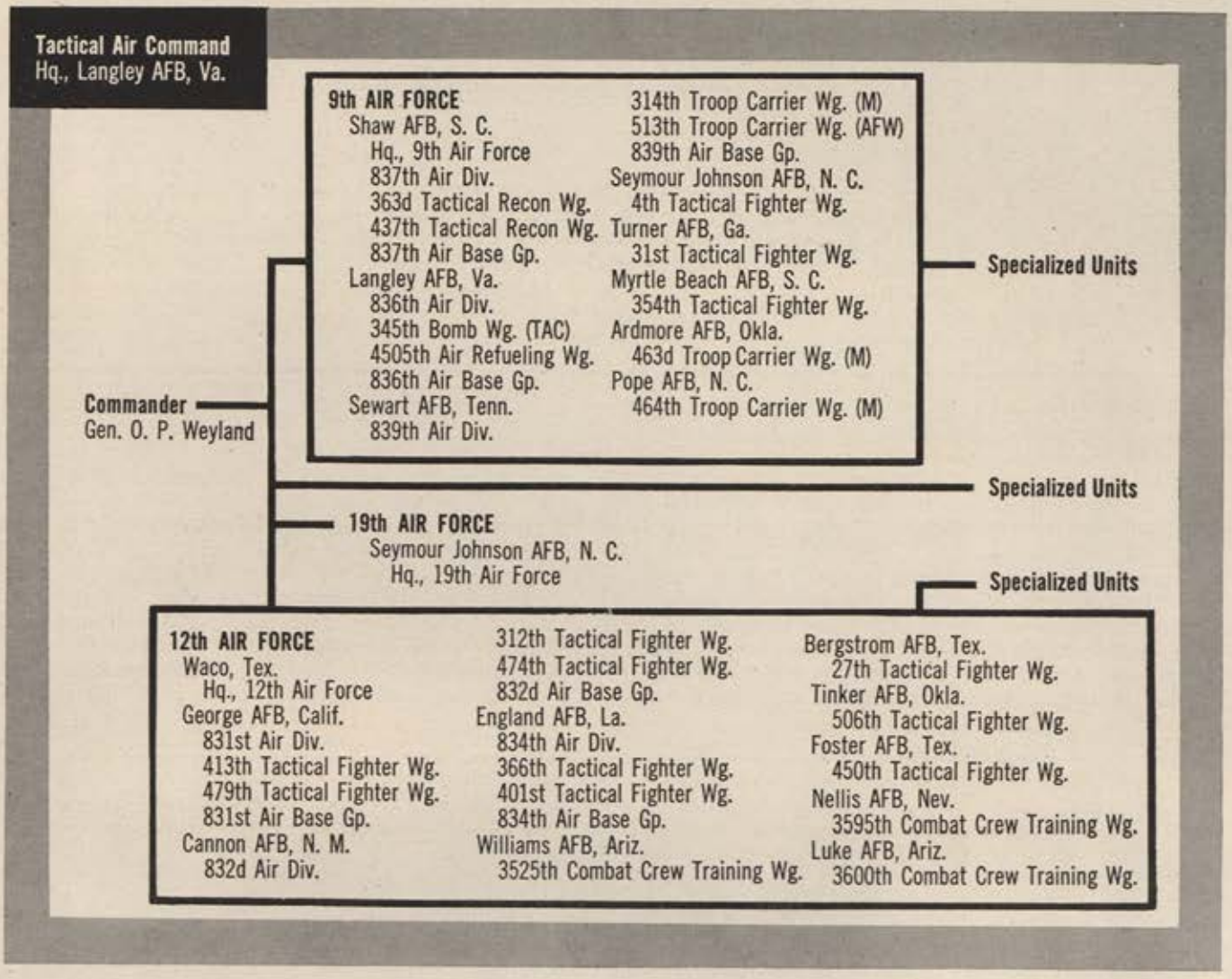
This limited war mission does not detract in any way from the command's general war capability. Tactical air forces, both overseas and in the United States, are fully committed to complement Strategic Air Command in the air offensive phase, and to supplement Air Defense Command in the air defensive phase of an all-out war.

The tactical fighter is probably the most versatile

(Continued on following page)

A Tactical Air Command pilot boards an F-100, workhorse of the force that must be ready for big or little wars.

TACTICAL AIR COMMAND



weapon in the world. If the mission is to destroy a truck or a rail bridge, an infantry patrol or a massed army, a single gun emplacement or an enemy air base, the air commander has the precise weapon to do the job incorporated into a single delivery system.

To keep pace with his versatile aircraft, the fighter pilot must be proficient in many different missions and weapons. In order that new pilots might gain this combat proficiency in the shortest possible time, TAC has assumed command of the former Air Training Command bases, Luke and Williams Air Force Bases in Arizona and Nellis Air Force Base, Nev.

At the present time the workhorse of TAC's fighter force is the North American F-100. The command also has a wing of McDonnell F-101 Voodoos.

This spring, Gen. O. P. Weyland, TAC Commander, accepted the first production model of the F-105, the first aircraft to be designed specifically for the tactical fighter mission. Built by Republic Aviation, at Farmingdale, L. I., N. Y., the Mach-two-plus F-105 possesses an internal bomb bay, an aerial refueling system, an all-weather radar navigation and bombing system, and other features which give it global range and nearly unlimited firepower.

For its air superiority role it will be equipped with Sidewinder air-to-air missiles and the Vulcan, the world's fastest firing cannon.

To speed transition of TAC crews to the F-105, the Air Force introduced a procedure calling for operational testing by TAC and ARDC. Pilots of the 4th Tactical Fighter Wing, Seymour Johnson AFB, N. C., are presently conducting the testing at Eglin AFB, Fla. This innovation should shorten the time from delivery to combat-ready by one to two years.

Another fighter to be added to the TAC inventory in coming months is a tactical version of the Lockheed F-104.

In keeping with TAC's responsibility to provide, equip, and train aircrews for our tactical forces overseas, the 17th Bomb Wing, equipped with Douglas B-66 tactical bombers, was deployed to England in the spring of 1958. At present TAC's light bomb strength is confined to a single Martin B-57 wing located at Langley AFB, Va.

The Lockheed C-130 has proved itself highly reliable and adaptable to the TAC mission. Able to operate from hastily prepared airfields, with cargo weighing up to twenty tons, the transport has a short-field takeoff capability unequaled by any known aircraft of its size today.

Since 1954 Tactical Air Command has been providing both USAFE and PACAF with trained tactical missile squadrons. The 4504th Missile Training Wing at Orlando AFB, Fla., trains TAC's "Missilemen."

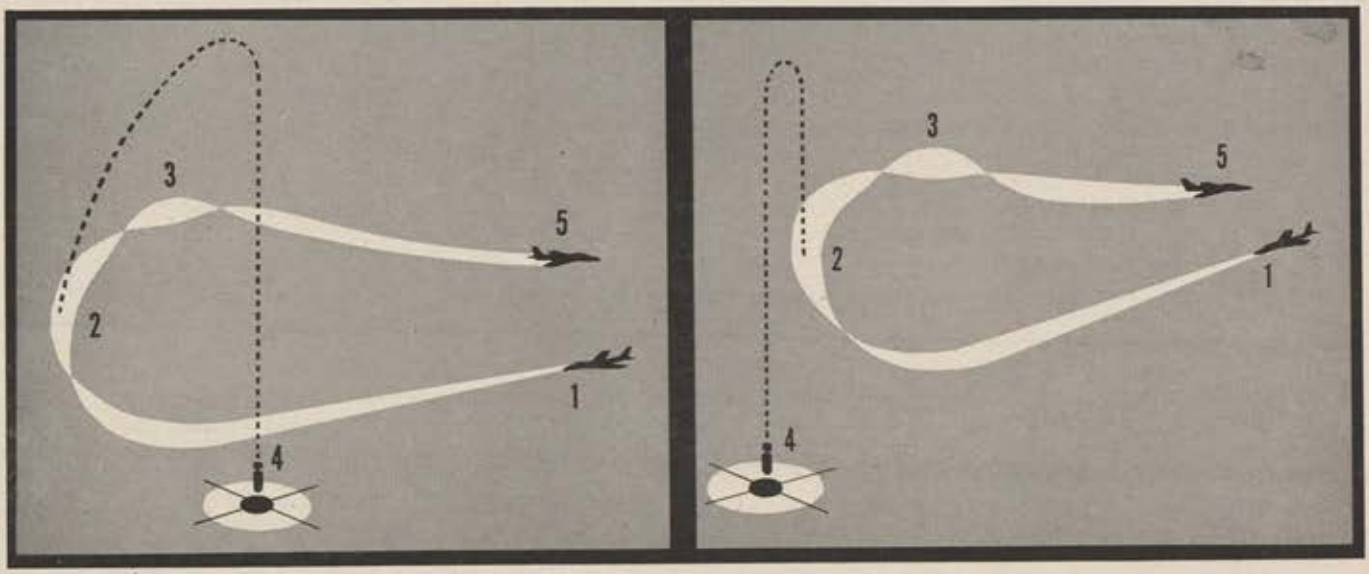
The Martin TM-76A Mace will shorty be added to the TAC inventory. Capable of operating at extremely low

(Continued on page 114)

A symbol of the command's transport capability, this Lockheed C-130 wings its way past famed Mt. Fujiyama in Japan.

Zero launcher makes it possible for this F-100 to blast into the air at 275 mph without benefit of usual runway.

First production model of the new Republic F-105 Thunderchief fighter-bomber rolls out at Farmingdale, L. I., plant.



TAC's Low-Altitude Bombing System (LABS), considered the most efficient, safest for tactical A-bomb delivery. Left, "over-the-shoulder" method, with target used for initial point and bomb released automatically. Plane escapes bomb blast by Immelmann maneuver. Sketch at right shows "vertical-angle release" system, with bomb automatically released from aircraft at given angle at predetermined initial point. Immelmann is again used in escape. In both diagrams "1" is low-level approach run-in; "2" is bomb release point; "3" is aircraft at completion of Immelmann, half-rolling from inverted flight; "4" is target or impact point; and "5" is the escape position of the aircraft from the bomb blast.

altitudes and at nearly sonic speed, the Mace is launched from an aluminum tractor trailer with huge, low-pressure tires. All power, support, and electronic test equipment is included in the one system. Also, its new guidance system, called ATRAN, is considered jam proof. This new guidance system, developed by Goodyear Aircraft Corp., relates a film strip, actual or synthetic, to the terrain over which the Mace is flying. If the missile deviates from the programmed route, the missile's flight is adjusted to rematch the terrain with the film.

Under tactical conditions the number of installations needed to present a solid radar fence against a low-altitude missile would be enormous.

A second type of guidance system for the Mace is inertial, which also eliminates the need for ground control facilities. The inertial system emits no radiation of any type, thus avoiding electronic detection. Since no check points are necessary, the inertially guided Mace can navigate over vast expanses of water as well as terrain.

At present TAC units, which will use the Mace overseas, are training at Orlando AFB, Fla.

The Air Force Tactical Air Reconnaissance School is conducted by TAC at Shaw AFB, S. C., where the command maintains two tactical reconnaissance wings. TAC also supports the Army's reconnaissance needs.

The RF-101, RB-66, and WB-66, TAC's reconnaissance aircraft, give the command the capability for ECM (electronic countermeasures) photographic and weather reconnaissance. The new WB-66 (weather recce) carries a complete airborne weather station and technicians. Since it is air refuelable, it can obtain weather information over wide geographical areas.

To be effective in a general war, tactical aircraft must possess a quick reaction plus the ability to live through the initial enemy blow. To achieve these requires maximum dispersal and shelter for aircraft.

Several methods of dispersal are under consideration. The STOL (short takeoff landing) aircraft and the VTOL (vertical takeoff landing) aircraft are presently being developed.

A development now well under way is the ZEL (zero-length launcher) system, which will boost tactical fighters into the air like a tactical missile. Fully armed, fueled, combat-ready F-100s have been successfully launched by the ZEL system. The F-100, boosted from a trailer by a 130,000-pound-thrust rocket, attains a speed of 275 mph under full control four seconds after launch. The jet drops the booster at burnout and proceeds on its way in a conventional manner.

Shortly after the Korean War ended, it was apparent that this country must develop an efficient, economical means of combating limited wars. General Weyland, on his return to TAC from commanding the United Nations Air Forces in Korea, directed that a limited war force be developed from within TAC's resources. This was the birth of the Composite Air Strike Force (CASF).

Tailored in size for almost any situation, ranging from Communist-instigated internal unrest in a small uncommitted country to a full-scale local war on the order of Korea, the CASF is a single self-supporting air force capable of filling the power vacuum in the isolated areas of the world where limited wars could most logically start.

The CASF concept was first exercised in 1954. The 21st Fighter-Bomber Wing, based at George AFB, Calif., was deployed on short notice to an abandoned strip in South Carolina. To simulate an overseas movement, all the equipment and personnel needed to support the wing under combat conditions were airlifted by transports.

Shortly after the 21st arrived at the deployment base it was ordered to begin a thirty-day operational test. The order required 3,000 sorties in a thirty-day period. All missions were conducted with live ammunition and bombs to South Carolina and Florida bombing and gunnery ranges.

All maintenance was performed on the spot by mechanics and technicians with prepackaged equipment; therefore, the wing was able to exceed the 100-a-day sortie rate.

The TAC staff analyzed the operational results and formulated the plans and requirements for the Composite Air Strike Force.

By the following spring Headquarters USAF revised the TAC mission in Air Force Regulation 23-10 to include such a force and gave the command a free hand in formulating doctrine and theory for its use.

That same year the Nineteenth Air Force was established as a command echelon for the CASF. Commanded by Maj. Gen. Henry Viccellio, the Nineteenth Air Force was organized as a headquarters with a small staff of operations and planning officers. The headquarters had no units directly assigned to it; yet, all units in TAC could be funneled into this one Air Force when or if it was necessary.

The force would have to be able to fight at any point in the world, with US or allied forces or without them. The force would need air-superiority fighters for protection and to win control of the battleground; fighter-bombers to perform interdiction and support missions; tactical bombers for longer missions; photographic, electronic, and weather reconnaissance aircraft for intelligence information; cargo and tanker aircraft for support missions. All types would be available within Tactical Air Command.

In the summer of 1957 the Nineteenth Air Force held Exercise Power Pack. Units alerted for the exercise deployed to various TAC bases and awaited operational orders. During the exercise CASF jets flew missions over Canada, Puerto Rico, and North Africa.

In early November of 1957 a CASF composed of F-100C and D fighters, B-66 bombers, RF-101 and RB-66 photographic, and WB-66 weather reconnaissance jets was alerted and deployed to George AFB, Calif. The B-66s were ordered to Clark AFB in the Philippines nonstop, a seventeen-hour, ten-minute flight. The fighter squadrons were ordered to Hawaii and from there dispatched to Guam where they divided forces. The F-100C force, commanded by Brig. Gen. A. P. Tacon, flew to South Korea where it was immediately integrated into Fifth Air Force air defense net.

The F-100D fighter-bombers and the RF-101s flew to Clark AFB, P. I., and began their portion of the exercise. The F-100D fighter-bombers, after their 10,000-mile trip across the Pacific from Cannon AFB, N. M., landed and refueled, and the pilots were briefed for a target on Luzon. The target was a simple white "X" in a secluded mountain valley 700 miles away. Four hours after their arrival in the Philippines, the mission was completed.

The RF-101s, accompanied by the F-100Ds, flew to Formosa, where they were met by the US ambassador, performed demonstration flights for Chinese Air Force officials, and were placed on static display.

After the exercise the force gathered in Japan and again demonstrated their rapid deployment capability. Flying nonstop from Tokyo to Hickam AFB, Hawaii, in slightly over six hours, the jets established what amounted to unofficial records for the Pacific crossing.—END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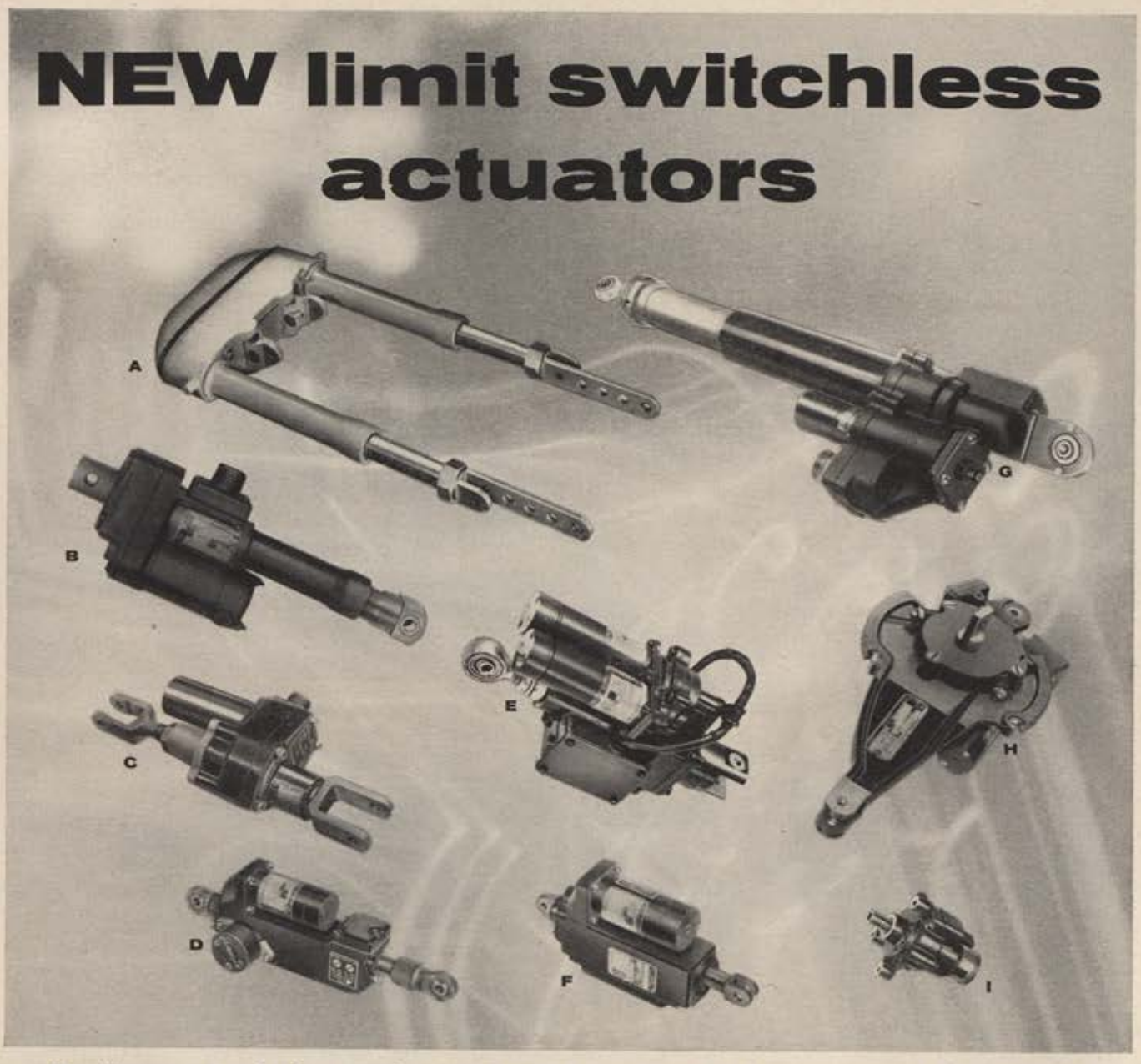

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• PACIFIC AIR FORCES

Keeping Peace in the Far East

THE AREA of responsibility of the Pacific Air Forces extends over four-tenths of the earth. PACAF is no isolated grouping of aircraft. It is part of the global United States Air Force.

With the inauguration of Headquarters Pacific Air Forces on July 1, 1957, all USAF fighting forces assigned to the Pacific and Far East areas were consolidated under a single field commander for the first time. In an emergency, PACAF action would be restricted only by the operational ranges of its aircraft. With its headquarters in Hawaii in instant communication with its combat-ready bases in Japan, South Korea, Okinawa, Guam, the Philippine Islands, and Taiwan, Pacific Air Forces would provide the fastest available retaliation if the Communists should attack anywhere in the Far East or in Southeast Asia.

The US air strength in the Pacific/Far East continually increases in importance, as the Communists continue their buildup of airpower, planes, and bases in North Korea (in violation of the armistice agreement); and further, continue construction of great numbers of jet air bases in South and Central China. As CINCPACAF Gen. Laurence S. Kuter has stated: "The creation of a jet air base complex in South and Central China is one of the most significant of all recent developments behind the Iron and Bamboo Curtains, for now the whole mass of Communist airpower has mobility and freedom of movement from the northeast tip of Siberia through Vladivostok, Mukden, Peking, Canton, and Hainan; from these bases it can cover Japan, the Philippines, Taiwan, and Southeast Asia. This mobility, flexibility, and freedom of movement did not exist before the Korean action."

PACAF must be ready.

Though the PACAF mission might be stated as: "To maintain peace in this area of responsibility," or, "To carry out, in concert with other United States' and friendly forces, the military portion of US policy in the Pacific/Far East," it is still wider and deeper. PACAF is engaged in a continuing and accelerating program of expansion and training of various friendly air forces within its area of responsibility. For example, the Japanese Air Self-Defense Force is now developing under PACAF tutelage and numbers more than 5,000 officers and men. The Republic of Korea Air Force (ROKAF), under the guidance and training of PACAF pilots and technicians, is now almost entirely ROK manned.

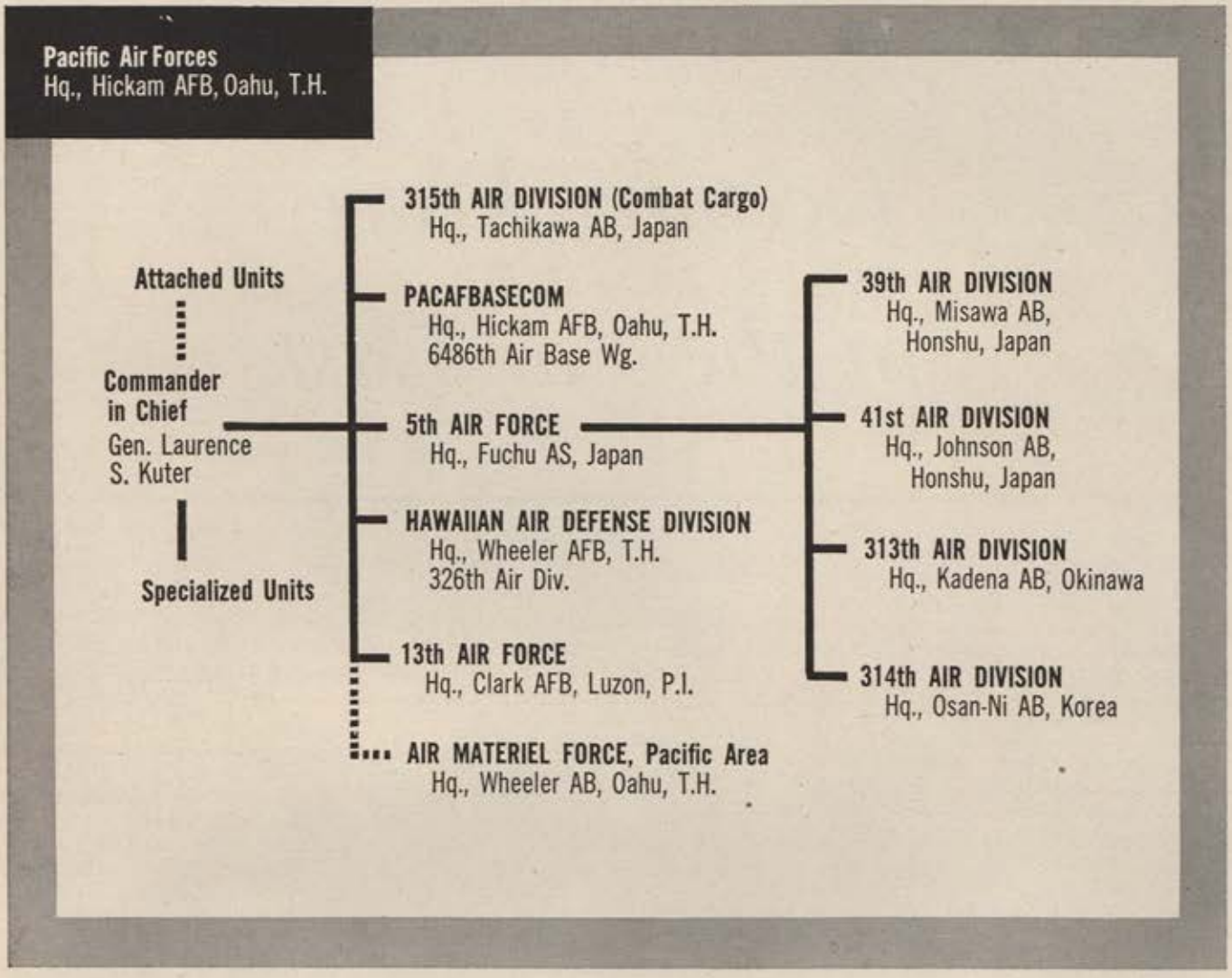
PACAF also provides administrative and logistical support for the air forces of Nationalist China, Thailand, and the Philippines.

In addition, PACAF conducts aeromedical evacuation, troop carrier operations, search and rescue missions; supports the Military Air Transport Service (MATS); controls air traffic in its area of responsibility; operates early-

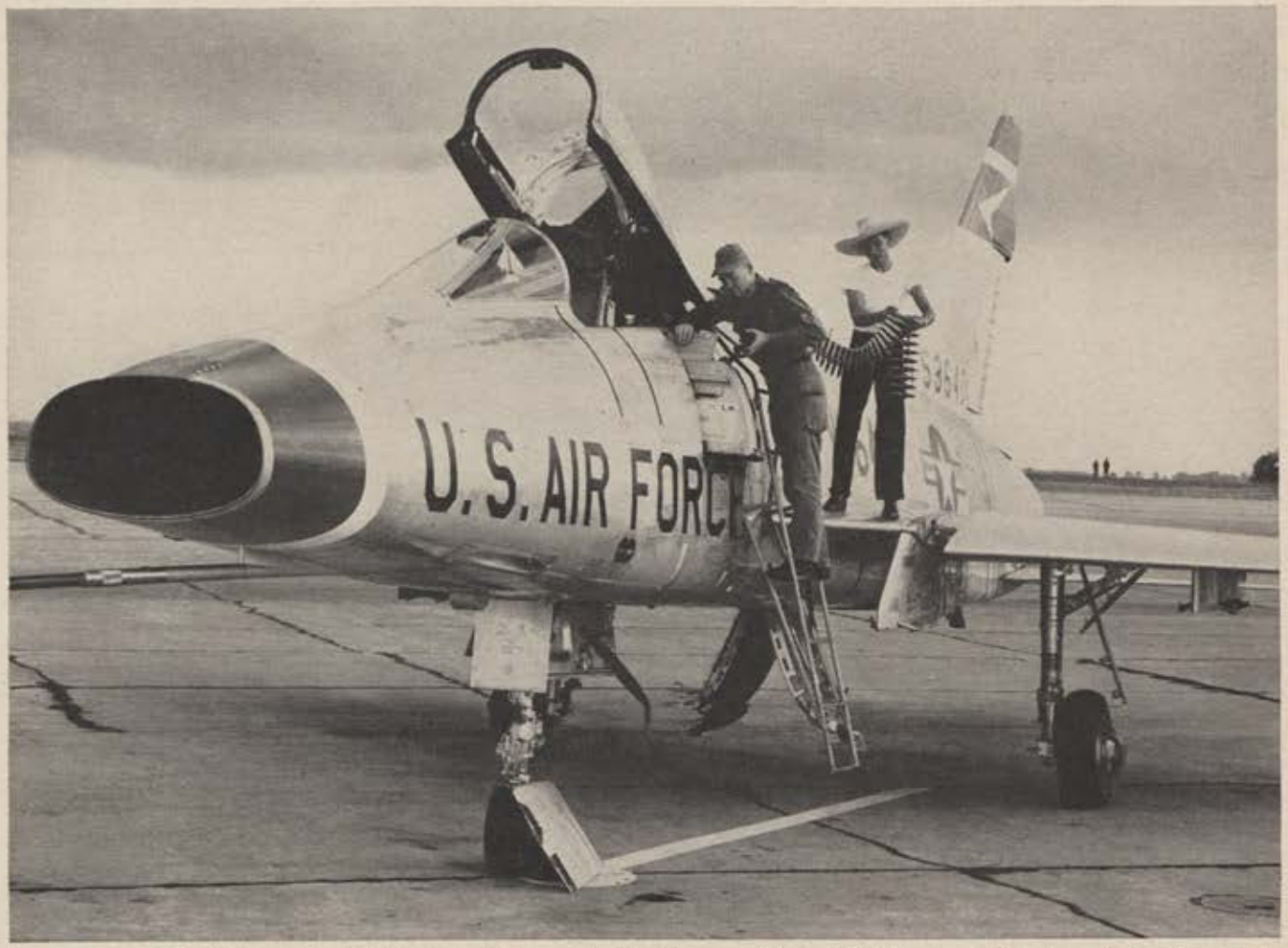
(Continued on page 119)

PACAF is the air component of the Pacific Command, whose Commander in Chief is Adm. Felix B. Stump, left, with PACAF Commander in Chief, Gen. Laurence Kuter.

PACIFIC AIR FORCES



PACAF keeps busy at the job of cooperation with allied forces. Here the speed brake of a Republic of Korea Air Force F-86 in the 10th ROKAF Fighter-Bomber Wing gets some attention from a USAF airman and a ROK Air Force officer.



Ammunition is loaded into an F-100 of the Thirteenth Air Force at Clark AFB in the Philippines, indicative of the way the men of the Pacific Air Forces work with the people who live in the vast area of the world covered by PACAF.

warning networks; and conducts aerial and weather reconnaissance.

PACAF is not only the largest overseas command geographically, but is also the only USAF command (under its former designation as the Far East Air Forces) that has engaged in combat since the end of World War II.

The original FEAF—Far East Air Force—was organized out of Army air units in the Philippines on November 16, 1941, under Maj. Gen. Lewis H. Brereton. It included the V Bomber Command, the V Interceptor Command, and the Far East Air Service Command; and had a strength of some 8,000 officers and men, and approximately 300 aircraft, concentrated largely on the island of Luzon. Fewer than half of the aircraft were suitable for combat, and much of the equipment for air defense was still awaiting shipment from the United States when World War II came.

Far East Air Forces—the new FEAF—was activated on June 15, 1944, under Gen. George C. Kenney. It was comprised of the Fifth, Seventh, and Thirteenth Air Forces, and the Far East Service Command. FEAF's mission was stated by General Kenney: "To supervise and direct the planned airpower expansion in the Far East necessary to the defeat of Japan at the earliest possible date."

FEAF's three Air Forces were to carry the main burden of tactical operations in support of the projected invasion of Japan, an invasion rendered unnecessary by the strategic bombardment of the Twentieth Air Force, capped by atomic bombs on Hiroshima and Nagasaki.

Later analysis by the US Strategic Bombing Survey of the war in the Pacific presented these careful conclusions: Control of the air was essential; greater economy of force was possible; and, "the lessons strongly support that form of organization which provides unity of command. . . ."

In September 1947, the United States Air Force was established as a separate and coequal service with the Army and Navy. However, there was an inevitable lag in reorganizing the command structure of the nation's military forces.

Despite this lag, when the Korean War broke in June 1950 the Far East Air Forces seized the initiative as soon as authorized to do so. The first sharp thrusts of the enemy were blunted, and the expulsion of US forces from the Korean peninsula was prevented. During more than three years of combat in Korea, FEAF kept offensive pressure on the enemy. They attacked him through the whole of North Korea, cutting supply lines, destroying stores, and rendering his every action a costly and difficult venture. In the air, also, FEAF wrote a new chapter of aerial history as Sabrejet pilots of its Fifth Air Force destroyed 802 Russian-built MIG-15s, with a total loss of only fifty-eight Sabres—a ratio of fourteen to one.

(Continued on following page)

From the time the Panmunjom truce talks began on July 10, 1951, until the armistice two years later, aircraft under FEAF control applied the constant destructive pressure which constituted the primary United Nations Command offensive action in Korea.

FEAF's post-Korea change of function was expressed in a message the then FEAF Commander, Gen. O. P. Weyland, received from the USAF Chief of Staff, Gen. Nathan F. Twining, in late 1953: "FEAF's job in the future is to assume the role of watchfulness and preparedness, for it must continue to be the most vigilant and best prepared of all the forces that guard the safety of Americans and the security of the Free World."

FEAF's headquarters have shifted, through the years, from Brisbane, Australia, to Hollandia, New Guinea; to the Philippines; to Nagoya, Japan; and thence to Tokyo; to Fuchu Air Station, Japan; and, as PACAF, to Hickam Air Force Base, Oahu, Hawaiian Islands. Besides General Kenney, its roster of commanders has listed such distinguished USAF generals as Ennis C. Whitehead, George E. Stratemeyer, O. P. Weyland, Earle E. Partridge, and, currently, Laurence S. Kuter.

At midnight on June 30, 1957, the Far East Air Forces deactivated its headquarters at Fuchu Air Station. At 0001 on July 1, 1957, the new standard of Headquarters Pacific Air Forces was unfurled at Hickam Air Force Base with General Kuter as Commander in Chief, PACAF.

PACAF helps in time of need. A sick Filipino woman is put aboard an air rescue SA-16 for medical transfer to Manila.

The consolidation of the Pacific Command, and the expansion of FEAF into the Pacific Air Forces, has resulted in the unity of command so long advocated by FEAF and so essential to the proper use of airpower.

Within this headquarters there have been other accomplishments of importance. PACAF has carried out a continued and complex phasing-in of new aircraft and weapons, without sacrificing combat capability. Three years ago the command was equipped with Lockheed F-94s, North American F-86s, Republic F-84s, Boeing B-29s, and Douglas B-26s. Today, all but the F-86Ds have been, or are being, replaced with North American F-100s and Martin B-57s; while for better reconnaissance PACAF pilots are flying Republic RF-84s, Boeing RB-50s, and Douglas RB-66s. Much of the credit for the efficiency of this changeover goes to the Air Materiel Command's Pacific logistic support system; with particular emphasis on the weapon system support concept as applied to the introduction of the F-100s, a complex new aircraft. And on Taiwan, the TM-61 (Matador) guided missile system has been installed, a significant weapon for the defense of Free Asia.

When the Communists invaded South Korea, in 1950, that country possessed only a handful of training aircraft. The other free countries of Asia had no defense potential in the air. Today, through the Military Assistance Program, there are more than fifty squadrons of combat aircraft operating in Japan, Nationalist China, the Philippines, Thailand, Indochina, and the Republic of Korea. Yet this numerical measure would mean little beyond the fact that so many aircraft had been delivered to those countries, were it not for the tireless efforts of the training units provided and supported by this command and by the MAAGs during the past four years (seven, in the case of the ROKAF).

As the major manifestation of US airpower in the Pacific/Far East, it is clearly our responsibility for developing unity of effort of the air forces of these free nations to counter the pattern of Communist aggression. Considering the scope and depth of Communist airpower, the fulfillment of this responsibility is one of the most important requirements confronting PACAF today.

Present programs provide for the development of some eighty MAP-supported squadrons in the Pacific/Far East. Unlike Europe, there is no NATO organization to tie together the forces of these free nations. PACAF must, therefore, bear the responsibility for binding together these air forces in common unity of purpose.

During recent years, other accomplishments include FEAF actions, in 1954, to support the French and Viet Namese in their fight against Communist aggression in Northern Viet Nam. Despite the outcome, FEAF proved its ability to provide material, maintenance, and other support with commendable speed, over great distances and in large quantities. This operation involved the use of some twenty Fairchild C-119s during a seven-month period, airlifting needed supplies through an air pipeline over 2,000 miles long. Also in 1954, five of FEAF's then new Douglas C-124 aircraft flew mercy missions to East Pakistan, which was suffering the worst floods in its history. Their cargoes consisted of medical supplies and personnel, plus two Sikorsky H-19 helicopters which saw five weeks of constant use.

These actions were concrete examples of PACAF's intent to do its part in assisting the free nations of the Far East and Southeast Asia, during the period in which their own capability to assist themselves is being developed.

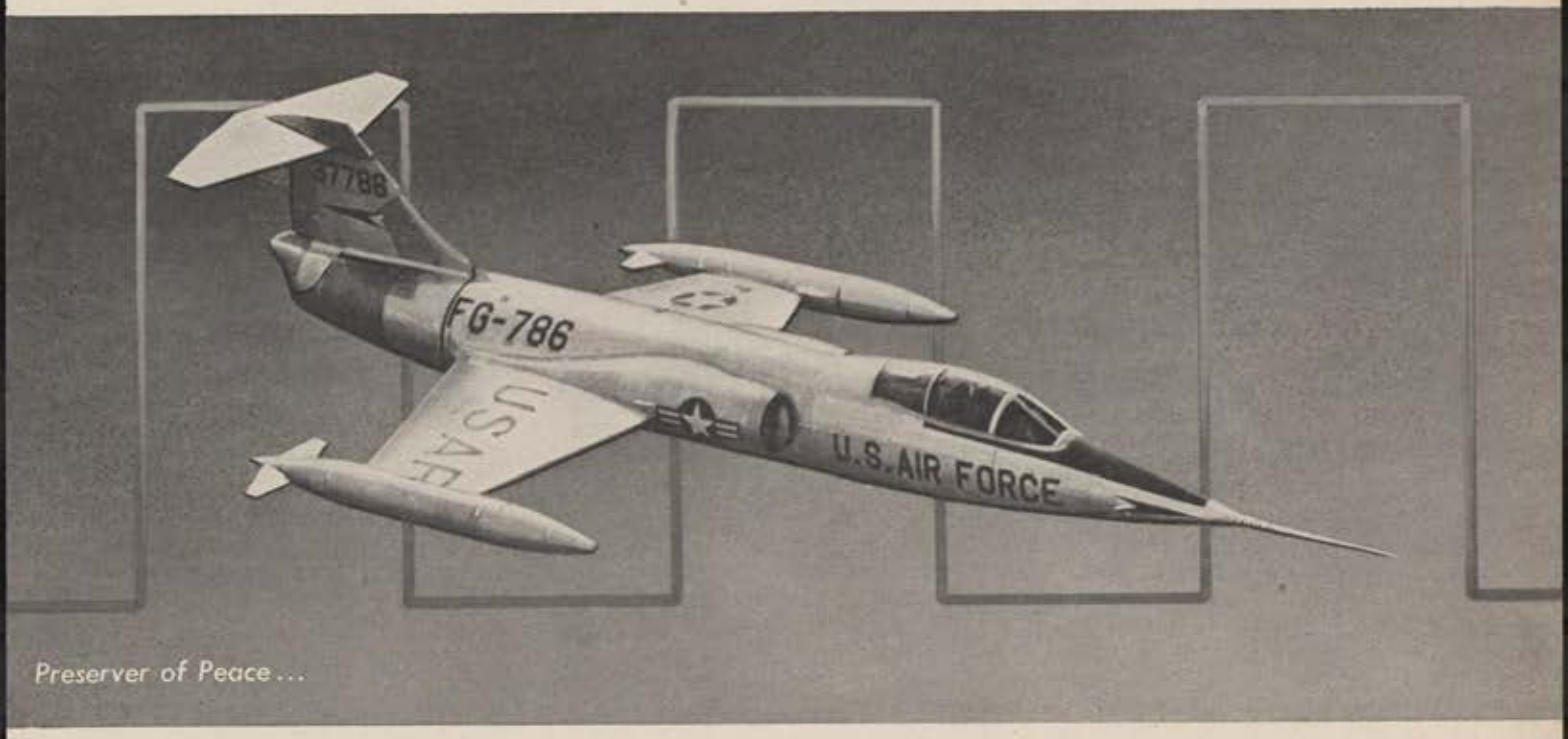
Another major accomplishment is, to the professional military man, a strange one—one with which he frequently feels he should not *need* to concern himself—but one which harsh necessity has dictated that he *must* be concerned with. This is the matter of improving relations with foreign countries and their officials. Initial efforts indicate that PACAF's concern has been effective and will continue to be even more effective.

In the new nations of Free Asia, PACAF representatives have found themselves acting as friends, neighbors, students, educators, businessmen—in fact, in all the special fields of civilian activity. And so, first of all, members of PACAF had to gain understanding of the varying cultures and people among whom they live and work.

During the past three years PACAF has done much valuable spade work in improving understanding and relations with the immediate neighbors—the people living adjacent to PACAF bases. A comprehensive community relations program has achieved gratifying results. But the importance of these efforts to improve public understanding and acceptance cannot be overemphasized. Though much has already been accomplished at local levels, there is much more still to be done in building toward understanding by nations as well as localities.—END

surface-air
time-division

DATA LINK



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Matador missile, now part of USAFE armament, is fitted into place on the launcher. Crew is guiding the wing section.

• UNITED STATES AIR FORCES IN EUROPE

From Britain to Pakistan

THE United States Air Forces in Europe stretches over an area of responsibility extending from the United Kingdom to Pakistan, and has four major components: Third Air Force, with headquarters at South Ruislip, England; Seventeenth Air Force, with headquarters at Wheelus Air Base, Tripoli, Libya; the 322d Air Division (Combat Cargo), with headquarters at Evereux/Fauville, France; and the command's own quota of tactical fighter-bomber and reconnaissance wings plus one wing of guided missiles. These tactical units are stationed throughout Germany and France with an additional fighter squadron on duty in the Netherlands.

Other important subcommands within USAFE include the 2d Air Division at Dhahran Airfield, Saudi Arabia, and the 7100th Support Wing at Wiesbaden, Germany. The 2d Air Division provides support for the Military Air Transport Service and other USAF commands as required and furnishes advice and support to other US military and governmental agencies in the Middle East.

Support for USAFE headquarters itself and for a number of US air bases in the central area of Europe is furnished by the 7100th Support Wing, believed to be the largest support wing in the entire Air Force.

USAFE headquarters is divided into two sections. Major administrative functions are performed at Lindsey Air Base, Wiesbaden, for some 100,000 Air Force personnel. Meanwhile, a streamlined combat headquarters is located some forty-five miles to the south at Ramstein. It is called Headquarters USAFE Advanced Operations Unit (USAFE ADVON). Activated on November 10, 1957, the ADVON unit is responsible for all USAFE operations and communications and a number of intelligence and flying safety functions.

To keep its units supplied, USAFE depends upon the logistical support system of the Air Materiel Forces, European Area (AMFEA). AMFEA, an important segment of the Air Materiel Command, provides the vital supply items to USAFE through major depots at Nouasseur, Morocco; Burtonwood, England; and Chateauroux, France. AMFEA headquarters are located in Wiesbaden, at Lindsey Air Base.

Since January of 1958 the headquarters of the European, African, and Middle East (EAME) Area Airways and Air Communications Service also has been located at the same base. The AACS, however, is under control of MATS.

USAFE's missions are directed from Hq. US Air Force, Washington, D. C.; the Commander in Chief of the US European Command (US CINCEUR) at Camp de Loges, near Paris; and the Supreme Allied Commander's Air Deputy, at Supreme Headquarters Allied Powers Europe (SHAPE), near Paris.

US CINCEUR handles joint peacetime planning and policy in matters that affect all three US services. SHAPE is the wartime command setup under the North Atlantic Treaty Organization (NATO) to include the armed forces of all NATO nations.

Although USAFE is not a NATO command, most of its tactical units are integrated into the NATO structure for war-planning purposes and joint maneuvers and would be a part of NATO forces in war.

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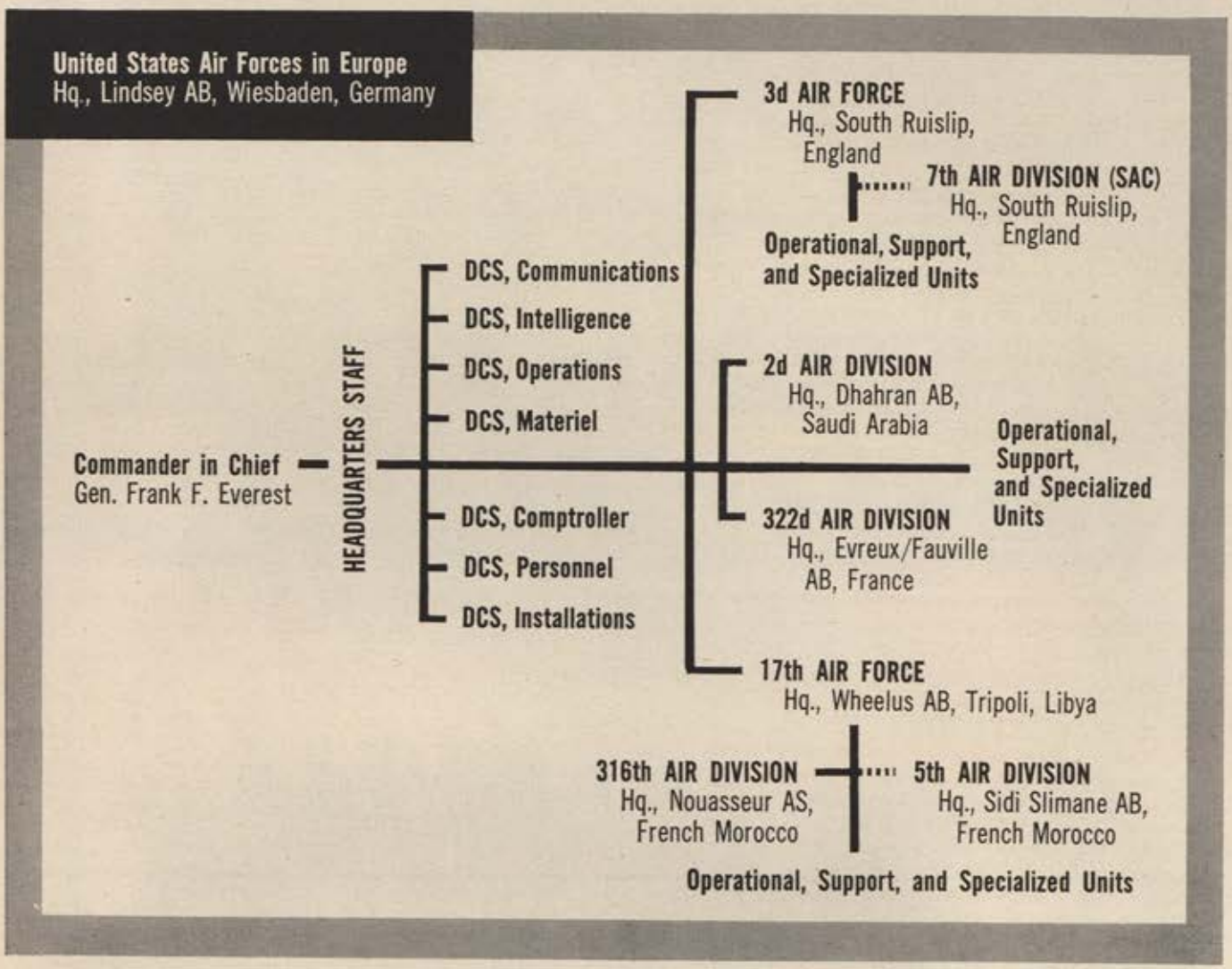

These USAFE wings, which include tactical units situated in Germany, France, and the Netherlands, are a part of NATO's 4th Allied Tactical Air Force (ATAF), stationed in Trier, Germany. Other major components of the 4th ATAF are the 1st Tactical Air Command of the French Air Force and the 1st Air Division of the Royal Canadian Air Force.

The 4th ATAF is one of two such tactical commands under Allied Air Forces Central Europe (AIRCENT) with headquarters at Fontainebleau, forty miles southeast of Paris.

The American tactical wings represent the largest single aerial contribution to the entire NATO framework.

Thus USAFE's extensive peacetime support of NATO includes training and equipping its own NATO-committed combat units, helping build new NATO bases and assisting in the on-the-job training of pilots and technicians of fifteen allied nations under the Military Assistance Program.

USAFE's area of interest sweeps in a giant crescent over an estimated 17,500,000 square miles from Norway and the United Kingdom through Western Europe to Morocco, the Mediterranean and the Middle East to Saudi Arabia, and eastward to Ceylon. In some areas the command is responsible only for supporting US air attachés. Naturally its greatest responsibility is in areas where USAFE personnel are based in Europe, Africa, and the Middle East.

USAFE is a combat-ready command.

This means training and organizing its units and providing them with aircraft and equipment which will best enable them to carry out their individual missions—defense, attack, support, transport, and reconnaissance.

And, should war come, USAFE's primary combat mission would be tactical air operations. In event of attack on America or its allies, USAFE's tactical units would form an atomic strike force of the Supreme Allied Commander Europe (SACEUR).

USAFE flies regular training missions in conjunction with the Seventh US Army. USAFE air liaison officers and forward air controllers are on duty with the Seventh Army at all times. The Seventh Army has ground liaison officers with USAFE fighter-bomber and reconnaissance units. USAFE also conducts a joint Seventh Army-USAFE air-ground operations school at Ramstein, attended by some 1,500 students each year.

To achieve its combat goals, the command uses a broad variety of aircraft.

In 1956, for example, six types of aircraft were added. New tactical types included North American F-100 Super Sabres and Douglas RB-66 jet reconnaissance bombers. Additions to the command's transport fleet included Fairchild C-123 and Douglas C-124 transports, Vertol H-21 helicopters, and Convair C-131A medical evacuation planes.

In 1957 USAFE got its first F-100F Super Sabres, usable either as a trainer or tactical fighter, and USAFE's first Lockheed C-130 Hercules turboprop transport was assigned to the 322d Air Division.

Other USAFE aircraft include the Republic RF-84F Thunderflash, North American RB-45, and Martin RB-57 jet reconnaissance planes; F-84F Thunderstreak fighter-bombers; North American F-86D fighters; Douglas C-47, C-54, and C-118, and Fairchild C-119 transports; Sikorsky H-19 helicopters; Grumman SA-16 amphibians, used in air rescue work; and Lockheed T-33 jet trainers. Units armed with TM-61 Matador missiles are based at Hahn, Bitburg, and Sembach Air Bases in Germany. The units became the Air Force's pioneer guided missile wing in September 1956 when the 701st Tactical Missile Wing was activated at Hahn. The Martin TM-61 first entered service with USAFE in Germany in 1954.

First wing to receive F-100s, the fighter-day model, was the 36th Fighter Day wing, at Bitburg. The first fighter-bomber version, the F-100D, went to the 48th Fighter-Bomber wing, Chaumont, France. With the airdrome structure now existing in the European area, these aircraft may be used at almost any base SHAPE directs.

RB-66s began arriving in USAFE in November 1956. RB-66s are replacing RB-45 and RB-57 jets for weather and photo reconnaissance duties. The first B-66 bombers arrived in England in January 1958 for duty with the 47th Bombardment Wing (Tactical).

First C-123 Provider assault transports joined the 322d Air Division in May 1956. Designed to takeoff and land in very short distances, the C-123s took part in their first USAFE-Seventh Army joint air transportability exercises, carrying men of the 10th Infantry Division at Kitzingen, Germany, in July 1956.

C-124 Globemaster transports from the Tactical Air Command serve in USAFE on a rotational training basis. During their periods of duty in the USAFE area they are under operational control of the 322d Air Division.

Addition of C-131A Samaritan transports meant an improvement in medical air evacuation services in which an average of about 1,000 patients are carried monthly to and from Army and Air Force hospitals in the USAFE area. The C-131A is pressurized throughout, has provisions for oxygen for passengers, and for an iron lung. With a top speed of over 300 miles per hour, it makes possible faster and safer medical air evacuation.

Because of the devastating weapons available today, USAFE commanders cannot concentrate their aircraft at main air bases during actual combat as is the custom during peacetime.

The answer is the dispersal concept.

Basically, the plans call for each USAFE fighter-bomber wing to have available additional dispersed operating bases. Some should be located from thirty to fifty miles from the main base and be easily accessible by surface transportation. More distant bases require air transportation to make them useful in time of emergency. Such bases vary in size. They may be only a station with a runway long enough to accommodate the required aircraft, parking space for a single squadron, underground storage facilities for fuel, ammunition, and supplies, a tent area to house personnel and limited navigational aids to permit all-weather operation. Other dispersed operating bases may be regularly used major airfields, such as Wiesbaden or Rhein-Main.

The dispersal plan is a working plan.

Dispersal exercises are conducted as frequently as possible. The maneuvers cover a typical three-squadron base in which two of the units move out to dispersed operating bases and the remaining unit scatters its aircraft around the home base as much as possible.

USAFE was activated on August 16, 1945, to give air support to US occupation forces in Germany and Austria. The command's duties then included getting 180,000 Air Force troops back to the US, disposing of surplus Air Force property scattered over Europe, and disarming the German Luftwaffe.

On June 26, 1948, USAFE launched the world's most spectacular peacetime air supply program—the Berlin Airlift.

A combined Royal Air Force-USAF task force, with two US Navy squadrons, usually landing one plane every three minutes in Berlin, supplied the Soviet-blockaded city with coal, food, and other vital supplies, around the clock for eleven months. After the Communists admitted defeat in May 1949, the airlift continued for four months as further testimony to its capabilities.

A brief period of calm and sharp cutbacks in strength was interrupted by the Korean War in June 1950, and USAFE began the rebuilding which led to its present strength. USAFE's personnel strength has since expanded seven times. Meanwhile, a series of organizational changes have been effected to achieve maximum combat capability.

A major reorganization took place on January 21, 1951, when the now US-based Twelfth Air Force was reactivated as USAFE's major tactical air force. The Twelfth Air Force is no longer a part of this command. On January 1, 1958, the Twelfth Air Force, less personnel and equipment, was transferred to the Tactical Air Command, Waco, Tex.

On the same date in 1951, the 3d Air Division (later,

(Continued on page 126)

Army troops board USAFE C-123 assault transport in USAFE-Tenth Division air transport exercises in Germany.

USAFE helped make Christmas 1956 a little brighter for Hungarian refugee children with the delivery of toys.

USAFE master sergeant at Friesing, Germany, demonstrates HF equipment test procedures for these Belgian airmen.

the Third Air Force) in the United Kingdom, was assigned to USAFE, and on January 22, 1951, Lt. Gen. Lauris Norstad (later General), now Supreme Allied Commander Europe, became USAFE Commander in Chief, and later also Commander in Chief, Allied Air Forces Central Europe.

USAFE's Seventeenth Air Force was activated at Rabat, Morocco, on April 25, 1953. It moved to Wheelus Air Base, Libya, on August 1, 1956.

The 322d Air Division was activated on March 1, 1954.

Each year USAFE continues to carry out airlift operations to relieve human suffering. This provides its aircrews with experience in carrying passengers and supplies under emergency conditions. The year 1956 saw a large number of such operations.

First of these missions came February 10, when three C-119s of the 322d Air Division paradropped 104,000 pounds of food and clothing to suffering Greeks snowbound in rugged mountain regions, after an appeal for help from the US Ambassador to Greece, Cavendish W. Cannon.

Then came Operation Snowbound, from February 13 to 16, 1956, when USAFE transports carried some 700,000 pounds of food, clothing, and blankets from Germany to thousands of cold and hungry Italians, Sicilians, and Sardinians who had been cut off by the worst snowstorms to hit those areas in this century.

Policeman to policeman. An American air policeman gets directions to destination from a Parisian gendarme.

The mid-February 1956 snowstorms brought misery to other areas. On Isle Denard, just off the coast of France, an unprecedented two feet of snow fell in two days. A helicopter from the 7413th Air Base Group, Bordeaux, airlifted food and clothing to the islanders.

In mid-March 1956, the 322d Air Division C-119s flew 178,000 pounds of rice, cheese, butter, and dry milk, and 125 tents, to destitute families in Turkey, stricken by earthquakes, floods, and fires.

Earthquakes in Lebanon brought the next call for assistance, and USAFE aircraft rushed 37,000 pounds of blankets, tents, and medical supplies to the victims, with the flights originating at Dhahran, Saudi Arabia, and Nouasseur, Morocco, in March 1956.

In November 1956, USAFE was called on to help airlift emergency supplies to Austria for victims of the Hungarian uprising. A USAFE C-119 flew an iron lung and five tons of medical supplies from Zurich, Switzerland, to Vienna; three other Flying Boxcars took fifteen tons of food and medical supplies from England to Vienna; USAFE transports hauled bedding and mess gear for 5,000 persons from Wiesbaden, Chateauroux, and Burtonwood, to Munich for rail shipment to Austria. Later, C-119s took an additional eighty-three tons of emergency supplies to Munich for shipment by rail to Austria.

C-54, C-119, and C-123 transports of the 322d Air Division aided in evacuation of nearly 500 persons from the Middle East after fighting broke out in the Suez Canal area in late October 1956. These passengers—both US and United Nations personnel—were flown to Athens from Tel Aviv, Israel; Damascus, Syria; and Amman, Jordan. Some were later airlifted to Rome.

During November 1956, the problem of transporting United Nations Emergency Forces troops from north European countries to the UN staging area at Naples, Italy, was referred to USAFE, and within a short time, C-124s and C-119s began these missions. During the month, from Denmark, Norway, and Sweden, the 322d Air Division transported to Italy 1,196 troops and 226 tons of supplies and equipment for use in the troubled Suez area. Later, on December 10, 1956, USAFE planes also transported 250 Finnish troops and equipment from Helsinki to Naples.

USAFE furnished logistic support and a considerable number of personnel to Operation Safe Haven, December 11, 1956, to January 2, 1957, when 9,700 Hungarian refugees were airlifted from Munich, Germany, to the US in MATS aircraft or on MATS chartered flights. During Operation Safe Haven II, in January-July 1957, flights originated at USAFE's Neubiberg Air Base, near Munich, instead of Munich-Riem Airport, as had been the case in the earlier operation. In Safe Haven II, another 4,616 persons were flown from Europe to the US.

Another well received USAFE effort has been the annual Operation Kinderlift, in which for the past five years USAFE transport planes have carried thousands of Berlin refugee and under-privileged children to West Germany for five-week vacations during the summer. The total number of children between the ages of five to sixteen, airlifted to vacations in West Germany and American homes each year, have been: 1,000 in 1953, 1,440 in 1954, 2,130 in 1955, 3,216 in 1956, and 2,140 in 1957.

Special airlift flights in 1957 included transport by 322d Air Division C-119 and C-124 aircraft of 400,000 pounds of insecticide from Morocco to Tunisia during June 27-29 to help fight what was described as the latter country's worst locust plague in history.—END

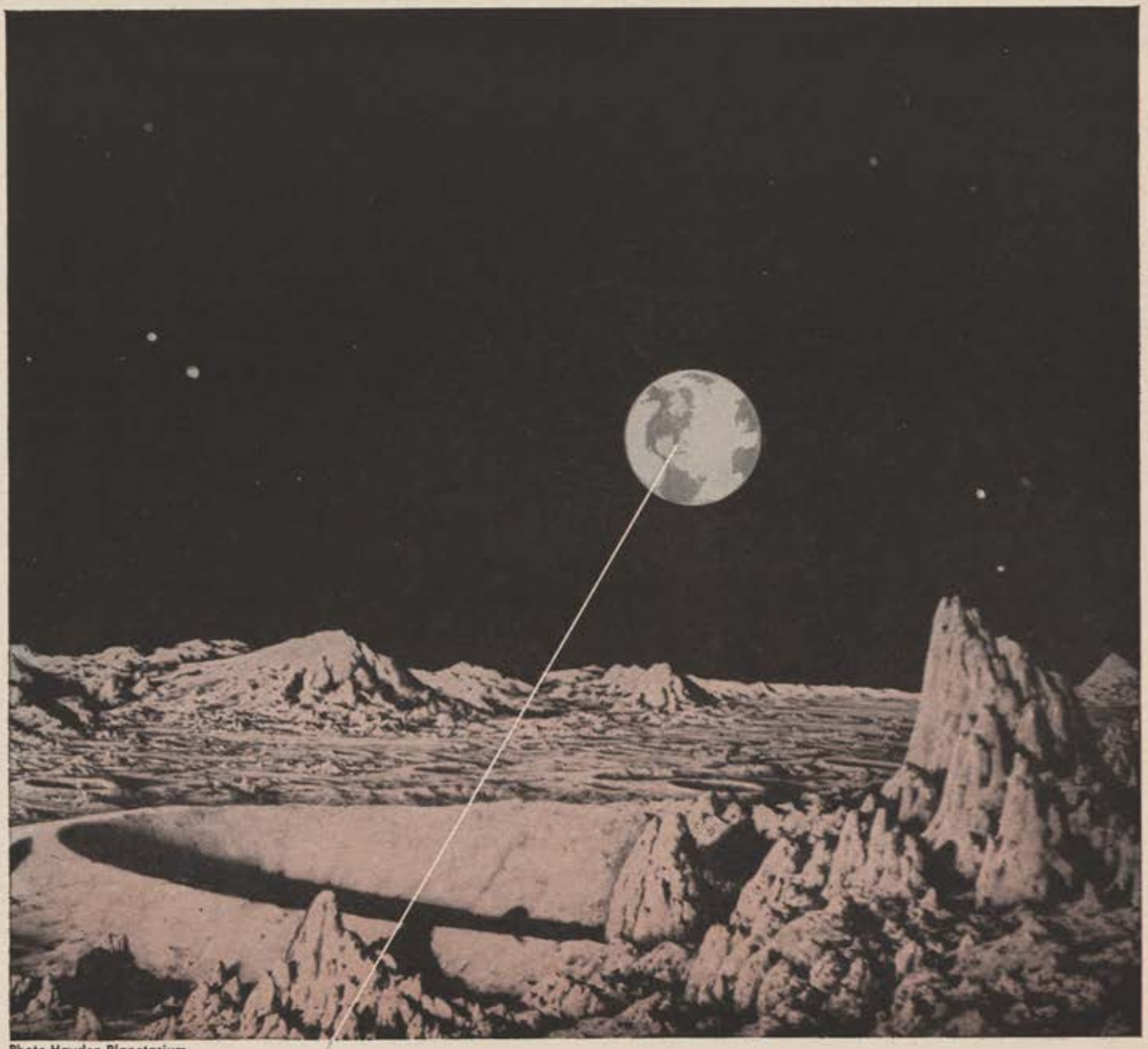

Photo Hayden Planetarium

ANYONE FOR THE MOON?

Yes, many of us perhaps, and in the foreseeable future . . . maybe tomorrow . . . maybe next month. But certainly moon travel, unmanned at first, then complete with men and complex scientific equipment, will tell us more about the Universe and the laws of nature which govern our existence. ➢ ➢ The same resources and technological skill . . . greatly augmented by the now vital aeronautical, astronautical, and atomic brain-power which Republic has developed over more than a quarter century . . . are now concentrating on solutions to every problem . . . designed to strengthen the Free World which we insist must and will live.

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Top of the World Guardian

THE Alaskan Air Command, born on war-torn Adak in 1945, has undergone a nearly continuous process of reorganization and conversion which attests to the increasing strategic importance accorded America's "Last Frontier."

Lying in the shadow of the Siberian mainland, Alaska, as the recently admitted forty-ninth state, is ideally situated to alert the continental US of impending attack along the Arctic air lanes. Alaska's vastness (586,000 square miles) and the diversity of its weather are incidentals with which the command has learned to cope. Its mission is threefold.

- AAC is charged with supplying, through a radar and communications system, the earliest possible warning of attack against the mainland.
- The command provides for the air defense of Alaska and the Northwest Arctic approaches to the US.
- Finally, but not least, AAC maintains a "launching platform" (Eielson AFB, near Fairbanks) from which the Strategic Air Command would mount retaliatory attacks.

In addition, the command supports the western segment of the Distant Early Warning (DEW) Line, America's northernmost electronic fence, along the rim of the Arctic from the new state's northwest shoulder to Barter Island on the Canadian border.

Today the DEW Line is fully operational. Far to the south, along the Aleutian Chain, an extension to the system is under construction. At its westernmost tip this DEW Line "stretch-out" will tie into Navy picket ships and long-range early-warning aircraft operating between the Aleutian Island chain and Pacific outposts.

Backing the DEW Line is AAC's network of Aircraft Control and Warning Stations. The past year has seen a thoroughgoing program of modernization, aimed at incorporating the latest electronic equipment into the network without disrupting the vital business of keeping a radar eye on the Arctic air lanes.

And the command's AC&W Stations have another responsibility in the event of conflict—they would control the air battle as it developed above Alaska.

AC&W sites, manned by approximately 150 technicians, are located along the coastal approaches with backup control sites near Alaska's population and military centers. Their trademarks are bulbous radomes housing huge revolving antennas.

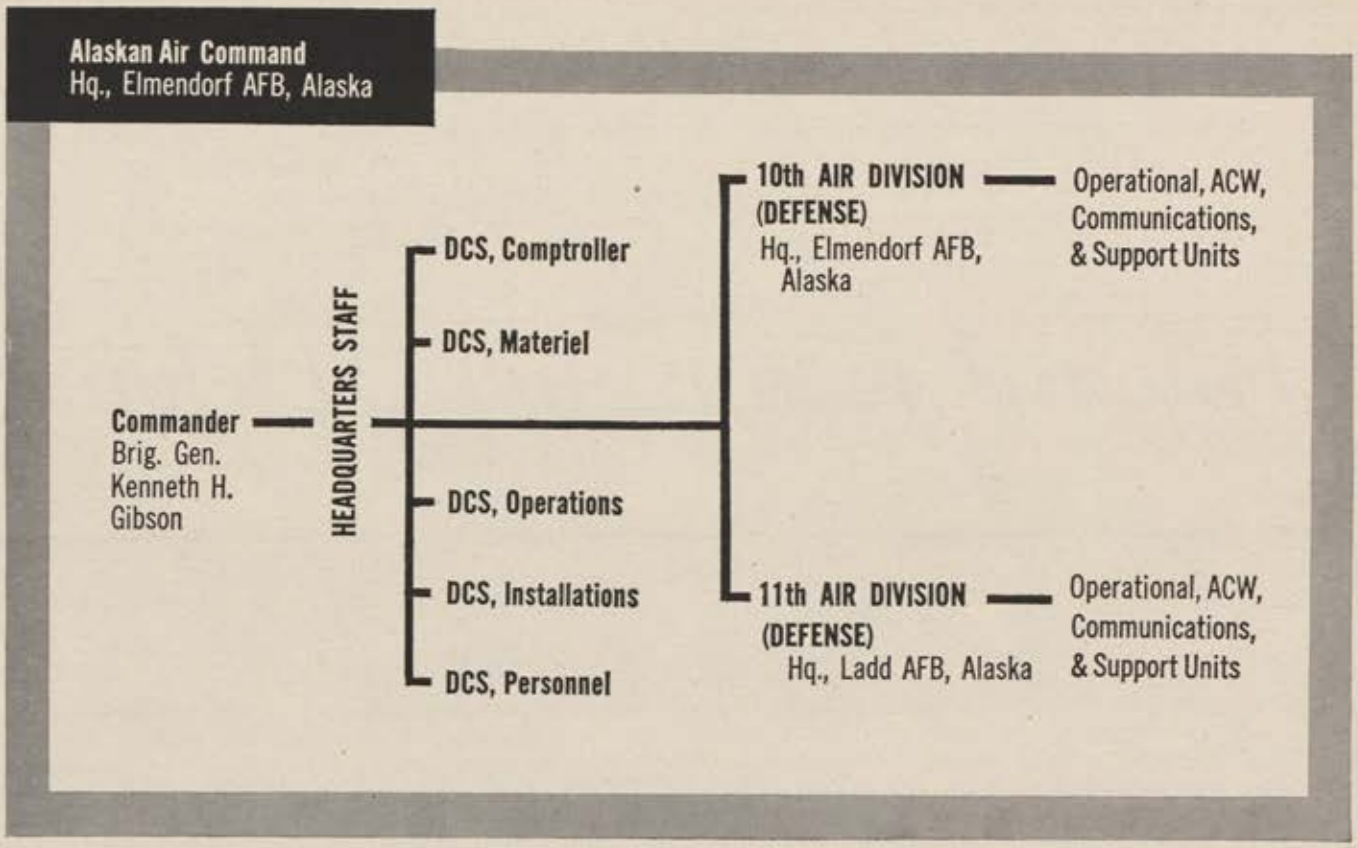
And lately other structures have risen in the northland. Towering scoop-shaped antennas, resembling drive-in movie screens, identify installations belonging to the White Alice communications system.

Dedicated in March 1958, White Alice is the new tropospheric-scatter, long-distance telephone and telegraph network serving the greater part of the new state's interior. Its building problems rivaled those of the DEW Line. Its cost—approximately $140 million.

Although White Alice is operated by a civilian contractor, Alaskan Air Command, as the principal user, furnishes much of its logistic support. For the first time, Alaskans—both civilian and military—are enjoying reliable communications where formerly they had been precarious or nonexistent.

A milestone in the past year's operation was AAC's conversion from the Northrop F-89 to the supersonic Convair F-102 as its fighter-interceptor mainstay. Two squadrons of the sleek deltas—the 31st and 317th FIS—are currently assigned to Elmendorf AFB under the 10th Air Division. Both outfits arrived in Alaska during early autumn, 1957.

Two Convair F-102s, based at Elmendorf (near Anchorage), start sweeping turn over some of world's worst terrain.



In addition to the fighter-interceptor squadrons, the 10th Air Division operates eight Aircraft Control and Warning Squadrons south of the Alaskan Mountain Range.

Concurrent with the F-102s' arrival, AAC received a replacement aircraft for the venerable C-119. The newcomer was Fairchild's versatile C-123 Provider, whose short-field landing and takeoff characteristics make it a bush pilot's dream. Manned by personnel of the 5040th Operations Squadron, the Provider, together with the de Havilland L-20 Beaver and the Vertol H-21 helicopter, shuttle an endless stream of men and materiel to and from a score of remote radar sites.

With the arrival of the F-102s, AAC could boast a front-line fighter to beef up its mission capability. It was deemed wise, however, to concentrate this new strength in Southern Alaska. North of the Alaska Range, where the 11th Air Division wields control, an improved version of the F-89 was installed. This is the "J" model Scorpion, containing a revamped electronic armament system and a vastly increased weapons payload. The 449th FIS, stationed at Ladd AFB, near Fairbanks, is equipped with the F-89J.

Ladd is to Fairbanks what Elmendorf is to Anchorage—a tight military community of Air Force and Army personnel living and working together with a civilian population of similar size.

Twenty-six miles south of Fairbanks, along the Alaska Highway, lies Eielson AFB. Its three-mile-long runway can handle SAC's heaviest bombers. SAC bomber wings rotate assignment to Eielson on a temporary-duty basis. Permanently assigned is the landlord 5010th Air Base Wing and, until recently, the 58th Weather Reconnaissance Squadron.

The command underwent a thorough organizational shakeup in the past year, made mandatory by reduced manpower allocations. Another innovation was the adoption of a consolidated maintenance concept, a move that considerably reduced manpower spaces. Cutbacks already planned will further reduce AAC strength in the months to come. By the end of fiscal year 1959, it is expected to stand at approximately 17,000.

In May of 1957, in conjunction with International Geophysical Year scientists, AAC established a semipermanent camp on a drifting ice floe in the Arctic Ocean. That it was accomplished successfully is a tribute to the skill and resourcefulness of Capt. Burton C. Jenkins. Despite weather and the uneven surface of the untested floe he put his Douglas C-47 safely down.

The floe was examined and determined to be thick enough to support the camp and subsequent landings by cargo-carrying aircraft. Before many weeks had passed a total of eighteen Air Force men and scientists were making their home upon the meandering ice cake, collecting information about the vast and heretofore uncharted Polar Basin. The encampment is scheduled to be maintained throughout the remainder of the eighteen-month International Geophysical Year.

Project Ice Skate is but one of a number of enterprises undertaken by the command in addition to its regularly prescribed mission. The command participates in annual Arctic maneuvers, cold-weather experimentation and testing, Arctic rescue support of special projects, mapping surveys, and the like.

The Air Force is now considering Alaska as a location for long-range ballistic missile early-warning facilities.

Such "super-radar" in Alaska would detect missile devices launched from the vicinity of the Polar Cap. When linked with other Air Force detection warning networks, it would provide a key segment in the growing high-frequency electronic fence guarding the continental US.—End

• CARIBBEAN AIR COMMAND

Toward Hemispheric Defense

THE Caribbean Air Command, with headquarters at Albrook Air Force Base, Panama, Canal Zone, has as its primary objective the supervision and operation of the USAF Missions within Latin America. The USAF Missions were organized to advise and assist the Latin American republics in developing effective air forces, designed to satisfy the needs of the individual country and to serve the over-all plan for hemispheric defense.

Allied to that objective, and supporting the USAF program in Latin America, the command administers the Air Force phase of the Mutual Assistance Program (MAP) and operates the Headquarters School for Latin America, USAF. Other requirements include providing logistic support for the USAF Missions and the Air Attachés and airlift support for the field headquarters of the Inter-American Geodetic Survey.

The Caribbean Air Command serves as the air component of the Caribbean Command, joint headquarters for the US Armed Forces in the Canal Zone. As such, it also is responsible for operational missions assigned to it by the Commander in Chief, Caribbean Command. Foremost among these are the air defense of the Caribbean Command area, air traffic control within the Panama Air Traffic Control Area, search and rescue missions within the Panama area, supporting Air Force units engaged in mapping and charting Central and South America, and organizing for joint training operations with Army and Navy forces.

USAF Missions are presently in operation in Argentina, Bolivia, Chile, Colombia, Cuba, Ecuador, Guatemala, Haiti, Honduras, Nicaragua, Paraguay, Peru, El Salvador, Uruguay, and Venezuela. They are composed of officers and airmen whose numbers vary according to the requirements of the country concerned. In addition, Caribbean Air Command renders supervisory and administrative support to the USAF's section of the Joint Brazil-United States Military Commission in Rio de Janeiro, Brazil.

Accredited Mission personnel are nominated by the USAF through diplomatic channels on an individual basis before acceptance by the host government. The usual tour is for three years. Accredited Mission personnel are paid by the host government. Missions are set up through individual agreements between the United States and the various Latin American countries.

The goal of the Missions is standardization of equipment, terminologies, tactics, and techniques, vital to the Inter-American Defense System, with good relations and understanding with the military and civilian personnel of the other American republics as a by-product.

In 1943, the chief of a Latin American air force asked if he could send twenty airmen to Albrook to observe US mechanics on the flight line. Within a matter of months, the Caribbean Air Command was host to airmen of several countries, and a Latin American on-the-job training program was launched. In 1947, USAF Headquarters authorized the USAF School for Latin America, which has trained nearly 4,000 airmen and officers from eighteen countries.

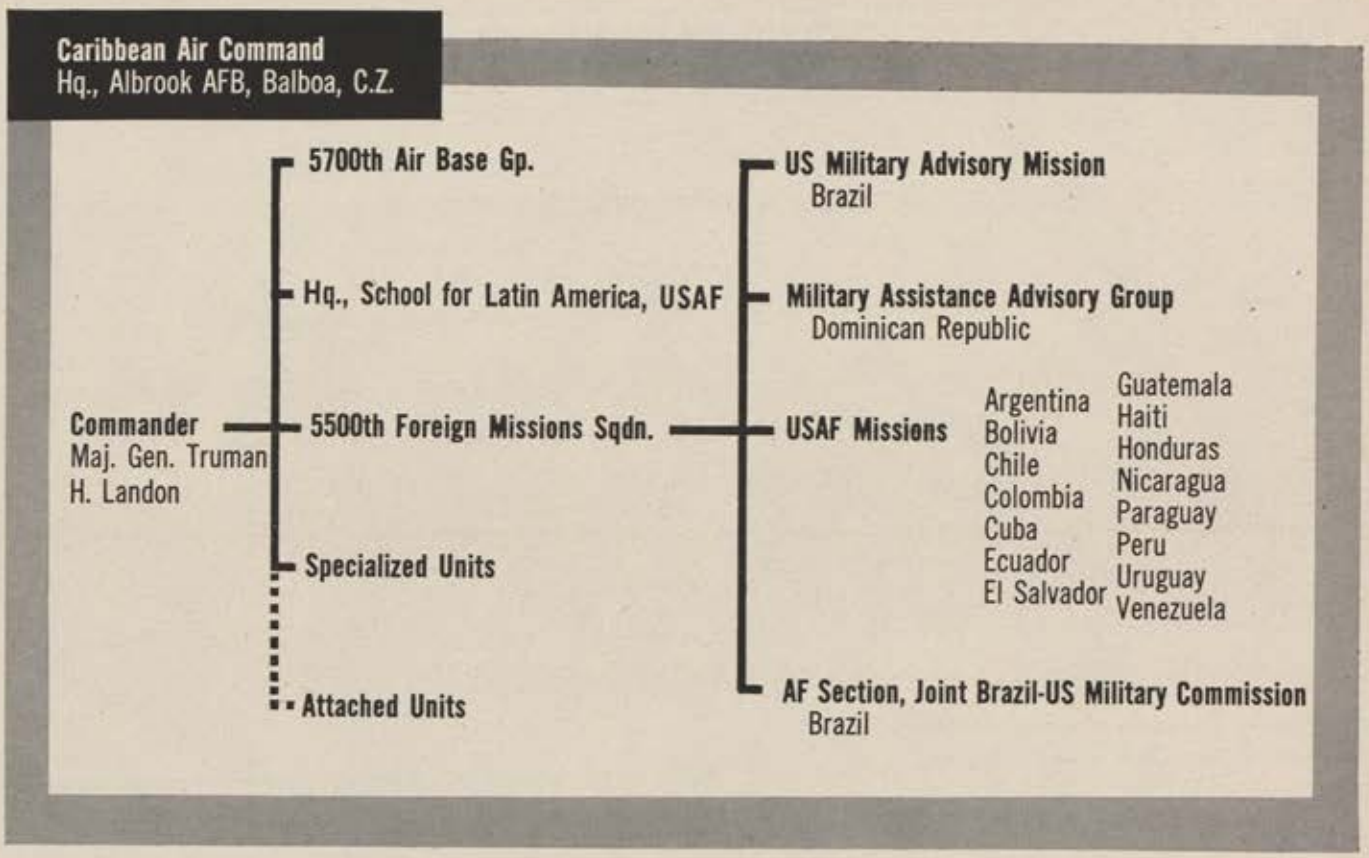
Instruction in classrooms and on the flight line is in Spanish, by bilingual USAF enlisted technicians. Approximately 600 officers and airmen are trained each year.

Caribbean Air Command also administers the Air Force phase of the Mutual Assistance Program in Latin America. Three types of military assistance are monitored by the command:

- Direct grants of equipment and other assistance to certain countries to prepare their forces for specific hemispheric defense missions.
- Opportunities to purchase US weapons and equipment, which Latin American countries need for internal security and hemispheric defense, and
- Aiding in the selection of qualified personnel for specialized training in the United States.

The Caribbean Air Command renders administrative and supervisory support to the Military Assistance Advisory Groups (MAAGs) in the Dominican Republic, Chile, Colombia, Cuba, Uruguay, Brazil, Ecuador, and Peru. The MAAGs are responsible for the administration of the Mutual Assistance Program within their host country. In the Dominican Republic the MAAG is fully manned in the absence of a USAF Mission to that country. In the other seven republics, the USAF Missions have absorbed the functions and responsibilities of the MAAGs.

Albrook Air Force Base, an active base since 1922, was named in honor of Lt. Frank P. Albrook in 1924. It is the only fully operational base of the command. Two others, Howard and France Air Force Bases, also in the Canal Zone, are on an inactive status. Within the Caribbean area are twenty-five other inactive stations and airfields, held under the ninety-nine-year lease agreement with Great Britain, over which Caribbean Air Command exercises real estate responsibility. The "Cross Roads Base" quarters the 5700th Air Base Group and several tenant organizations in addition to the USAF School for Latin



Members of Inter-American Defense Board view equipment used in the command's School for Latin America, located at Albrook AFB, in the Canal Zone.

Many dignitaries visit the Albrook installation. Right, reviewing Latin American students is Maine's Senator Margaret Chase Smith, a WAF Reserve officer.

America, and Headquarters Caribbean Air Command. Albrook is also a MATS terminal.

Caribbean Air Command furnishes aerial logistic support to military Missions, Air Attachés, and to the field headquarters of the Inter-American Geodetic Survey. Also, upon request from proper authority, CAirC transports medical personnel, supplies, and food to stricken areas in Latin America, and assists in the treatment or evacuation of persons requiring emergency medical assistance.

When an area of Ecuador was ravaged by torrential floods in April 1953, CAirC planes flew 302 missions from Quito to Guayaquil, carrying 1,300,000 pounds of vital foodstuffs and medical supplies. Caribbean Air Command personnel and aircraft assisted also in Colombian, Honduran, Haitian, and Panamanian flood and disaster relief.

The rescue organization at Albrook Air Force Base has performed an average of fifty rescue missions annually. —End

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• AIR TRAINING COMMAND

Gateway to the Air Force

New airmen at Lackland AFB, Tex., line up for inspection by one of the 1,200 instructors assigned to basic training.

IT ALL begins at Lackland AFB, near San Antonio, in Texas.

This is the "Gateway to the Air Force," and the beginning of training that is planned to turn out the right number of people qualified in the right skills at the right time.

The largest of the major air commands—Air Training Command—is charged with conducting this training, at thirty-two bases scattered throughout the United States. In fiscal year 1957, more than 135,000 men and women attended ATC's technical schools. Another 21,000 received instructions in flying training, and an additional 19,000 participated in crew training.

Probably the most dramatic change that has affected Training Command in the eleven years since the Air Force became a separate service, has been the addition of specialized missile training courses to the more than 600 courses—typing to electronics—which are already being taught.

ATC's mission is basic. First, it recruits personnel. The problem here is to get the best people possible—particularly the best educated in science, mathematics, and in reading comprehension.

Secondly, ATC must give these people basic military training, technical training leading toward qualification in a specialty, and field training of advanced and specialized instruction; officer schooling (excluding ROTC and Air Force Academy), preflight training for officers and cadets, flying training leading to an aeronautical rating, and advanced flying training for rated personnel.

The carrying out of this mission is effected extensively by advances in science and technology.

Take, for example, a trend that has developed in electronics training. The fire control system in the Lockheed P-80B aircraft of the mid-40s demanded seven electronics technicians for each squadron. And each of these men required ten weeks of training. Today, a Convair F-102 squadron demands fifty-nine technicians and each man needs forty-four weeks of training on a system complicated by 4,000 vacuum tubes and ninety black boxes.

With this increasing complexity of electronics equipment, more maintenance personnel are needed and each man must receive more training. And the advent of missiles —full of intricate "plumbing" and complex "gadgets"—has further taxed training demands.

ATC has had to develop new training philosophies as well as courses, new management concepts as well as physical facilities, and set about to provide the necessary flow of qualified manpower needed in operating such weapon systems as the Genie, Bomarc, Atlas, Titan, Thor, Snark, Goose, and the GAR series.

Most important has been the development of the "prime base" concept. At these prime bases, most of the technical training for a particular missile weapon system takes place. Some training is done at other ATC bases, called "support bases."

Sheppard AFB is an example of a prime training base. Weapon systems assigned to Sheppard include the Atlas, Titan, and Thor. At this base near Wichita Falls, Tex., men learn what they need to know about the airframes, airborne guidance systems, equipment cooling, and power generation. At Chanute AFB in Illinois, a support base for these three missiles, courses are taught in propulsion

(Continued on page 137)

Air Training Command
Hq., Randolph AFB, Tex.

Commander
Lt. Gen. Frederic H. Smith, Jr.

- **Chanute AFB, Ill.**
  3345th Tech Trng. Wg.
- **Lowry AFB, Colo.**
  3415th Tech Trng. Wg.
- **Sheppard AFB, Tex.**
  3750th Tech Trng. Wg.
- **Amarillo AFB, Tex.**
  3320th Tech Trng. Wg.
- **Keesler AFB, Miss.**
  3380th Tech Trng. Wg.
- **Lackland AFB, Tex.**
  3700th Military Trng. Wg.
- **Wright-Patterson AFB, Ohio**
  3500th USAF Rctg. Wg.
- **Chanute AFB, Ill.**
  3499th Fld. Trng. Wg.
- **Bryan AFB, Tex.**
  3530th Pilot Trng. Wg.
  (Basic Single Engine)
- **Reese AFB, Tex.**
  3500th Pilot Trng. Wg.
  (USAF Basic Pilot School—Multiengine)
- **Vance AFB, Okla.**
  3575th Pilot Trng. Wg.
  (USAF Basic Pilot School—Multiengine)
- **Laredo AFB, Tex.**
  3640th Pilot Trng. Wg.
  (Basic Single Engine)
- **Webb AFB, Tex.**
  3560th Pilot Trng. Wg.
  (USAF Basic Pilot School—Single Engine)
- **Greenville AFB, Miss.**
  3505th Pilot Trng. Wg.
  (Basic Single Engine)
- **Goodfellow AFB, Tex.**
  3545th Pilot Trng. Wg.
  (Basic Multiengine)
- **Craig AFB, Ala.**
  3615th Flying Trng. Wg.
  (USAF Pilot Instructor School)

Harlingen AFB, Tex.
3610th Navigator Tng. Wg.
(USAF Navigator School)
(USAF Advanced Flying School—Multiengine)

Mather AFB, Calif.
3535th Navigator Tng. Wg.
(USAF Navigator School)
(USAF Advanced Flying School—Multiengine)

James Connally AFB, Tex.
3565th Navigator Tng. Wg.
(USAF Navigator School)
(USAF Advanced Flying School—Multiengine)

Moody AFB, Ga.
3550th Combat Crew Tng. Wg.
(USAF Advanced Flying School—Interceptor)

Perrin AFB, Tex.
3555th Combat Crew Tng. Wg.
(USAF Advanced Flying School—Interceptor)

Stead AFB, Nev.
3635th Combat Crew Tng. Wg.
(USAF Survival Training School)

Nellis AFB, Nev.
3595th Combat Crew Tng. Wg.
(USAF Advanced Flying School—Fighter)
(USAF Fighter Weapons School)

Randolph AFB, Tex.
3510th Combat Crew Tng. Wg.
(USAF Advanced Flying School—Medium Bomber)

Luke AFB, Ariz.
3600th Combat Crew Tng. Wg.
(USAF Advanced Flying School—Fighter)

Williams AFB, Ariz.
3525th Combat Crew Tng. Wg.
(USAF Advanced Flying School—Fighter)

Francis E. Warren AFB, Wyo.
3450th Tech Tng. Gp.

Scott AFB, Ill.
3310th Tech Tng. Gp.

Tyndall AFB, Fla.
3625th Combat Crew Tng. Gp.
(Act. Controller School)

Graham AB, Fla.
3300th Pilot Tng. Gp.
(Contract Primary)

Bartow AB, Fla.
3303d Pilot Tng. Gp.
(Contract Primary)

Spence AB, Ga.
3302d Pilot Tng. Gp.
(Contract Primary)

Moore AB, Tex.
3301st Pilot Tng. Gp.
(Contract Primary)

Malden AB, Mo.
3305th Pilot Tng. Gp.
(Contract Primary)

Bainbridge AB, Ga.
3306th Pilot Tng. Gp.
(Contract Primary)

Field Printing Sqdns. (Four)

NEWS FOR TAXPAYERS

The versatile Lockheed C-130 Hercules. This gigantic prop-jet cargo plane can carry 20-ton loads 6 miles per minute.

WHY THIS AIRPLANE NOW COSTS YOU LESS

At the right is a picture of what engineers call a Numerically Controlled Profile Milling Machine. Bendix makes the "controlling" part. What it does is produce a finished part directly from basic design information on a blueprint . . . eliminating the many in-between steps usually required in tooling-up work.

It has many different applications but, in every case, cuts machining, material or labor costs. One example: By using conventional tooling-up methods, Lockheed Aircraft Corporation's Georgia Division estimates it would have cost them $72,450 and taken ten men over five months to make 600 follower cams or templates required in tooling for the giant Hercules airplane pictured above. By using the new Bendix Numerical Control system, Lockheed with five men made the 600 cams in *two* months at a cost of $37,548 . . . a saving of $34,902 for us taxpayers on one operation alone!

Lockheed summarizes the advantages of this Bendix development thus: Reduces tool manufacturing time; increases shop load potential; reduces rework due to human error; makes qualified personnel available for other work.

Bendix has more Numerical Control systems for machine tools in use today than any other manufacturer and thus is in a better position to discuss specific application problems with you. For complete information about automatic control of machine tools, contact Bendix Controls Section, 21820 Wyoming, Detroit 37, Mich.

Installation of Kearney & Trecker milling machine and Bendix Numerical Control system, Lockheed Aircraft Corporation, Marietta, Ga.

A thousand products Bendix AVIATION CORPORATION Fisher Bldg., Detroit 2, Mich. *a million ideas*

ATC students examine an F-86D at Perrin AFB, Tex., hear plane's highlights prior to adventure of the first flight.

Student H-19 mechanic works under the close supervision of Stead AFB, Nev., instructor during preflight checkout.

systems and propellant handling. At Keesler AFB in Mississippi, courses are given in ground guidance. And at Lowry AFB near Denver, men learn about warheads and nose cones.

Chanute, Keesler, and Lowry are support bases for the Atlas, Titan, and Thor because they already teach similar courses relating to conventional aircraft: Chanute on engines, Keesler on electronics, Lowry on armament. This saves time and money in classroom and training aid construction, and other areas.

The prime base acts as "training manager" for the weapon system that has been assigned, overseeing all of the training that goes on at these support bases, and making certain there is adequate coverage of every necessary phase.

Present and planned prime training bases other than Sheppard include Amarillo for the GAM-72 Quail and the Snark; and Lowry for the GAM-63 Rascal, the GAR series, and the Matador.

But while time and money are saved by support bases, missile training is still tremendously costly. Bases must be equipped with specialized training facilities, maintenance and check-out areas must duplicate the same stringent requirements that will be used by operational missile squadrons, housing facilities must be available, and hundreds of hours must be devoted to programming and scheduling.

Besides all this, there is the problem of manpower: qualified instructors and high-aptitude students.

ATC's missile training program is divided into two types: "special" and "formal."

Phase 1 of special training is conducted by missile contractors, so that an initial military capability is reached. Usually, the instructors and part of the men who will man the first operations units are trained during this phase.

Phase 2 of special training completes the military instructor staff and the initial manning of the first operational units.

Phase 3 is formal training, where officers and airmen work toward a semiskilled level of proficiency in their specialty.

Most missile courses are geared to individuals already experienced in certain specialties. Later, however, these courses will be redesigned for students with less experience and training. In fact, the majority will be fresh from the basic military course at Lackland.

Besides this individual training, certain missile systems require crew training. This training is conducted by the command that will employ the particular weapon system—unless ATC is requested by the using command to do the training and the request is approved by Air Force Headquarters.

Today's Air Force recruit gets his first taste of military life at Lackland. Here, he learns the fundamentals of leadership, discipline, and tradition. Air Force requirements, plus tests and interviews, determine the right jobs for the right people.

After four weeks at Lackland, those qualified begin technical training at one of ATC's technical schools, as radio and radar technicians, control tower operators, jet mechanics, administrative personnel, missile technicians, photographers, and as specialists in hundreds of other fields.

Schools are located at Amarillo AFB, Amarillo, Tex.; Chanute AFB, Rantoul, Ill.; Keesler AFB, Biloxi, Miss.; Lowry at Denver, Colo.; Sheppard at Wichita Falls, Tex.; and at Lackland.

Other airmen who are already specialists because of civilian occupations go directly to similar technical jobs. Still others, not selected for technical training, remain for the full basic military course of eight weeks. Enlisted WAF undergo a nine-week basic course at Lackland before entering a technical field.

First-team airmen, who leave Lackland after four weeks, continue basic training on a part-time basis at their technical school.

But once an airman leaves ATC and heads for a using air command, his training is not over. ATC's 3499th Field Training Wing, with headquarters at Chanute AFB, takes the classroom to students at bases and commands throughout the world.

This field training program, three years old this past July, allows many technical schools to provide instruction through only the fundamental phase of a course. Students are then assigned to an operational unit and spend half of their time for four weeks in on-the-job training. The other half is spent under advanced instruction provided by the field training unit.

The field training program was designed by ATC as a partial answer to one of the Air Force's major problems: getting the most use possible out of a first-term enlistee.

Today, the Air Force is building a missile force while keeping ready a manned aircraft force. For this reason, while the pilot training rate has been declining, there has been a consistent attempt to increase the quality of the pilot graduate.

Eight years ago, the training rate was set at more than 7,000 pilots annually. Early in 1957, the yearly rate dropped to 3,800 and shortly afterward, when the number

(Continued on following page)

WAF students at Keesler AFB, Miss., learn to read scopes as part of training to join Air Defense Command units.

of wings was cut from 137 to 128, the announced production was 2,700 a year. The possibility of further reductions cannot be overlooked, particularly since the '59 budget is based on an Air Force of 117 wings at the end of fiscal '58 and of 105 at the end of fiscal '59.

Air Force flying personnel come from two main sources: graduates of the AFROTC program, and men who enter as aviation cadets. Both groups enter the Air Force through the preflight courses of the Officer Military Schools at Lackland AFB.

ROTC graduates destined for primary pilot training receive six weeks of processing and course work including instruction in officer responsibilities, orientation to flying training, physical and physiological training. Future navigators attend a four-week course.

Aviation cadets spend twelve weeks at Lackland's preflight schools learning about leadership, intelligence, Air Force history, military law, and organization. Both future pilots and navigators receive hours of physical and physiological training, plus work in flying orientation.

After preflight, aviation cadets and student officers enter one of ATC's six contract schools: Bainbridge AB, Bainbridge, Ga.; Bartow AB, Bartow, Fla.; Graham AB, Marianna, Fla.; Moore AB, Mission, Tex.; Spence AB, Moultrie, Ga.; or Malden AB, Malden, Mo.

In primary, students learn the fundamentals of flying from civilian instructors in the Beech T-34 and the North American T-28. This year—in line with the Air Force move toward an all-jet combat force—students of Class 59-D at Bainbridge AB began using the dual-seat Cessna T-37 twin-jet primary trainer. By the end of 1960—when the T-37 phase-in program is completed—Training Command expects to have nearly 400 of the jet trainers.

A small military detachment is assigned to each contract school to supervise, give check rides, and carry out the necessary administrative work.

Next comes the second, or basic, flying training phase. This training requires several months at such bases as Craig AFB, Selma, Ala.; Laredo AFB, Laredo, Tex.; Greenville AFB, Greenville, Miss.; Reese AFB, Lubbock, Tex.; Vance AFB, Enid, Okla.; and Webb AFB near Big Spring, Tex.

In single-engine training, the Lockheed T-33 is used; in multiengine, the North American B-25. On graduation day, cadets are commissioned, and both cadets and student officers receive their silver wings.

At Stead AFB, ATC conducts helicopter training in the Bell H-13, Sikorsky H-19, and Vertol H-21.

Primary-basic navigation training takes place at two ATC bases: Harlingen AFB, Harlingen, Tex., and James Connally AFB, Waco, Tex. Two upgrading, nine advanced, and seven miscellaneous courses of varying lengths are also conducted as part of the navigator training program. ATC's advanced navigator training base is Mather AFB, near Sacramento, Calif.

Air Training Command also operates several postgraduate courses which bring together all of the various skills developed in pilot and navigator training, as well as in gunnery and other technical training courses. These schools combine pilots, navigators, gunners, and radio and radar operators into combat-capable teams.

At Luke AFB near Glendale, Ariz., and Nellis AFB at Las Vegas, Nev., are schools for fighter-bomber training in the Republic F-84 and the North American F-100. At Perrin AFB, Sherman, Tex., and Moody AFB, Valdosta, Ga., advanced students learn interceptor tactics in the North American F-86D and the T-33. At Williams AFB, Chandler, Ariz., fighter-day combat maneuvers are taught in the F-86F. And at Randolph AFB, San Antonio, Tex., jet qualification training is conducted.

These advanced training programs range everywhere from six weeks to several months in length.

Several flying and nonflying courses are designed to qualify officers as rated jet pilots, tactical and aircraft controllers, and—at Stead AFB, near Reno, Nev.—survival training for crew personnel.

In mid-1957, ATC Headquarters moved to its present site at Randolph AFB, and consolidated its flying and crew training functions under one subordinate command. At the same time, one of the two remaining subordinate commands—the Flying Training Air Force—not only assumed the crew training function, but also moved from Waco, Tex., to Randolph.

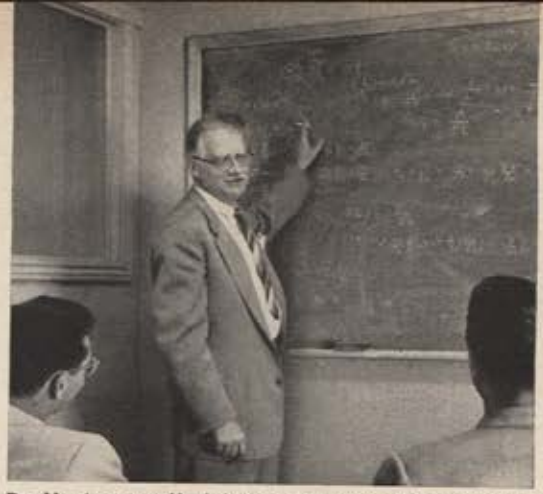
The move of ATC Headquarters, from Scott AFB in Illinois to Randolph, placed it geographically closer to many of its training bases. Thirteen of its thirty-two bases and one of its six contract flying schools are in Texas. By mid-1958, another change eliminated two subordinate commands—Technical Training Air Force at Gulfport, Miss., and Flying Training Air Force—and their responsibilities and functions were assumed by a reorganized command headquarters. This is expected to save more than $5.6 million a year in recurring operating costs.

Today, the picture of Air Training Command is a changing picture brought about by the ever-increasing demands of modern space age warfare. For with every change in weapons, for every revision in the philosophies of management, for every new Air Force requirement, the training program must also be revised; sometimes minutely, other times infinitely. Often, the slightest change may demand the training of new instructors, the writing of new manuals, and the building of new equipment.

Perhaps the three single factors most expressive of this largest of the Air Force's major commands are its diversity of training, its massive scale of operation, and the importance of its end product.

Push-button warfare, indeed, presents a paradox. It does not take the place of man. Instead, it makes the human element, trained to think and trained in skills, more important than ever before.—END

Progress Report on Aeronutronic Systems, Inc.

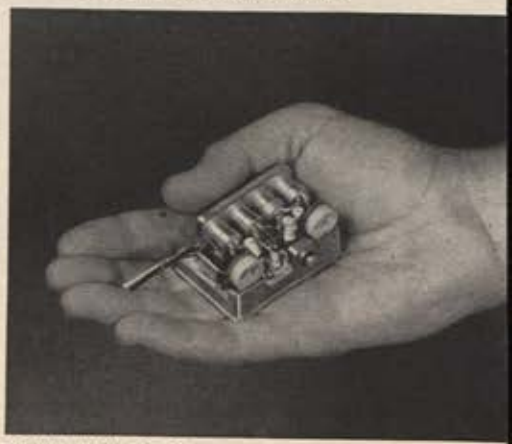


Dr. Montgomery H. Johnson, Director of Aeronutronic System's Advanced Research Staff, discusses problems related to lunar research flights. Other Advanced Research Staff interests include the study of air opacity, infrared missile emissions, and high altitude and free space nuclear explosions.

Far Side Missile developed by Aeronutronic for USAF Office of Scientific Research. Four-stage rockets like this were balloon launched and fired to record breaking altitudes where they measured the Earth's magnetic field and cosmic radiation intensities.

How Aeronutronic is meeting the needs of advancing science and technology

The Ford Motor Company established Aeronutronic Systems, Inc. to engage in the development and manufacture of highly technical products for military and commercial purposes. In a time of expanding science, Aeronutronic is meeting the technological needs of the Nation. A few of Aeronutronic's broad interests and activities are illustrated here.



ASI Model IL-101 Subminiature Transmitter provides exceptional frequency stability under high acceleration space conditions. Size of unit: 1.1 x 1.4 x 2 inches. Weight: less than 5 ounces. Output: 150 ± 10 mw.

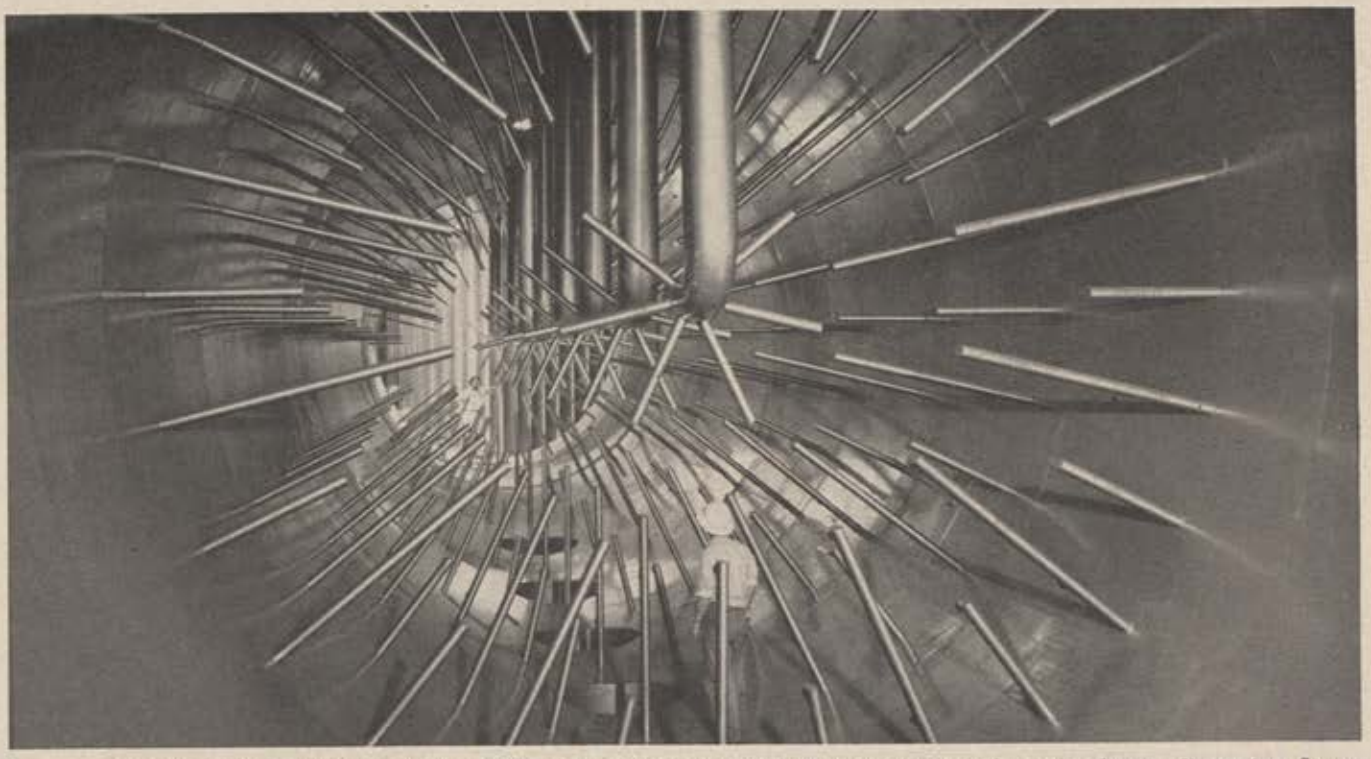
Aerial view of Newport Beach, California, where Aeronutronic Systems, Inc. is building modern, new facilities to carry out military and commercial programs involving the most advanced research, development, experimentation and production. Aeronutronic's new facilities are located 40 miles south of Los Angeles on a mesa overlooking Newport-Balboa Harbor and the Pacific Ocean.

Prototype model of ASI Digital System Simulator. Unit is designed to give direct check of reduction of logical equations, to study a system's operations prior to construction, and to study alternate logical designs.

AERONUTRONIC SYSTEMS, INC.

a subsidiary of Ford Motor Company

For information and booklets about Aeronutronic's interests, facilities or products, address: Aeronutronic Systems, Inc., Building 25, 1234 Air Way, Glendale, California.



Spray coolers for future ramjets under ARDC study shown at AEDC. Water cools superheated exhaust, dispersing flame.

• AIR RESEARCH & DEVELOPMENT COMMAND

Objective: Superiority

THE Air Research and Development Command (ARDC) functions as a unique management tool to achieve and maintain qualitative superiority for the United States Air Force over potential enemies. Established on January 23, 1950, the command headquarters are at Andrews AFB, Md., outside of Washington, D. C.

ARDC draws upon the total technological potential of the nation. The command maintains close working liaison with scientists, industry, educational organizations, and government agencies for maximum results of research, within the limits of the development dollars available. Some fifty domestic field offices provide liaison for the ARDC science-industry team.

Currently, ARDC annually expends some $43 million in the US for basic research. The amount represents about six percent of its nonweapon budget. This type of research is supported by contracts with nearly 250 universities, colleges, and other nonprofit institutions, and about seventy industrial concerns. Additional work is being supported within ARDC laboratories and other government agencies.

During fiscal year 1958, about $4 million was spent on 200 contracts originating within ARDC's European office in Brussels, Belgium. The office monitors basic research projects throughout Free Europe and the Near East.

In addition, the Air Force Ballistic Missile Division, Hq. ARDC, manages priority missile projects—including intercontinental ballistic missiles (ICBMs).

At its various centers (*see chart*), ARDC provides its contractors with test facilities, the scope of which would be far beyond the economic capabilities of nongovernment organizations.

At Patrick Air Force Base, Fla., ARDC's Missile Test Center operates a completely instrumented test range which stretches more than 5,000 miles over the Atlantic Ocean.

At the Arnold Engineering Development Center, Tullahoma, Tenn., huge wind tunnels permit testing of jet and rocket engines at simulated altitudes up to 80,000 feet. At the Air Force Flight Test Center, in California, a vast dry lake provides miles of hard landing surface for testing tomorrow's aircraft.

In its effort to reduce the time between an idea and the production of a weapon system, ARDC has conceived a new approach integrating research, development, and production of weapons. Known as the "weapon system concept," it considers an airframe, components, and support equipment as closely integrated parts of an entity.

Since USAF R&D covers much of the scientific spectrum, only a small area of the command's activities can be listed. Following are some of the research and development problems faced by the command.

Immediate and pressing are flight problems to be encountered in space at some 500,000 feet by a rocket plane

(Continued on page 143)

Air Research and Development Command
Hq., Andrews AFB, Md.

Commander
Lt. Gen. Samuel E. Anderson

HEADQUARTERS STAFF

Deputy Commander Weapon Systems

Deputy Commander Research & Development

Deputy Commander Ballistic Missiles and **Commander** Ballistic Missile Div., Inglewood, Calif. Manages Air Force ICBM and IRBM projects.

Deputy Commander Resources

Deputy Commander Air Defense Systems Integration

WRIGHT AIR DEVELOPMENT CENTER
Wright-Patterson AFB, Ohio
Conducts development with primary responsibility in aeronautical and related material including self-contained navigation, airborne electromagnetic radiation warfare, and aeromedical research activities.

ROME AIR DEVELOPMENT CENTER
Griffiss AFB, N. Y.
Operational development and testing of electronic supporting systems, subsystems, components, and associated equipment.

AIR FORCE CAMBRIDGE RESEARCH CENTER
Laurence G. Hanscom Field, Mass.
Research and technical development in areas of electronics, geophysical sciences, and human engineering.

ARNOLD ENGINEERING DEVELOPMENT CENTER
Tullahoma, Tenn.
Constructs and operates a series of wind tunnels and high-altitude test cells for development testing and evaluation of aircraft, guided missiles, aerodynamic components, and propulsion systems.

AIR FORCE FLIGHT TEST CENTER
Edwards AFB, Calif.
Flight tests aircraft, powerplants, components, allied equipment, and accomplishes static firing tests of guided missile powerplants. Maintains Experimental Rocket Engine Test Laboratory, Flight Test Pilot School, and Air Force Parachute Test Group.

AIR PROVING GROUND CENTER
Eglin AFB, Fla.
Engineering evaluation tests on aircraft bombing and firing systems and components. Maintains climatic hangar for testing weapon systems under extreme temperatures.

AIR FORCE SPECIAL WEAPONS CENTER
Kirtland AFB, N. M.
Air Force responsibility in development and testing of nuclear and thermonuclear weapons, their components, and associated equipment.

AIR FORCE MISSILE DEVELOPMENT CENTER
Holloman AFB, N. M.
Conducts Air Force research, development, tests, and evaluation on guided missiles, controlled targets, related equipment, and biodynamics and space biology.

AIR FORCE MISSILE TEST CENTER
Patrick AFB, Fla.
Tests long-range guided and ballistic (bombing) missiles and target drones at Cape Canaveral, Fla.

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH
Washington, D. C.
Exploratory research in physical, material, aeronautical, and biosciences. Provides and reports scientific knowledge and achievements. Basic research.

ARMED SERVICES TECHNICAL INFORMATION AGENCY
Arlington, Va.
An agency of ARDC. Provides centralized technical information services to all Department of Defense agencies and their contractors.

EUROPEAN OFFICE, ARDC
Brussels, Belgium

and a pilot speeding at more than 20,000 miles per hour.

At speeds of Mach 4—four times the speed of sound—temperatures can reach more than 900 degrees Fahrenheit and far higher at lower altitudes. As speeds and skin temperatures increase further, the point will be reached when conventional materials—even stainless steel and titanium—are no longer suitable for airframe construction.

A breakthrough in the development of adequate heat-resistant materials would have a profound effect on the entire field of high-speed aircraft and missiles.

Another technological problem is the rapidly increasing complexity of weapon systems.

In the case of interceptor fire-control systems the pilot can no longer aim and fire his guns or rockets without the aid of "black boxes"—electronic fire-control systems. These systems not only "think" and act much faster than the human brain, but can also be made to "see" through the night, fog, and clouds, thus permitting operation in every type of weather.

One of the most serious problems resulting from such increased complexity is reliability. If but one of the more than 1,500 electronic tubes on a jet bomber fails, a crew and an expensive aircraft may be lost.

Now building is the experimental X-15. Soon it will attain a speed of 3,600 mph and climb to 100 miles and higher. Future plans call for a "boost-glide" version of the X-15 to fly at speeds of 18,000 mph and altitudes well above 100 miles.

ARDC also is interested in the thermodynamics of hot gases in the 100,000-degree range, expansion of knowledge of meteoric debris, cosmic radiation, and other phenomena which affect operation of an extra-atmospheric environment.

Another ARDC project concerns the North American B-70 "chemical bomber" recently nicknamed Valkyrie, scheduled to replace the B-52. Present plans call for the aircraft to exceed Mach 3, at an altitude of more than 70,000 feet, with a range of 8,000 to 10,000 miles.

ARDC, under its newly formed office of the Assistant for Nuclear Programs, also has been researching the WS-125A—a nuclear-powered bomber.

Solar energy is another ARDC area of interest. The sun emits 20,000 times as much energy as we now use for energy purposes—energy that in a single day equals that released by two million atomic bombs of the Hiroshima size (20,000 tons of TNT).

Whether or not pilots will rocket across the threshold of the earth's boundaries into space will depend upon today's basic research in dozens of scientific areas and disciplines. This is ARDC's bailiwick, too.

Scientists working for or with ARDC are combining their knowledge to measure the earth's surface; the temperature of tropic and arctic waters; the wind velocities in the upper regions far above the earth; the tensile strength and weakness of new experimental metals; and the physical and mental limits of man.

Others are planning to project missiles at speeds of 15,000 mph or faster over intercontinental distances. Physicists, mathematicians, and other scientists are working against time to discover a defense against such missiles.

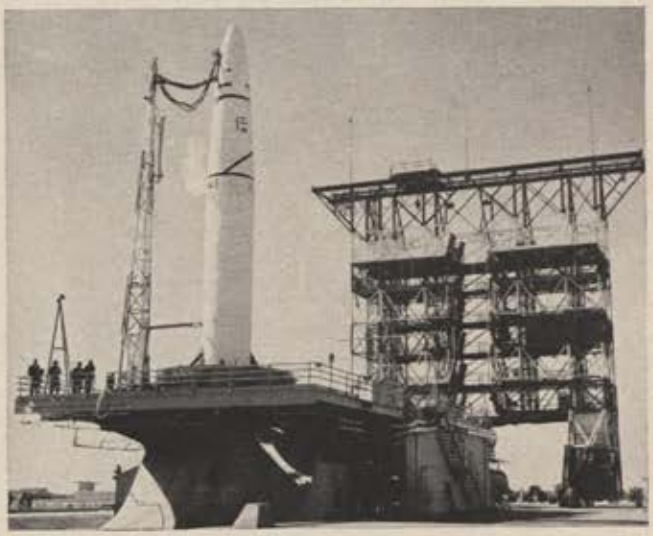
ARDC-sponsored programs in the last eight years constitute a chronicle of scientific breakthroughs and world records, many of which still stand.

- On September 7, 1956, Capt. Iven C. Kincheloe rocketed the experimental Bell X-2 to 126,200 feet (23.9 miles)—an altitude never before reached by man. The record stood as of June 30, 1958.
- Less than nine years after Capt. Charles (Chuck) Yeager first flew faster than sound, Capt. Milburn G. Apt, on September 27, 1956, flew the X-2 at 2,178 mph. This is the fastest ever traveled by man.
- In the manned balloon area, Lt. Col. David G. Simons rose to an altitude of 102,000 feet (twenty miles) on August 20-21, 1957. Exactly two months later on October 21, during Project Far Side, a projectile was fired straight through the top of a free-flying balloon to an unprecedented height of more than 2,400 miles.

On the ground, ARDC has conducted some spectacular tests. Perhaps the most publicized occurred in December 1954 with Col. John P. Stapp acting as "human guinea pig." While strapped into a seat of a squat, steel sled at Holloman AFB, N.M., the "space surgeon" was slammed to a body-jarring stop from a top speed of 632 mph in 1.4 seconds.

The colonel's experience was equivalent to ejection from a jet at 35,000 feet at 1,500 mph.

Commercial airlines and allied industries have greatly benefited from ARDC's R&D programs to improve training and equipment. One example is the development of the J-57 engine simulator now available commercially to both the engine and airline companies for training purposes.



An Air Force Thor IRBM being prepared for static test firing at the Air Force Missile Test Center, Cape Canaveral, Fla. Missile's gantry is being rolled to safety.

Modern computers, greatly improved through Air Force-backed research, now enable relatively small industrial firms to make use of this time- and money-saving equipment.

In the field of photography, ARDC efforts have been especially effective. Cameras, films, and developers have been considerably improved, and benefits passed on to commercial agencies. A newly discovered fast-acting photographic developer, when applied industrially, will save untold numbers of man-hours and millions of dollars.

A transparent rubber for use as an interliner in supersonic aircraft windshield glass, developed under an ARDC contract, may have application to the automotive as well as the aviation industry.

A new silicone rubber is resistant to swelling and will have application to a dozen industries, such as automotive, farm equipment, and aviation.

The X-15 research program, started in 1952, is a joint

(Continued on following page)

The "wild black yonder" at 50,000 feet. View was seen by Lt. Col. David G. Simons of ARDC during 1957 balloon ascent.

endeavor with the NACA, Navy, and the aircraft industry. After North American completes flight tests to demonstrate structural integrity and satisfactory performance of the propulsion and control systems, ARDC will establish the plane's maximum speed and altitude and obtain data and experience required to design future weapon systems.

Continuing research and testing can be credited—in addition to pilot skill—for the official speed record (1,404.19 mph) chalked up by Capt. Walter W. Irwin last May 16 in a Lockheed F-104A.

Congress has appropriated several millions of dollars to further projects designed to put man into space. ARDC is working on preliminary phases of these projects.

Eventually, the Minuteman system of missiles will replace the 5,500-mile-range Atlas and Titan ICBMs. Unlike the liquid-propelled Atlas and Titan, Minuteman will feature a solid-propellant fuel.

Subject clad in Air Force MC-2 high-altitude suit is readied for high-speed ride on rocket sled at Edwards AFB, Calif. Test will subject rider to terrific shock of windblasts.

Meanwhile, the Atlas has been undergoing flight tests at ARDC's Air Force Missile Test Center, Patrick AFB, Fla., since June 1957. The two-stage Titan, potentially superior to the Atlas both in range and payload, is scheduled for flight tests late this year.

Flight testing of the Martin Mace, successor to the Matador (already deployed in Europe and Formosa), began on September 25, 1957. Flight tests run through a controlled air corridor from ARDC's Air Force Missile Development Center near Alamogordo, N. M., to a preselected area some 650 miles away at Wendover AFB, Utah.

The Hughes Falcon, a 100-pound, six-foot, solid-propellant missile, homes on target either electronically or by infrared means. It became operational in March 1956.

Genie, an atomic air-to-air rocket developed by ARDC, was placed in the Air Defense Command weapons inventory in January 1957. Continued progress is being recorded on two decoy missiles—the air-launched Quail and the ground-launched Goose.

The supersonic air-to-surface Hound Dog, capable of carrying a nuclear warhead hundreds of miles, already is under development on a high-priority basis for eventual use by SAC.

Rascal, an air-to-ground guided missile, was launched recently by SAC's Rascal training unit to target from a distance of seventy-five miles. The rocket-powered, thirty-two-foot-long, four-foot-in-diameter, high-altitude, high-speed missile is fitted with a nuclear warhead.

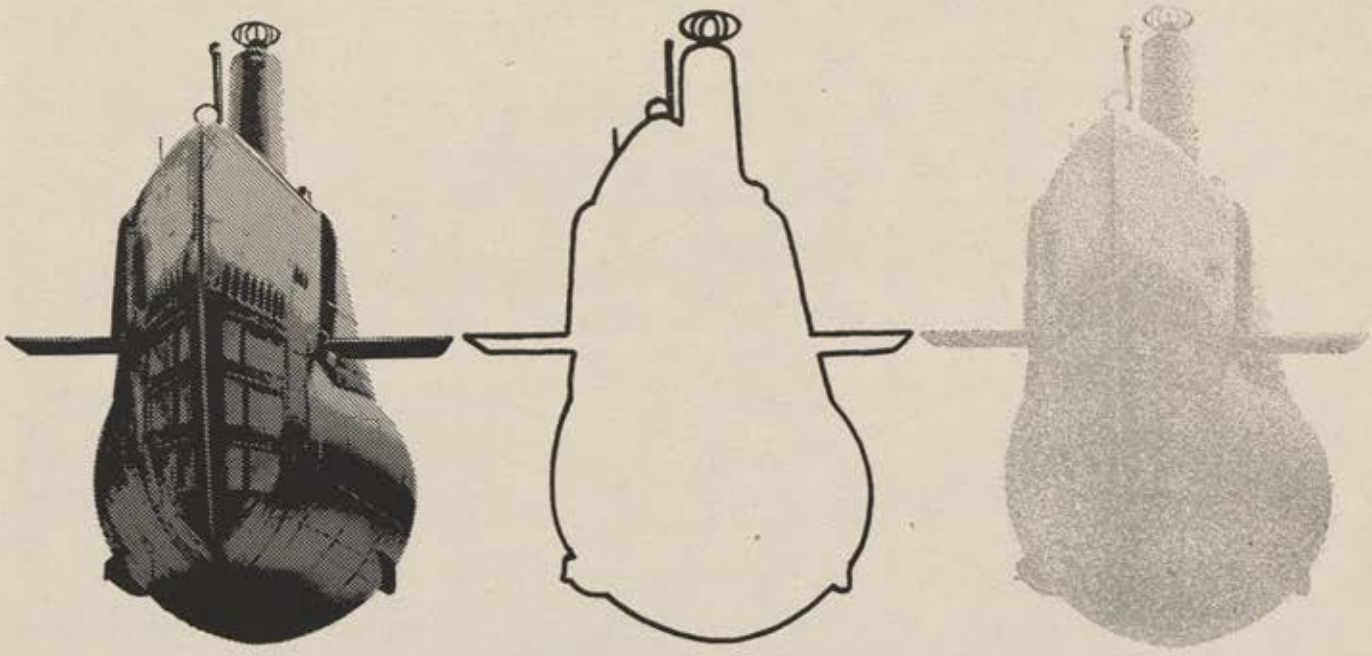
Now in production, the 250-mile-range, 15,000-pound Bomarc is designed to engage and destroy an oncoming enemy far from target. The first Bomarc Training Unit—the 4751st Air Defense Missile Wing—was activated in January of this year at the Air Proving Ground Center, Eglin AFB, Fla.

The Thor IRBM, now in production, first was flight tested early in 1957 at AFMTC. Thor operational squadrons will deploy overseas late this year.

Snark, intercontinental, air-breathing missile, was assigned to SAC's first Snark missile unit last year. In tests conducted at AFMTC, the missile was successfully fired down the 5,000-mile range and impacted with predicted accuracy onto a predetermined target near Ascension Island.

The sole, unchanging objective of military strength is to bend a potential or actual enemy to your will. If he can be influenced to pursue peace because he fears defeat, the objective is obtained. This is ARDC's mission.—END

in antisubmarine warfare, it has to be . . .



YES or NO . . . not MAYBE!

It takes a lot of faith in your radar, sonar and/or magnetic detection equipment to leave an area with a "clean" stamp . . . even more faith than it takes to believe the blip that shouts "sub below." Such confidence-building equipments are not developed overnight . . . indeed, the technology spawning this gear at Texas Instruments dates back nearly thirty years to similar techniques in pinpointing subsurface mineral wealth. Since its entry into this complex field, TI has supplied literally thousands of detectors to the free world's navies . . . *operational* means of locating, tracking, and triggering counter-attacks against the subs that swim the sea.

For detailed information on operational as well as advanced ASW gear now under development, properly cleared military or industrial personnel write or wire for appointments to: SERVICE ENGINEERING . . .

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NAVTAC: "Pipeline" to a happy landing

The uniqueness of the new NAVTAC en route navigation and instrument landing system by Stromberg-Carlson is in its *combination* of functional modules.

The NAVTAC equipment is an assembly designed to provide high-performance aircraft with the TACAN navigational aid, plus marker beacon receiver, glide slope and runway localizer for instrument landing situations.

The entire system is packaged in a compact unit only 5" high, 10½" wide, 22" deep, and weighing only 47.5 lbs. Individual modules can be separated up to distances of several feet without any adverse effect on performance.

The equipment is designed to meet the rigorous environment of the high-performance aircraft of today and tomorrow. Its operating ambient temperature range is −60 to +125 degrees C. at altitudes up to 70,000 feet. Widespread use of semiconductors in the ILS receivers and TACAN circuitry means high reliability, small size and low power consumption.

Included in the design is the capability of performing complete preflight confidence tests with the use of a small auxiliary test set.

Complete technical details on the NAVTAC system are available on request.

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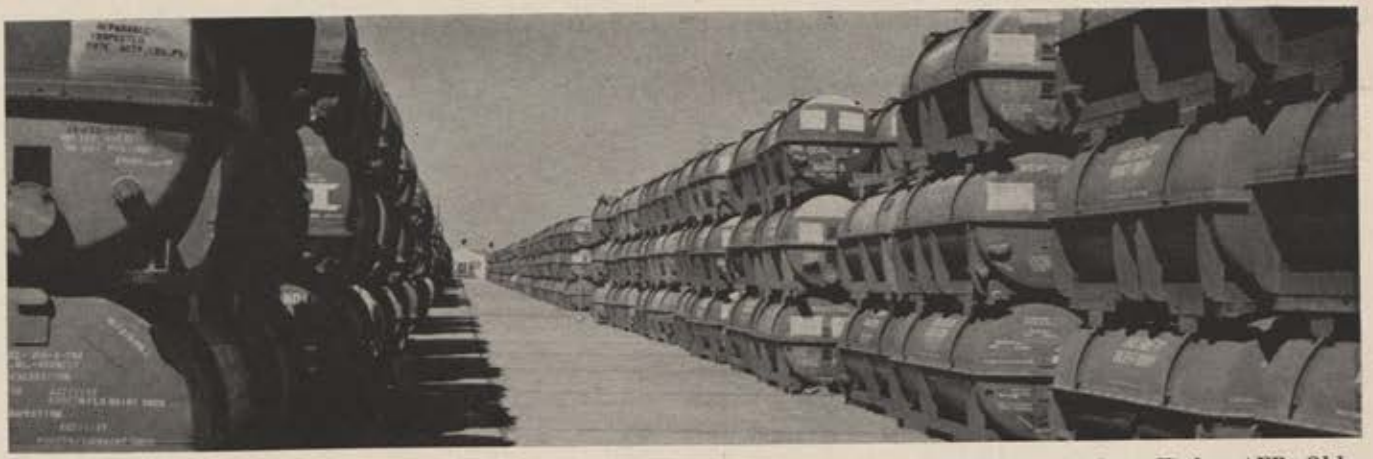


Plenty of power. Jet engines, powerplants of the Air Force's global fleet, are ready for shipment from Tinker AFB, Okla.

• AIR MATERIEL COMMAND

Worldwide Warehouse

HUB of the Air Force's worldwide procurement, supply, maintenance, and distribution activities is Headquarters Air Materiel Command (AMC), Wright-Patterson Air Force Base, Ohio. Gen. Edwin W. Rawlings is Commander of AMC, and Lt. Gen. William F. McKee is Vice Commander.

Air Materiel Command buys, stores, transports, and maintains the aircraft and equipment used by the Air Force. The command also buys the equipment for more than thirty nations in the Mutual Assistance Program.

It is AMC's job to provide the proper logistic support to maintain the Air Force's globe-scattered combat forces in a state of readiness. Its procurement, supply, and maintenance operations provide a vital logistics link between Air Force research and development and combat units.

Principal organizational components of AMC are its directorates—Plans and Programs, Procurement and Production, Supply, Maintenance Engineering, Transportation and Services, and Personnel and Support Operations.

In the field, there are eight Air Materiel Areas for major supply depots in the United States, six depots (four of which are closing), an Air Materiel Force in Europe, and another in the Far East.

The Directorate of Procurement and Production is the buying organization of the Air Force. Specifically, the directorate procures, produces, plans, schedules, budgets, and supervises the Air Force's aerial weapons under the best possible conditions. Further, it makes sure that this country's aviation industry continues to produce these weapons so that they are available in time to meet any aggressor's challenge. The Director is responsible for successful completion of all Air Force purchases anywhere in the world. This includes procurement and production of more than twenty-five separate weapon systems, as well as the engines, armament, and equipment which make these airplanes combat ready, and the nuts and bolts that hold the components together.

The directorate is AMC's link with American industry. Its buyers, contractual specialists, engineers, lawyers, and management executives are in direct daily contact with industry. Procurements in fiscal year 1957 totaled about $9 billion.

Air Materiel Command has more than 15,000 active prime contracts with about 3,200 companies, many in the small business category. In turn, these prime contractors subcontract a considerable part of their work, thus spreading the Air Force dollar among all segments of the industry.

The directorate at Headquarters AMC buys complete weapon systems and major components, such as engines, propellers, navigational and communications equipment, and items requiring extensive engineering. Under decentralization, Air Materiel Areas and Air Force depots buy items in their assigned property classes, for which the AMAs and depots have primary supply and maintenance responsibility.

Local purchase includes several thousand items formerly procured, stored, and issued centrally, as well as housekeeping and off-the-shelf items. More than 250 air bases in this country and overseas spend about a billion dollars this way each year. Offshore procurement is Air Force procurement money spent outside the continental limits of the US.

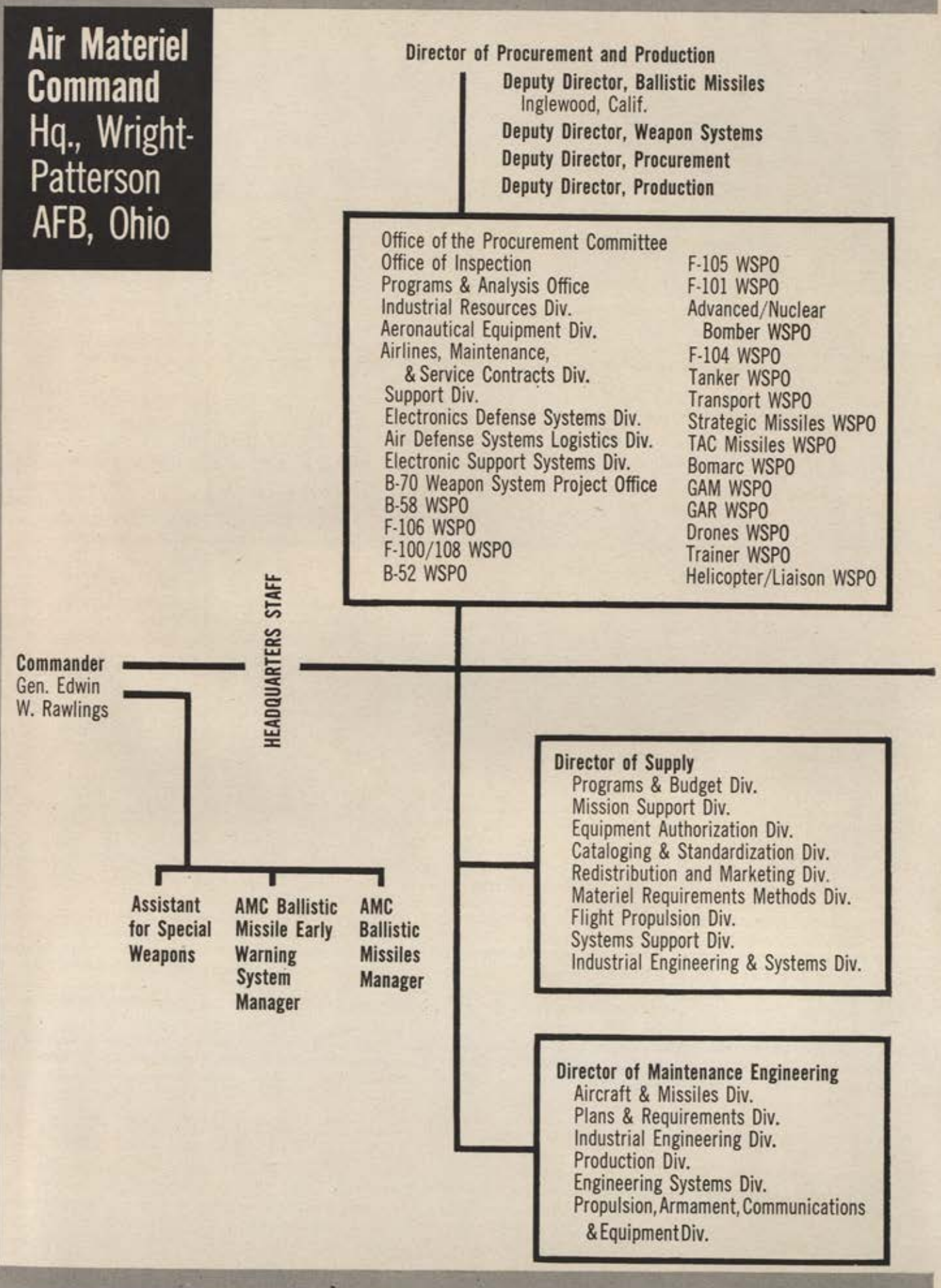
Packaging and delivery of supplies is the job of AMC's Directorate of Transportation and Services. Supplies and equipment must be protected against deterioration and physical damage regardless of climatic or other hazards throughout the world, with emphasis on packaging for airlift.

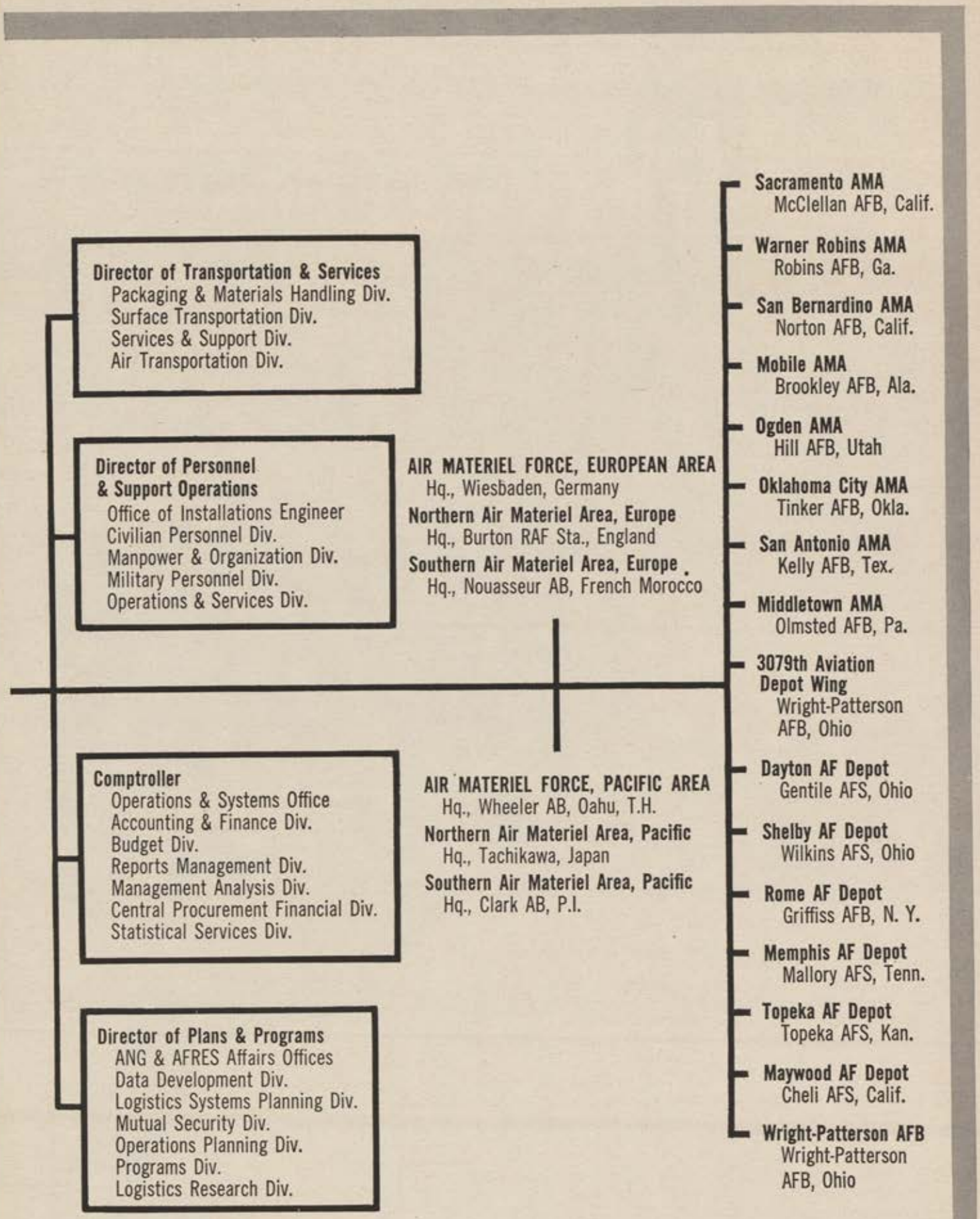
AMC Supply is a worldwide system equipped to furnish any one or all of 1,400,000 different items to any Air Force activity in the world. AMC is the warehouse for the Air Force.

During the past year, a new concept of supply management has aimed to manage and support the Air Force's modern, expensive, and complex weapon systems more effectively. Its basic objectives are to provide: rapid re-

(Continued on page 151)

Air Materiel Command Hq., Wright-Patterson AFB, Ohio

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Packaging & Materials Handling Div.
Surface Transportation Div.
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Office of Installations Engineer
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Manpower & Organization Div.
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Hq., Burton RAF Sta., England
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Hq., Nouasseur AB, French Morocco
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Northern Air Materiel Area, Pacific
Hq., Tachikawa, Japan
Southern Air Materiel Area, Pacific
Hq., Clark AB, P.I.
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Warner Robins AMA
Robins AFB, Ga.
San Bernardino AMA
Norton AFB, Calif.
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Brookley AFB, Ala.
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Hill AFB, Utah
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Tinker AFB, Okla.
San Antonio AMA
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SYSTEMS FOR GROUND SUPPORT, MISSILES, AIRCRAFT

sponse to needs of tactical units; preciseness in materiel management; and economy in the inventory.

Under this concept, a supply manager is designated for each new weapon system. Although limited at present to materiel support for a specific weapon system, the scope of the manager's responsibilities is gradually being extended to provisioning, requirements computation, cataloging, and related areas.

Another major activity of the directorate is the disposal program, handled by the Materiel Redistribution and Marketing Division. AMC's disposal program not only enables the Air Force to get back part of the original cost of obsolete and excess materiel, but also clears vitally needed warehouse space for storage of new equipment.

Another supply program of importance is Hi-Valu, designed to tighten procurement and distribution controls of the relatively few high-cost items which account for the major portion of the dollars spent.

As a result of the Hi-Valu program and other modernized concepts in AMC management, money for aircraft spares requested of Congress in the past five years has been reduced from forty-three to 23.5 percent of the total aircraft program. This means a reduction in requests for appropriations from Congress of $6.3 billion during the past six years.

In 1957, it appeared timely to consider the other side of the coin. The price of labor in relation to the cost of low-value items, and the Air Force effort to reduce manpower, demanded that AMC apply a different type of management to such items. AMC simply cannot afford to spend too much time and effort in keeping track of them.

In 1957 there were 68,000 AMC maintenance engineering personnel in the continental United States. In charge of this activity is AMC's Directorate of Maintenance Engineering.

Generally, Air Force maintenance engineering falls into two categories: technical support and production support. Technical support consists of advice on maintenance, as well as programming for modernization and maintenance engineering logistic support of all Air Force and Mutual Assistance Program equipment. To keep servicing information up to date, AMC administers more than 25,000 separate transactions annually in preparing and publishing technical instructions.

On the production side—actual overhaul of equipment—AMC annually processes about 35,000,000 items through its depot maintenance shops. Approximately 12,000 aircraft and 35,000 aircraft engines are modernized and overhauled each year in AMC depots and commercial facilities.

Current Air Force policy is to use existing depot facilities for selected workloads most vital to the Air Force mission—support of first-line weapons, and work which does not lend itself to contract. The depot facilities can be rapidly expanded to multiple shifts. Contract facilities are used for overflow workloads, work on selected aircraft, repair of commercial items, and for the analytical overhaul by prime contractors of selected equipment. More than one-third of the AMC depot maintenance dollar is being spent for contractual services.

Many improvements have been made in maintenance engineering. AMC's support of Strategic Air Command's Emergency Plan, initiated by Maintenance Engineering in 1955, has been tested and improved. Mobile maintenance teams travel over the globe, and special alert teams are ready to keep SAC aircraft operational at all times.

The Directorate of Personnel and Support Operations has staff supervision over all personnel matters, including administration and training of both military and civilians.

In view of the billions involved, another main cog in AMC is the Comptroller. His office sees to it that AMC's huge appropriation is put to work in businesslike ways. His big job is studying and applying better business methods. He is General Rawlings' principal adviser on management principles, practices, and techniques. The UNIVAC computer at Headquarters AMC is under his control.

The Directorate of Plans and Programs functions as a central planning organization.

The directorate prepares AMC plans and programs for the materiel support of aircraft and missiles in combat units, and the command or management structure, physical structure, and data flow structure. It also develops AMC internal emergency plans and plans for the logistics support of combat or other forces.

The directorate's Operations Planning Division prepares AMC capabilities, objectives, and operational plans for emergency use as well as current plans.

The Programs Division obtains, develops, and disseminates program data and associated materiel policy guidance.

The Data Development Division plans the logistic data system. The Logistics Systems Planning Division provides plans and planning direction, with principal emphasis on long-range planning.

Mechanical aids like UNIVAC, here being operated by civilian at Hq. AMC, Wright-Patterson AFB, speed procurement.

The Logistics Research Division investigates new techniques and electronic devices in conjunction with consultant firms.

A modernized industrial quality control system has been established within AMC. Keeping the system parallel with developments in design, production, maintenance, and supply is the work of the Quality Control Staff Office. On a policy level, this coordinates and integrates all quality control activities.

Its activities are directed toward preventing defects, detecting unsatisfactory trends, conserving materiel, manpower and equipment, and collecting data for management.

Air Materiel Command is revamping its entire supply and transportation systems to keep pace with the military demands of today. Its aim is to have so many details ironed out in advance that Air Force units throughout the world will have what they need when they need them. At worst, Air Materiel Command wants such items available within a few days—not months as so often in the past.

There were two causes of the age-old delays. One was obvious—the lack of adequate transportation. The other was not so evident—the maze of paper work required.

(Continued on following page)

Airlift of supplies was instituted by AMC to solve the transportation problem. LOGAIR, the domestic Air Force airlift system, is a scheduled contractual airlift to more than seventy AF bases in the United States. More than half of the cargo consists of aircraft engines and spare parts.

The bulk of AF cargo, about eighty percent, still moves via surface means. But AMC's Directorate of Transportation and Services is making surface transportation speedier than ever. LOGLAND, a consolidated pool distribution truck system, operates in the United States. LOGSEA handles water-borne cargo in both military and commercial vessels.

Perhaps the biggest step in speeding up supply paper work was the installation of transceivers for overseas and domestic service during 1955.

This equipment began operation between Dayton, Ohio, and Newark, N. J., April 1, 1955. By November 1955, transceivers connected by leased telephone lines had been installed at all Air Materiel Areas, Air Force depots, and logistic control groups in the United States. Service was extended overseas in 1956, with transceivers operating in France, England, Morocco, Panama, Alaska, Philippines, Hawaii, Guam, and Japan, and transmitting to the United States by radio. The AMC transceiver network is controlled by the Transceiver Control Station, Tulsa, Okla.

The new equipment is reducing transmission pipeline time for ordering supplies from weeks to a few hours. From five to ten punch cards can be transmitted per minute on each transceiver. Electronic impulses from card impressions are transmitted hundreds or thousands of miles to another transceiver which produces duplicate cards.

The Air Force expects transceivers and airlift to reduce costs substantially by cutting transmission pipeline time. Supply inventories will consequently be reduced.

Best of all, a combination of transceivers and airlift can place the necessary supplies in the hand of the user—AMC's "customer"—within a few days, even though the customer is in the Middle East or the Far East.

What transceivers are doing in communications, other electronic machines are accomplishing in data-processing. Here is the background area in supply paper work, unseen by the squadrons in the field, but essential to AMC's work. As orders pour in, AMC must see to it that sufficient quantities of supplies are on hand at its depots in order to avoid delay.

Since there are some 1,400,000 items in AMC's supply lines, only electronic machines can do the detailed statistical work.

Air Materiel Command launched an electronics data-processing equipment program with installation of a UNIVAC at Wright-Patterson in May 1954.

Today, eight large-scale electronic computers have been installed at six AMC depots in addition to the headquarters, and by the end of fiscal year 1959, similar equipment is planned to be installed at all the remaining depots in the United States.

Of the machines so far installed, four are IBM 705s. The fifth is an IBM 702. The other three are UNIVACs.

All the equipment so far mentioned are tape-reading machines. The program also calls for twenty-two Random Access Memory devices, or medium computers, such as the IBM 650 RAM and UNIVAC File Computer, to be installed by the end of fiscal year 1959 at all depots and at Headquarters Air Materiel Command. Their primary purpose is to provide a high-speed, flexible, dynamic data flow system.

Using these new techniques, it is now possible to state with timeliness and accuracy how many engines of a certain type are in the Air Force inventory by location and condition, worldwide. This is being done at Oklahoma City, where worldwide engine records are maintained on the IBM 702 and daily management reports are being produced—containing information that is never more than a few days old.

Knowing how many engines are on hand, and how long they will last, makes it far easier for supply managers to know how many more to buy. How long they will last is determined by actuarial tables.

Simultaneously, this same data is used in overhaul requirements computation, and in better projection of requirements for spare parts. While no estimate of the reduction in costs achieved in these fields alone has been made, it runs into many millions of dollars.

Thus, while the primary purpose of the electronic data processing equipment has been maximum combat support, AMC management believes that the machines are more than "earning their way" in reduced inventory requirements, on which future purchase is based.

All of this equipment is leased and there is no plan for purchase, at least through fiscal year 1960. In rentals, AMC expects to pay about $12 million during the current fiscal year.

In addition, the machines are expected eventually to more than pay their own way in reduced clerical costs. By fiscal year 1960 the expanded electronic machine program will require about 2,000 personnel, systems analysts, machine programmers, and operators.

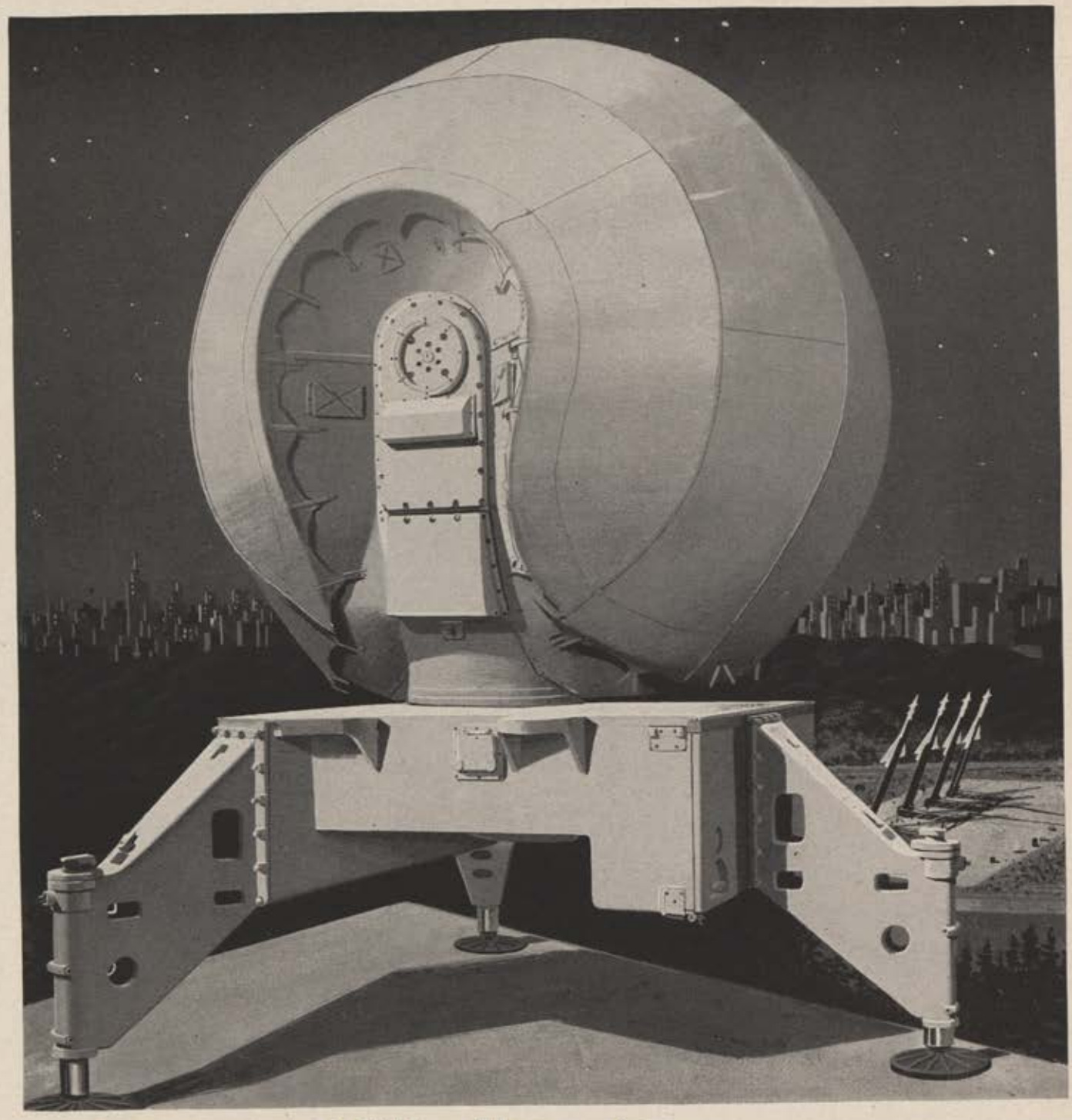
The advent of missiles into the Air Force inventory has resulted in some realignment and readjustment of command operations. In December 1957, the command announced that most of the resources of the San Bernardino Air Materiel Area will be used to support the ballistic missile program. One of the largest and most modern electronic data-processing centers in the Air Force has been constructed at San Bernardino for this purpose.

San Bernardino's computer center will be connected by a high-speed communications network with all other AMC installations, all major industrial facilities, and all launching sites. Thus elements associated with the production, support, and operation of the ballistic missiles force will be involved.

Maj. Gen. Benjamin I. Funk is Ballistic Missile Manager for AMC, with offices at Inglewood, Calif. He reports directly to General Rawlings, and is authorized to contact the Air Staff directly on problems which need to be resolved immediately.

Rapid technological advances have resulted in major structural changes in the command during the past year. Four depots and seven storage sites in the United States are being closed out (two storage sites already closed), as part of the "improved zone of the interior logistics program." Two depots in Europe are in the process of being closed as part of an improved overseas program, with Air Force units in Europe obtaining their support direct from depots in this country or from overseas sources. Similar plans have been approved for Pacific depots. The total program looks forward to the time period beyond 1962 and the logistics complex required then to keep the supply system in tune with:

- The changing nature of weapons with the consequent change in war planning and in the character of the forces.
- More rapid methods of providing more responsive supply support.
- Changes in composition of war stocks.
- Location of critical war stocks at the point of intended use, as distinguished from large depot reserves.—END



big ears of Nike Hercules

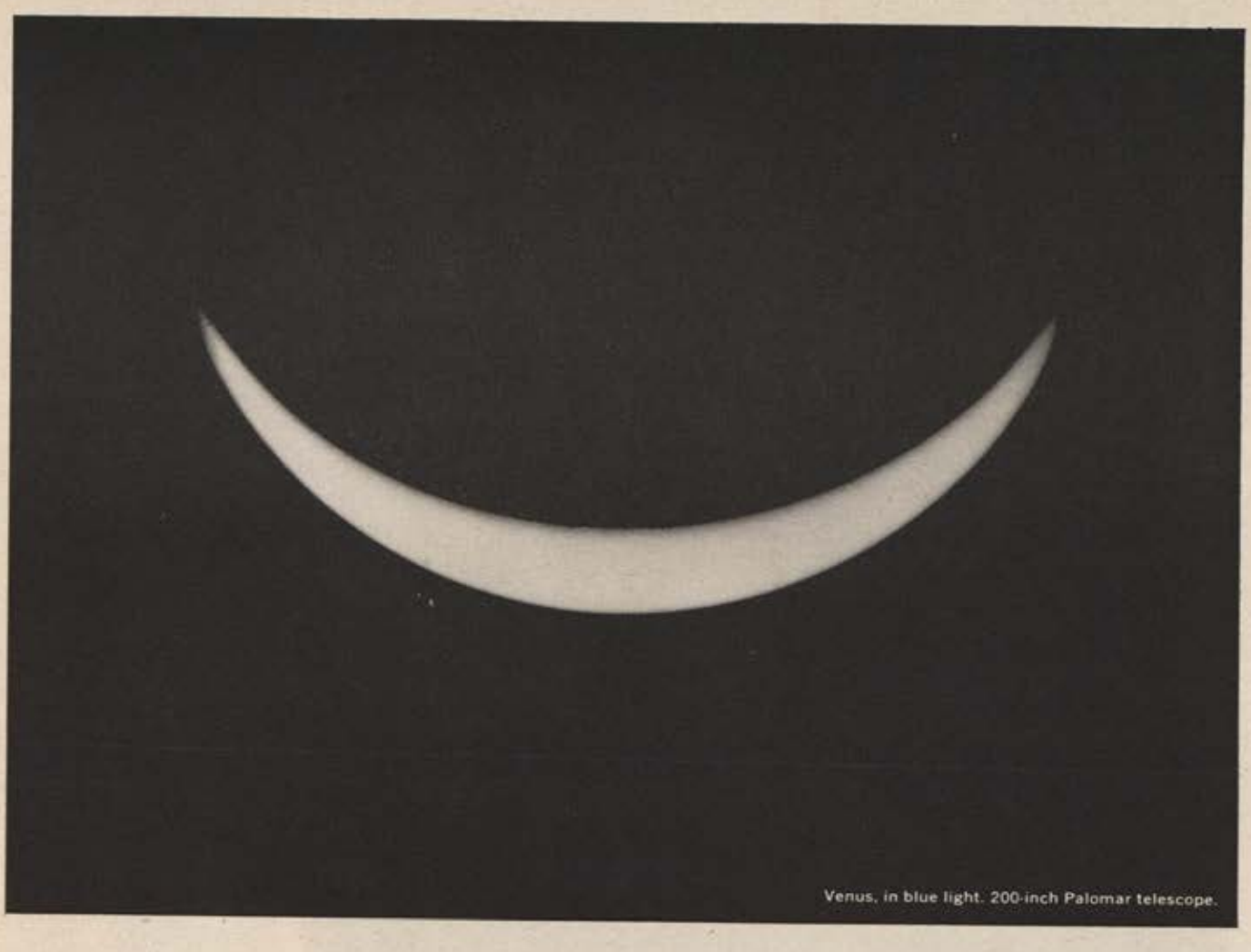
Mounts for radar antennae used by the U. S. Army's Nike Hercules to track aerial intruders and guide the deadly Nike missiles that strike them from the sky are products of the integrated manufacturing and engineering skills of Kelsey-Hayes, working in close cooperation with Western Electric. Capabilities range from prototyping to final production. The Speco Division is one of seven Kelsey-Hayes Divisions devoted to the production of aircraft and missile components.
Kelsey-Hayes Company, General Offices: Detroit 32, Michigan.

Nike Antenna Mount produced by Speco Division of Kelsey-Hayes requires over 2,000 individual parts, many of which are machined to a tolerance of less than two ten-thousandths of an inch.

KELSEY-HAYES

AVIATION DIVISIONS, KELSEY-HAYES CO., DETROIT 32, MICHIGAN

18 PLANTS: Detroit and Jackson, Michigan; Los Angeles; McKeesport, Pa.; Springfield, Ohio (Speco Division); Utica, New York (Utica Drop Forge & Tool Division); Davenport, Iowa (Farm Implement and Wheel Division); Philadelphia (Heintz Division); Clark, New Jersey (New Jersey Division); Windsor, Ontario, Canada.



Venus, in blue light. 200-inch Palomar telescope.

SPACE FLIGHT and NUCLEAR PROPULSION

A drastic reduction in vehicle mass ratios... substantially increased specific impulse values... a capability for achieving very high speeds... these are some of the significant advantages that will come from the application of nuclear energy to space flight.

A number of different propulsion systems have been proposed to utilize nuclear reactions. The simplest system consists of a fission reactor through which the propellant is passed, heated, and then expanded through a rocket nozzle. Fission reactors can also be employed as a source of energy to generate electric power, which in turn can be used to accelerate ions or charged particles, or to create and accelerate a plasma. And fusion reactors, when developed, can be used to generate electric power for the same purposes. In addition, in the case of the fusion reactor, there is the attractive possibility that the reaction energy can be used directly without conversion to electric power.

The fission-powered thermal propulsion system will probably constitute one of the next major advances in space technology. As an example of the gain which can be achieved, consider a vehicle with a payload weight of about 25 tons for a manned flight to one of the nearer planets, landing, and returning. Powered by chemical rocket engines, the takeoff weight for such a vehicle would be 50,000 tons. But powered by a fission-thermal propulsion system, weight at launch would not exceed 500 tons... a 100-fold reduction in the mass ratio. Considerably greater gains are predicted for the more advanced systems.

Systems studies and advanced research in the application of nuclear energy to the requirements of space flight are in progress at Space Technology Laboratories. This work illustrates the emphasis at STL on the exploration and development of new concepts and techniques in ballistic missile and space technology.

Since 1954, Space Technology Laboratories has been providing over-all technical direction and systems engineering for the Air Force ICBM-IRBM programs. Both in support of this responsibility and in anticipation of future system requirements, the Laboratories are engaged in a wide variety of advanced research and experimental development projects (as distinct from development for manufacturing, in which STL is not engaged). These activities are directed toward the exploration of new approaches in space vehicle electronics, aerodynamics, hypersonics, propulsion, and structures.

SPACE TECHNOLOGY LABORATORIES

A Division of The Ramo-Wooldridge Corporation

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Military passengers board a MATS C-118 at Charleston AFB, S. C. They're on their way to North Africa and Europe.

• MILITARY AIR TRANSPORT SERVICE

Delivering People, Goods

THE Military Air Transport Service began the second decade of its history on June 1, 1958. Its primary mission is to place troops, supplies, and outsize equipment anywhere in the world in support of the strike forces. Although MATS has undergone major internal changes during its first ten years, this mission has remained unchanged.

Lt. Gen. Joseph Smith, who commanded MATS for 6½ of its first ten years and was succeeded on August 1 by Gen. William H. Tunner, describes 1948-1958 as "a decade that shaped military air transport history."

General Smith stresses that MATS is a modern up-to-date system. "In the event of aggression, the ready and prompt ability to fulfill our mission may well be a vital factor. . . . Such a concept demands modernization with the latest technological advancements. Ten years of experience in this basic combat mission have enabled MATS to organize; to equip and to keep crews up to date and in step with the times. . . . MATS today is flexible, adaptable, and modern," says General Smith. "This has been the decade in which the dynamic nature of air logistics has been realized."

MATS, a major Air Force command, was formed by consolidating two wartime air transport agencies—the Air Transport Command and the Naval Air Transport Service. MATS cut its teeth on the famous Berlin Airlift. Both Air Force and Navy personnel and aircraft took part in the fourteen-month Operation Vittles to provide some 2,325,509 tons of food, fuel, and medicine to Berlin and her beleaguered population of 2,500,000 people.

MATS has demonstrated its capabilities in other dramatic airlifts—the Pacific Airlift in support of United Nations forces in Korea; the airlift of high-priority cargo and personnel during the construction of Thule Air Base in Greenland; Operation Wounded Warrior; airlift of United Nations troops and equipment to the Suez Canal Zone; and the Hungarian Refugee Airlift—Operation Safe Haven.

When the Korean War began in the summer of 1950, MATS was delivering approximately seventy tons of cargo to the Far East each month. Within three months, MATS transports were delivering up to 106 tons a day into Japan alone. The number of MATS Pacific Airlift planes increased from fifty Douglas C-54s to a total of 160 MATS trans-

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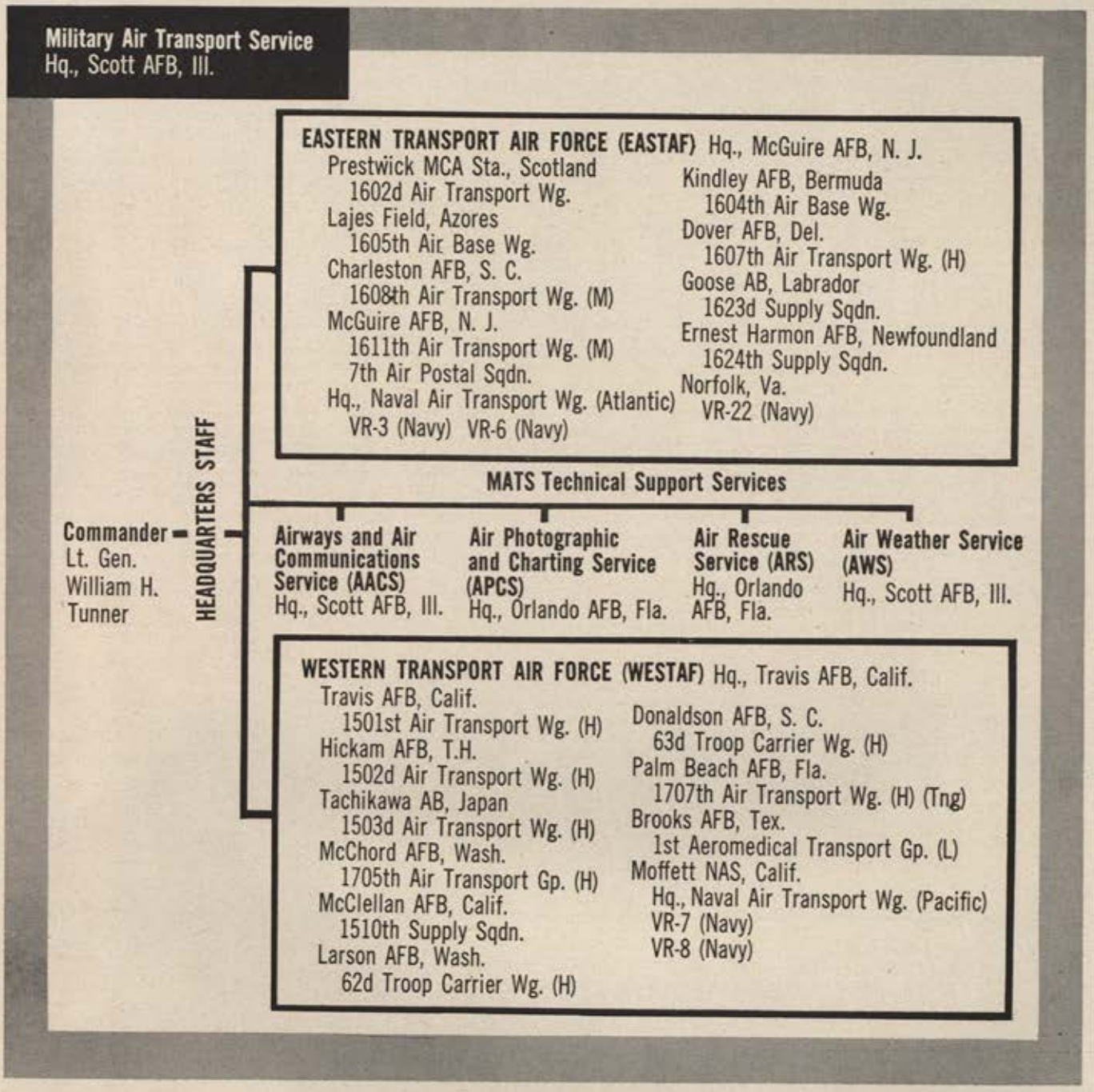
MILITARY AIR TRANSPORT SERVICE



ports, plus seventeen supplied by United Nations members and sixty-six leased from civil airlines. A total of 160,000 tons was airlifted in nearly 35,000 transpacific crossings before the Korean armistice was signed in 1953.

This Pacific Airlift proved that air transport into a combat theater is not a one-way proposition. The return airlift was used to bring home combat casualties and other military patients as well as passengers from all services. Ninety percent of all evacuations of Korean wounded was by air. The result: death rate from wounds was reduced from a World War II figure of four percent to lower than two percent. Medical air evacuation is now standard procedure.

In 1951 another rigorous test of MATS strategic airlift capability was the movement of personnel and materiel into Thule, Greenland. Moving bulldozers, power shovels, road graders, trucks, fuel, and, in one instance, a heavy crane, MATS demonstrated the potential of airlift into isolated areas. MATS has been credited with advancing the completion date of construction on the far northern base by a full year.

During 1954 MATS flew the longest aerial mercy mission in aviation history. More than 500 French troops wounded at Dien Bien Phu in Indochina were flown three-quarters of the way around the world in Operation Wounded Warrior.

In December 1956, the Hungarian Refugee Airlift Operation Safe Haven and the airlift of the UN police troops headed for the Suez area, once again proved that MATS was organized for D-day readiness. MATS flew 9,700 Hungarian refugees to America, including several thousand passengers carried by civil contract airlines.

During the past year, MATS was called on to deliver supplies and equipment in support of Operation Deep Freeze—airlift support for Naval Task Force 43 in the Ant-

arctic. Everything from the kitchen sink and a food mixer to a three-ton Weasel and a seven-ton tractor was dropped at the Antarctic base. Despite some of the worst weather and radio blackout conditions ever recorded, the drops were remarkably successful.

While the command is perhaps best known for its airlift role, MATS is not solely an air transport organization. There are other equally vital services within MATS—the Air Force technical supporting services:

● **Air Weather Service** (AWS) provides meteorological data on a global scale to US Air Force and Army units. Beginning in 1917 as part of the Signal Corps, AWS now has more than 11,000 men manning 330 weather stations in twenty-six countries throughout the world. A net of weather observation stations, both manned and automatic, is spread throughout the northern hemisphere. Also the Air Weather Service severe weather warning system, developed largely to enable aircraft to be moved from the path of dangerous storms, has been effective, with some adaptations, in warning the civil population of storms. Weather reconnaissance has added much to our knowledge of hurricanes and typhoons.

● **Airways and Air Communication Service** (AACS) transmits this mass of weather data. AACS also operates fixed aeronautical point-to-point and ground-to-air radio stations, airdrome control towers, electronic navigation aids, landline facilities and teletype stations, cryptographic sections and message centers. AACS operates more than 2,000 facilities from 250 strategic sites manned by nearly 27,000 military personnel.

As the installing and operating agency for the USAF's Global Communications Systems, AACS transmits an average of three million messages monthly.

Another significant MATS service is STRATCOM, a worldwide communications network installed by AACS. Although the STRATCOM became operational in 1956, this vast and complex undertaking has not yet been finished.

● **Air Rescue Service** (ARS) is most dramatic of the MATS services. With its motto "That Others May Live," ARS was organized primarily to save the lives of Air Force crews involved in aircraft accidents. ARS humanitarian emergency work ranges around the world, covering both military and civilian crises. Not long ago, for example, when Maj. Samuel Tyson brought his crippled MATS Stratocruiser into Hilo, Hawaii, on two engines, Air Rescue was there. Intercepting the Boeing C-97 while it was still several hours out, aircraft from the 76th Air Rescue Squadron at Hickam AFB escorted him all the way in to a safe landing.

ARS history is crowded with outstanding achievements. In recent months, Rescue directed all operations by units of the Department of Defense during the two great New England floods and the floods in California. Rescue also has led the fight against floods in Japan, Italy, England, Holland, Mexico, Costa Rica, and at home in Kansas and Texas.

One of the most decorated and honored units of the Korean conflict was a detachment of the 3d Air Rescue Group which completed 9,690 rescues within the combat area. Of this total, 996 United Nations personnel were rescued from behind the enemy lines. (For this work, the men of the 3d Air Rescue Group received the Air Force Association's Flight Trophy in 1953.)

● **The Air Photographic and Charting Service** (APCS) is the youngest member of MATS. Operating photographic and aerial mapping units throughout the world, this organization handles the over-all photographic requirements of the Air Force. More than 7,500,000 aeronautical charts are distributed monthly by APCS, from an up-to-date stock covering the entire globe.

MATS has an unparalleled safety record. In fact, military and civilian passengers on MATS scheduled flights are afforded worldwide accident insurance protection at regular commercial airline rates. In 1950 and again in 1954 MATS won the Daedalian Trophy for the lowest Air Force accident rate per 100,000 flying hours. Transport operations achieved a rate of only two accidents per 100,000 flying hours in 1954. In 1957, MATS had its lowest accident rate, with an over-all rate of 3.9 per 100,000 flight hours, and 1.08 per 100,000 hours in transport operations.

Specialized aircraft development, such safety devices as antiskid brakes and anticollision lights, improvements in navigational aids, communications techniques, and other equipment have all contributed to this outstanding record.

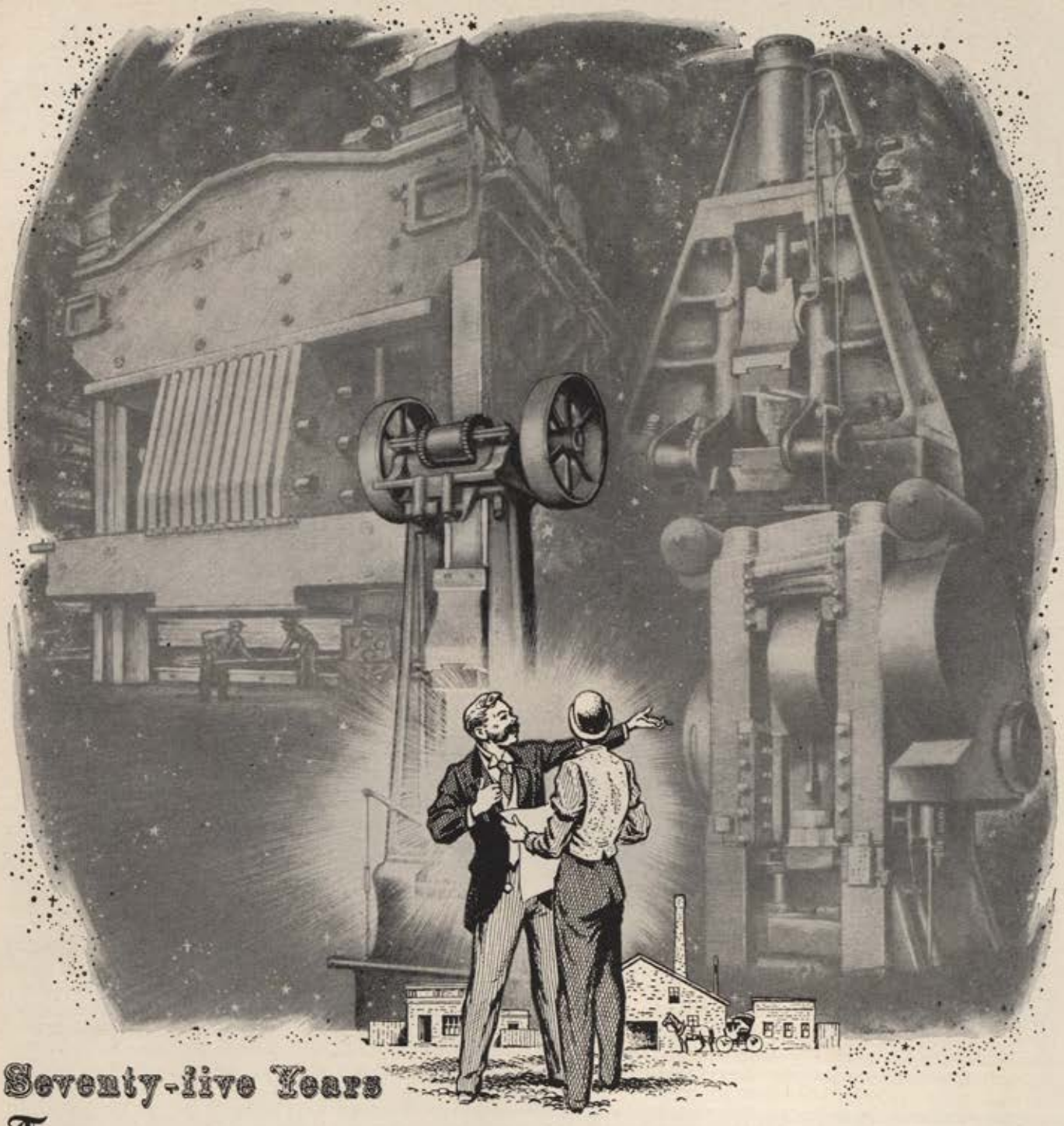
In 1948 MATS inherited, from Air Transport Command, bases designed to handle World War II situations and equipment. But situations were changing and equipment fading into obsolescence. For example, since the American continent "leans toward Europe," our Atlantic system funneled all traffic through a northeastern corridor. From Newfoundland, routes fanned out to take advantage of such island stepping stones as Iceland and the Azores. However, as early as 1948 engineers were designing aircraft with enough range to permit traffic to follow more direct routes. New bases on the Atlantic seaboard provide a more modern route structure, less vulnerable to knockout by the bombing of a few key bases. Dover, Del., was acquired April 1, 1952; McGuire, N. J., on July 1, 1954; and Charleston, S. C., on March 1, 1955.

Since October 1957 MATS has operated from headquarters at Scott Air Force Base, Ill., after nine years at Andrews Air Force Base, Md. From 1948 until last month strategic operations were executed by three transport divisions: the Atlantic, with headquarters at McGuire AFB, N. J.; the Continental at Kelly AFB, Tex.; and the Pacific at Parks AFB, Calif. But July 1958 saw this divisional responsibility revised. The Atlantic Division was redesignated Eastern Transport Air Force (EASTAF) and the Continental and Pacific Divisions were consolidated into the Western Transport Air Force (WESTAF) at Travis AFB, Calif. EASTAF took over all routes across the Atlantic and the Caribbean, with the headquarters remaining at McGuire. WESTAF retained all earlier responsibilities of Continental and Pacific Divisions, including domestic air evacuation.

Two men commanded MATS during the command's first ten years. First commander was Gen. Laurence S. Kuter, now Commander in Chief, Pacific Air Forces. He was succeeded in November 1951 by Lt. Gen. Joseph Smith, who retired this summer and was replaced by Gen. William H. Tunner. General Tunner had been MATS Deputy Commander for Operations under General Kuter.

MATS has entered the missile and space age with the latest in transport equipment. In 1948 the fleet was mainly composed of Douglas C-54 aircraft, but Operation Vittles graphically demonstrated the value of larger transports for strategic airlift. Over the years MATS has been gradually replacing obsolete aircraft with new planes designed for greater speed, range, and aircraft load—the Boeing C-97 Stratocruiser in 1949; the Douglas C-124 and R6D in 1951; the Douglas C-118 in 1952; the Lockheed R7V in 1953; the Lockheed C-121 in 1955; and in August 1957 MATS received its first swift, long-range turboprop—the Douglas C-133, which ushered in a new era in oceanic flight.

This is the Military Air Transport Service. Its transport divisions and diversified support services are potent factors in the maintenance of world peace.—END



Seventy-five Years

THERE WAS a growing surplus in the United States Treasury—the Polygamy Act was passed—letter postage was reduced from three cents to two cents—the Brooklyn Bridge was opened—standard time was adopted—in 1883, when two young men, just graduated from Worcester Polytechnic Institute, established the business bearing their names—WYMAN-GORDON. The total capital was $27,000.

Integrity, initiative, ambition and ability were theirs. Endowed with these qualities and privileged to operate under that unique American system of free, private, competitive enterprise the Company prospered and grew.

On this our 75th anniversary, we salute the spirit of our founders and we pledge our every effort to help preserve, against the steady erosion of the last quarter century, that system which has made our nation what it is today and which has enabled us to build the greatest industrial production in the world, resulting in the highest standards for all segments of our people.

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• CONTINENTAL AIR COMMAND

Administering Reserve Forces

FROM the standpoint of numbers of people affected by its mission, the Continental Air Command (CONAC) is one of the larger commands of the Air Force, with functions and responsibilities extending to Puerto Rico, Hawaii, and Alaska.

CONAC's main efforts are directed toward accomplishing two major segments of its multifunction mission. The first is the administration, logistical support, and training of the Air Force Reserve. The other is supervision of the training of the Air National Guard units and periodic inspections to measure the ANG's compliance with Air Force standards.

Among CONAC's other missions are: coordination of the efforts of all Air Force commands in domestic emergency operations; mobilization, in war and other emergency, of units and individuals assigned to CONAC; negotiations with naval organizations in matters pertaining to anti-submarine warfare in defense of the United States; constituting a single Air Force contact with continental Army commanders, sea frontier commanders, and civilian agencies; implementation of the National Search and Rescue Plan for the continental US; and providing finance services for the Air National Guard.

The Continental Air Command was activated on December 1, 1948, as a higher echelon superimposed upon the Air Defense Command and the Tactical Air Command. The First, Fourth, Tenth, and Fourteenth Air Forces of ADC, and the Ninth and Twelfth Air Forces of TAC were reassigned to command jurisdiction of Headquarters CONAC. Operational headquarters of both ADC and TAC were still maintained under the 1948 framework but with the sole function of planning, preparing, and conducting air defense of the United States and support of surface forces.

Tenth Air Force search and rescue team mission includes tracking the course of aircraft missing when such mishaps occur in its eighteen-state area. Group is part of CONAC.

Principal motives behind the 1948 organization were the need for a stronger air defense and the desire to create a more effective Air Force Reserve and Air National Guard. CONAC's primary missions in 1948 included air defense, tactical support, operational training of units and combat crews, and the USAF Reserve Forces.

In the summer of 1950 CONAC's six numbered air forces were reduced to four, each with its distinct geographic area of responsibility. The Korean War, with its emphasis on tactical aviation, brought about the reestablishment of the Tactical and Air Defense Commands as major air commands in December 1950 and January 1951, respectively. Thus CONAC was able to concentrate on the Air Force Reserve, the Air National Guard, and the AFROTC. The Command's mission area was expanded to include unit training, equipping, and preparing for overseas shipment of engineer aviation units assigned to the Air Force.

In 1952 the AFROTC program was transferred to the Air University, leaving the Air Force Reserve and the Air National Guard as CONAC's major mission areas.

In line with over-all reduction of Air Force strength during 1957 and beyond, CONAC set up an Air Force Reserve structure of three air forces and fifteen troop carrier wings in training. The Air National Guard Wing strength was set at twenty-four wings. Approximately 458,000 officers and airmen are today assigned to the Air Force Reserve, and the Air National Guard complement consists of about 69,000 men.

CONAC exercises regional functional responsibility through three major subordinate commands: the Fourth, Tenth, and Fourteenth Air Forces.

Headquarters CONAC are at Mitchel AFB, Hempstead, L. I., N. Y. Fourth Air Force maintains headquarters at Hamilton AFB, San Rafael, Calif., near San Francisco. Its area includes Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, and Washington.

Headquarters of the Tenth Air Force are at Selfridge AFB, Mount Clemens, Mich., near Detroit. Its area covers Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New

(Continued on following page)

Mexico, North and South Dakota, Oklahoma, Texas, Wisconsin, and Wyoming.

Fourteenth Air Force Headquarters are at Robins AFB, near Macon, Ga. Its area includes Alabama, Connecticut, Delaware, Florida, Georgia, Kentucky, Maine, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, New York, North and South Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, West Virginia, and the District of Columbia.

These numbered Air Forces administer two types of reserve training: Unit Training and Individual Training.

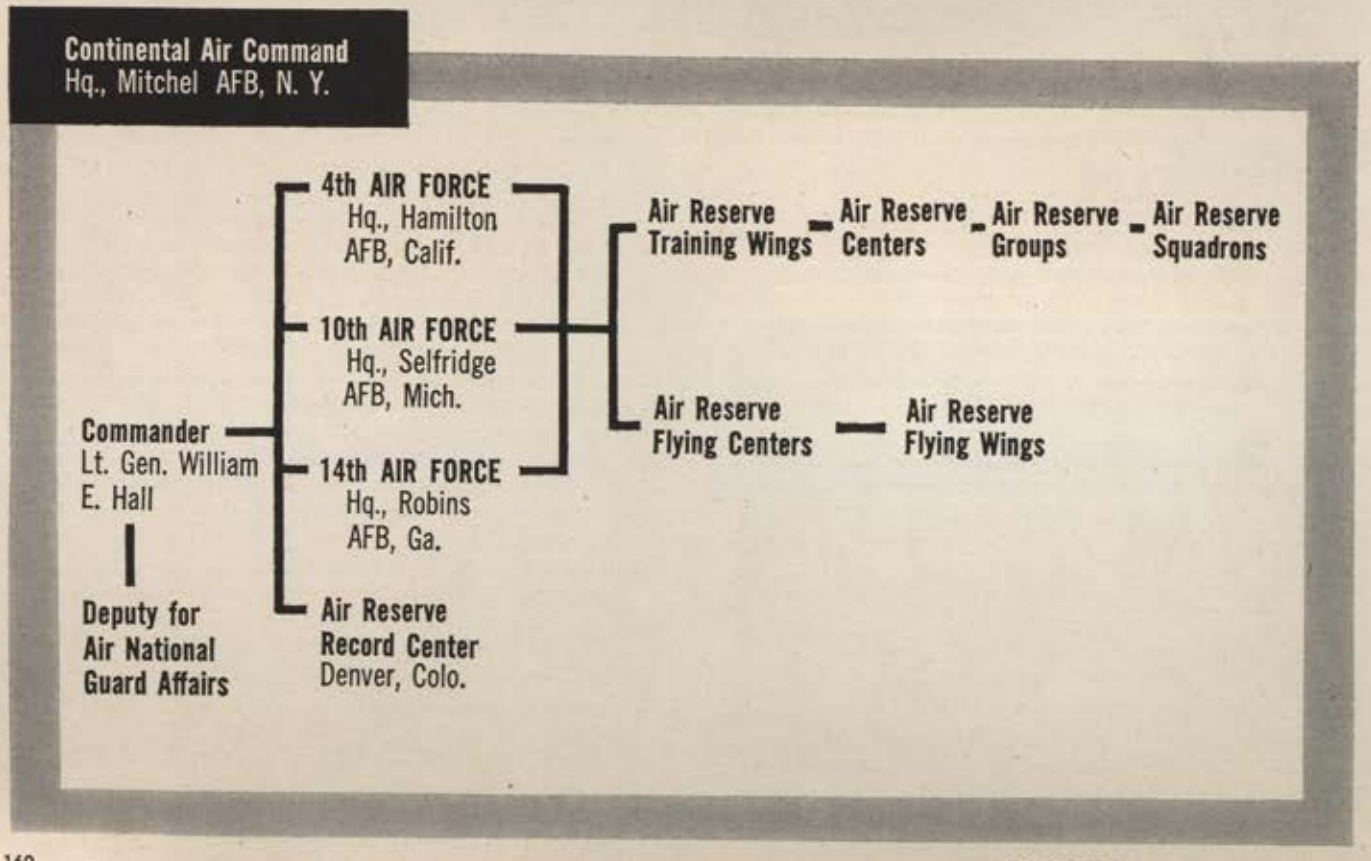
The Unit Training program is accomplished by Air Force Reserve Flying Training Centers reporting directly to the numbered Air Forces. Air Reserve Flying Centers monitor each of the Reserve's fifteen troop carrier wings. These flying wings are organized units with manning tables applicable to corresponding wings of the major Air Force gaining commands. As a result, Reservists in a Reserve Flying Training Wing can be integrated into gaining commands immediately since their training program is patterned after the training prospectus of the gaining command. At present the troop carrier wings are equipped with Fairchild C-119 aircraft. The 445th Troop Carrier Wing at Dobbins AFB, Ga., converted to the more modern Fairchild C-123s in late July.

Individual Training is accomplished in Air Reserve Centers in the larger cities. These organizations provide specialized training as well as administrative supervision and support for nonflying Air Reserve units and to discharge certain field responsibilities of the CONAC Air Force commanders. Since each numbered Air Force has a huge geographic area to serve, sixteen Air Reserve Training Wings have been created, each composed of about fifteen Air Force specialists with supervisory responsibility over four to seven Air Reserve Centers. Standardization of training, exchange of ideas, and quicker identification of problem areas should result.

Reservists learn air skills at class at Warren AFB, Wyo.

Under the Air Reserve Center concept, more than 300 cities and towns have Air Reserve Groups or Squadrons, whose members train at Air Reserve Centers. These represent the largest body of trained individual Reservists. The proficiency of the individual Reservist determines the amount and kind of training he will receive. Specialized courses are designed to increase an individual's proficiency in his career field. In addition career development courses are offered, designed to enrich the military background of the individual.

Recently, CONAC announced the activation of ten



Air Reservist performs vital maintenance on C-119 engine.

hospital units. With facilities for 6,000 bed patients, these units are located at Air Reserve Centers and Flying Centers throughout the country. The hospitals are being staffed with skilled medical Reservists.

The Air Reserve Records Center in Denver, Colo., is the repository of master personnel records of Reservists not in active military service and is the unit of assignment for Reservists not affiliated with Reserve training organizations. Many of these unaffiliated Reservists enroll in military correspondence courses prepared by the Air University.

Continental Air Command currently has a number of special activities, among them Operation Swift Lift, the biggest airlift ever undertaken by the Air Force Reserve. In this operation since April 1957 Air Force Reserve troop carrier crews have provided airlift assistance to the active Air Force throughout the continental US.

Flying around the clock, Air Reserve troop carriers have ferried military personnel and cargo for the USAF's Ninth and Twelfth Air Forces, hauled aircraft engines for the Air Materiel Command, and furnished airlift for the Civil Air Patrol and Air Force ROTC.

As of mid-May '58 Air Reserve troop carrier crews had completed over 500 airlift missions or about 1,000 individual sorties for the USAF. Some 7,500 passengers had been flown, approximately 5,000,000 cargo pounds airlifted, about 2,634,000 ton-miles flown, and some 9,000,000 passenger-miles traveled.

Using twenty-five troop carrier transports, Air Reservists have logged more than 14,000 hours on Swift Lift missions.

This has been accomplished without a single major accident—a contributing factor in Continental Air Command's receiving the Daedalian Trophy for the USAF's best flying safety record during 1957. CONAC achieved a new low flying accident rate of 6.2 per 100,000 flying hours last year.

In the summer of 1956, in Operation Sixteen Ton, the Air Force Reserve's second biggest airlift, Air Reserve troop carrier wings ferried nearly 1,000,000 pounds of equipment from Long Island to the Caribbean area, to assist the US Coast Guard establish a LORAN (Long-Range Navigation Aid) chain in the Caribbean.

In the Summer Encampment Program, some 18,000 Air Force Reservists manning the fifteen troop carrier wings are getting two weeks' active-duty training at Air Force installations throughout the country this summer. The Air Force Reserve is currently operating 596 aircraft. Of these, 562 are Fairchild C-119s, the balance being Curtiss C-46s. The C-119 conversion program is expected to be completed this fall, and introduction of the C-123 has already begun.

The Air Reserve Technician Program began in mid-May at some twenty-four Air Force bases. By October the ART program is expected to be under way at thirty-three bases. This program combines Civil Service employment with active Reserve participation.

The ART program is based on the need for a hard core of skilled, permanent Reserve personnel immediately available to the Air Force Reserve wings in emergency or national mobilization.

Along with assuring maximum combat readiness, the plan should save both manpower and money.

President Eisenhower's Air Coordination Committee in March 1956 designated the US Air Force the Search and Rescue Coordinator for the inland United States. The US Air Force assigned this responsibility over to Continental Air Command. The Search and Rescue (SAR) plan coordinates all military and civilian search and rescue facilities into a single agency, eliminating duplication.

Search and Rescue Coordination centers have been established at Mitchel Air Force Base, N. Y., Robins Air Force Base, Ga., Selfridge Air Force Base, Mich., and Hamilton Air Force Base, Calif. A fifth was activated at Dallas Naval Air Station, in June.

CONAC's Rescue Coordination centers have handled 612 search and rescue missions since June 1957, covering a wide variety of operations, from searches for downed aircraft to flood and hurricane disaster relief.

Some 23,642 flying hours have been logged on search missions. Over 11,484 sorties have been flown, and aircraft have been dispatched to aid 928 persons in distress —497 of whom were saved.

Another important CONAC mission is the supervision of training and inspection of the Air National Guard. CONAC provides Regular Air Force personnel to work closely with the Air Guard as air advisers. CONAC's three air forces are responsible for supervision of the Air Guard's units.

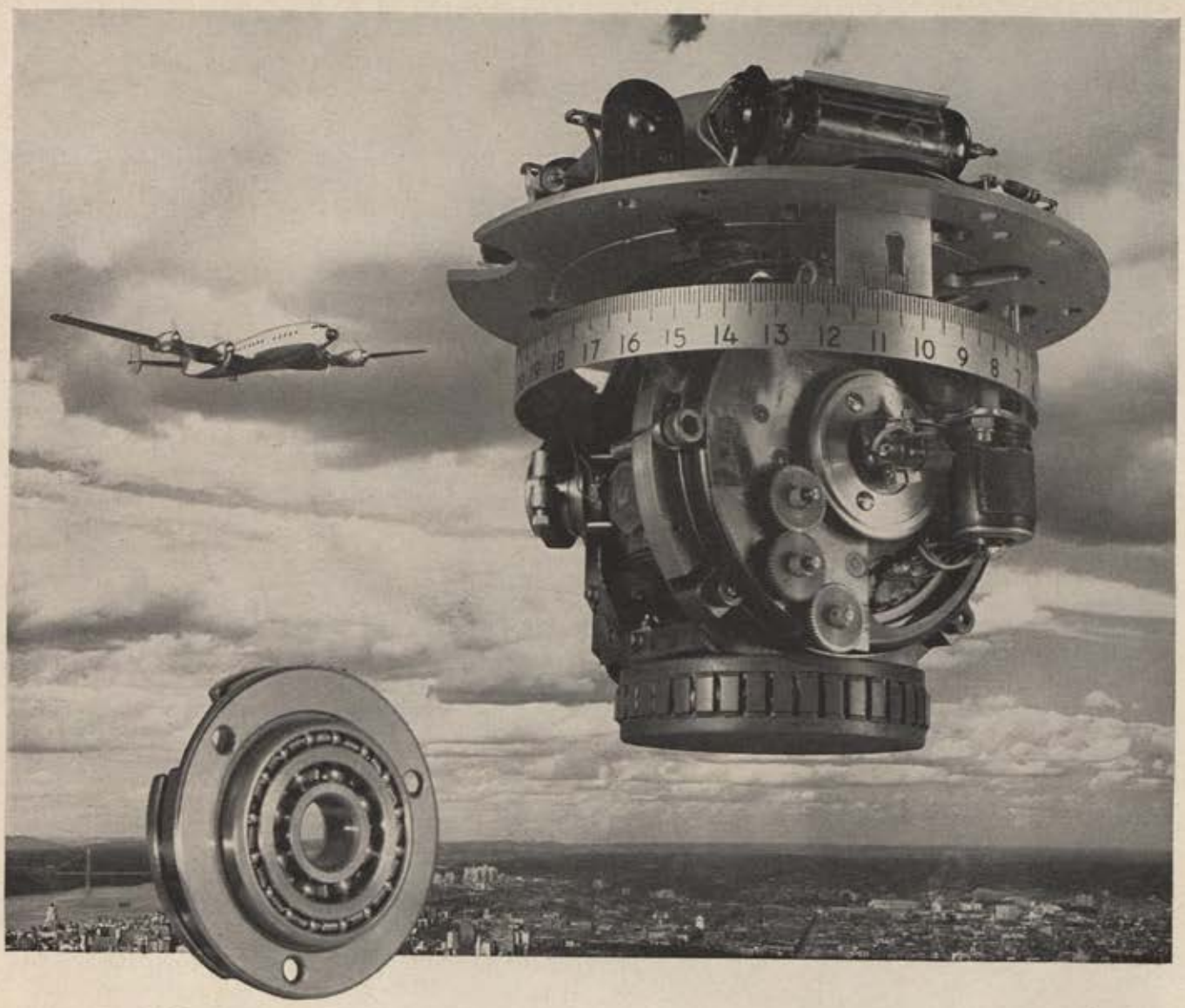
The ANG's twenty-four wings include twelve all-weather fighter-interceptor wings, eight day fighter-interceptor wings, and four tactical reconnaissance wings. The Guard also has four air resupply groups, four aeromedical transport squadrons, and one air transport squadron.

Jet fighters utilized by the Air Guard include Republic RF-84Fs, North American F-86s, Northrop F-89s, Lockheed F-94s—now being phased out—and North American F-100As. In addition the Air Guard operates Martin B-57s, Grumman SA-16s, Fairchild C-119s, and Douglas C-47s.

ANG's fighter-interceptor wings are being trained for Air Defense Command and Tactical Air Command mobilization assignment. Aircraft and crews of a number of ANG units are currently serving on alert status with regular interceptor units of North American Air Defense Command.

The Air Guard's ground units include Air Control and Warning, Airways and Air Communications, Weather, and Communications. These have mobilization assignments to major commands which have similar functional missions.

Continental Air Command also has important responsibilities of lesser scope: operation of special air missions, participation in the Air Explorer program, Armed Forces Disciplinary Control Boards and the Military Affiliated Radio System, and coordination of local defense with Civil Air Patrol units.—END



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New Departure created the special manufacturing techniques for the high precision production of these unique gimbal ball bearings. The Sperry Rotorace (TM) Gyroscope employs two of these bearings, each of which is actually two bearings, one concentric within the other. One outer race is fixed to the gimbal frame, while the other carries a light gear rotating it in periodically alternating directions, thus reducing random drift.

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NOTHING ROLLS LIKE A BALL

Men at the Ready

IT IS fashionable in some quarters to suggest that modern technology has made man unnecessary to the scheme of modern combat forces. The suggestion could not be further from the truth. Men will be needed for a long time to come—trained men, that is. And it is in this context that the Air Force Reserve exists today.

The Reserve program consists of two parts—individuals and units. But the objective is common: to provide *trained* manpower to the active-duty Air Force when, and if, it is needed.

The Air Force Reserve approach to this requirement is through fifteen flying training wings and eighty-two Reserve Centers, which provide the training for units and individuals. The fifteen flying training wings are being equipped with Fairchild C-119s and their mission is primarily one of logistic support. One of the fifteen wings will soon convert to Fairchild C-123s—a USAF first-line aircraft designed for air transport assault. The eighty-two Centers offer courses to more than 52,000 individuals, including some 20,000 Standby Reservists, in most Air Force career fields.

Since the Korean War, great progress has been made toward a stable Reserve program. This has not been easy. Decisions and policies have not always been received favorably and enthusiastically by all Reservists. But they were necessary to achieve a Reserve force with a true and immediate combat capability.

In recent years the 500,000 Reserve inventory has been screened and some 300,000 people retained on a Ready Status, who can be mobilized in a matter of hours.

An important step toward this capability was the establishment of the Reserve Records Center in Denver. Here are handled the master record files of all Reservists. And, despite the fact that the Center handles about 275,000 pieces of mail each month, most of it dealing with changes of address, the error factor in the address file is less than two percent.

The combat capability of the Reserve flying wings has improved markedly in the last year, while the accident rate decreased during the same period. Last year, Continental Air Command had the lowest accident rate in the Air Force—6.2 per 100,000 flying hours—and won the coveted Daedalian Trophy, awarded annually to the command with the best flying safety record.

The record was achieved while Reserve wings were transitioning from jets and Curtiss C-46s to C-119s. And, as every airman knows, transition time is the time most conducive to accidents.

Such a record must mean that Reserve crews are skilled and proficient. This is the result of a training program of live missions. No longer are flying time requirements met by grinding around in the local traffic pattern. Reserve units conduct "rodeos" where airdrops are made competitively in a pattern of precise navigation. Rescue units stand alert and have made several successful rescue missions. To date, Reserve crews have airlifted more than 8,000 passengers and more than 5,000,000 pounds of cargo while piling up more than 14,000 accident-free flying hours.

This kind of training by doing will continue. Reserve navigators, for example, assigned to navigation training squadrons are scheduled to receive overwater training to such places as Puerto Rico, Panama, and Bermuda.

Training by doing is also the theme of the effort in behalf of individual Reservists. The 1959-1960 war plan establishes a requirement for 46,476 officers and 132,668 airmen on an individual basis. Of this number 16,704 officers and 31,889 airmen are scheduled to be procured, trained, and administered by the major command to which they are assigned.

Another 10,484 officers and 35,035 airmen will receive fifteen-day tours of active duty with the major command to which they are assigned and will be attached to CONAC Reserve Centers for their inactive-duty training and administration.

Finally, 19,288 officers and 65,744 airmen will be assigned to, trained, and administered by the Reserve Centers. However, they will be offered fifteen-day active-duty tours with a major command which is most closely connected with their mobilization assignment speciality.

The Air Force presently is studying the feasibility of Reservists manning Bomarc air defense missile sites. Two years ago a board headed by Lt. Gen. Charles B. Stone, III, then Commander of CONAC, suggested that Reservists might logically operate Bomarc sites.

This suggestion has been given impetus in a recent memorandum from Gen. Thomas D. White, Chief of Staff, who directed that the Air Reserve Technician portion of the Reserve components be investigated for possible utilization in the Bomarc program.

The study is tied to the technician portion of the program for the obvious reason that technicians, by the nature of their full-time employment, have a much faster reaction time than the Reservist who is employed at a considerable distance from the site.

In this connection, the technician program is moving ahead rapidly. Early this year the first technicians were employed at two locations—Davis Field, Muskogee, Okla., and Ellington AFB, Tex. There are now twenty-four bases employing technicians and another eleven will be added this fall. When the program is in full swing, some 7,500 active-duty Air Force officers and airmen assigned to administering the Reserve flying wings will be released for assignment against worldwide commitments of the active establishment.

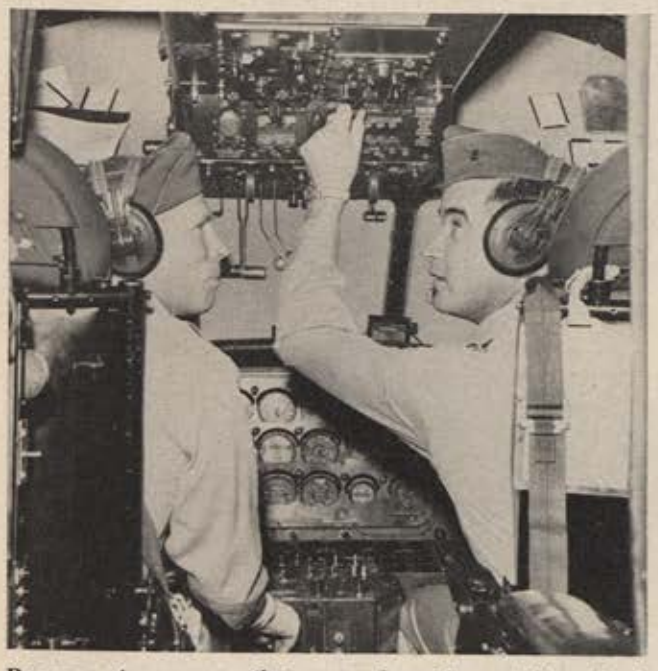
The technician program is one of the very real accomplishments of the past year. It will make a measurable contribution to the Air Force. In addition to releasing officers and airmen for assignments to the active force,

(Continued on following page)

the program will improve the combat capability of Reserve flying units.

The Air Force is fully aware of the vast reservoir of talent and skill in the Air Force Reserve, available for the tapping. At the moment there are on duty in Headquarters USAF, throughout the Air Staff, some fifteen Air Force Reserve officers, whose principal responsibility is to advise their staff sections on matters pertaining to the Reserve. There are Reserve officers on the staff of all major commands who function in a similar role.

There also exists the Air Reserve Forces Policy Committees, groups which meet at least twice a year to consider Reserve matters and recommend policies to the Air Force. Recently, Assistant Secretary Smith directed all USAF staff agencies to assist these committees in carrying out their advisory functions. Each directorate has been ordered to keep the committees fully informed on all plans, programs, and related matters concerning the Reserve components.



Reserve air rescue pilots run through preflight check of SA-16 amphibian aircraft at Williams AFB in Arizona.

In line with establishing closer liaison between staff agencies and Reservists, General LeMay has devised a plan to improve communications between the two groups. More information about the policies and programs of the Air Force will be made available to the Reserve. One method will be a series of briefings in the Pentagon for selected Reservists, who will be invited to conferences with key Air Staff members. Upon return to their home stations, these Reservists will be expected to relay to other Reservists the information they have obtained.

Improved communication can be expected also from the recent action which created sixteen Air Reserve Training Wings to have supervisory control over the eighty-two Reserve Centers. These wings will be located at or near existing flying centers so that military transportation can be used to the maximum in performing staff visits and inspections. The wing staff will be very small: five officers, seven airmen, and three civilians. But it was designed so in order to make each member more accessible to Reservists in the Centers.

These training wings will report directly to CONAC's three numbered Air Forces. Three of the wings will come under Fourth Air Force and supervise activities of seventeen centers. Six wings will operate under Tenth Air Force, with cognizance over twenty-six centers. The Fourteenth Air Force will have seven wings, responsible for thirty-nine centers.

The new program reduces supervisory control problems inherent in the old system under which CONAC's numbered Air Forces supervised activities of ninety-three Centers which, in turn, trained about 1,000 widely scattered units.

To support the Reserve training program has required large sums of money. One expenditure area that has been given close attention is that of facilities.

In the last two years the Reserve has been given greater construction support by the Air Force than in all years since World War II combined. Two years ago more than $33 million was placed under contract for facilities at fourteen flying locations.

Last year, some $17 million was earmarked for construction, making a total for the two-year period of some $50 million. And the pace continues. This year's budget contains an item of $5 million for Reserve construction. This is money well spent, for without proper facilities training suffers and participation lags.

A major problem in the Reserve program is that of retention and promotion. As requirements of the active Air Force change, the need for individuals with specific specialty skills changes. Often, as a result, there is reduced opportunity to earn points for retention.

The retention problem will never be solved completely —and to the satisfaction of all. But there is constant analysis of functions of the Air Force mission which Reservists might perform. Some of these include aircraft control and warning, manning of dispersed storage sites for Air Materiel Command, storage and care of bomb damage repair equipment, logistic support of missiles, and Civil Defense.

As for the other major personnel problem—promotion, an effort is being made to amend the Reserve Officers Personnel Act in such a way as to make promotions more orderly and more available.

If Congress votes the Air Force suggested amendments, the "pusher" clause of ROPA, which has caused accelerated mandatory promotions for seventy percent of the majors and lieutenant colonels, will be repealed. Secondly, the position vacancy promotion freeze will be thawed and promotions can be permitted since they no longer would be charged against grade ceilings ROPA now imposes.

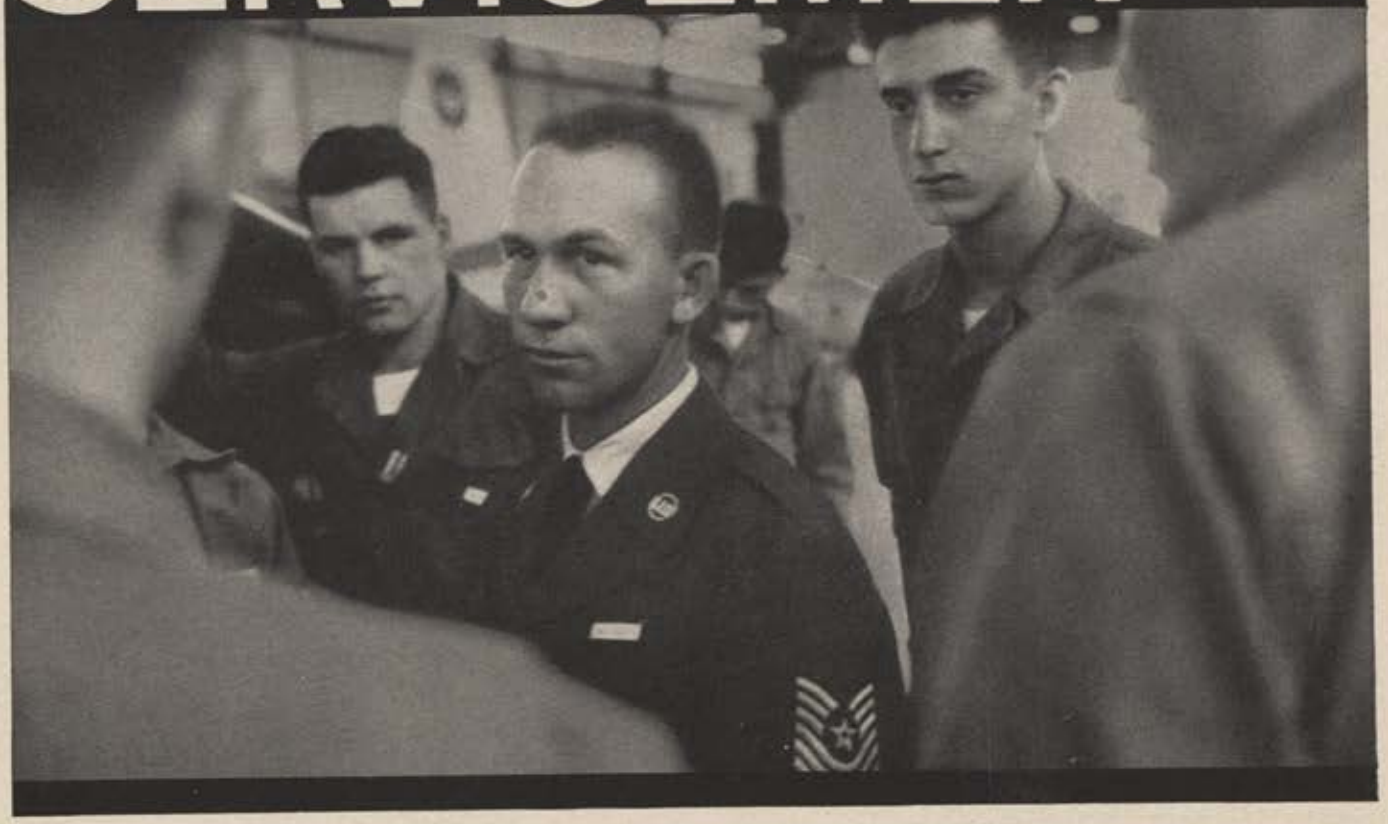
The Reserve program is determined by the requirements of the Air Force. But its success depends upon demonstrated recognition by Reservists themselves of three factors:

- Availability of the individual at the time and place the Air Force needs him.
- Qualification in his specialty.
- Motivation which places service to country far ahead of service to a drill pay check, rank, or retirement.

The decisive phase of any war is the building of the weapon systems and the training of the men to use them. This means that the Air Force, the nation's *immediate* strike force, must be buttressed by a truly "Ready Reserve."

This is the goal: A Ready Reserve of trained citizen-airmen who can use effectively and immediately the awesome tools which our science and technology are capable of fabricating.—END

FORMER SERVICEMEN



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Vital to any missile system evaluation program is proof of missile accuracy against actual airborne targets. High-performance drones can simulate virtually any type of intruder. But a drone becomes a useful target only when it is equipped with an effective three-dimensional scoring system. Simple miss distance indication is not enough, for missile kill potential depends also upon where the missile explodes in relation to the target flight path. Any scoring system, to be effective, must register *both miss distance and missile trajectory in relation to the target.*

The Trans-Sonics® Trajector* introduces the third dimension to airborne scoring systems to locate the point of closest approach in three dimensional space *and* to determine the flight path of the missile in relation to the speeding target. It presents a complete score on the ground ready for immediate use. Designed to fit all types of target drones, the Trajector operates independently of the missile, requiring no synchronization nor missile modification.

Tested, proved, and ready for operational service, the Trajector is the most effective answer to your missile scoring problem. Write for Trajector Booklet "How to Score the Effectiveness of Weapon Systems" to Trans-Sonics, Inc., Burlington, Mass.

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• AIR NATIONAL GUARD

Defense Team Partner

THE LINE that once divided functions of the Air Force and the Air National Guard is rapidly dissolving as Air Guard units become more and more an integral part of the nation's air strength.

In fact, it is perhaps a misnomer today to refer to the Air National Guard as a "reserve" force, since many ANG units now fly side by side with those of the regular Air Force in active air defense and tactical missions.

The concept of the Air National Guard as a reserve force whose men and planes would be used to fill out Air Force units in an emergency is as outmoded as the prop-driven fighter. That technique was employed as recently as the Korean emergency, but it does not fit today's conditions.

Two major factors have brought about the new concept of the Air National Guard as a full partner on our defense team.

First is the Soviet capability to inflict a devastating surprise attack across the entire nation which has made it imperative that all our available defensive and retaliatory striking power be ready for immediate and decisive action.

Second is the skyrocketing cost of modern weapon systems which shows no sign of leveling off in the future. It is true that the kill capability of today's weapons is immeasurably greater. Nevertheless, the nation simply cannot afford to maintain military forces with overlapping missions.

Faced with the responsibility for providing airpower for all essential missions within severe budget limitations, Gen. Thomas D. White, USAF Chief of Staff, ordered his Director of Plans to review Air Force and Air National Guard mission capabilities. General White set up two major objectives—to eliminate overlapping functions, and to assure that Air National Guard units are provided equipment in types and quantities that will enable them to perform D-day missions effectively.

The Air National Guard's new structure has grown out of these discussions.

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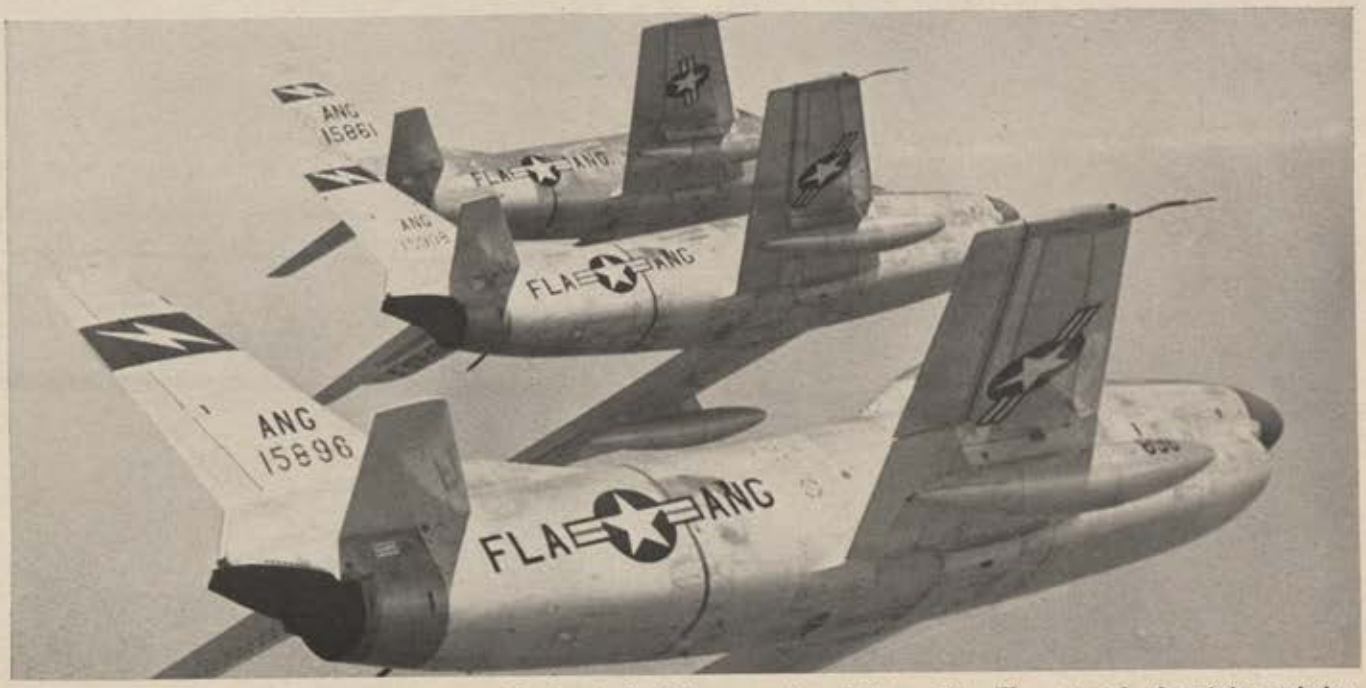

F-86Ds of ANG's 125th Fighter Group (Air Defense) head homeward to Jacksonville, Fla., at end of training mission.

Since air defense is the primary mission of the majority of Air National Guard units, it was called to sit down with the Air Defense Command to work out an integrated air defense network. In some cases, ADC turned over existing bases and facilities to the Air National Guard which promptly moved units into place to maintain the air defense of those areas. In other instances, where Air National Guard units were already in place to assume the mission, the Air Force considered it reasonable to withdraw their own air defense units. The Air National Guard, in turn, reduced its force structure in some areas to fit program requirements.

Similar studies were made of tactical reconnaissance requirements and fighter-bomber requirements of the active Air Force.

In working out these arrangements, the Air National Guard has had the full support of the forty-eight states, incoming Alaska, and Hawaii, Puerto Rico, and the District of Columbia whose Adjutants General have had to resolve numerous problems of personnel, facilities, and community relations to make the new program fully effective.

This Hawaiian Air Guardsman, Donald Nishihira, helped locate lost Navy plane last year. Survivors were rescued.

As a result of these actions, the Air National Guard is in the healthiest position in its history. Even though it has been reduced by three separate wing headquarters and three separate squadrons, it has for the first time acquired a sound mission responsibility and the weapon systems necessary to do the job.

The Air National Guard structure after reorganization includes eighty-one tactical squadrons in twenty-four wings, plus two separate squadrons outside the US, as follows:

- Air defense: twelve wings, forty squadrons, plus one squadron in Hawaii and one squadron in Puerto Rico.
- Fighter-interceptor (day): four wings, thirteen squadrons.
- Fighter-interceptor (day, general purpose): four wings, twelve squadrons.
- Tactical reconnaissance: four wings, sixteen squadrons.

In addition, it has support units comprised of four aeromedical evac squadrons, four air resupply squadrons, and one air transport squadron.

To equip these squadrons, the Air Force has released a large number of aircraft to the Guard much sooner than expected. Our fighter-interceptor crews are flying North American F-86Ds and F-86Ls, and Northrop F-89Ds and Hs—the same types of aircraft being used by many regular Air Force units for comparable missions.

General purpose fighter squadrons are equipped with Republic F-84Fs and F-86Fs and Hs, while tactical reconnaissance units are using RF-84Fs and Martin RB-57s.

Latest addition to the Guard aircraft roster is the North American F-100. Two fighter squadrons are now equipped with this Century series fighter and more are scheduled to receive them as soon as adequate Air Force logistical support can be made available.

Most of the Guard's headaches in airfield facilities, which hampered conversion of some fighter units to jet aircraft in previous years, are now in the past. In the past year it placed under contract all projects authorized by the Congress—at a saving of $2 million under the estimated cost. Current projects are primarily devoted to lengthening runways and expanding parking aprons.

These California Air Guardsmen have the assignment of maintaining intricate radio relay system, a vital routine.

With only minor exceptions, facilities now meet minimum Air Force standards. Meanwhile, an improvement and modernization program is planned to keep pace with new aircraft and missions programmed for the future.

While many people tend to think of the Air Guard's readiness in terms of its tactical flying squadrons, the Air Force is making good use of the Guard's capabilties in other fields as well. At present, four aircraft control and warning squadrons are on full-time alert as part of our air defense radar net. These organizations, two in Hawaii, one in Colorado, and one in Utah, are performing a valuable peacetime service to both military and civilian aviation in radar tracking and surveillance at the same time that they bolster the nation's defense against air attack.

(Continued on page 172)

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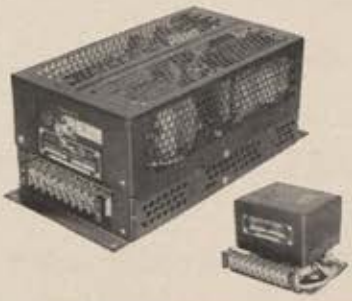

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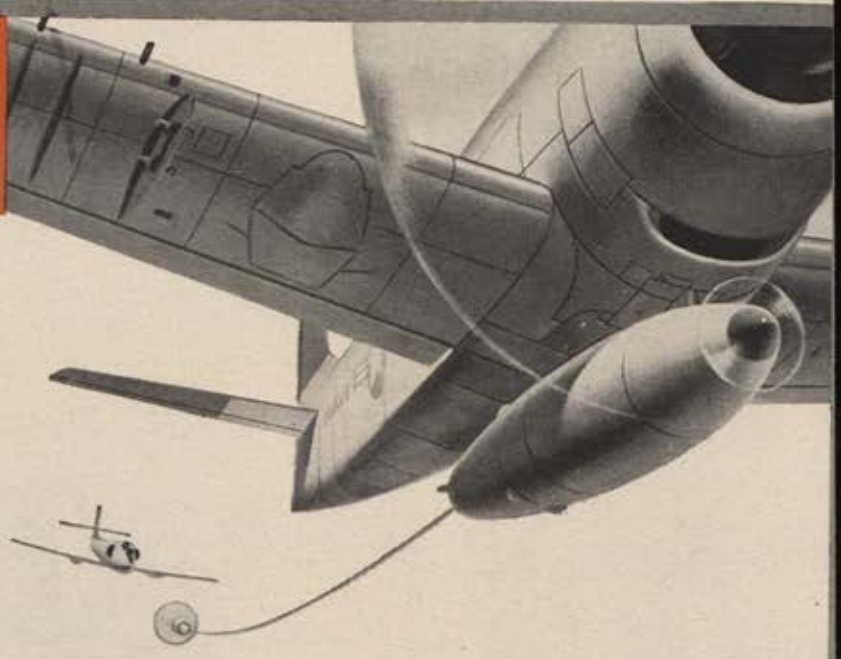

MAKES ANY PLANE A TANKER

An Aeroproducts full-feathering four-bladed turbine provides all the power needed for pumps and reels in the self-contained "Buddy Store" that turns fighters or attack bombers into aerial tankers in split seconds. This first successful ram air-powered tanker kit is lighter and more streamlined—needs no plumbing or power from the tanker plane.

Little things that mean a lot to Jet-Age Progress

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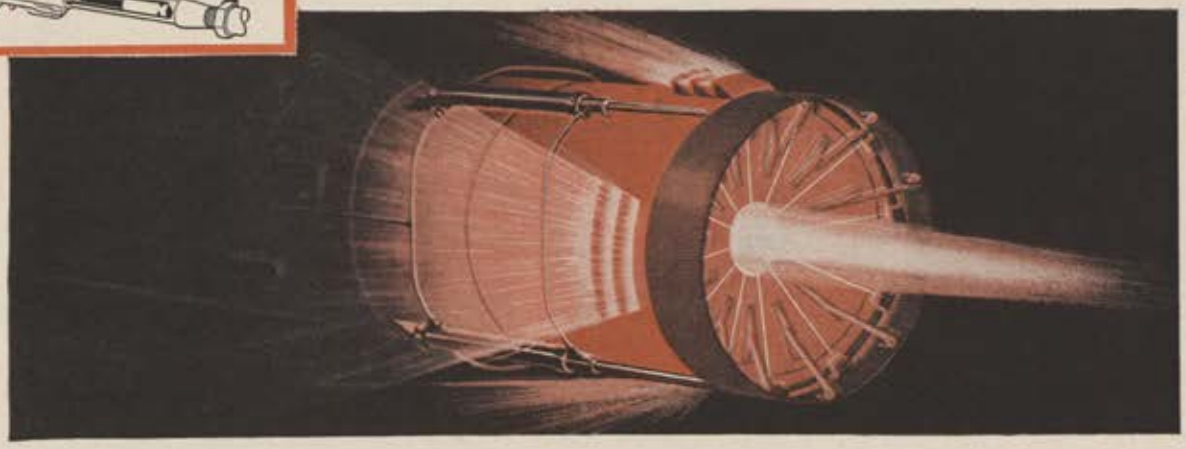
Proved in severe tests from ambient to 1000°F, the new Aeroproducts high-temperatures linear hydraulic actuator makes dependable operation of thrust spoilers and thrust reversers possible. Now being supplied to Marquardt Aircraft Company for incorporation in a complete reverser system, its patented fluid flow and seal system removes heat rapidly and continuously—provides positive seal—assures smooth, dependable operation. Patented synchronization system permits multipoint installation. If required, a patented self-locking feature automatically holds reverser or spoiler in fixed position if power fails.



The four examples shown here – each tops in its field – are only a part of the Aeroproducts story. Aeroproducts proved design ingenuity and production know-how are now speeding the solution to many "sticky" airborne accessory problems on commercial and military aircraft and on missiles and rockets. Aeroproducts engineers are ready today to consult on your projects – classified or unclassified. Write:

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Air technicians swap shop-talk with "drill status" mechanics from a North Carolina Air Guard F-I organization.

Our electronics and communications units are keeping pace with their active-duty counterparts in equipment, realistic training, and administrative reorganization to meet requirements of the commands to which they would be assigned in an emergency.

The Air National Guard is currently exploring with the Air Force the possibility of manning and operating missile sites with Air Guard personnel, and foresees many advantages to Air Guard operation of these sites. Guard units already possess men qualified in virtually all the specialties necessary to maintain these missiles. The nature of missile site operations is ideally suited to the Air Guard structure which employs full-time technicians on ready alert status nearby. The Guard would require less housing and support facilities and, since its men would be living in and defending their own home communities, it would escape morale problems which have troubled some regular similar Air Force units.

Iowa Air Guard pilots score gunnery target during field training in Wyoming. They meet regular AF standards.

The Air National Guard's personnel picture is a key reason for optimism. It has been directed to maintain its units at ninety percent of authorized strength—approximately the *effective* strength of regular Air Force units—which allows a maximum of 72,900 officers and airmen in a drill pay status. At the end of May 1958, there were more than 70,000 on the rolls, and no problems are foreseen in attaining and maintaining the required ninety percent level. In fact, this has enabled State Adjutants General to direct Air Guard units to be more selective in recruiting—taking only the best men available—and to screen out officers and airmen who are not up to Air Guard standards of proficiency and character.

All enlistees without prior service are required to attend USAF basic training. Since July 1957, some 11,000 airmen have entered the eleven-week course and, from inauguration of the six-months' active-duty for training program in March 1957, more than 1,300 recruits have combined basic and technical training.

The skill and experience level of Air National Guard noncommissioned officers has always been above par. The new men are also measuring up favorably in comparison to those in the regular Air Force. In the past year, the same job knowledge tests used by the Air Force have been given to more than 10,000 Air Guardsmen, of whom seventy-five percent made passing grades.

This record, virtually identical to that of the Air Force, is remarkable considering that the majority of the Guardsmen tested have had no active-duty experience other than basic training.

There is increased emphasis on technical school attendance to supplement on-the-job training. Constant retraining is necessary as new and more complex equipment is introduced into Air Guard squadrons. More than 1,200 officers and 3,200 airmen completed courses at Air Force technical schools in fiscal year 1958.

While most aircrew members are veterans of Air Force service, some 400 pilots and thirty observers graduated from Air Force flying training in Air Guardsman status in fiscal year 1958.

A recent addition to the Guard's aircrew training program is the Air National Guard jet instrument school at Ellington Air Force Base, Tex. Reduction in Air Force training programs last year, coupled with assumption of combat crew training by major commands, prompted the Air Guard to establish its own postgraduate aircrew training facility. With the cooperation of the Air Force, which provided aircraft and set up an instructor standardization program, the Guard was able to open the school in October 1957. Since that time more than 200 officers have been graduated.

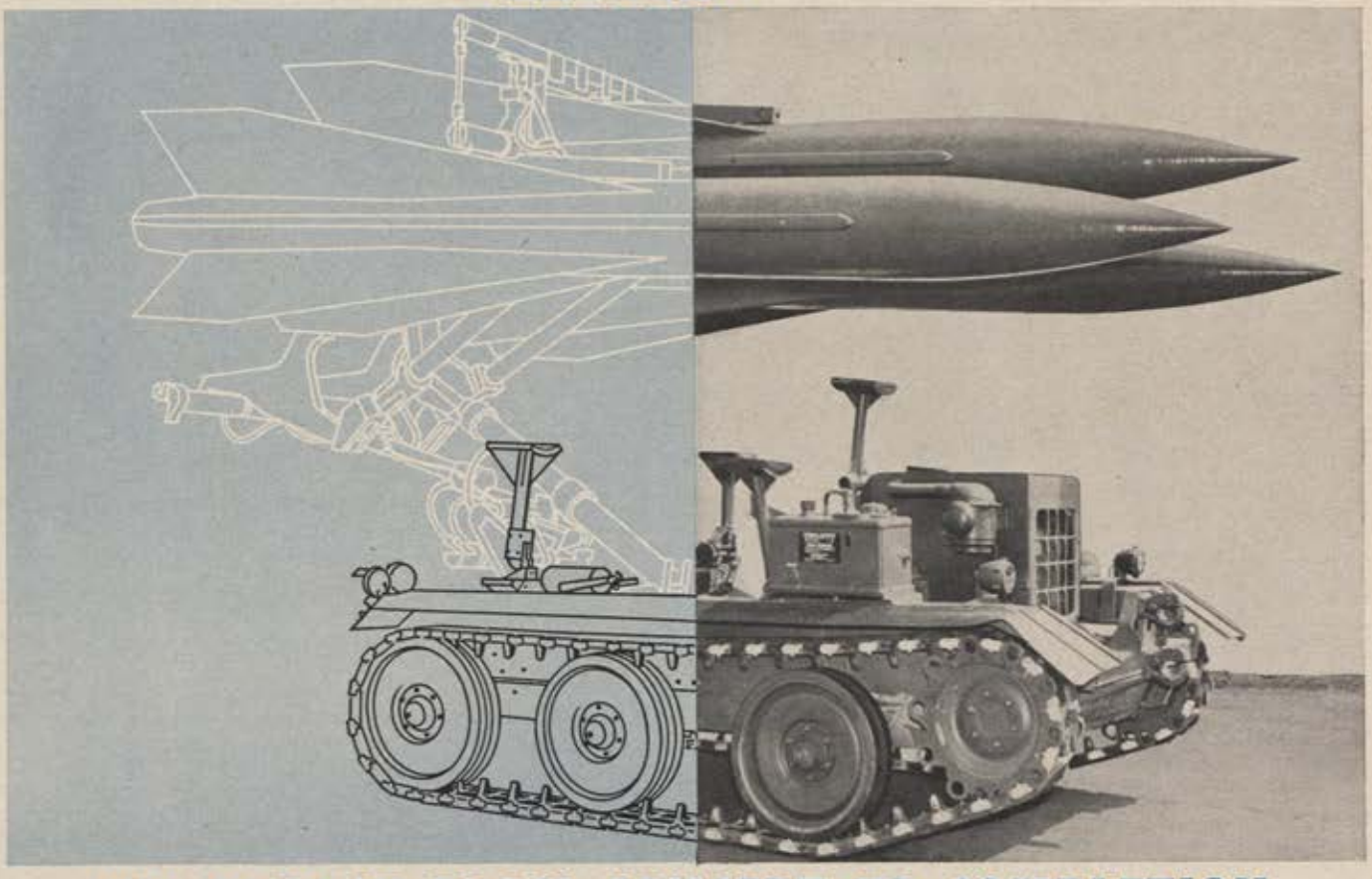
The Air Guard's flying safety record is comparable to that of regular Air Force commands with similar aircraft and missions.

In summary, the Air National Guard is ready for its role as a full-fledged member of the Air Force first team. Today's Air National Guard is characterized by modern weapons, improved facilities, a high degree of training, and skilled and dedicated personnel.

The defense of our nation is provided by forces on land, sea, and air, each meshing into an integrated whole. No one can visualize the complete defense picture without an adequate understanding and appreciation of the combat capabilities of the Air National Guard.—END

...speaking of

Missile Ground Support ***MOBILITY***



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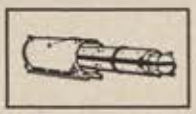
Launcher-Erectors & Power Units



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FOOD MACHINERY AND CHEMICAL CORPORATION

Ordnance Division

Missile Equipment Section S-B

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TELLING THE MISSILE WHERE TO GO

. . . and how to get there!

The button is pushed. The missile rises from the launching pad – slowly – then roars into space.

But the problem has just begun! Now the "brain" inside the missile takes over. This is the crucial part of missile warfare.

The target must be found – or met head-on – or overtaken. The missile must be *steered*. It must change course, double back if necessary. It must "think" its way to the enemy.

What ITT is doing about it

Since 1949, top scientists in ITT laboratories have been deeply engaged in missile guidance and control. They are deeply engaged now – playing a big role in national defense–working with the Navy, the Air Force, the Army, universities and associated laboratories, and other manufacturers.

They developed the complete airborne guidance for TALOS, the Navy's deadly "flying fish" launched from guided-missile cruisers. They developed the complete guidance for the Army's LACROSSE, including ground, air, tracking, and computing equipment. They helped with RASCAL, an Air Force air-to-surface missile. They developed the launching and firing controls and test equipment for the Air Force's BOMARC missile. They are designing and building communication networks for the ATLAS intercontinental ballistic missile.

Experience—where it counts

ITT is especially qualified for missile guidance development–because of long experience and special skills in air navigation and radar.

Other skills count heavily too – in infrared detection and homing, direction finders, inertial systems, computers, semi-conductors. ITT is also rich in these skills, and has the research laboratories and expanding manufacturing plants to carry the work forward.

Depend upon it – when the missile is launched, it will know where to go . . . and how to get there.

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AND MANUFACTURING PLANTS IN 20 FREE-WORLD COUNTRIES

View of part of the Air University complex at Maxwell AFB, Ala., where USAF officers prepare for their space age futures.

• AIR UNIVERSITY

School for Professionals

ALL of us here, who know the air as a profession, have long been conscious of the compelling need for time—time free from other duties; time for study; time to think into the future. We want to see the world not only as it is, but as it will be in five years' time or a decade. For that we need quiet, in an academic center of our own."

At the official dedication of Air University, on September 3, 1946, Gen. Carl Spaatz (now retired), then Commanding General of the Army Air Forces, thus described the establishment of Air University.

The university of the air has been in operation for twelve years now—twelve busy years during which it has emerged not only as the true educational and doctrinal center of the United States Air Force but as a pillar of national security as well.

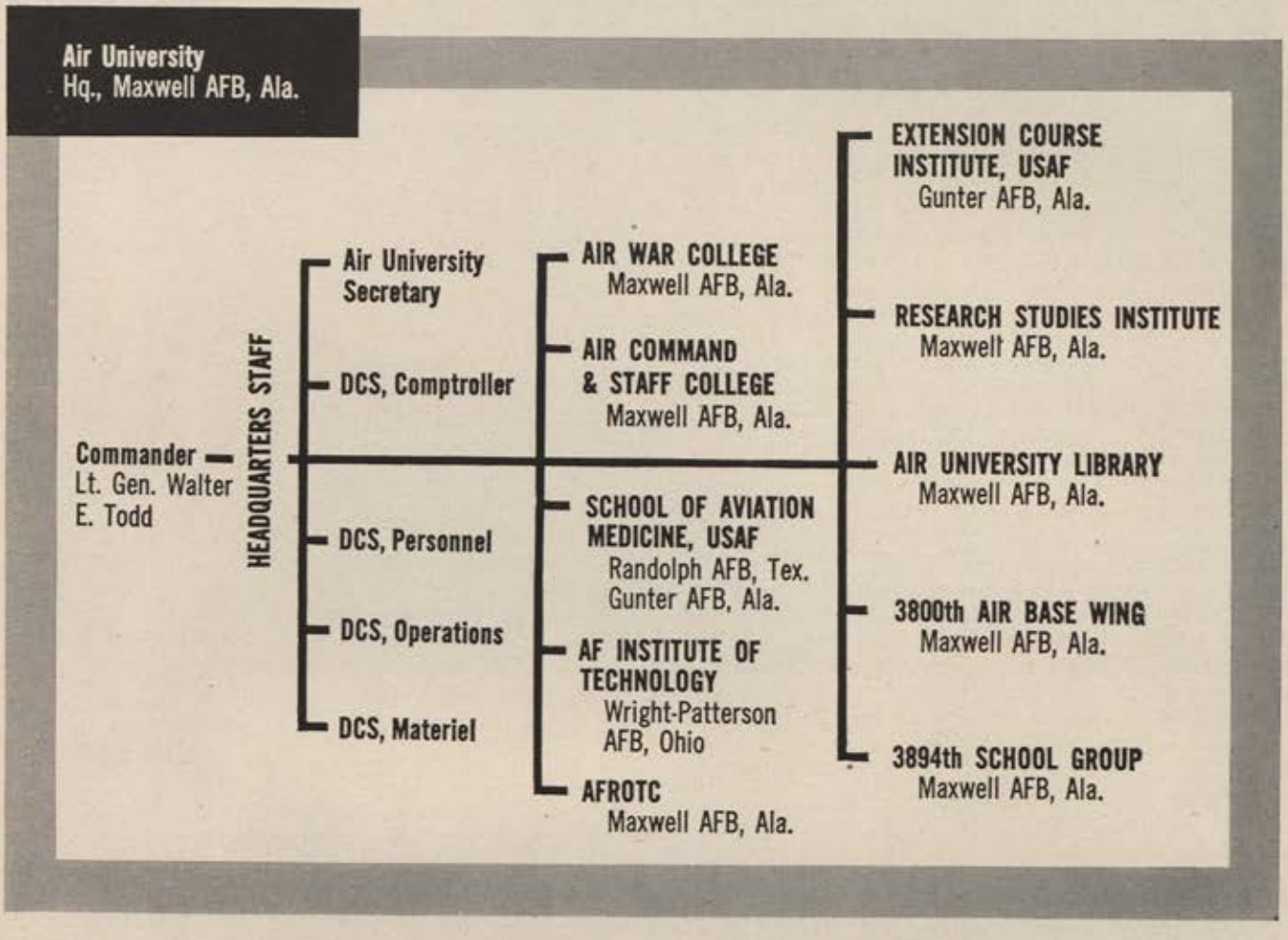
Air University is a unique command where student officers are afforded the opportunity "to think into the future . . .; to see the world . . . as it will be in five years' time or a decade." Here, for the first time, the Air Force has a single command, the sole purpose of which is to conduct the professional educational program for its career officers, without operational or administrative responsibilities.

Formally stated, the mission of Air University is to prepare officers for command of squadrons, groups, wings, and larger Air Force units and for staff duties with all types of Air Force organizations. Further, Air University is charged with providing education to meet the scientific and technical requirements of the Air Force and instruction within Air Force Reserve Officer Training Corps and in aviation medical services. Finally, Air University serves as the doctrinal and educational center of the United States Air Force.

Air University operates, as a separate major command, directly under the Chief of Staff, USAF. Headquarters of the command are located at Maxwell Air Force Base, Ala., as are many of its major components. To fulfill its educational mission, Air University operates various schools and supporting agencies.

At the top of the ladder is Air War College at Maxwell,

(Continued on following page)



where senior officers are prepared for the highest command and staff positions. Also at Maxwell is Air Command and Staff College, which conducts two principal schools: Command and Staff School for intermediate command and staff duty officers, and Squadron Officer School for junior officers. Air Command and Staff College also conducts the Academic Instructor Course, Allied Officer Preparatory Phase (where officers from allied foreign countries receive language and other training), and the Air Warfare Systems Courses (where key personnel are indoctrinated in weapon systems and their utilization).

At Randolph Air Force Base, Tex., and Gunter Air Force Base, Ala., is the School of Aviation Medicine, where Air Force medical services personnel are trained and medical flight problems are researched. The Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio, devotes its efforts to the education of officers in the technological, scientific, and other specialty requirements of the Air Force.

Most widely dispersed part of Air University is the Air Force ROTC program, which provides qualified, highly selected cadets as potential officers of the USAF. Approximately 100,000 young men are enrolled in 179 detachments and eleven sub-detachments in civilian colleges and universities.

Rounding out the educational program is an Extension Course Institute at Gunter, which provides a correspondence course system of home study for Air Force members, reserve personnel, and civilian personnel of the Air Force.

Three additional activities are an important part of Air University's educational system: Research Studies Institute, which renders research and professional assistance to students, faculties, and staffs of the schools and to Headquarters USAF; Air University Library, which provides bibliographic, research, reference, and documentary service; and 3894th School Group, which monitors Air Force personnel assigned as staff members, instructors, or students at non-Air Force service schools engaged in professional officer education.

Not only Air Force officers attend the courses of Air University. Other branches of the armed forces, various government departments, and many of our allied countries are represented.

The history of Air University goes back to the day in December 1945 when Maj. Gen. David M. Schlatter arrived at Maxwell, bringing with him a few notes he had obtained at the Pentagon, the lessons learned in World War II, and the theories evolved at the old Air Corps Tactical School, which had moved to Maxwell from Langley Field in 1931.

In February 1946, Austin Hall, the building selected for the headquarters of the new school, was a beehive of activity, as new personnel for the school, staff members, and faculty members reported each day.

That same month marked the beginning of a series of educational conferences at Maxwell. Representatives from all Air Force commands gathered at Maxwell to discuss what the over-all educational program for the AAF should be.

By March 1946, when the school was redesignated Air University, most of the groundwork for the new command had been finished. Maj. Gen. Muir S. Fairchild had been

appointed commanding general, with General Schlatter as his deputy.

General Spaatz had extended an invitation to leading civilian educators to review the educational program as to its soundness, progressiveness, and thoroughness. Twelve such men accepted the invitation, and the Air University Board of Visitors was thus established.

Three new courses—Air War College, Air Command and Staff School, and Air Tactical School—were established during that first year. A Special Staff School at Craig and Gunter Air Force Bases, Ala., was also a part of Air University. A fifth school—the School of Aviation Medicine, assigned to Air University in April 1946—continued in operation at Randolph Air Force Base, Tex. Supervision of the curricula of the Institute of Technology, Wright-Patterson Air Force Base, Ohio, was also an Air University responsibility, and in 1950, the institute was transferred to the university from Air Materiel Command. The same year, transfer of correspondence school responsibility from Continental Air Command was effected, and the Extension Course Institute was established.

Air Force professional education was curtailed briefly when the Korean War began. Operation of Air War College was temporarily suspended. Air University's' programs at Tyndall and Craig Air Force Bases ended in September 1950 when these installations were transferred to Air Training Command. Air Tactical School was redesignated Squadron Officer School and was moved from Tyndall to Maxwell, where it was conducted by Air Command and Staff School. The academic functions of USAF Special Staff School, formerly at Craig, also were placed under the jurisdiction of Air Command and Staff School.

To meet expanding instructional requirements of the School of Aviation Medicine, a Gunter branch of the school was established in October 1950.

By late fall of 1950, more stability was reflected in the command's programs. Courses were shortened, but more students attended them, many as Reserve officers called to extended active duty.

And the Korean War served to sever more completely thinking which tended to go back to World War II. New lessons related to a "limited war" concept were now under study. Research interest stressed more carefully the study of the Soviet Union and its influence in Eurasia.

On May 25, 1951, Research Studies Institute, composed of the USAF Historical Division, Arctic-Desert-Tropic Information Center, and Documentary Research Division, was formed from the resources of Air University Library. The professional staff of the institute renders many specialized services for faculty and staff officials, for students, and for USAF officials elsewhere, in the fields of history, political science, and geography.

Another important development in Air University's educational program occurred in August 1952, when administrative responsibility for the AFROTC program was transferred from Continental Air Command to Air University.

November 1954 saw Air Command and Staff School redesignated as Air Command and Staff College. Gen. Laurence S. Kuter, then Air University Commander and now Commander in Chief, Pacific Air Forces, considered that the new designation "will give this institution the added prestige that the Air Command and Staff School deserves by virtue of its position in the USAF educational system."

Command of the Air University passed from General Fairchild to Maj. Gen. Robert W. Harper in May 1948. That October Maj. Gen. Orvil A. Anderson served briefly as acting commander until Gen. George C. Kenney took over at the end of the month. General Kenney was succeeded in August 1951 by Lt. Gen. Idwal H. Edwards, who was commander until the spring of 1953, when Maj. Gen. John DeF. Barker became acting commander. General Kuter was commander from April 1953 until May 1955 and was followed by Lt. Gen. Dean C. Strother, who last month became Deputy Chief of Staff, Operations, at Headquarters USAF. At that time Lt. Gen. Walter E. Todd became Air University's seventh fully designated commander.

Air University has concentrated its efforts on quality rather than quantity. Officers to attend Command and Staff School and the Air War College are selected by boards of senior officers in Headquarters USAF in much the same manner as they would be chosen for promotion to higher rank. Under present conditions, less than fifteen percent of eligible officers can expect to be selected to attend resident courses at Command and Staff School or Air War College.

Since its establishment, Air University has graduated 179,133 students, including 133,277 resident students, 45,106 AFROTC graduates, and 750 additional faculty personnel who were credited as "graduates" of a number of courses. An additional 131,955 have completed courses through the Extension Course Institute.

Air University has also graduated from its resident courses 937 officers from fifty-two allied countries. In fifteen cases, allied graduates of Air University schools either were, or have become, chiefs of the respective air arms of their nations.

The educational achievement record is one of which Air University can also justly be proud.

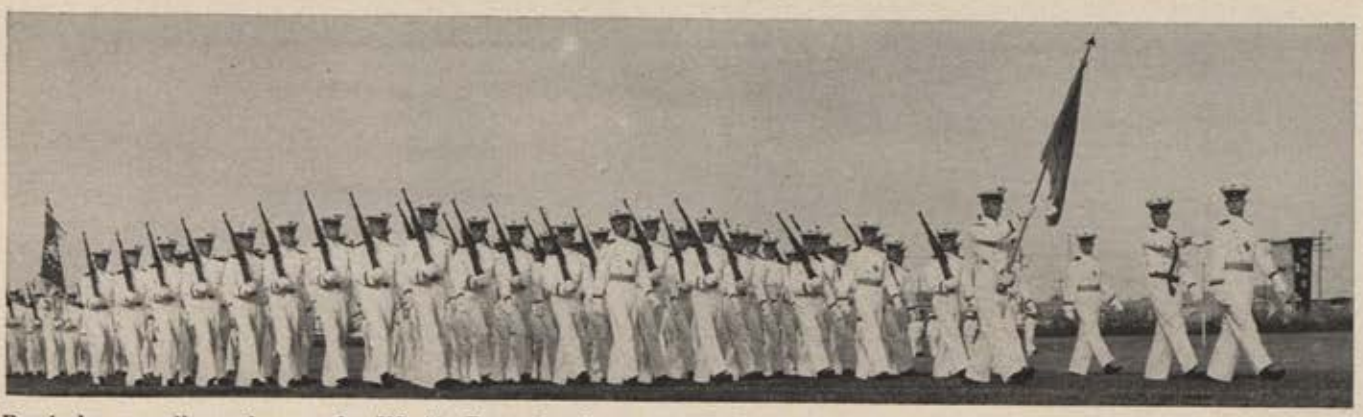
Establishment of a single command to supervise, coordinate, and study the over-all educational program of the Air Force permits Air University to recommend to Headquarters USAF changes in educational policy and enables it to avoid costly duplications and costs to our taxpayers.

Annual examinations by the Board of Visitors permits close liaison with civilian colleges and universities and civilian enterprise. Since the first visit by civilian educators in 1946, a similar board has visited Air University at least once yearly to advise AU leaders on organization, management, policies, curricula, and methods of instruction. The board of fifteen members reports to the Chief of Staff.

Just before Air University was officially opened, the late Gen. Hoyt S. Vandenberg said: "Initially and in the future, traditionalism, rigidity of thought and doctrine, and the formalizing of instruction must be carefully avoided. The whole effort of instruction must be to prepare students for future war and NOT for past wars." This Air University has done and will continue to do. In 1954, when he was Air University Commander, General Kuter said, in effect, that Air University educates officers, not for tomorrow's war, but the day after tomorrow's, further pointing out that "by and large the formula for war in the *near* future has already been determined."

Here at Maxwell, Air Force officers learn to solve complex problems of military management, tactics, and strategy; to seek solutions; to develop the ability to attack problems in an orderly manner, by logic, by analysis, by applying tested principles at every step.

Here "approved solutions" are avoided wherever possible to preclude narrowing the range of thinking and discouraging originality. Embodying the spirit of academic freedom is Air University's motto: *Proficimus More Irretenti*—"We Make Progress by Custom Unhindered."—END



Precisely, proudly, cadets at the US Air Force Academy parade. Soon they'll move to their new Colorado Spring home.

• UNITED STATES AIR FORCE ACADEMY

Tomorrow's Commanders

THE IDEA of an Air Force Academy, comparable to West Point and Annapolis, arose during World War I, stimulated by Billy Mitchell. Between the two world wars, Congress considered but never authorized an air academy to educate and train Regular Air Service officers.

After World War II, in September 1947, the United States Air Force was established on a coequal basis with the Army and Navy. On April 1, 1954, an Air Force Academy was authorized.

Under the provisions of the enabling act, the Secretary of the Air Force appointed a Site Selection Commission. The Commission recommended three sites, including one of approximately 18,000 acres of ranchland east of the Rampart Range of the Rocky Mountains, eight miles north of Colorado Springs. On June 24, 1954, the Secretary chose the Colorado Springs site and simultaneously selected Lowry Air Force Base, at Denver, as the Academy's interim home, pending the construction of permanent facilities at the new site.

On August 14, 1954, the United States Air Force Academy was activated. Lt. Gen. Hubert R. Harmon was assigned as the first Superintendent, and on July 11, 1955, the Academy admitted the first class of 306 cadets selected through competitive examinations. The second and third classes were approximately the same size, but in June 1958 the Academy opened its doors to 448 cadets who, like their predecessors, were selected on a competitive basis.

The Academy is scheduled to move to the Colorado Springs site in late August and early September 1958. Beginning in 1959 the Academy will admit 712 cadets annually, under a congressionally enacted appointment system similar to West Point's. By 1962, when the new system of cadet selection goes into effect, the Cadet Wing should reach its total authorized strength of 2,520. This includes twenty-four cadets from other North American and Latin American countries.

The entire program of instruction of the Air Force Academy, under constant study and review since 1948, is geared to preparing Air Force officers for the air and space era. Maj. Gen. James E. Briggs, who succeeded General Harmon as Superintendent in the summer of 1956, shares General Harmon's concept of the Academy's mission and is equally aware of the problems involved.

He recognizes that the Air Force will need scientists, both in and out of uniform. He expects many of the leading graduates to go on to eminence in science and engineering through graduate study. But he has also pointed out that, in addition to scientists, the Air Force will need many officers with the stamina, the skill, and the adventurous spirit required to pilot manned vehicles through air and space.

Furthermore, as the Academy's graduates reach greater maturity and step into positions of broader responsibility, they must be able to understand the impact of scientific advances upon weapons, strategy, and tactics and to explain the nation's defense needs to its political leaders, who make the final decisions.

To do this, the Academy's curriculum emphasizes general education as well as professional military subjects. As General Briggs has phrased it: "At the Air Force Academy we do not try to turn out narrow specialists in any field. Instead, we should strive to launch our graduates upon the main stream of thought and knowledge, to give them the fundamentals upon which future specialization in any Air Force career field may be based."

September 1958 will mark the beginning of the Academy's instruction at the permanent site and also the inauguration of a revised and rescheduled curriculum designed to eliminate duplication and improve the sequence of studies. The program includes 166 credit hours, of which 140 hours are to be in general education, and twenty-six hours in military airmanship. The general education curriculum is balanced between the basic and applied sciences on the one hand, and the social sciences and humanities on the other. For example, it prescribes fifteen credit hours in English, three in philosophy, twelve in history, ten in political science, seventeen in mathematics, and six each in mechanics, aerodynamics, and thermodynamics. A credit hour consists of 150 minutes of effort per week for 17½ weeks.

As a part of the curriculum revision announced in March 1958, the Academy has established a Department of

Astronautics to teach the fundamental physics of manned and unmanned flight through space. In another phase of curricular development, the Air Force Academy offers, in addition to its required program of general education, a program known as curriculum enrichment. This consists essentially of extra courses in certain fields for cadets with special preparation or unusual ability. It is now possible for an exceptional cadet to major in Public Affairs, English, Engineering Sciences, Basic Sciences, or Western Culture.

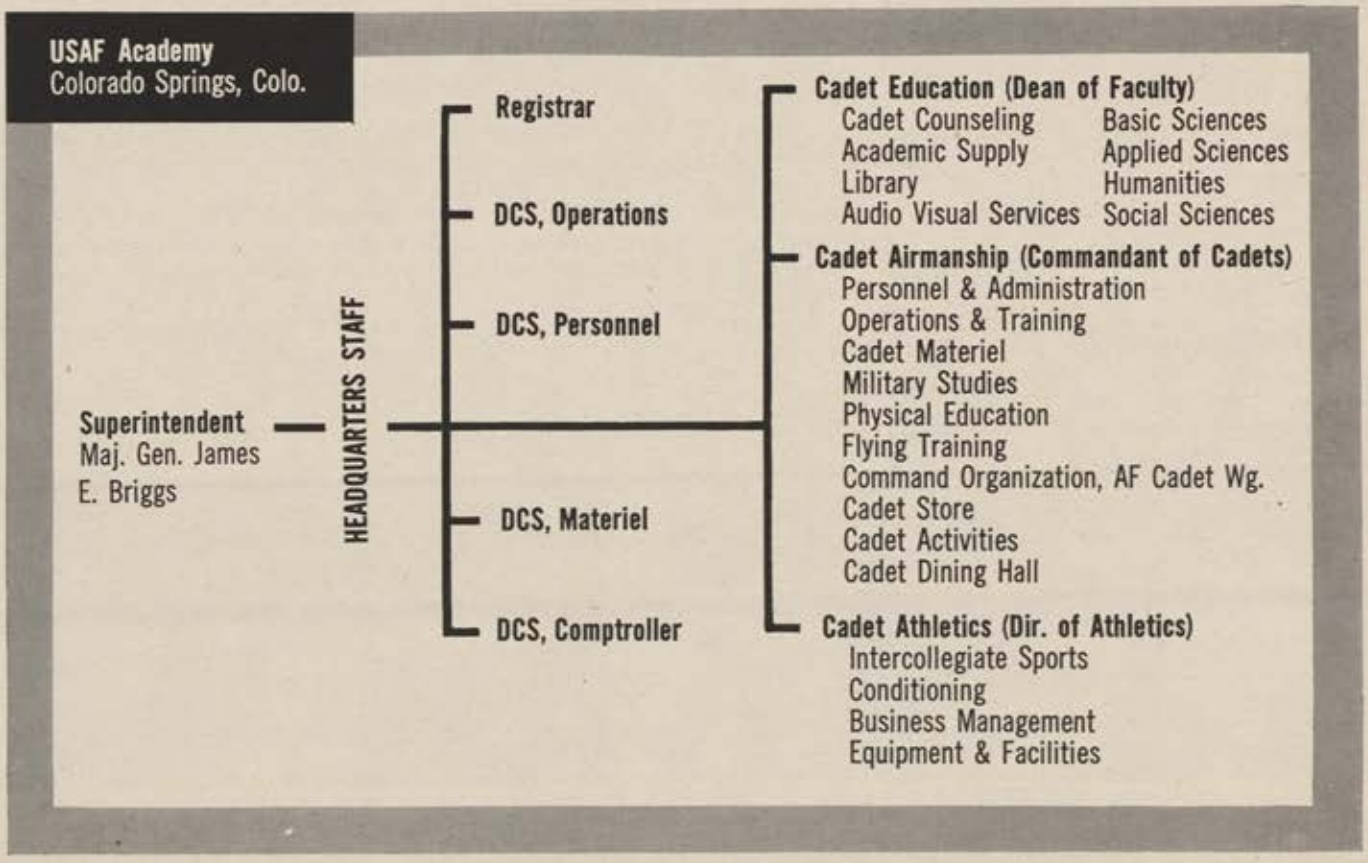
The cadet's professional education is centered in the military airmanship program which includes military studies, flying training, and physical education. The cadet studies the principles of Air Force management and leadership and the application of those principles. He learns about the organization, support, and employment of air, sea, and land forces, and about the national security structure. His instruction includes first-hand observation at American and allied military installations in the United States and overseas. Also, the cadet practices aerial navigation in Convair T-29 Flying Classrooms, and receives an introduction to pilot training. Full-scale pilot training must wait until after graduation. Upon graduation, a cadet will receive a bachelor of science degree, a commission as a second lieutenant, and the wings of a navigator.

Classroom scene at the Academy. Classes are small and usually informal to allow best presentation of subjects. Cadets spend nearly 3,000 classroom hours in four years.

The Academy conducts a carefully developed physical education program. All cadets not engaged in a seasonal intercollegiate sport must participate at least twice each week in intramural competition. With a student body of about 1,100—less than half the total authorized strength of 2,520 to be reached in the early 1960s—the Academy at the beginning of the 1958 football season faces a tough intercollegiate schedule. Iowa, Stanford, Utah, and Colorado are among its ten opponents. The next year, the first Air Force-Army game is scheduled, and 1960 will witness the beginning of another great sports tradition, Air Force football competition with Navy.

Permeating every activity of the cadet is the Honor Code. After the end of their first summer of strenuous training, and before the beginning of the first academic year, the cadets subscribe to these principles: "We will not lie, cheat, or steal, nor tolerate among us those who do." The code is administered by the cadets themselves. Rigorous discipline also is part of the Academy program.

The Academy, throughout its brief history, has endeavored to secure young men capable of growth in knowledge, skill, and in the ability to think for themselves, and who possess the qualities of leadership, and who would dedicate their lives to service to their country as Air Force officers.—END



Aircraft Proximity Warning System utilizes modulated beams of light to detect the approach of aircraft from *any* direction as far away as 5 to 7 miles.

Voice Messages ride "silent" beams of light between control tower and aircraft.

COMMUNICATIONS
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The light that makes these words readable is brother to a new kind of light — *modulated light*. But modulated light is no ordinary brother by any measure. It can't be jammed or intercepted by any known means. Invisible, if desired, it can transmit "silent" words . . . reach out into miles of sky to give warning . . . trigger a bomb . . . give jam-free guidance to supersonic missiles . . . you name it!

It's photo elastic modulation that does the trick! Inexpensive, simple light modulating equipment developed by Decker Corp. promises to solve problems throughout the entire field of communications and control. If you'd like to find out more about modulated light and what it can do, we'd welcome an opportunity to demonstrate the technique.

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Interception-proof Military Communication System employs invisible, jam-proof light to transmit vital voice messages in air-to-air, air-to-ground, and ground-to-ground communications.

Jam-proof Missile Guidance attains new accuracy and reliability through control by modulated light.

• AIR FORCE ACCOUNTING AND FINANCE CENTER

Money Headquarters

THE Air Force Accounting and Finance Center, 3800 York St., Denver, Colo., has one primary goal: up-to-the-minute fiscal service for the Air Force.

For hundreds of years, military forces could plan budgets months ahead, and—in peace or war—be fairly sure that their budget money would be available in time to take advantage of the comparatively slow-paced military technical progress.

The jet age—and tomorrow's rocket age—have changed this leisurely approach to military accounting activities.

The new Air Force thinking watches the airpower dollar, not from the historical "bookkeeping" aspect, but from a day-to-day combat viewpoint. That is, with just so many dollars now available, how can the air arm move these monetary forces—swiftly—to take advantage of today's scientific strides?

Knowing how it stood two or three months ago in the fiscal battle does not permit the Air Force to use its dollars to full advantage. Thus technology has put new demands on the accounting system.

In 1957, the Center took over from the Pentagon all Air Force accounting. Shortly after that Col. Edward J. Hopkins, formerly Director of Accounting of the Air Materiel Command, was named to head the Center. Under Colonel Hopkins, whose primary duty is Assistant Comptroller of the Air Force Fiscal Operations, the Center has taken the AMC "Hi-Valu" approach and applied it to fiscal problems: have the specialists use more of their brainpower on the millions of dollars that will affect deterrent capability and less of their brainpower on the thousands.

With this in mind, the Center is working to speed, improve, and simplify the fiscal reporting system with the goal of providing combat commanders, strategic planners, and research chiefs with up-to-date, easy-to-understand data on their dollar obligations and expenditures.

As plans develop, the Center and its 325 field offices around the world will combine electronic data-processing and instantaneous worldwide communications systems to provide its services. As a first step, it now makes use of the Air Force transceiver network. This system enables the Center to obtain immediate reproduction of complex financial figures at the Denver "home office" from command headquarters. In Denver, the financial reports are analyzed for Air Force headquarters and other government agencies in Washington.

But the techniques of processing and communication are of complementary, rather than of primary, importance. The Center is giving the closest attention to the *value* of the information that is being relayed. Service to the commander, not restrictions on his command authority, is the Center's concept of its mission.

All Air Force central accounting is performed at the Center. It maintains the "proprietary" accounts—those which keep dollar tabs on all Air Force property, now totaling about $70 billion in worth; it keeps "appropriations" accounts—the dollars allocated to the Air Force for its thousands of projects—and knows how those dollars are allocated in turn around the world; and it maintains "expenditure" accounts, requiring analysis of about 400,000 paid bills each month.

Check-disbursing machine at Denver writes and mails allotments for Air Force and civilian employees based overseas.

In the finance function, the Center oversees payments for Air Force equipment and materiel and the pay of Air Force people everywhere. This involves about 34,000,000 separate transactions annually.

In an average month the Center issues more than 700,000 checks, $1.5 billion worth annually. Most of these are allotment checks, mailed promptly at month's end to banks, insurance companies, and families after deduction from the pay of officers and airmen.

The largest single checks—about $56 million apiece—go to the Internal Revenue Service every three months and represent income tax withheld from Air Force personnel. Additional millions of dollars are turned over to the Social Security Agency. All retired pay is also mailed from the Denver installation.

To carry out these and other fiscal services the Center employs approximately 1,900 persons, all Civil Service employees with the exception of sixty key Air Force officers.

The Center was organized as the Air Force Finance Center in January 1951 and, under the new accounting approach, was renamed the Air Force Accounting and Finance Center in September 1957.—END

Housekeeper and Host

HEADQUARTERS Command, USAF, at Bolling Air Force Base, D. C., was so designated on March 19, 1948. It had previously been the Bolling Field Command. Its mission is (1) to provide aircraft for and supervise the administrative and proficiency flying in the Washington area; (2) provide administrative and logistic support for Headquarters USAF and Air Force units in the Washington area that are not self-supporting; (3) operate the 1020th Special Activities Wing, Fort Myer, Va., to which are assigned military missions throughout the world; (4) provide disbursing services for Headquarters USAF; (5) provide statistical services for assigned and attached organizations; (6) organize, train, and maintain a ceremonial unit to represent the Air Force at public ceremonies; (7) provide housing and dining facilities for all airmen on duty within the Military District of Washington; (8) provide casualty service; (9) participate in disaster relief and other domestic emergencies; (10) monitor a Reserve training program; and (11) conduct and support Air Force balloon operations.

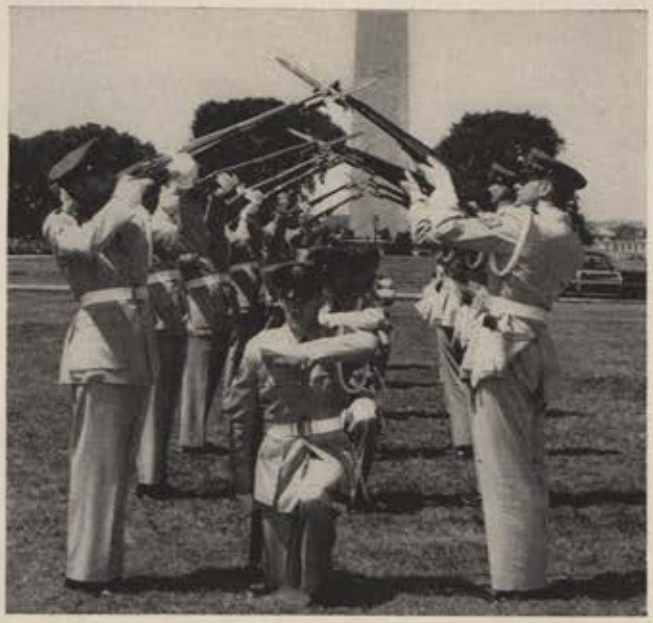
Maj. Gen. Reuben C. Hood, Jr., has been the Commander of Headquarters Command since August 1, 1956. The 1100th Air Base Wing, which operates Bolling Air Force Base, has, since its reactiviation on December 1, 1957, been under the command of Col. Edwin B. Miller, Jr. Andrews Air Force Base has been assigned to Headquarters Command, USAF, since October 1, 1957; it was also under the jurisdiction of this command between 1949 and 1952.

Andrews is the largest activity assigned to Headquarters Command. It extends over 4,420 acres and is today operated by the 1001st Air Base Wing under Col. William T. Smith. The combined air traffic of Bolling and Andrews averaged 21,707 aircraft movements per month for fiscal year 1958.

During most of World War II, Andrews was known as Camp Springs Army Air Field. In March 1945 the base was renamed in honor of Lt. Gen. Frank M. Andrews, USAAF, Commanding General of the United States Forces in Europe, who was killed in an airplane crash off Iceland, May 3, 1943.

For a long time Bolling Field was the only exempted station in the Air Corps, and from 1941 the Army Air Forces, operating directly under the Commanding General, AAF. In July 1945, Bolling Field was assigned to Continental Air Forces, a tenant on the base since March 1945. Continental Air Forces was redesignated Strategic Air Command in March 1946, while still at Bolling Field. But in October 1946 it moved to Andrews Field where it remained until moving in 1948 to Offutt Air Force Base, Neb.

Andrews Air Force Base was the home of Headquarters Military Air Transport Service from August 1946 to January 1958. In January 1958, Headquarters Air Research and Development Command moved to Andrews. Other units on the base are the 113th Fighter-Interceptor Wing (2257th Air Reserve Flying Center), 1823d AACS Group, 2045th AACS Group, Headquarters 4th Weather Group, 95th Fighter-Interceptor Squadron, 4716th Ground Observer Squadron, and Detachment 1 of the 12th Aero Medical Squadron.

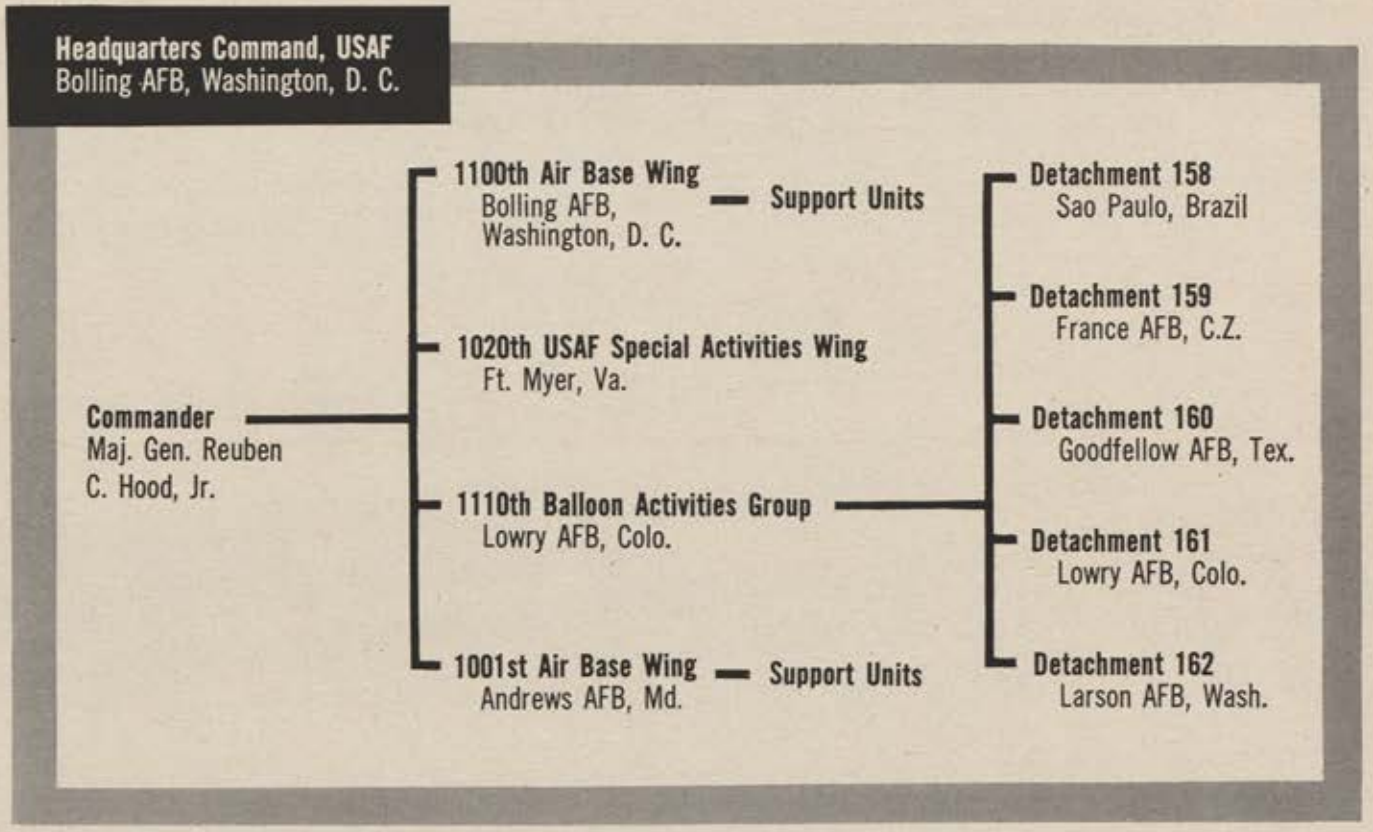


Headquarters Command's 1100th Security Squadron boasts a crack drill team, here performing in Washington, D. C.

The 1020th Special Activities Wing, at Fort Myer, Va., is under Col. Lawrence P. Dash. The wing serves as a carrying agency and provides limited administrative services for USAF personnel assigned to USAF military missions, commissions, advisory groups, air attaché systems, schools and similar activities, and for personnel assigned to "field extensions" and "special activities" of Headquarters USAF.

One of the unique organizations of the Air Force, assigned to Headquarters Command, is the 1110th Balloon Activities Group under Lt. Col. John A. Buckley at Lowry Air Force Base, Colo., with detachments in Brazil, the Canal Zone, Texas, and Washington.

Bolling Air Force Base has been the home of Headquarters Civil Air Patrol since 1946. The AAF Band was formed there in 1941, and its current counterpart, the United States Air Force Band, continues to make its headquarters there. The Band includes the Symphony Orchestra



and the Drum and Bugle Corps. The Bandsman School, USAF, another tenant of Bolling Air Force Base, is assigned to the 1100th Air Base Wing.

The Drill Team, formed from personnel in the 1100th Security Squadron, performs at public ceremonies throughout the country.

Bolling's long history goes back even before World War I, when the need for a landing field in the Washington area was recognized. Anacostia Flats was chosen because of its convenience to downtown Washington and the fact that the land was already under the jurisdiction of the federal government.

The building site selected in 1917 was between St. Elizabeth's Hospital and the Anacostia River. The estimated cost of the original construction was $69,000 for a barracks, two hangars, and grading and preparing the field. In 1958 the buildings and grounds at Bolling Air Force Base, and assigned activities in the Washington area other than Andrews Air Force Base, represented an investment of approximately $20 million, with a replacement cost many times that figure.

The first American officer of high rank to lose his life in World War I, Col. Raynal Cawthorne Bolling, was honored on July 1, 1918, when the landing field under construction in Washington was named for him.

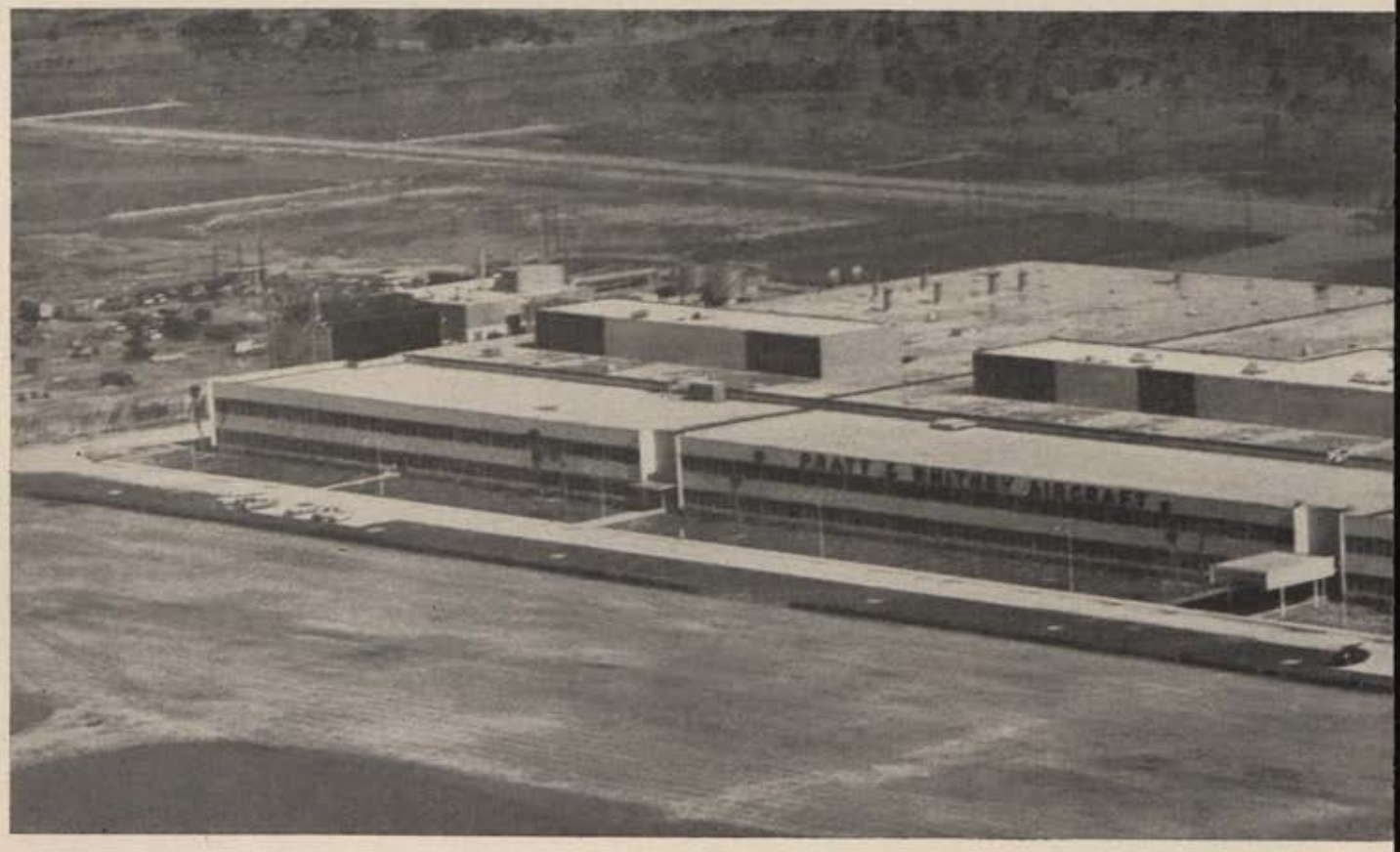
Immediately after the Armistice, there was great public pressure to reduce military expenditures as well as some doubt as to the best location for a permanent landing field in the Washington, D. C., area. Some consideration was given to College Park, Md., and to Mount Vernon, Va. However, no move was made because of the cost involved. Brig. Gen. William Mitchell used his considerable influence to keep Bolling Field in operation.

Bolling Field figured prominently in the development of both military and civil aviation in the 1920s and 1930s. The first annual National Army Air Tournament, in which half a dozen countries were represented, took place in May 1920. Later the same year, in October, General of the Armies John J. Pershing and General Mitchell came to greet Capt. (later major general) St. Clair Streett when he returned with the flight he had led to Alaska. Captain Streett was assigned to Bolling Field as Operations Officer in 1921. He was one of the principal planners for the round-the-world flight by Air Service pilots in 1924.

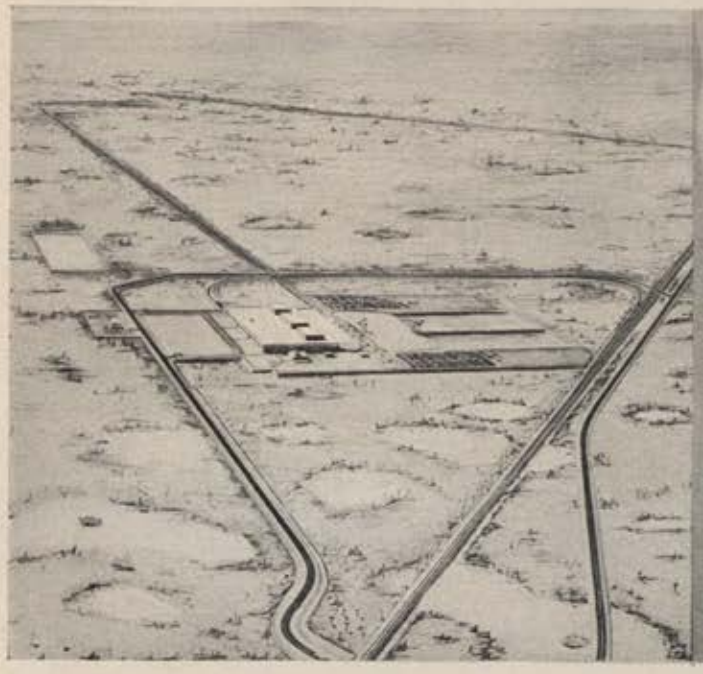
The most significant development of the 1930s at the base was the construction of New Bolling Field, directly south of the old location, which was turned over to the Navy in 1937. The facilities of the new base were taxed to the utmost during World War II. The mission of Bolling Field at that time was (1) to supply air transportation and other services for the War Department and other agencies of the federal government; (2) to be ready to participate in the air defense of Washington; and (3) to supply trained men to combat organizations.

The Bolling Field echelon of Headquarters Eighth Air Force was extremely active in the spring of 1942, especially in the procurement of personnel for movement to England. The Twelfth Air Force was activated at Bolling Field in August 1942 for the invasion of North Africa.

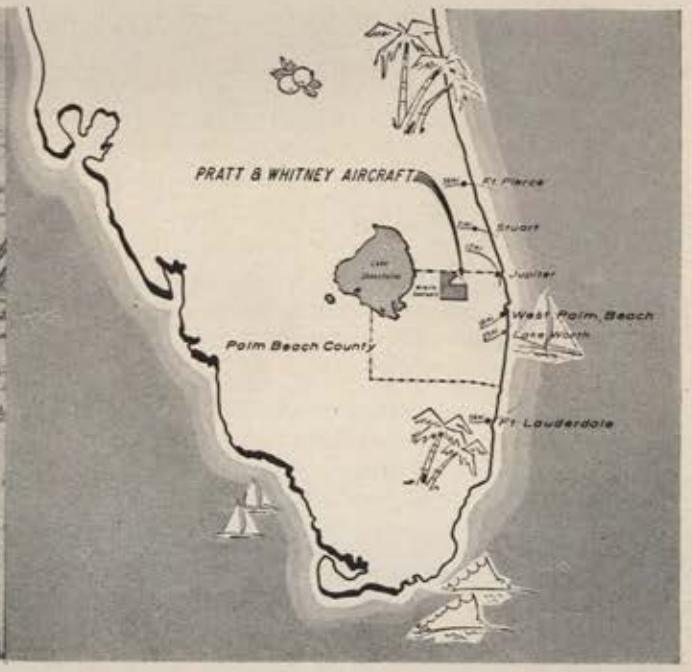
The turbulent postwar years have focused continuous attention on Bolling Air Force Base. A majority of the people coming to Washington for temporary duty at Headquarters USAF make some use of base facilities, particularly dining, housing, and transportation. One of its unusual features is the boat service that operates between the south end of the base and the Pentagon. The commissary, club, and other privileges are used by many Air Force personnel who have no other "home" in the Washington area. Today Headquarters Command, with its assigned and attached organizations, is both housekeeper and host for the Air Force in the nation's capital.—End



FLORIDA RESEARCH AND



ISOLATION—Ten square miles comprise the site of Pratt & Whitney Aircraft's new Florida Research and Development Center. Experimental shops and offices covering some 17 acres are in the foreground, while the tests areas, barely visible in upper left, lie four miles in the background.



LOCATION—The new Center is located at United, Florida, midway between West Palm Beach and Lake Okeechobee, in the upper Everglades area. It is almost surrounded by a wildlife sanctuary. Most employees live in the cities and towns along the east coast of Florida, driving to the Center on excellent new highways.

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Future aircraft and missiles may require propulsion systems far different from those in wide use today—different in size, power output, appearance and perhaps even in the basic method of utilizing energy.

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The new Florida Center, financed and built by Pratt & Whitney Aircraft, is unique in America's air industry. Here a completely air-conditioned plant with 17 acres under roof is specially designed and equipped for the development of new power plants of virtually any type. Testing is handled in special isolated areas; the nearest is four miles from the plant and many miles from any inhabited area. The new Center can be greatly expanded on its 10-square-mile site. Continued isolation is insured by a vast wildlife sanctuary in which the Center is located.

Today about 1800 people are employed at the Center, of whom about half are scientists, engineers and highly trained technicians. By late next year, a total of about 3500 employees is anticipated.

The new Florida Research and Development Center is one more reason why Pratt & Whitney Aircraft is able to continue producing the world's best aircraft propulsion systems . . . in whatever form they take.

Pratt & Whitney Aircraft

Division of United Aircraft Corporation

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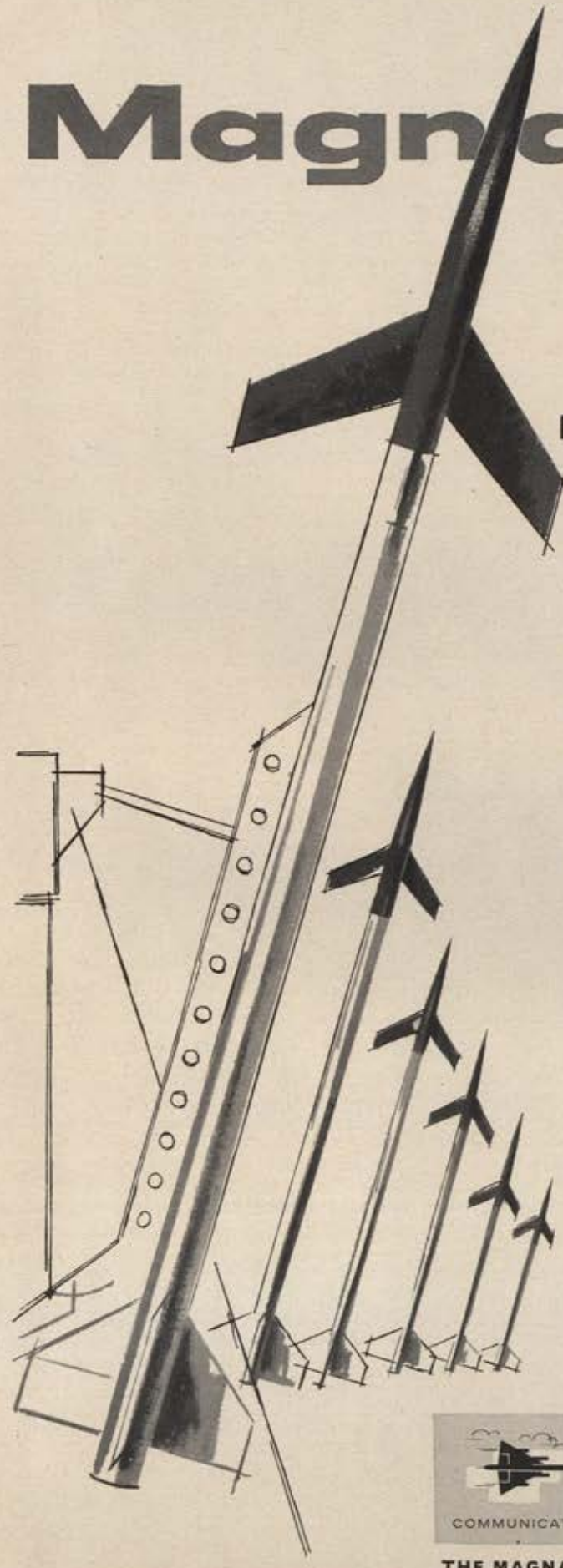
FLORIDA RESEARCH AND DEVELOPMENT CENTER—United, Florida.

Magnavox

data handling equipment for missile maintenance...

Magnacard



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Friendly Foe

When a new air defense missile is produced, its "kill accuracy" is theoretical until it is tested against a realistic target under operational conditions. The new, supersonic missile target, **USAF XQ-4,** is one of many "friendly foes" developed by Radioplane to simulate various air enemy threats.

Duplicating the performance and radar appearance of a supersonic, high-altitude bomber, the radar-controlled XQ-4 is designed to test the seek-and-kill ability of air defense systems and their missiles.

As major advancements have been made in U.S. Armed Forces air defense weapon systems, Radioplane has designed and developed targets compatible with the missions of these weapons. The XQ-4, for example, not only imitates invading bombers, but tallies up the score of hits and misses when fired upon.

Radioplane, the first to produce remotely controlled target aircraft, maintains dynamic research programs to seek low-cost solutions for tomorrow's defense problems.

Radioplane

A Division of Northrop Aircraft, Inc.

VAN NUYS, CALIFORNIA, AND EL PASO, TEXAS

July 1, 1957 — June 30, 1958

HIGHLIGHTS OF THE YEAR IN THE USAF

July 1, 1957—Gen. Thomas D. White became Chief of Staff, USAF. On the same date he was succeeded as Vice Chief of Staff by Gen. Curtis E. LeMay, promoted from command of SAC.

July 3, 1957—Snark, a 5,000-mile intercontinental cruise missile, went into production. Snark operates at near-sonic (600-700 mph) speeds. While its speed does not compare with that of ballistic missiles, Snark is more accurate and, presently, can carry a heavier load.

July 10, 1957—The Convair B-58, our first supersonic bomber, was publicly unveiled. The Hustler can fly at twice the speed of the B-52. It has a radical design which includes a needle-like fuselage, a delta-shaped wing, and a disposable pod that can house a nuclear bomb.

July 10, 1957—The 704th Strategic Missile Wing, the first in the USAF, was activated at Cooke AFB, Calif., to train with the Snark missile.

July 15, 1957—The Tactical Air Command began a mobility test exercise by deploying elements of its composite strike force over three widely separated areas of the globe. Participating were day fighter, fighter-bomber, light bomber, reconnaissance, troop carrier, and tanker aircraft.

July 19, 1957—The first nuclear defense rocket was perfected. An F-89 Scorpion fired an MB-1 Genie rocket over the heads of exposed Air Force observers on Yucca Flat, Nev. The nuclear charge could have destroyed a scattered formation of planes, yet the detonation had no ill effects on those on the ground. MB-1 will be mounted on new Mach 2 interceptors.

July 24, 1957—The Falcon GAR-2A, a heat-seeking infrared missile which would be attracted to jet exhausts or other heat-emitting sources, was successfully tested.

July 24, 1957—In compliance with a DOD directive, the USAF announced plans to reduce manpower to reach a military strength of 900,000 by December 31, 1957.

July 31, 1957—DEW Line, a distant early-warning radar system costing $500 million, was announced as fully in operation. DEW Line extends across North America from its eastern terminus on Baffin Island to Cape Lisburne on the northwest coast of Alaska.

August 1, 1957—NORAD, a joint US-Canadian organization to defend North America from air attack, was established by informal agreement, formally consummated by treaty on May 19, 1958. Gen. Earle E. Partridge commands.

August 6, 1957—SAC announced it would activate the first squadron of Bell GAM-63 Rascal air-to-surface, rocket-powered, guided missiles for operational use. Rascals will be launched by B-47 Stratojets many miles from their targets and will arrive there at supersonic speeds.

August 15, 1957—Gen. Nathan F. Twining became Chairman, Joint Chiefs of Staff, the first Air Force officer to serve in this important post.

August 19-20, 1957—Maj. David G. Simons, USAF, an AF doctor, soared nineteen and a half miles to the rim of the stratosphere to set a new manned-balloon altitude record. He was airborne for thirty-two hours.

August 26, 1957—The Soviet Union claimed to have successfully tested a "super-long-range" intercontinental multistage ballistic missile.

August 28, 1957—The USAF took delivery of the first C-133A, a giant transport which can haul nearly 100,000 pounds of cargo for 1,000 miles. This aircraft can also fly the equivalent of twenty loaded freight cars from Los Angeles to New York.

September 1, 1957—Col. Emma Jane Riley became Director of the WAF, succeeding Col. Phylis D. Gray, who retired.

September 13, 1957—The 1st Missile Division was activated under ARDC with headquarters at Cooke AFB, Calif.; it was organized to plan and prepare for future operational units of this type.

September 20, 1957—General White announced that radar had been developed with detection ranges on ICBMs out to 3,000 miles.

October 1, 1957—Gen. Thomas S. Power, SAC Commander in Chief, set as a goal an operational status that

would place one-third of SAC's aircraft and crews on a fifteen-minute alert basis.

October 21, 1957—USAF scientists fired a four-stage rocket into space as part of Operation Far Side. The end-stage rocket reportedly reached 2,400 miles into outer space after it was launched from a balloon supported from a platform 100,000 feet above Eniwetok Atoll.

October 23, 1957—An Air Force Bomarc interceptor missile sought out and destroyed a drone more than 100 miles out over the Atlantic Ocean at a height of over 60,000 feet. In this test the Bomarc, which had no warhead, followed the drone so closely that a collision resulted. Total elapsed time between alerting the missiles and launching was less than two minutes.

November 11-13, 1957—Gen. Curtis E. LeMay flew a Boeing KC-135 tanker from the US to Argentina in thirteen hours and two minutes, covering 6,350 miles and setting a new world record for nonstop, nonrefueling jet flight. On the return flight, the KC-135 reached Washington in eleven hours and five minutes, setting another record for the 5,204 miles from Buenos Aires.

November 16-18, 1957—Six B-52s made a 10,600-mile nonstop round trip to Argentina, teaming the Stratofortress on a refueling operation with the KC-135 tanker, underscoring the Air Force claim to a global combat capability for its bomber force.

November 21, 1957—ICBM bases were begun at Francis E. Warren AFB, Wyo., the first of a number of such bases to be built.

November 22, 1957—An integrated atomic aircraft project was established between the AEC and the Defense Department. Maj. Gen. Donald Keirn, USAF, was selected to head the ANP (Aircraft, Nuclear Powered) project.

November 27, 1957—Secretary of Defense Neil McElroy ordered the Air Force Thor IRBM into production.

November 27, 1957—Four RF-101 Voodoo jets, flying at speeds near 800 mph, broke three records in a transcontinental round trip from New York to Los Angeles and return. Capt. Robert Sweet, fastest of the four pilots, accomplished his flight in six hours and forty-two minutes.

November 30, 1957—General White announced that the ICBM and IRBM had been placed under SAC to speed USAF readiness to integrate these ballistic missiles, when they are ready, into the operational forces.

December 5, 1957—The first Snark operational unit, the 556th Intercontinental Guided Missile Squadron, was activated at Patrick AFB, Fla., to be stationed at a missile site under construction at Presque Isle AFB, Me.

December 12, 1957—Maj. Adrian E. Drew piloted a McDonnell F-101 Voodoo to a speed of 1,207.6 mph over Edwards AFB, Calif., to recapture the official world's speed record held by Great Britain.

December 17, 1957—The USAF successfully fired an Atlas ICBM for the first time at Cape Canaveral, Fla. In this limited range test of a reported 500 miles, the missile landed in the preselected target area.

December 23, 1957—The Air Force awarded North American Aviation a development contract for the B-70 bomber, which will be powered by chemical fuels and be capable of speeds in excess of 2,000 mph at ceilings in excess of 70,000 feet.

January 1, 1958—The 672d Strategic Missile Squadron, using the Thor IRBM, was activated under the command of Col. Harry J. Zink, USAF.

January 6, 1958—The Air Force set up the Stever (Ad Hoc R&D) Committee to conduct a thorough review of all phases of the Air Force R&D program and to make recommendations to improve its effectiveness. Chairman is Dr. H. Guyford Stever, former Chief Scientist, USAF; committee includes eight other distinguished scientists and administrators.

January 15, 1958—The 864th Strategic Missile Squadron, using the Jupiter IRBM, was activated under the command of Col. William C. Erlenbusch, USAF.

January 15, 1958—The Air Force activated the 4751st Air Defense Missile Wing, to develop and conduct a training program for Bomarc missile units. The Bomarc is presently capable of ranges up to 250 miles at supersonic speeds. It already has scored a kill on a drone aircraft over 100 miles away at 60,000 feet.

January 18, 1958—Secretary of Defense McElroy clarified the respective responsibilities of the Army and Air Force in the anti-ICBM detection field. He directed the Air Force to concentrate on that part of its Wizard program that pertained to the radar and data-handling aspects, so as to work it in with the SAGE system. The Army was directed to continue to perfect the Nike-Zeus program, concentrating on system developments so as to produce an effective defense against the ICBM at the earliest time.

January 25, 1958—The Snark SM-62 intercontinental guided missile was flown the full 5,000-mile length of the Cape Canaveral test center's flight range, the first full-range test launching for this missile.

January 28, 1958—A Thor intermediate-range missile was successfully fired at the Cape Canaveral missile range in Florida as one in a series of missile flight tests. The Thor flew its prescribed course and landed in the preselected impact area.

January 28, 1958—The Thor intermediate-range missile had a successful launching, the sixth of seven tries, and the eleventh of the Thor's test program.

February 8, 1958—The USAF awarded a contract to RCA for systems management of a ballistic missile early-warning system that will use existing communications, including DEW Line, to the maximum, and will work in conjunction with the SAGE system. The system is designed to detect enemy missiles at maximum distance from North America to provide early warning for NORAD, SAC, and civil defense agencies.

February 24, 1958—The US State Department announced an Anglo-US agreement under which Thor missiles will be provided by the US. The UK will man, operate, and own the missiles, as soon as Britons are trained by the United States. The nuclear warheads, however, remain American property.

February 28, 1958—The USAF was authorized to proceed with Project Minuteman, which, it is hoped, will establish the feasibility of a solid-propellant ICBM. In addition, the USAF was directed to consider the use of the Navy-developed Polaris missile as a second-generation land-based IRBM. Polaris is expected to have an earlier operational availability, although the USAF conceives that the Minuteman project may ultimately lend itself to an IRBM employment.

February 28, 1958—The USAF received the go-ahead order from William M. Holaday, Defense Director of Guided Missiles, to find a more easily handled liquid propellant than the liquid oxygen now in use. USAF will pursue this project, especially for use in Titan missile system.

March 11, 1958—An Air Force Boeing B-47 Stratojet dropped an unarmed nuclear weapon near Florence, S.C., because of "mechanical malfunction of the plane's bomb-lock." Prompt and full explanations by the USAF, as well as generous aid rendered the family that was made homeless by the conventional explosion of the trigger, did much to allay public feeling about aircraft carrying nuclear loads over populated areas.

March 15, 1958—A contract for $150 million, one of the largest to date, was awarded to the American Bosch Arma Corporation, Hempstead, N.Y., for inertial guidance sys-

(Continued on following page)

tems to be provided the Titan ICBM, which is expected to be fired in flight test before the end of the year.

March 26, 1958—White Alice, the new military telephone and telegraph system, went into full operation in Alaska. White Alice employs tropospheric scatter, using large antennas resembling outdoor movie screens, which beam ultra-high-frequency radio signals against the troposphere, the five-mile-thick envelope of air that surrounds the earth. White Alice antennas are sensitive enough to pick up a tiny fraction of the signal that is deflected downward. The signal is greatly amplified and sent leap-frogging to the next antenna, which is as much as 170 miles away. In this manner, the most isolated posts in the Arctic have been brought into close, quick communication with headquarters.

March 27, 1958—Lt. Col. David G. Simons won the Fédération Aéronautique Internationale Gold Medal for having soared 101,516 feet into space in a free balloon. Colonel Simons turned himself into a human guinea pig in a historic thirty-two-hour flight to gather invaluable data on man's ability to survive in the substratosphere. Past winners of the FAI award include Charles A. Lindbergh, Wiley Post, Jacqueline Cochran, James Doolittle, and Charles E. Yeager.

March 27, 1958—Secretary of Defense McElroy announced that the Advanced Research Projects Agency (ARPA) would proceed with several space projects, including three lunar probes which were assigned to the USAF Ballistic Missile Division, ARDC, in Inglewood, Calif. AFBMD plans to use a Thor-Vanguard system with a third stage to be developed.

April 1, 1958—Two SAC ICBM units were activated at Cooke AFB, the 576th Strategic Missile Squadron, SAC's first of this type, and the 393d Missile Training Squadron, which will train the 576th Squadron for deployment to Francis E. Warren AFB, Wyo. Other squadrons will be trained for missile sites as they become available.

April 2, 1958—President Eisenhower requested supplementary funds from Congress for the fiscal year 1959 defense budget. In addition to $136.6 million it would get for military construction, the USAF share would include $577.1 million to speed the Minuteman solid-propellant ICBM, the GAM-77 Hound Dog missile, the Titan ICBM, and more procurement funds for thirty-nine B-52s and twenty-six KC-135s that would permit the Air Force to replace a B-47 wing with another B-52 wing.

April 8, 1958—An Air Force KC-135 Stratotanker set a new nonstop, nonrefueled distance record for jets when it flew 10,228 miles from Tokyo to Lajes Air Base in the Azores.

April 16, 1958—President Eisenhower sent draft legislation to Congress proposing reorganization of the Defense Department to concentrate more authority in the Office of the Secretary of Defense, to eliminate service rivalries and duplication. General White, Chief of Staff, USAF, backed the plan without reservation.

April 20, 1958—USAF announced the beginning of a nationwide survey by SAC of civil airports for the purpose of evaluating the total existing airport assets of the nation that would be available to support military operations.

April 23, 1958—A reentry test vehicle consisting of a Thor and a special second-stage Aerojet propulsion unit with a mouse in the nose cone was launched from Cape Canaveral to obtain data on the ability of animal life to sustain the rigors of spaceflight.

April 28, 1958—USAF announced beginning of tests of improved Bomarc IM-99, which would extend its range from 200 to 400 miles. In these tests, some thirty-five to forty missiles will be fired to achieve high standards of reliability and performance.

May 7, 1958—An Air Force Lockheed F-104 Starfighter, piloted by Maj. Howard C. Johnson, attained a new world altitude record of 91,249 feet, more than two miles higher than the unofficial record of 80,190 feet recently set by a French plane.

May 13, 1958—The USAF streamlined logistic support of European bases involving consolidation or closing of depots or materiel areas, and concentration of authority in Headquarters Air Materiel Force, European Area (AMFEA), while moving it from Wiesbaden, Germany, to Chateauroux, France. Reorganization is intended to eliminate the middleman in logistics, hence permit bases in Europe to reduce stocks on hand and enable operational units to procure logistic support directly from the US.

May 12, 1958—The USAF announced that Congress would be asked to authorize construction of ten Bomarc missile facilities costing $122 million in nine states along the northern tier of the US.

May 16, 1958—Capt. Walter W. Irwin flew an F-104 Starfighter to a speed of 1,404.19 mph, above Edwards AFB, Calif.

May 21, 1958—The USAF announced that the initial launching sites for Titan ICBM would be at Lowry Range, near Denver, Colo.

May 27, 1958—Delivery of the first Republic F-105 Thunderchief fighter-bomber to the USAF ushered in a new era of flexible nuclear airpower. The Thunderchief can fly 1,300 mph and, by aerial refueling, can carry an H-bomb on a global mission.

June 1, 1958—Public Law 85-422, a military pay bill, went into effect. It provides all military personnel with more than two years of service an increase of at least six percent. It contains provisions for additional proficiency pay to encourage highly skilled personnel to remain in uniform.

June 3, 1958—An advanced inertial system, announced jointly by the AF and NACA, will guide the hypersonic X-15 research plane, which in 1959 is expected to fly more than 3,600 miles an hour (a mile a second) at an altitude over 100 miles. The flight instrument system will help the X-15 pilot control his plane to prevent it from reentering the atmosphere too steeply or at too shallow a glide.

June 16, 1958—USAF awarded contracts for Phase I development of the Dyna-Soar boost-glide orbital bomber to two teams of contractors headed by the Martin Co. and Boeing Airplane Co. Martin team includes Bell Aircraft, American Machine & Foundry, Bendix, Goodyear Aircraft, and Minneapolis-Honeywell. Boeing team includes Aerojet-General, General Electric, Ramo-Wooldridge, North American, and Chance Vought.

June 20, 1958—Ad Hoc Committee on R&D recommended revision of AF procedures so that authority and responsibility can be delegated together; reorganization of ARDC along functional rather than geographic lines; longer term financing for some projects; reform of agencies above the AF; more flexible budgeting.

June 27-30, 1958—Two KC-135s broke established speed records when they crossed the Atlantic from New York to London in just under five hours and twenty-eight minutes, returning in five hours and fifty-two minutes. The record-breaking flights were tragically marred, however, by the crash of a third KC-135, killing fifteen people, including six newsmen.—END

(See page 193 for events from August 1, 1907, to June 28, 1957)

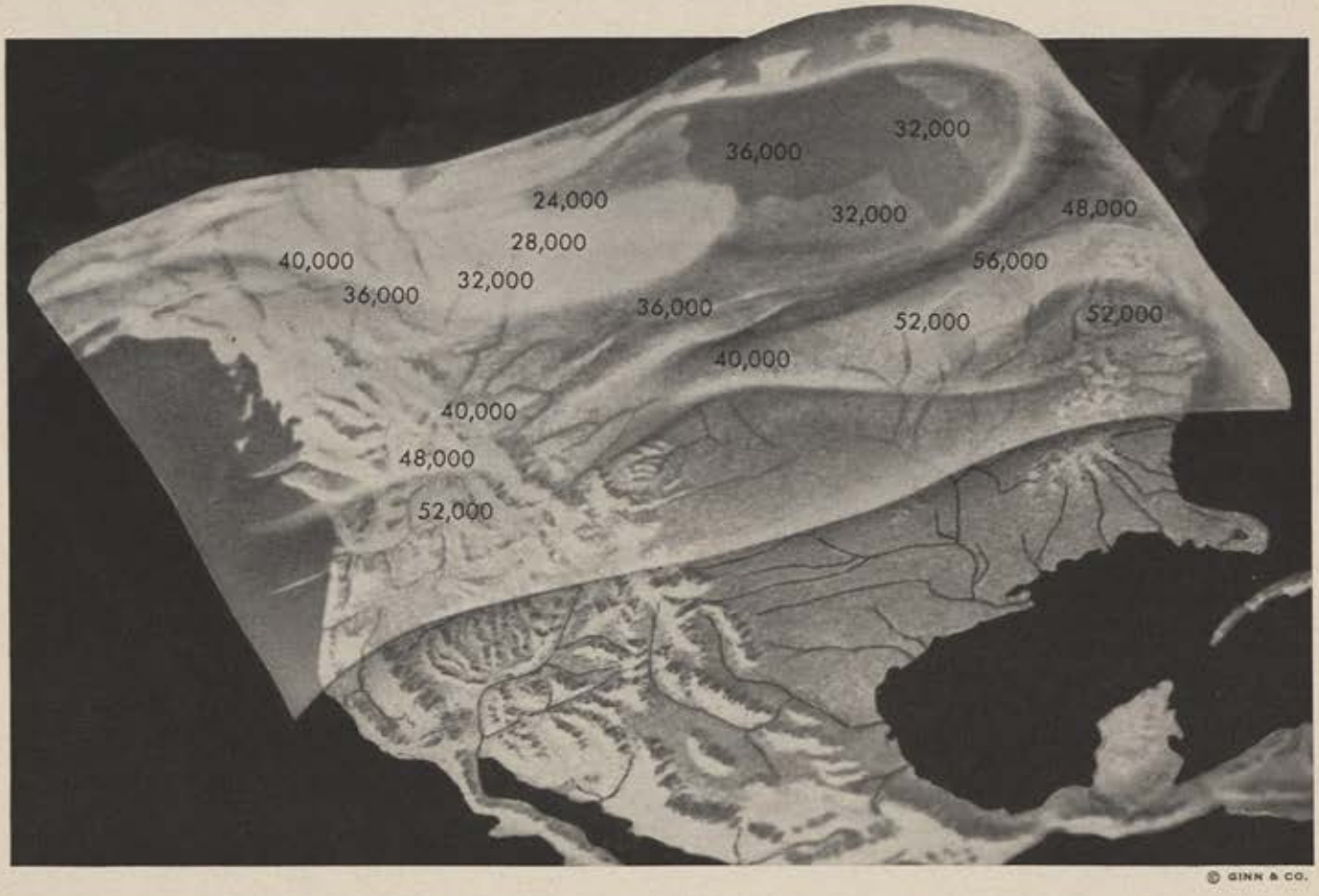
FLY WEATHER-WISE — Mobil

These weather items prepared in consultation with the United States Weather Bureau

THE TROPOPAUSE

With the introduction of turbo-prop and turbo-jet aircraft the location of the tropopause assumes greater importance. Technically, the tropopause is that point in the atmosphere where the normal decrease of temperature with altitude ceases. It is the coldest layer in the atmosphere encountered by turbine-powered aircraft. It also indicates the level of maximum winds which are always found within a few thousand feet of this tropopause layer.

As the illustration shows, the height of the tropopause varies across the United States from 30,000 ft. to 56,000 ft. In some places it slopes down almost vertically, especially over the cold side of jet streams. Notice when flying from North to South, the average range of the tropopause varies almost 100% and temperatures vary sharply under such flight conditions.



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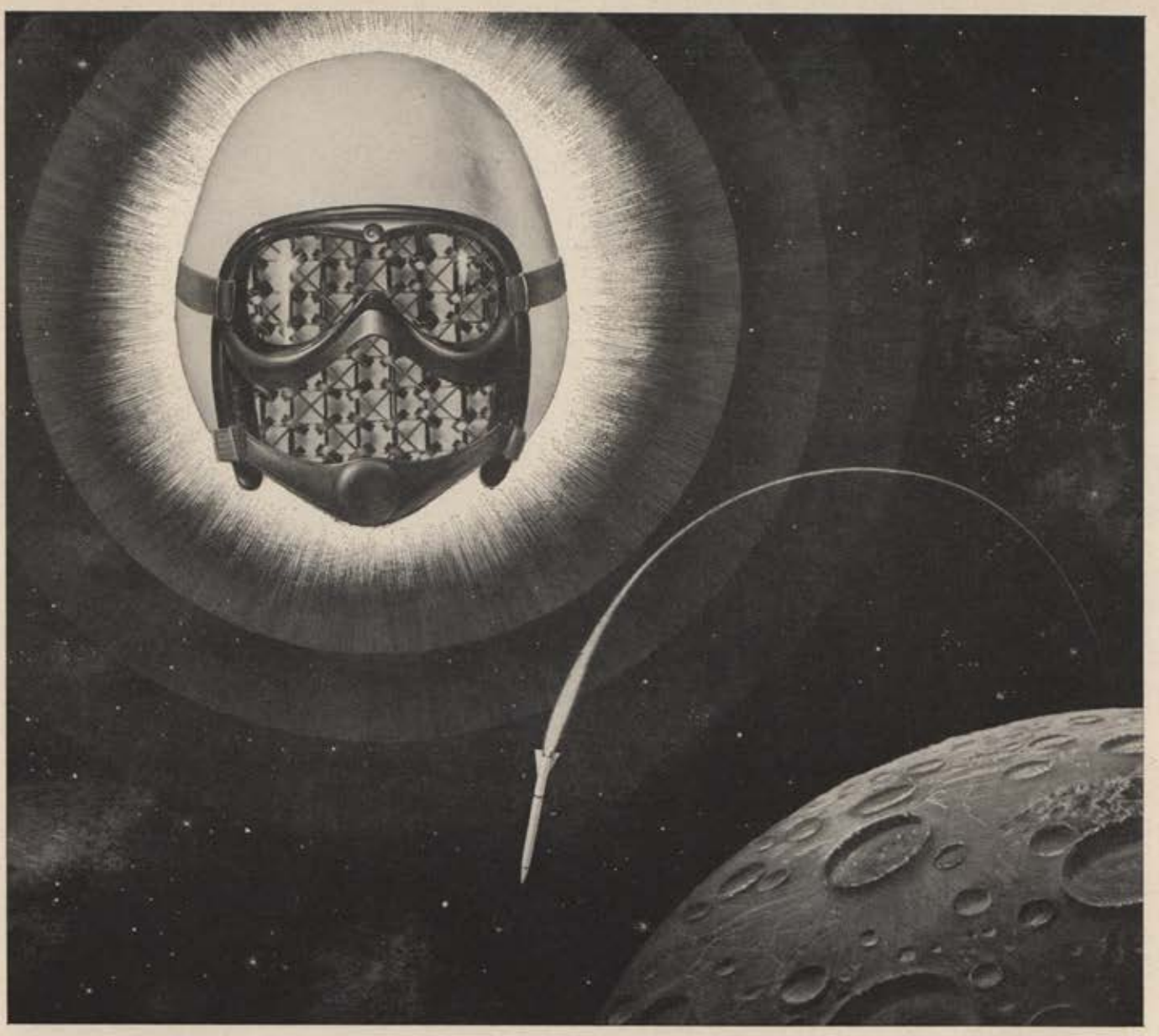

Spaceman-1958

Today, the electronic brain is the spaceman controlling the rockets and satellites probing outer space. It is a vital part of many electronic systems being developed by Sylvania to help man explore the universe.

Scientists and engineers at Sylvania Electronic Systems are developing advanced electronic systems that will contribute to man's conquest of outer space. Over 1,000 strong, their combined training and experience represents literally thousands of years of research and development work in electronics. This concentrated source of research and engineering knowledge, combined with Sylvania's outstanding laboratory and production facilities, is behind many of today's most dramatic scientific advances.

Programs currently under development by Sylvania Electronic Systems include advanced communications, microwave receivers, complex transistorized computers and such "impossible" projects as antimissile missiles. Such programs indicate the kind of experience and proven capability, from initial concept through automated mass production, that is available to you for any project, whether large or small. Call on Sylvania Electronic Systems engineers. They will welcome the opportunity to explore with you your specific project or problem.

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ELECTRONICS FOR INDUSTRY AND NATIONAL DEFENSE

August 1, 1907 — June 28, 1957

FIFTY YEARS OF AIRPOWER

A Chronology

August 1, 1907—Aeronautical Division was established in the Office of the Chief Signal Officer, US Army, consisting of Capt. Charles de Forrest Chandler and two enlisted men.

February 10, 1908—US Army signed a contract with the Wright brothers of Dayton, Ohio, for the nation's first military airplane.

September 17, 1908—Wright brothers' plane crashed at Ft. Myer, Va., killing Lt. Thomas E. Selfridge and seriously injuring Orville Wright. Selfridge was the first US military airman to lose his life.

August 2, 1909—Aeronautical Division, US Army Signal Corps, accepted the Wright "Flyer" following a successful flight of one hour and twenty minutes at an average speed of forty-two and a half mph.

September 6, 1909—First US Army airfield was established at College Park, Md.; it became a center of military aviation activities. Many early aviators, including Lt. Henry H. Arnold, flew training missions here.

October 26, 1909—Lt. Frederic E. Humphreys became the first Army officer to solo in the Army's first airplane at College Park, Md. Lt. Frank P. Lahm soloed fifteen minutes later.

March 3, 1911—Congress appropriated $125,000 for expenditure on military aviation in fiscal year 1912, the first of its kind. Congress rejected the request of Brig. Gen. James Allen, Army Chief Signal Officer, for a $1 million appropriation.

March 5, 1913—The 1st Aero Squadron, the first US military air organization to see action (in Mexico in 1916), was activated in Texas City, Tex., under Capt. Charles de Forrest Chandler.

July 18, 1914—Aviation Section was established in the US Army Signal Corps. It was charged with the operation of all military aircraft, pertinent appliances and signal apparatus installed in aircraft, and training in aeronautics.

March 3, 1915—National Advisory Committee for Aeronautics was established by Act of Congress.

March 21, 1916—Lafayette Escadrille, including American pilots, was organized by French Air Department. Escadrille flyers were the first Americans to see action in World War I.

May 20, 1916—Lt. Col. George O. Squier assumed command of the Aviation Section, Signal Corps.

July 24, 1917—Congress appropriated $640 million to expand the Aviation Section, Signal Corps, to meet the French government's request for 5,000 pilots, 50,000 ground personnel, and 4,500 airplanes by early 1918.

September 3, 1917—Brig. Gen. William L. Kenly appointed Chief of the Air Service, AEF—the first time control of all Army air activities was placed under a single chief.

October 18, 1917—Army Air Research and Development was born at Dayton Research Laboratory, McCook Field, Ohio.

October 18, 1917—Aviation Medical Research Board established by Signal Corps to explore ways to extend man's ability to tolerate higher and faster flight. Three months later, the first US School of Aviation Medicine began operation at Hazelhurst Field, Mineola, L. I., N. Y.

February 18, 1918—US airpower began to make itself felt in World War I, as the 103d Pursuit Squadron, under the French Army, began operations over enemy lines.

April 12, 1918—First action by US air units in World War I. 1st Aero Squadron attacked by enemy planes while on reconnaissance mission.

April 14, 1918—First US aerial victories in World War I recorded by Lts. Alan F. Winslow and Douglas Campbell, who shot down two German intruders over Toul airdrome.

May 18, 1918—American day bombardment aviation traces its beginnings to the establishment of the 96th Bombardment Squadron at Amanty airdrome, France.

May 20, 1918—By the terms of the Overman Act, Army aeronautics was divorced from the Signal Corps in a major War Department shakeup. Two air departments were created: the Division of Military Aeronautics—responsible for operations; and the Bureau of Aircraft Production—responsible for procurement, supply, and training.

September 12-15, 1918—Brig. Gen. Billy Mitchell directed the biggest bomber offensive of World War I, involving 1,481 aircraft in a massive assault against German lines in the St.-Mihiel area of the Western Front.

(Continued on following page)

October 1, 1918—First bombing using electrical releases instead of original "toss-bombing" method in which bombardiers heaved their explosives over the side in the general direction of a target. In this attack, 200 US planes, accompanied by 100 pursuits, and fifty-three three-place ships, dropped some twenty-two tons on a German infantry counterattack.

November 11, 1918—Armistice Day, World War I, found forty-five US Air Service squadrons, manned by 767 pilots, 481 observers, twenty-three gunners, and 740 airplanes assigned.

December 23, 1918—Maj. Gen. Charles T. Menoher was appointed Chief of Army Air Service. General Menoher regarded the airplane as an auxiliary to ground forces.

April 28, 1919—First jump with a free back-pack parachute was made at the Army Air Service Test Center at McCook Field, Dayton, Ohio, by Leslie Irving from a plane flown by Floyd Smith, designer of the parachute.

May 29, 1919—First Congressional Medal of Honor granted to a pilot was awarded to Lt. Frank Luke for extraordinary heroism in action near St.-Mihiel, France. The posthumous Medal of Honor was presented to Luke's father.

June 4, 1920—Army Reorganization Act was passed by Congress, creating a new Air Service as "a separate and coordinate branch of the line of the Army," with authorized strength of 1,516 officers and 16,000 enlisted men.

February 21, 1921—First transcontinental flight within twenty-four hours flying time was made by Lt. William D. Coney, 91st Aero Squadron, US Air Service, in a de Havilland DH-4B between San Diego, Calif., and Jacksonville, Fla. Coney covered the 2,079 miles in twenty-two hours and twenty-seven minutes flying time, and thirty-six and a half hours elapsed time.

June 16, 1921—First Air ROTC training camp was opened at Fort Sill, Okla., with thirty-one students.

July 21, 1921—Brig. Gen. Billy Mitchell, commanding the 1st Provisional Air Brigade unit of seven Martin bombers, sank the former German battleship *Ostfriesland*.

October 5, 1921—New Chief of Air Service, Maj. Gen. Mason M. Patrick, favored an increased role for airpower but rejected the concept of an independent Air Force outside the War Department.

May 2, 1923—Lt. Oakley G. Kelly and Lt. John A. Macready, in a Fokker T-2 airplane, began the first nonstop coast-to-coast flight from New York to California, which they completed in twenty-six hours and fifty minutes. Their flight touched off a series of record flights by Air Service pilots.

September 5, 1923—Army bombers made short work of two obsolete battleships, the USS *Virginia* and the USS *New Jersey*, off Cape Hatteras.

April 6-September 28, 1924—US Air Service flyers, in Douglas World Cruiser biplanes, completed the first round-the-world flight in aviation history, covering more than 26,000 miles. They circled the globe in 363 hours actual flying time and 175 days elapsed time.

December 10, 1925—Morrow Board, which had been convened by President Calvin Coolidge to investigate US airpower, concluded: "We do not consider that airpower, as an arm of national defense, has yet demonstrated its value for independent operations." Board did recommend some changes which led to the establishment of Army Air Corps.

December 17, 1925—A court-martial found Billy Mitchell guilty of violating the 96th Article of War and sentenced him to five-years' suspension of rank, pay, and command. Mitchell resigned from the Army.

March 16, 1926—Robert Goddard, "father of American rocketry," launched a liquid-fueled rocket which traveled 184 feet in two and a half seconds at an average speed of sixty mph.

July 2, 1926—Army Air Corps established by Congress. Maj. Gen. Mason M. Patrick was named first Chief of Air Corps, and on July 16, 1926, F. Trubee Davison became the first Assistant Secretary of War for Air.

May 21, 1927—Charles A. Lindbergh, Captain, US Army Reserve, completed the first solo, nonstop flight from New York to Paris in his *Spirit of St. Louis*. His flight stirred the imagination of the American people and had a profound effect upon the development of aviation in the United States.

December 12, 1927—Maj. Gen. James E. Fechet appointed Chief, Army Air Corps. His major problem was to maintain efficiency in the face of severe cutbacks in planes and personnel.

January 1-7, 1929—The *Question Mark*, piloted by Maj. Carl Spaatz and Capt. Ira C. Eaker, established the world endurance mark of 150 hours and forty minutes by aerial refueling. Other participants included Lt. Harry Halverson and Lt. Elwood R. Quesada.

June 20, 1930—Randolph Field, Tex., the "West Point of the Air," was dedicated, becoming headquarters for the Air Corps Training Center and the site of primary and basic flying schools.

September 24, 1929—First all-blind flight was made by Lt. James Doolittle in a Consolidated NY-2 biplane at Mitchel Field, Long Island, N. Y. The plane had an enclosed cockpit. Doolittle could not see the ground or any part of the airplane except an illuminated instrument board. He was accompanied by Lt. Benjamin Kelsey.

November 6, 1930—Capt. Eddie V. Rickenbacker, America's foremost ace in the first World War, with twenty-six victories, received a Congressional Medal of Honor.

January 9, 1931—McArthur Pratt Agreement spelled out Army and Navy air responsibilities. The naval air force was to be concerned with fleet missions and the Army Air Corps employed as an element of the Army in defending the coast at home and in overseas possessions. The first major organized attempt to reconcile, in writing, service aviation roles.

December 19, 1931—Maj. Gen. Benjamin D. Foulois became Chief of Air Corps. His flying career had begun in 1908 when he rode with Orville Wright on the final acceptance flight of the Wright Flyer. His advocacy of a greater role for airpower led to the review and reforms in 1934 by the Baker Board.

February 19, 1934—Army Air Corps took over operation of the airmail service in response to cancellation of existing airmail contracts because of some evidence of fraud and collusion. After loss of nine pilots and passengers, Army Air Corps was relieved of assignment on June 1, 1934.

July 24, 1934—Lt. Col. Henry H. Arnold and Air Corps personnel began photographic reconnaissance to determine the practicability of defending Alaska by air.

March 1, 1935—GHQ Air Force established under Brig. Gen. Frank M. Andrews, on the same level as the Office of the Chief of the Air Corps. GHQ was to be the operational air arm, while the Air Corps continued to handle supply and training.

November 11, 1935—Capt. Orvil A. Anderson and Capt. Albert W. Stevens ascended to an altitude of 72,395 feet in Explorer II, the largest balloon ever built. They were enclosed in a nine-foot airtight gondola and brought back valuable scientific information on the atmosphere.

December 22, 1935—Maj. Gen. Oscar Westover, new Chief of Air Corps, strongly favored building up the Air Corps.

(Continued on page 197)

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However, he rejected the concept of a separate Department of Air.

March 1, 1937—First Boeing B-17 was delivered to the GHQ Air Force at Langley Field, Va. The Flying Fortress was the first plane capable of fulfilling Air Corps plans for strategic bombardment.

May 12, 1938—Three B-17s from GHQ Air Force "intercepted" the Italian liner *Rex* some 725 miles out of New York harbor. They dramatically understood the potential of the long-range bomber and unleashed serious interservice friction between Army and Navy over alleged Air Corps intrusion upon Navy roles and missions.

March 1, 1939—War Department consolidated its military air organization, giving the Chief of the Air Corps direct supervision and control of all Army air activities in the Washington area, including subordination of GHQ Air Force.

April 3, 1939—Congress provided for substantial Army Air Corps expansion by authorizing the procurement of 6,000 planes and doubling its enlisted strength.

July 1, 1939—Six Army contract pilot schools began training fifty aviation cadets each, as the beginning of a program sponsored by the Army Air Corps; before the end of World War II AAC gave primary flying training to more than 200,000 personnel.

May 16, 1940—A few days after the Wehrmacht, spearheaded by the Luftwaffe, began to overrun Western Europe, President Franklin D. Roosevelt authorized a 50,000-plane program, a goal many skeptics deemed unattainable. Our "arsenal of democracy" eventually achieved a 96,000-planes-a-year production rate, although it took four years to get there.

November 19, 1940—GHQ Air Force restored to coequal status with Office, Chief of Air Corps.

May 21, 1941—Air Corps Ferrying Command, forerunner of Air Transport Command, was created. ATC grew during World War II into a world airline. By V-E Day it mustered 2,461 transports, of which 798 were four-engined transports.

June 20, 1941—The Army Air Forces was established. Maj. Gen. "Hap" Arnold was named the first Commanding General, AAF. GHQ Air Force became Air Force Combat Command.

December 7, 1941—A Japanese air attack on Pearl Harbor sank four battleships, damaged four others, and incapacitated the Hawaiian Air Force. US entered World War II against Japan on December 8, 1941, against Germany on December 11, 1941.

December 10, 1941—First US bombing mission of World War II took place in Luzon when five escorted B-17s attacked enemy transports off Vigan.

March 9, 1942—Army Air Forces was given operational autonomy within the War Department on a basis of equality with the Army Ground Forces and the Army Services of Supply.

April 18, 1942—Lt. Col. Jimmy Doolittle led an intrepid band of flyers in sixteen B-25s that took off from the carrier *Hornet* and bombed Japan in a desperate one-way mission. While the raid caused insignificant damage, it gave impetus to Japanese plans for expansion, and gave US morale a hypodermic shot after we had suffered the worst military reverses in our history.

June 7, 1942—First American general missing in action, Maj. Gen. Clarence L. Tinker, Commanding General of the 7th Air Force, lost on a 2,500-mile mission of B-24s attempting to knock out Japanese bombers based on Wake Island.

June 8, 1942—European Theater of Operations (ETOUSA) established.

April 3, 1942—The 10th Air Force began operations in Burma when a small force attacked Japanese installations in Rangoon.

July 4, 1942—China Air Task Force activated in CBI, supplanting the famous American Volunteer Group (AVG), destroyed more than 300 enemy planes at a cost of fifty planes and nine pilots.

July 4, 1942—First AAF unit to fight in Europe, the 15th Bombardment Squadron, attacked four Dutch airdromes, flying six American-built A-20 Boston light bombers belonging to the RAF.

August 17, 1942—Twelve B-17s of the 8th AF attacked railroad yards in occupied France, the beginning of the daylight bombing that played such a great role in the ultimate defeat of Germany.

October 2, 1942—Bell XP-59A was the first American jet to fly.

November 8, 1942—Operation Torch, the largest invasion in history up to that time, began when 850 ships, with heavy air support that included the 12th AF as a principal component, moved against North African landing beaches.

January 14, 1943—Casablanca Conference convened; Allied leaders laid plans for the Combined Bomber Offensive against Germany that envisaged USAF daylight bombing and RAF night bombing undertaking round-the-clock attack of Axis in Europe.

June 11, 1943—As a result of incessant bombing attacks, Pantelleria surrendered to Allies without land invasion.

July 10, 1943—The first large-scale Allied airborne invasion struck Sicily. Troop carriers dropped 4,381 paratroopers.

July 21, 1943—Field Manual 100-20 promulgated by the War Department, establishing coequality and interdependence of landpower and airpower. FM 100-20 became the basis for modern tactical air doctrine.

August 1, 1943—Seventeen B-24 Liberators swept in at low level on a 2,400-mile round trip to the Ploesti oil refineries, dropping 311 tons of bombs, damaging six of the thirteen refineries, and cutting production by more than one-third.

August 17, 1943—Schweinfurt-Regensburg raid: on the first anniversary of daylight bombing, the AAF bombers engaged in their greatest, and in some ways their most disastrous, battle of the war. Three hundred and seventy-six B-17s dispatched against the deepest target yet sought in Germany dropped a bombload of 724 tons, lost sixty bombers (sixteen percent of force), and claimed to have shot down 288 enemy aircraft.

January 1, 1944—US Strategic Air Forces in Europe (USSTAF) activated.

February 19, 1944—The Big Week, Operation Argument, began with a concentrated attack by all available USAAF and RAF bombers on German aircraft production. In six days 3,800 bomb sorties from 8th and 15th AFs dropped 10,000 tons of bombs at a cost of 226 planes. According to United States Strategic Bombing Survey, seventy-five percent of all buildings at German plants producing ninety percent of its aircraft were damaged or destroyed.

March 1, 1944—AAF reached its peak strength with 2,411,294 officers and enlisted men and 79,908 military aircraft.

April 4, 1944—20th Air Force activated in Washington, D. C., with Gen. Henry H. Arnold in command. This was the first truly global air force.

June 2, 1944—First shuttle-bombing mission using the USSR as eastern terminus was flown by US bombers led by Lt. Gen. Ira C. Eaker, commanding the Mediterranean Allied Air Forces.

(Continued on following page)

June 6, 1944—D-day in Normandy gave the Army Air Forces a chance to prove the value of military airpower. Gen. Dwight D. Eisenhower assured invading troops: "If you see any planes, they will be ours." The AAF proved his point, flying more than 8,000 sorties, including 4,000 9th Air Force sorties, and diversionary raids by the 12th and 15th Air Forces against southern France.

June 12-13, 1944—First German V-1 pulsejet buzz bomb missile throbbed across the English Channel and ushered in a new and radically different phase of warfare.

June 15, 1944—B-29 Superfortresses of XX Bomber Command operating from China (later based on the Marianas) began the first of a series of strategic, long-range bombing strikes on Japanese homeland that helped bring the Empire to its knees.

September 8, 1944—A V-2 landed near Paris, France. The ballistic missile came too late to alter the course of World War II, but the Nazis fired more than 14,000. More than 2,000 landed in England, killing and injuring upward of 50,000 people.

March 9, 1945—Maj. Gen. Curtis E. LeMay, XX Bomber Command, ordered low-level incendiary fire-bomb attacks against Japanese urban industrial centers. Seventeen strikes up to June 15, 1945, involved a total of 6,960 sorties that dropped 41,600 tons of incendiary bombs, razing 102 square miles of a planned target area of 106 square miles in Tokyo, Nagoya, Kobe, Osaka, and Yokohama.

March 11, 1945—Greatest weight of conventional bombs dropped by the USAAF on a single target in Europe fell on Essen, where 1,079 bombers released 4,738 tons. This raid was part of Operation Clarion, the climax of strategic bombing in the ETO.

April 1, 1945—Highest qualitative peak reached by the AAF in World War II, with 224 groups of 243 active groups overseas and combat ready.

May 8, 1945—V-E Day—Germany surrendered unconditionally, marking end of European hostilities.

July 16, 1945—The first atomic explosion in history produced a weapon which could be carried aboard an aircraft. Nuclear fission occurred on the Alamogordo Bombing and Gunnery Range, N.M., portending a revolutionary era in airpower and in all future warfare.

August 6, 1945—Atomic warfare ushered in by a single B-29, *Enola Gay*, which dropped a nuclear bomb on the city of Hiroshima, Japan, causing more than 200,000 casualties.

August 9, 1945—A B-29 dropped a second atomic bomb on Nagasaki; the next day the Japanese Imperial Government sued for peace.

August 14, 1945—Hostilities ceased in the Pacific and Japan agreed to accept terms of unconditional surrender according to the Potsdam Agreement.

September 2, 1945—V-J Day—Japan formally surrendered in a ceremony aboard the battleship *Missouri* in Tokyo Bay.

September 26, 1945—General of the Army "Hap" Arnold outlined a seventy-group postwar Air Force in testimony before a House Appropriations Committee.

December 19, 1945—President Harry S. Truman sent a message to Congress calling for unification of the military establishment and a single Chief of Staff. This message coalesced a growing support for unification and led to the National Security Act of 1947.

February 5, 1946—Air Force Association was incorporated in the District of Columbia as a nonprofit corporation to assist in obtaining and maintaining adequate airpower for national security and world peace, to keep AFA members and the public abreast of developments in the field of aviation; to preserve and foster the spirit of fellowship among former and present members of the USAF.

March 1, 1946—Gen. Carl Spaatz succeeded General Arnold as Commanding General, AAF.

March 21, 1946—SAC, TAC, and ADC, the three combat commands of the Army Air Forces, were established.

April 19, 1946—Consolidated Vultee received a contract for the MX-744, an "upper air test vehicle," the prototype of the Atlas ICBM. For economy reasons, the project was canceled in 1949; a successor was revived in 1951.

July 1, 1946—A B-29 dropped a Nagasaki-type atom bomb on seventy-three naval vessels off Bikini Atoll in the Pacific during Operation Crossroads. Five ships were sunk and nine heavily damaged, marking the beginning of a new war-planning relationship between airpower and seapower.

August 8, 1946—The B-36, the world's largest land-based bomber, capable of carrying 10,000 pounds of bombs to a target 4,000 miles distant, completed its maiden flight at Fort Worth, Tex.

September 3, 1946—Carl Spaatz dedicated Air University at Maxwell Field, Ala., center of airpower doctrine and learning; Maj. Gen. Muir S. Fairchild was first commander.

December 14, 1946—The Scientific Advisory Board recommended (in "Toward New Horizons") to General Spaatz and to the War Department, that a separate center for guided missile research and development be established.

January 1, 1947—Far East Command was established at Tokyo under a JCS directive, with General of the Army Douglas MacArthur commanding. The directive grouped all western Pacific US forces—land, sea, and air—under one head.

May 1, 1947—AAF personnel strength reached its postwar ebb at 303,614; General Spaatz later remarked that demobilization of the largest air force in history had left it without a single squadron immediately capable of combat with wartime efficiency.

June 5, 1947—Marshall Plan, enunciated at Harvard University by Secretary of State George C. Marshall, acknowledged Europe's economic prostration, and pledged US aid. This step, shortly after the Truman Doctrine, marked the turning point of US traditional peacetime policy of isolationism.

September 17, 1947—National Military Establishment came into existence under terms of National Security Act of 1947, which was signed into law on July 26, 1947, by President Truman.

September 18, 1947—Stuart Symington was sworn into office as first Secretary of the Air Force, which was established as a department coequal and coordinate with Departments of the Army and Navy.

September 21-22, 1947—An Air Force C-54 with preset, push-button control, flew from Newfoundland to an airport near London with a full crew aboard who served as observers only. Details of the flight were accomplished by the automatic radio-guided control of a "mechanical brain."

September 26, 1947—Gen. Carl Spaatz was sworn in as first Chief of Staff, USAF.

October 14, 1947—Capt. Charles E. Yeager coaxed the X-1 research aircraft through the sonic barrier at 670 mph.

October 29, 1947—The aviation cadet program, which had been suspended since the end of the war, was reopened and programmed to train 3,000 pilots in two years.

November 18, 1947—Unified tactical airpower assured. General of the Army Dwight Eisenhower, US Army Chief of Staff, notified Secretary of Defense James E. Forrestal that employment of tactical airpower under a single com-

(Continued on page 201)

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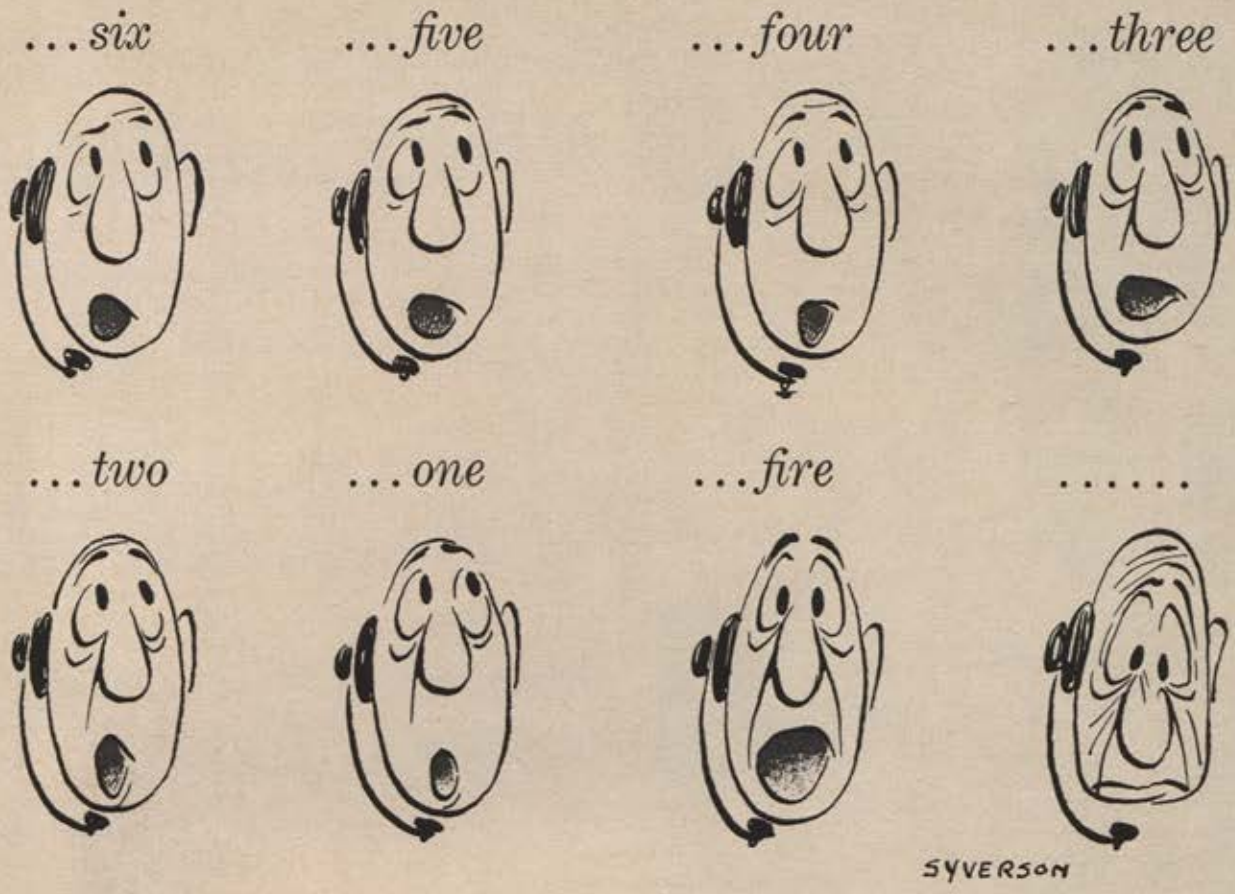

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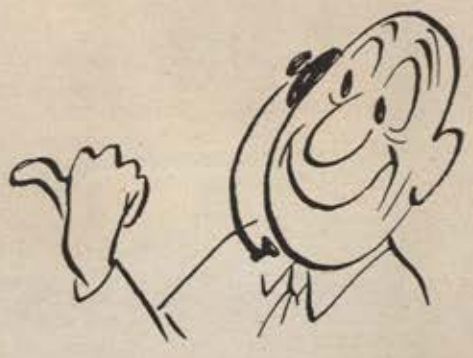

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mand in World War II was the outstanding illustration of the effective and economic employment of airpower. His memorandum set the postwar pattern for undivided tactical airpower under the USAF.

January 1, 1948—"Survival in the Air Age," a report by the President's Air Policy (Finletter) Commission, assigned first rank in the defense of the US to the USAF, and specifically urged enactment of a seventy-group AF program.

February 4, 1948—Secretary Forrestal directed consolidation of Air Force and Navy military air transport, which took place June 1, 1948. MATS became first example of unification of major function following passage of National Security Act of 1947.

March 11-14, 1948—Key West Agreement formulated by service chiefs; respective roles and missions delineated.

April 30, 1948—Gen. Hoyt S. Vandenberg succeeded Gen. Carl Spaatz as Air Force Chief of Staff. Although he compiled a great World War II record, Vandenberg's greatest campaign—for more airpower—was to be fought on the ground.

June 12, 1948—WAF legalized by Woman's Armed Service Integration Act, authorizing regular contingent of female military personnel in USAF.

June 25, 1948—Operation Vittles began with telephone call from Gen. Lucius D. Clay, US military governor, to General LeMay in Wiesbaden, asking whether he could fly forty-five tons of supplies to blockaded Berlin. Before this airlift ended on September 30, 1949, more than 2,343,000 tons of supplies (1,784,000 tons by USAF planes), were carried on 277,000 flights.

August 20-22, 1948—Newport Conference reemphasized primary strategic air responsibility of the USAF and underscored its primary atomic responsibilities.

September 1, 1948—An XR-12 photographed a 2,700-mile strip of the United States from coast to coast in a single flight, using 390 individual frames and 325 feet of film. The flight was from Santa Barbara, Calif., to New York City.

November 4, 1948—Air Force formed the nonprofit Rand Corporation to give the armed services the benefit of the "nation's best scientific achievements."

February 26-March 2, 1949—Boeing B-50 *Lucky Lady II* flew around the world nonstop from Carswell AFB, Tex., in ninety-four hours and one minute. Flight proved the feasibility of aerial refueling for long-range missions.

March 31, 1949—Winston Churchill told a Boston audience: "It is certain that Europe would have been Communized like Czechoslovakia, and London under bombardment, but for the deterrent of the atomic bomb in the hands of the US." This was a most significant and laudatory reference to the deterrent role of SAC.

April 4, 1949—NATO born when the US, Canada, and ten west European nations adopted a North Atlantic defense pact, agreeing that "an armed attack against one or more of them in Europe and North America shall be considered an attack against all."

May 11, 1949—Cape Canaveral range begun. President Truman signed a bill authorizing $75 million for the Air Force to begin construction on a 3,000-mile missile test range near Cocoa, Fla.

May 13, 1949—Air Force Medical Department was established on the same basis as the Army and Navy Medical Departments, with Maj. Gen. Malcolm C. Grow, the Air Surgeon, as chief of the new department.

August 10, 1949—President Truman signed National Security Act Amendments which converted the National Military Establishment into the Department of Defense and established a Chairman of the Joint Chiefs of Staff.

August 25, 1949—House Armed Services Committee completely vindicated Air Force officials who had been charged with fraud and favoritism in the procurement of the B-36 by Cedric R. Worth, admitted author of a scurrilous anonymous document.

September 23, 1949—President Truman announced that Soviet Russia had exploded an atomic device in August 1949, an event which set in motion drastic correctives in US military strategy hitherto predicated on US monopoly of the atomic bomb.

October 21, 1949—Arnold Engineering Development Center begun at Tullahoma, Tenn., as Congress appropriated the first $30 million to undertake construction of research center whose objective was development of basic research data on subsonic, transonic, and supersonic flight, nuclear energy, propulsive devices, and other subjects.

October 29, 1949—President Truman impounded $615 million voted by Congress to build the Air Force toward the seventy-group goal.

December 5, 1949—The Air Force diverted $50 million from other proj-

(Continued on following page)

50 YEARS—CONTINUED

ects to start immediate construction on a radar screen in Alaska and in certain US areas. This move was related to the disclosure that the Soviets had exploded an atomic device in August 1949.

January 10, 1950—President's fiscal year 1951 military budget requested $13.5 billion as adequate to defend the nation in "any situation which may arise in the next two years." AF Secretary Symington said forty-eight groups were inadequate.

January 23, 1950—Air Research and Development Command established, for the first time giving command status to this important function.

March 15, 1950—JCS made basic decisions on guided missile roles and missions. The Air Force was given the formal and exclusive responsibility for strategic guided missiles.

April 24, 1950—Thomas K. Finletter succeeded Stuart Symington as Secretary of the Air Force.

June 25, 1950 (Korean time)—North Koreans launched an unprovoked attack on South Korea. Russian-made T-34 tanks spearheaded drive southward with the objective of conquering all of Korea.

June 27, 1950—President Truman ordered US air and naval forces under Gen. Douglas MacArthur to help repel North Korean invaders, and the UN invoked military sanctions against the aggressors. USAF planes were the first UN units to get into battle, as they shot down a YAK attempting to interfere with evacuation of Americans from Kimpo Airfield, Seoul.

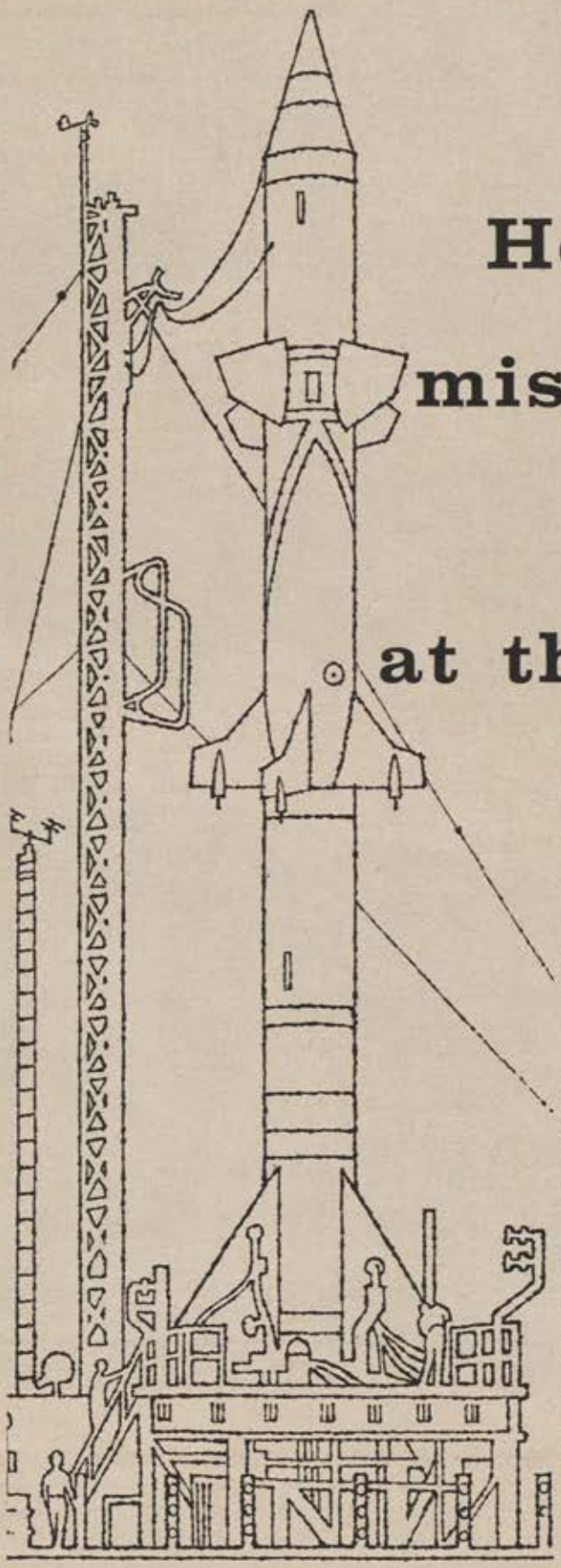
June 29, 1950—Within eight hours of having received instruction to aid South Korean defense, USAF bombers and fighters flew 183 missions against invading tanks and infantry.

July 11, 1950—President Truman signed a bill authorizing a seventy-group Air Force.

September 22, 1950—Col. David C. Schilling, flying an F-84 Thunderjet, crossed the Atlantic Ocean from England in ten hours and one minute, completing the first nonstop transoceanic flight in a jet aircraft.

November 8, 1950—The first aerial jet victory was scored in Korea by Lt. Russell Brown in an F-80 during the first all-jet dogfight in history, which took place near Sinuiju, North Korea, when nine to twelve MIGs attacked four F-80s. This victory, occurring when Red China's intervention in the Korean war was confirmed, marked the beginning of more than two years of bitter aerial fighting over what became known as MIG Alley.

(Continued on page 206)



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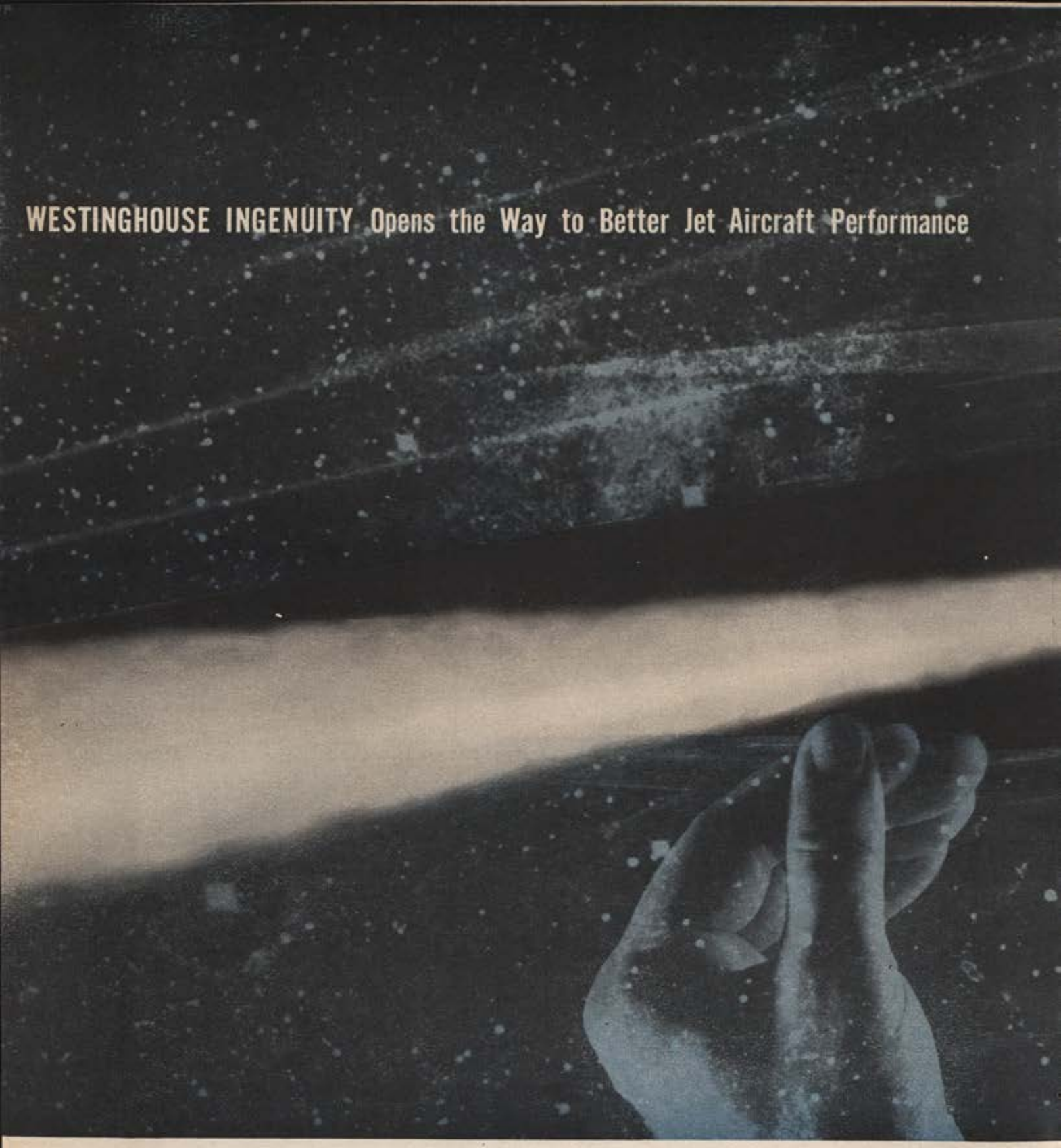

1004 Jet Inventions in the Last Two Years

Engineering and research scientists at Westinghouse made 1004 invention disclosures—each representing an improvement in jet engine design—during 1956 and 1957. The number of inventions this year is keeping pace with previous years, proving that creative engineering at Westinghouse is striving constantly toward better, more efficient jet propulsion.

Westinghouse, designer and builder of the first American turbojet, now holds more than 175 U. S. patents—many of them basic patents—on the jet

engine. A few of the Westinghouse "firsts" in the field include the axial flow compressor, iris exhaust nozzle, annular combustion chamber and step wall combustion liner.

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50 YEARS—CONTINUED

January 23, 1951—The USAF activated Project MX-1593, successor to MX-774, and prototype of Atlas ICBM.

April 18, 1951—The first Aerobee research rocket with a space biology experiment was launched at Holloman AFB, N.M.

May 20, 1951—Capt. James Jabara became the world's first jet ace when he shot down the fifth and sixth MIGs accredited to him in the Korean War.

July 31, 1951—Two USAF helicopters made the first successful Atlantic crossing from Westover AFB, Mass., to Prestwick, Scotland. Flight of 3,410 miles was made in five legs, in forty-three and a half flying hours.

August 24, 1951—Air Force Maj. Louis J. Sebille, killed in a crash near Hanchang, attacking Red troops in his damaged plane, was the first AF winner of the Congressional Medal of Honor in Korea.

September 13, 1951—TM-61 Matador, first tactical missile in the USAF, entered the operational inventory.

September 19, 1951—Air Force Authorization Act of 1951 established by law the major commands of the Air Force.

September 26, 1951—The biggest air battle over MIG Alley was fought in Korea when 115 Red and 101 US and Australian planes clashed in three major dogfights.

September 28, 1951—The Air Force Council, the highest USAF strategy board, recommended to Gen. Hoyt S. Vandenberg, Chief of Staff, that the Air Force begin to develop an unmanned intercontinental strategic bombardment weapon system (early ICBM).

October 8, 1951—President Truman approved the 143-wing Air Force recommended by the Joint Chiefs of Staff, the largest "peacetime" strength goal ever set for the Air Force.

October 13, 1951—It was reported that the US was completing a "secret" air base at Thule in northwestern Greenland from which SAC could launch attacks against any major target in Soviet Russia.

April 15, 1952—The Boeing YB-52 Stratofortress made its first flight.

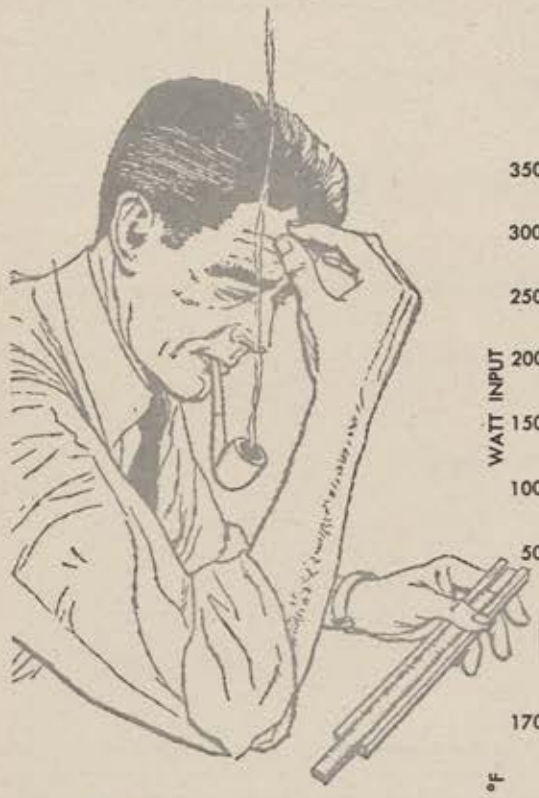
July 14, 1952—The Ground Observer Corps began its twenty-four-hour-a-day Skywatch as part of nationwide air defense program spurred by increasing Soviet long-range air capability.

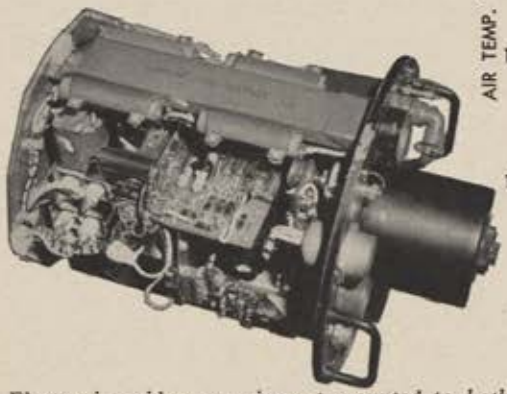
August 25-29, 1952—Airlift to Mecca—Fourteen USAF C-54s participated in around-the-clock schedule of airlifting 3,700 Moslems to the holy city in time for their religious festival.

(Continued on page 209)

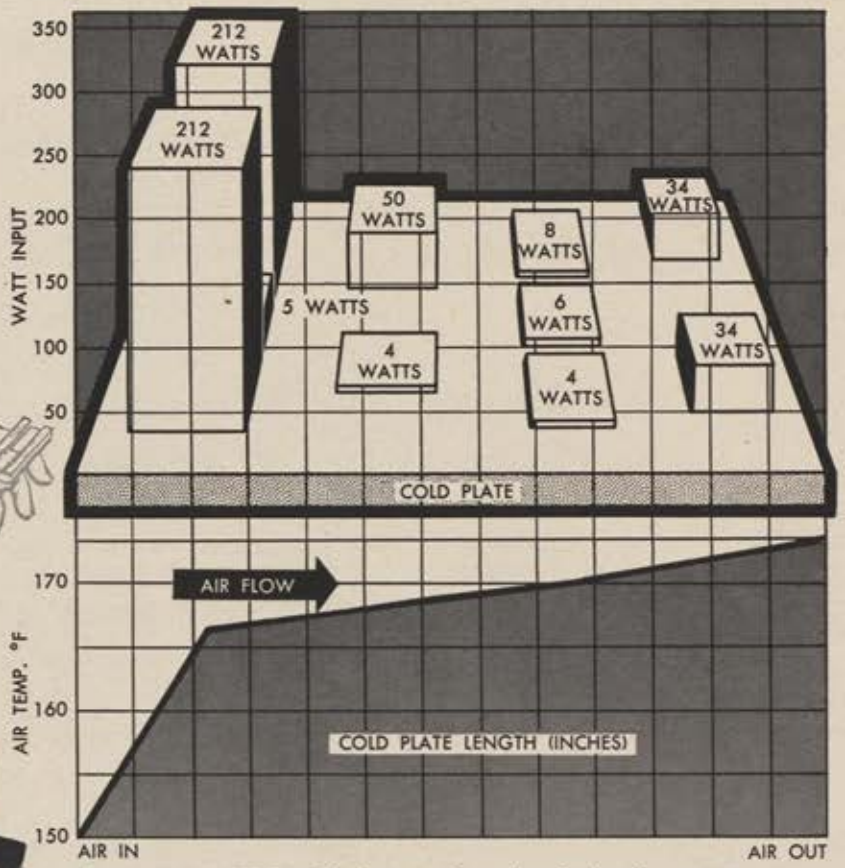
ELECTRONIC COOLING

Requirement: Stay within customer's envelope. Dissipate 569 watts thru 13 x 10 in. cold plate and not exceed a plate temperature of 173°F with cold plate air-in temperature of 150°F. Provide areas for circuits to be mounted to cold plate surface between power units.





Electronic guidance equipment mounted to *both* sides of UAP cold plate, contained in UAP pressurized case . . . for control of air-to-air missile.



Answer: UAP cold plate configuration designed to provide adequate heat transfer from localized high, medium and low heat concentration areas with air-in temperature at 150°F. All requirements met with room to spare.

The hypothetical conditions as stated above are typical of the problems that have come to us since the advent of electronically controlled supersonic missions.

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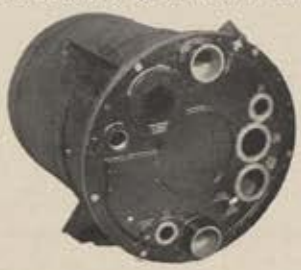

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50 YEARS——CONTINUED

November 4, 1952—Pace-Finletter Agreement limited Army aviation in size and scope to "organic" aircraft necessary for internal requirements. Empty weight of Army planes was restricted to 5,000 pounds.

February 4, 1953—Harold E. Talbott took office as Secretary of the Air Force.

June 30, 1953—Gen. Nathan F. Twining assumed command of the USAF. Outgoing Chief of Staff Vandenberg's proposal for a 143-wing Air Force was rejected as Administration settled for a $34.4-billion appropriation for fiscal year 1954, which included a $5-billion slash in USAF funds.

July 27, 1953—Armistice signed in Korea. USAF reported its 5th AF had shot down 984 Communist planes (including 823 MIGs). USAF admitted loss of 971 planes including ninety-four in aerial combat, of which fifty-eight were Sabrejets, 671 to ground fire, and 206 to other causes. Over-all ratios of Communists to US said to be nine to one; and the ratio of MIGs to Sabrejets fourteen to one.

September 6, 1953—Final USAF figures showed thirty-nine Korean War jet fighter aces who had destroyed five or more enemy planes in the air.

September 26, 1953—Agreement signed with Spain permitted the US to build four air bases and one naval base in Spain. These bases beyond the Pyrenees would permit SAC to continue operations in the event the defense of the rest of western Europe were made untenable by Communist aggressions.

October 2, 1953—One-hundred-thirty-seven-wing goal for USAF directed as a result of a JCS evaluation. End objective established as of June 30, 1956; later stretched to June 30, 1957.

February 1, 1954—Teapot Committee of top scientists recommended to the Air Force and to the Defense Department the feasibility of an intercontinental ballistic missile by 1960-61, assuming heavy financial commitments, early freezing of design, and central production planning. Report accepted February 10, 1954.

April 8, 1954—Office of the Assistant Chief of Staff for Guided Missiles was established in the Air Force to emphasize the importance of the missile program.

August 26, 1954—Maj. Arthur Murray flew the Bell X-1A to 90,000 feet.

September 1, 1954—Continental Air Defense Command (CONAD) was established. Effective control of all available military forces for defense of the US was given to the Department of the Air Force; Lt. Gen.

(Continued on following page)

George E. Stratemeyer was first commander.

December 10, 1954—Col. John P. Stapp attained a velocity of 632 mph during a rocket-propelled sled run—the greatest G-force yet sustained by man in deceleration tests—the equivalent of Mach 1.7 at 35,000 feet.

July 11, 1955—New Air Force Academy was dedicated at its temporary site at Lowry AFB. Colo., by Secretary Harold E. Talbott, and first class of 306 cadets was sworn in.

August 15, 1955—Donald A. Quarles was sworn in as Secretary of the Air Force.

November 8, 1955—Secretary of Defense Charles E. Wilson established a Ballistic Missile Committee in his office. At the same time he approved organizational changes to handle four types of ballistic missiles: the Atlas and Titan of intercontinental range, and the Jupiter and Thor of 1,500-mile range.

December 1, 1955—President Eisenhower directed that the IRBM and ICBM programs should have the highest national priority.

May 21, 1956—The first known airborne H-bomb was detonated by a B-52 high above the Bikini Atoll. The bomb, reportedly in the ten-megaton range, produced a three-mile-wide fireball and a mushroom-shaped cloud twenty-five miles high and 100 miles wide. The bomb was dropped from an estimated altitude of 50,000 feet.

June 23, 1956—Gen. Nathan F. Twining, Chief of Staff, landed in Moscow with a delegation of Air Force officers to attend Soviet Aviation Day celebration. American and British air leaders were impressed with the quality of Soviet aircraft.

September 7, 1956—Capt. Iven C. Kincheloe flew the Bell X-2 rocket-powered research aircraft to an altitude of 126,200 feet, nearing the effective outer limits of the earth's atmosphere. It was a new altitude record for manned flight.

September 27, 1956—Capt. Milburn G. Apt flew the X-2 research aircraft in excess of 2,100 mph in the fastest flight ever attained by a manned aircraft. The X-2 suffered an unexplained mishap and Captain Apt was carried to his death in the X-2's escape capsule.

November 26, 1956—Secretary of Defense Charles E. Wilson gave the USAF operational jurisdiction over long-range ballistic missiles. He also assigned point air defense responsibilities to the US Army and area defense responsibilities to the USAF.

(Continued on page 213)

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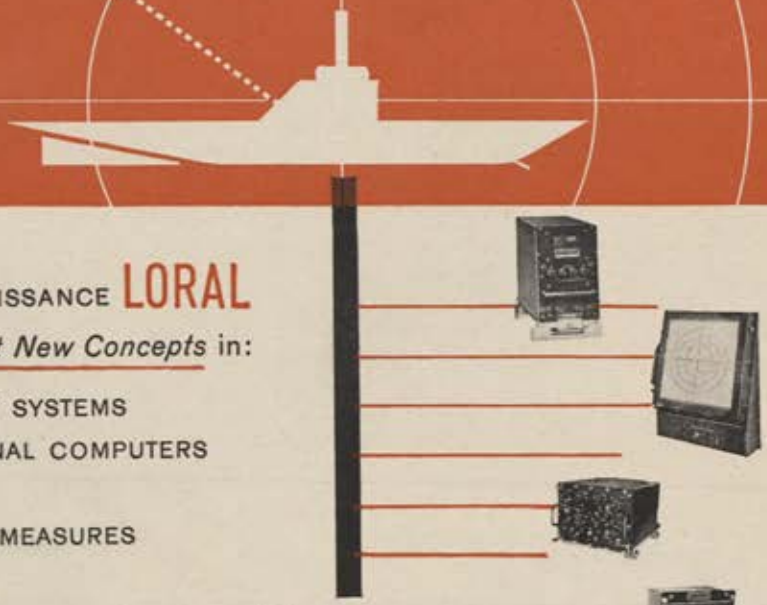

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50 YEARS——CONTINUED

January 16-18, 1957—Three B-52 bombers completed a 24,325-mile nonstop round-the-world flight in forty-five hours and nineteen minutes at an average speed of 535 mph. The B-52s simulated a bomb-drop halfway through the mission off Malaya before returning to Castle AFB, Calif. On April 21, 1958, USAF announced that the 93d Bombardment Wing, 15th Air Force, Strategic Air Command, the parent organization of these B-52s, would be awarded the Mackay Trophy for 1957 for "the most meritorious flight of the year."

March 18, 1957—Reaffirmation of basic principles of Pace-Finletter Agreement by Secretary of Defense Wilson. Memorandum specified Army use of aircraft within 100 miles on either side of front lines.

May 1, 1957—James H. Douglas, who had served four years as Under Secretary of the Air Force, succeeded Donald A. Quarles as Secretary of the Air Force.

May 10, 1957—"Toss-bombing" techniques, enabling B-47 Stratojets to drop nuclear bombloads safely and more accurately, revealed by the Air Force.

May 16, 1957—The Bomarc IM-99 was ordered into production. Bomarc is a ground-to-air pilotless interceptor with ranges in excess of 100 miles; it can be used for long-range area defense. Bomarc has attained speeds near Mach 2 and can intercept bombers at extreme altitudes.

June 2, 1957—AF Capt. Joseph W. Kittinger, Jr., rode a balloon to a height of 96,000 feet.

June 28, 1957—The Air Force announced the first KC-135A Stratotanker had been turned over to SAC for operational service. The KC-135A can fly more than 600 mph and has an operational ceiling above 35,000 feet.—END

(See page 188 for events since July 1, 1957)

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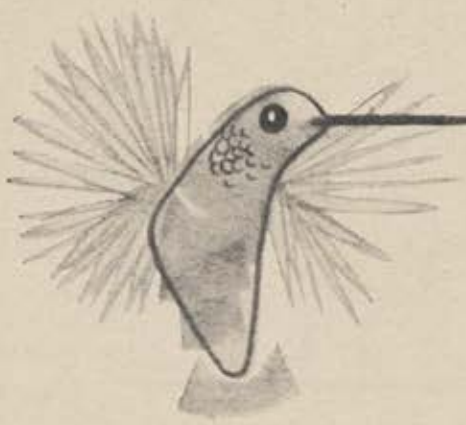

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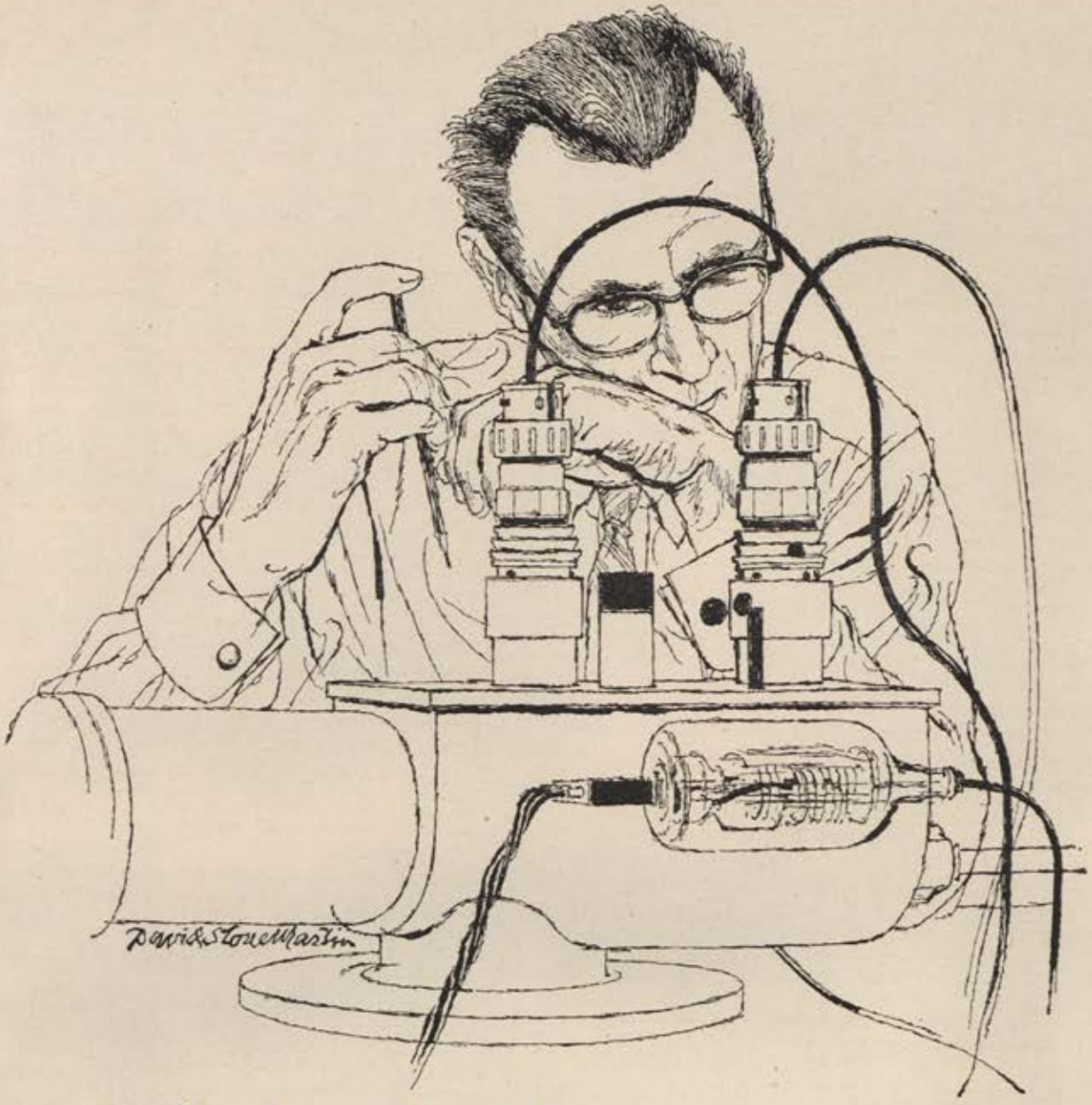

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Fact and Figures

AIR FORCE ALMANAC

SECTION A

Secretaries of Defense

James V. Forrestal	Sept. 18, 1947—Mar. 27, 1949
Louis Johnson	Mar. 28, 1949—Sept. 19, 1950
George C. Marshall	Sept. 21, 1950—Sept. 12, 1951
Robert A. Lovett	Sept. 17, 1951—Jan. 20, 1953
Charles E. Wilson	Jan. 28, 1953—Oct. 8, 1957
Neil H. McElroy	Oct. 9, 1957—

Assistant Secretaries of War for Air

F. Trubee Davison	July 16, 1926—Mar. 2, 1933
Robert A. Lovett	Apr. 10, 1941—Dec. 8, 1945
Stuart Symington	Jan. 31, 1946—Sept. 17, 1948

Secretaries of the Air Force

Stuart Symington	Sept. 18, 1947—Apr. 24, 1950
Thomas K. Finletter	Apr. 24, 1950—Jan. 19, 1953
Harold E. Talbott	Feb. 4, 1953—Aug. 1, 1955
Donald A. Quarles	Aug. 15, 1955—May 1, 1957
James H. Douglas, Jr.	May 1, 1957—

Under Secretaries of the Air Force

Arthur S. Barrows	Sept. 26, 1947—Apr. 21, 1950
John A. McCone	June 15, 1950—Oct. 9, 1951
Roswell L. Gilpatric	Oct. 29, 1951—Feb. 15, 1953
James H. Douglas, Jr.	Apr. 3, 1953—May 1, 1957
Malcolm A. MacIntyre	June 5, 1957—

Assistant Secretaries (Financial), Management

Eugene M. Zuckert	Sept. 26, 1947—Jan. 31, 1952
James T. Hill	July 5, 1952—Jan. 20, 1953
H. Lee White	Feb. 17, 1953—July 2, 1954
Lyle S. Garlock	Aug. 23, 1954—

Assistant Secretaries, Materiel

Cornelius V. Whitney	Sept. 26, 1947—Apr. 11, 1949
Harold C. Stuart	Oct. 17, 1949—May 24, 1951
Roswell L. Gilpatric	May 25, 1951—Oct. 29, 1951
Edwin V. Huggins	Nov. 29, 1951—Jan. 20, 1953
Roger Lewis	Apr. 3, 1953—Sept. 30, 1955
Dudley C. Sharp	Oct. 1, 1955—

Ass't Secretaries, Research & Development

Trevor Gardner	Mar. 1, 1955—Feb. 11, 1956
Richard Horner	Feb. 20, 1956—

Assistant Secretaries, Manpower, Personnel and Reserve

David H. Smith	Oct. 19, 1954—

Chief Scientists

Dr. Louis N. Ridenour	Sept. 11, 1950—Aug. 31, 1951
Dr. David T. Griggs	Dec. 12, 1952—June 30, 1953
Dr. Chalmers W. Sherwin	Feb. 1, 1954—Jan. 31, 1955
Dr. H. Guyford Stever	Feb. 1, 1955—July 31, 1956
Dr. Courtland Perkins	Aug. 1, 1956—July 31, 1957
Dr. George E. Valley	Sept. 1, 1957—

Chairmen, Scientific Advisory Board

Dr. Theodore von Karman	July 1, 1946—Dec. 31, 1954
Dr. Mervin Kelly	July 1, 1955—Nov. 21, 1955
Dr. James H. Doolittle	Nov. 21, 1955—

(Continued on following page)

SECTION B

Chiefs of the US Air Arm	Highest Rank Attained	Titles as Commander	Held Office From	To
James Allen	Brig. Gen.	Chief Signal Officer	Aug. 1, 1907	Feb. 13, 1913
George P. Scriven	Brig. Gen.	Chief Signal Officer	Feb. 13, 1913	Feb. 13, 1917
George O. Squier	Maj. Gen.	Chief Signal Officer	Feb. 14, 1917	May 20, 1918[1]
William L. Kenly	Maj. Gen.	Chief, Div. of Military Aeronautics	May 20, 1918	Dec. 22, 1918
Charles T. Menoher	Maj. Gen.	Chief of the Air Service	Dec. 23, 1918	Oct. 4, 1921
Mason M. Patrick	Maj. Gen.	Chief of the Air Service	Oct. 5, 1921	July 1, 1926
		Chief of the Air Corps	July 2, 1926	Dec. 12, 1927
James E. Fechet	Maj. Gen.	Chief of the Air Corps	Dec. 14, 1927	Dec. 19, 1931
Benjamin D. Foulois	Maj. Gen.	Chief of the Air Corps	Dec. 19, 1931	Dec. 21, 1935
Oscar Westover	Maj. Gen.	Chief of the Air Corps	Dec. 22, 1935	Sept. 21, 1938
Henry H. Arnold	Gen. of the Air Force	Chief of the Air Corps	Sept. 29, 1938	June 30, 1941
		Chief of the Army Air Forces	June 30, 1941	Mar. 8, 1942
		Comdg. Gen., Army Air Forces	Mar. 9, 1942	Feb. 28, 1946
Carl Spaatz	Gen.	Comdg. Gen., Army Air Forces	Mar. 1, 1946	Sept. 25, 1947
		Chief of Staff, USAF	Sept. 26, 1947	Apr. 530, 1948
Hoyt S. Vandenberg	Gen.	Chief of Staff, USAF	Apr. 30, 1948	June 30, 1953
Nathan F. Twining	Gen.	Chief of Staff, USAF	June 30, 1953	June 30, 1957
Thomas D. White	Gen.	Chief of Staff, USAF	July 1, 1957	Present

[1] On this date, Aeronautics was removed from Signal Corps jurisdiction

Deputy Chiefs of Staff, Plans and Programs
Lt. Gen. John K. Gerhart July 1, 1957—

Deputy Chiefs of Staff, Operations
Lt. Gen. Lauris Norstad Oct. 10, 1947—Mar. 1, 1950
Lt. Gen. Idwal H. Edwards Mar. 1, 1950—July 27, 1951
Gen. Thomas D. White July 29, 1951—June 30, 1953
Lt. Gen. Earle E. Partridge Jun 30, 1953—Mar. 25, 1954
Lt. Gen. Frank F. Everest Apr. 1, 1954—June 30, 1957
Lt. Gen. William H. Tunner July 1, 1957—June 30, 1958
Lt. Gen. Dean C. Strother July 1, 1958—

Deputy Chiefs of Staff, Personnel
Lt. Gen. Idwal H. Edwards Oct. 10, 1947—Mar. 1, 1950
Lt. Gen. Richard E. Nugent Mar. 1, 1950—Aug. 31, 1951
Maj. Gen. Emery S. Wetzel Aug. 31, 1951—Oct. 29, 1951
Lt. Gen. Laurence S. Kuter Oct. 29, 1951—Apr. 14, 1953
Lt. Gen. Emmett O'Donnell, Jr. May 1, 1953—

Deputy Chiefs of Staff, Materiel
Lt. Gen. Howard A. Craig Oct. 10, 1949—Sept. 15, 1959
Maj. Gen. Kenneth B. Wolfe Sept. 16, 1949—June 30, 1951
Maj. Gen. Carl A. Brandt July 1, 1951—July 15, 1951
Lt. Gen. Orval R. Cook July 16, 1951—Mar. 31, 1954
Lt. Gen. Bryant L. Boatner Apr. 1, 1954—May 9, 1955
Lt. Gen. Clarence S. Irvine April 28, 1955—

Deputy Chiefs of Staff, Development
Maj. Gen. Gordon P. Saville Jan. 23, 1950—July 2, 1951
Maj. Gen. Donald L. Putt July 2, 1951—Nov. 13, 1951
Lt. Gen. Laurence C. Craigie Nov. 14, 1951—Apr. 14, 1954
Lt. Gen. Donald L. Putt Apr. 15, 1954—June 30, 1958
Maj. Gen. Roscoe C. Wilson July 1, 1958—

Judge Advocates General
Maj. Gen. Reginald C. Harmon Sept. 18, 1948—

Surgeons General
Maj. Gen. Malcolm C. Grow Oct. 10, 1947—Nov. 30, 1949
Maj. Gen. Harry G. Armstrong Dec. 1, 1949—July 1, 1954
Maj. Gen. Dan C. Ogle July 15, 1954—

Chiefs of Chaplains
Maj. Gen. C. I. Carpenter Dec. 26, 1945—Aug. 20, 1958
Maj. Gen. Terence P. Finnegan Aug. 21, 1958—

Comptrollers
Lt. Gen. Edwin W. Rawlings Nov. 15, 1946—July 27, 1951
Lt. Gen. Charles B. Stone, 3d July 28, 1951—Dec. 14, 1955
Lt. Gen. Manual J. Asensio Dec. 15, 1955—

Inspectors General
Maj. Gen. Hugh J. Knerr Jan. 2, 1948—Sept. 16, 1949
Lt. Gen. Howard A. Craig Sept. 16, 1949—July 30, 1952
Lt. Gen. Bryant L. Boatner July 31, 1952—Mar. 31, 1954
Lt. Gen. Truman H. Landon Apr. 1, 1954—June 20, 1956
Lt. Gen. Elmer J. Rogers, Jr. June 21, 1956—

Strategic Air Command
Gen. George C. Kenney Apr. 21, 1946—Oct. 15, 1948
Gen. Curtis E. LeMay Oct. 16, 1948—June 30, 1957
Gen. Thomas S. Power July 1, 1957—

NORAD
Gen. Benjamin W. Chidlaw Sept. 1, 1954—Sept. 15, 1956
Gen. Earle E. Partridge Sept. 17, 1956—
(Became NORAD on Aug. 1, 1957)

Air Defense Command
Lt. Gen. George E. Stratemeyer Feb. 1946—April 1949
Maj. Gen. Gordon P. Saville Sept. 1949—Dec. 1950
Lt. Gen. Ennis C. Whitehead Jan. 1, 1951—July 31, 1951
Gen. Benjamin W. Chidlaw Aug. 1, 1951—May 31, 1955
Gen. Earle E. Partridge July 20, 1955—Sept. 16, 1956
Maj. Gen. Frederic H. Smith June 1, 1955—July 19, 1955
Lt. Gen. Joseph H. Atkinson Sept. 17, 1956—

Tactical Air Command
Gen. Elwood R. Quesada Mar. 21, 1946—Nov. 23, 1948
Maj. Gen. Robert M. Lee Dec. 24, 1948—June 20, 1950
Maj. Gen. Glenn O. Barcus July 17, 1950—Jan. 25, 1951
Gen. John K. Cannon Jan. 25, 1951—Mar. 31, 1954
Gen. O. P. Weyland April 1, 1954—

Air Training Command
Lt. Gen. Robert W. Harper Oct. 14, 1948—June 30, 1954
Maj. Gen. Glenn O. Barcus July 1, 1954—July 31, 1954
Lt. Gen. Charles T. Myers July 26, 1954—July 31, 1958
Lt. Gen. Frederic H. Smith Aug. 1, 1958—

Air Research & Development Command
Maj. Gen. David M. Schlatter Feb. 1, 1950—June 24, 1951
Lt. Gen. Earle E. Partridge June 24, 1951—June 20, 1953
Lt. Gen. Donald L. Putt June 30, 1953—Apr. 14, 1954
Lt. Gen. Thomas S. Power Apr. 15, 1954—June 30, 1957
Maj. Gen. John W. Sessums, Jr. July 1, 1957—July 31, 1957
Lt. Gen. Samuel E. Anderson Aug. 1, 1957—

(Continued on page 221)

MISSILE COMPONENTS Bulova safety and arming systems protect ground, air and sea crews from load to launch, then take over in flight. Safety factor of one in a million is specified and reliably delivered by Bulova's precision production facilities. Powder-driven gyros and fuzing systems are among other Bulova developments for 18 key missiles.

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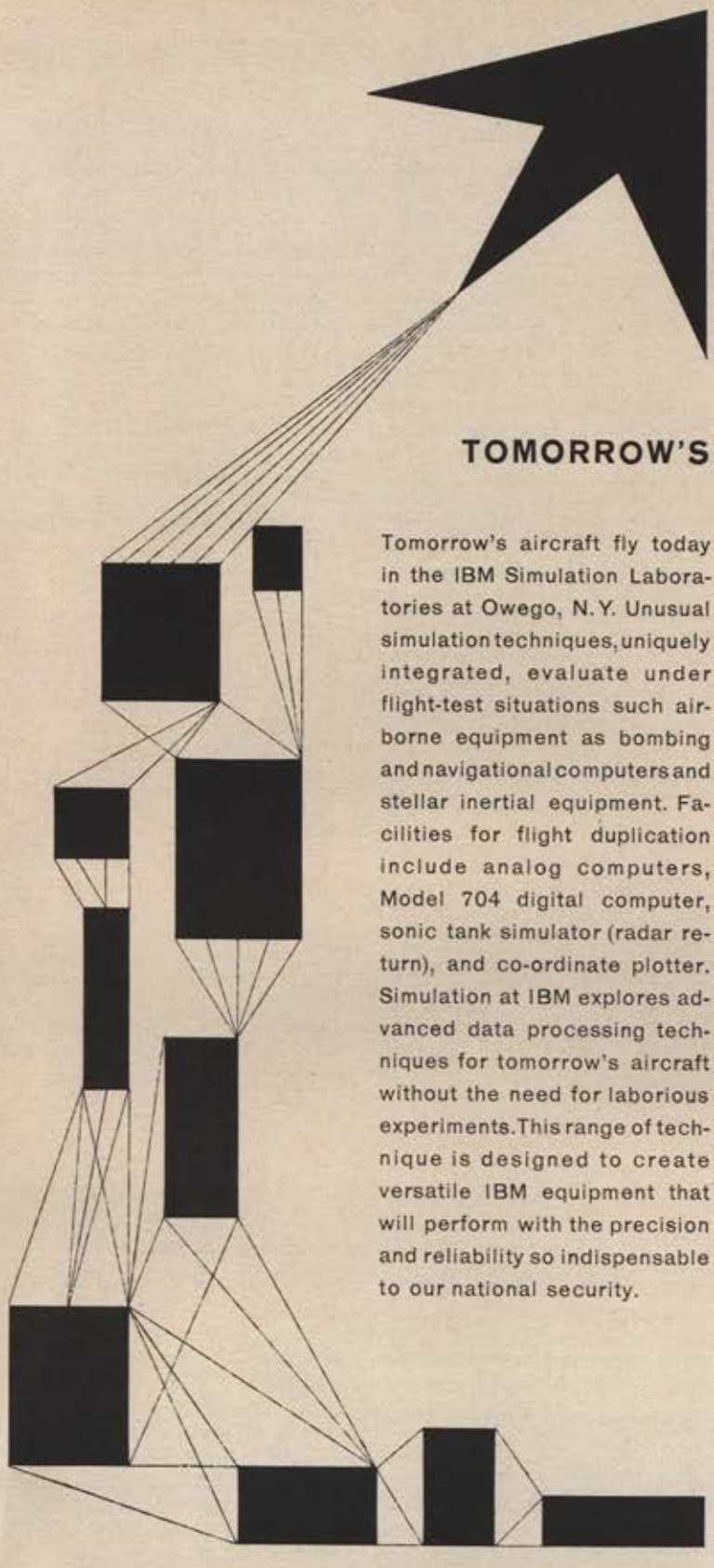

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Air Materiel Command

Gen. Joseph T. McNarney Oct. 1, 1947—Sept. 1, 1949
Lt. Gen. Benj. W. Chidlaw Sept. 1, 1949—July 24, 1951
Gen. Edwin W. Rawlings July 28, 1951—

Military Air Transport Service

Lt. Gen. Laurence S. Kuter June 1, 1948—Oct. 28, 1951
Lt. Gen. Joseph Smith Nov. 15, 1951—June 30, 1958
Lt. Gen. William H. Tunner July 1, 1958—

Continental Air Command

Lt. Gen. Ennis C. Whitehead Apr. 5, 1949—Jan. 1, 1951
Maj. Gen. Willis H. Hale Jan. 1, 1951—Feb. 18, 1952
Lt. Gen. Leon W. Johnson Feb. 18, 1952—Dec. 14, 1955
Lt. Gen. Charles B. Stone, 3d Dec. 15, 1955—June 30, 1957
Lt. Gen. William E. Hall July 1, 1957—

Air University

Maj. Gen. Muir S. Fairchild Mar. 15, 1946—May 17, 1948
Maj. Gen. Orvil A. Anderson May 17, 1948—Oct. 15, 1948
Gen. George C. Kenney Oct. 16, 1948—July 27, 1951
Lt. Gen. Idwal H. Edwards July 28, 1951—Feb. 28, 1953
Maj. Gen. John DeF. Barker Mar. 1, 1953—Apr. 14, 1953
Lt. Gen. Laurence S. Kuter Apr. 15, 1953—May 31, 1955
Maj. Gen. Dean C. Strother June 1, 1955—June 30, 1958
Lt. Gen. Walter E. Todd July 15, 1958—

USAF Academy

Lt. Gen. Hubert R. Harmon Aug. 14, 1954—July 31, 1956
Maj. Gen. James E. Briggs July 1, 1956—

SECTION C

Civilian Personnel Strength

1955 (June)	397,252 (Worldwide)
1956 (June)	432,659 (Worldwide)
1957 (June)	416,585 (Worldwide)
1958 (May)	373,210 (Worldwide)

Table of USAF Unit Aircraft Equipment (1958)

Type of Unit	Type/Model of Acft.	No. Acft. Per Sq.	No. Acft. Per Wing	Sq. Per Wing
Strategic Bomb	B-52/B-36	10	30	3
Medium Strategic Bomb	B-47	15	45	3
Strategic Recon	RB-36	10	30	3
Strategic Recon	RB-47	15	45	3
Fighter Interceptor	F-104, F-102 F-94, F-89, F-86	25	75	3
Tactical Bomb Z/I	B-66, B-57, B-45	12	48	4
Tactical Bomb O/S	B-66, B-57, B-45	16	48	3
Tactical Fighter Z/I	F-101A/C, F-100 F-86, F-84	18	72	4
Tactical Fighter O/S	F-101A/C, F-100 F-86, F-84	25	75	3
Tactical Recon	RF-101, RF-84 RB/WB-66	18	72	4
Troop Carrier	C-124	12	36	3
Troop Carrier	C-119, C-130, C-123	16	48	3

Airplanes on Hand in USAF (Type and fiscal year)

Type	June 1947	June 1948 a/	June* 1949
Very Heavy Bomber	2,983	—	—
Heavy Bomber	657	4	53
Medium Bomber	1,474	2,761	2,126
Light Bomber	1,678	3,078	1,596
Fighter	6,427	5,586	4,085
Reconnaissance	636	640	561
Transport	3,796	3,459	3,208
Trainer	6,047	5,358	6,875
Communication	1,390	1,487	1,222
Tanker	—	—	37
Search and Rescue	—	—	146
Special Research	—	2	2
Aerial Targets	—	—	—
Glider	—	—	—
Total	25,088	22,375	19,911

a Classification or redesignation of amber type aircraft was effective as of September 30, 1947.
* (Subsequent years' data are classified.)
Source: USAF Statistical Digest, 1947-48-49.

Aircraft Mission Designations

A—Amphibian
B—Bomber
C—Cargo and transport
D—Director
E—Early warning
F—Fighter or interceptor
H—Helicopter
K—Tanker
L—Liaison
M—Medical
P—Passenger
Q—Target and drone
R—Reconnaissance
S—Search and rescue
T—Trainer
U—Utility
V—Staff
W—Weather
X—Research, experimental

Missile Mission Designations

Mission letters

AAM—Air-to-air missile
AICBM—Anti-intercontinental ballistic missile
AIRBM—Anti-intermediate range ballistic missile
ANSAM—Antimissile surface-to-air missile
ASM—Air-to-surface missile
AUM—Air-to-underwater missile
CBM—Continental ballistic missile
DICBM—Defense intercontinental ballistic missile
FBM—Fleet ballistic missile, USN
GAM—Guided aircraft missile
GAR—Guided aircraft rocket
GM—Guided missile
ICBM—Intercontinental ballistic missile
IM—Interceptor missile
IRBM—Intermediate-range ballistic missile
MRBM—Medium-range ballistic missile
SAM—Surface-to-air missile
SM—Strategic missile
SRBM—Short-range ballistic missile
SSM—Surface-to-surface missile
SUM—Surface-to-underwater missile
TM—Tactical missile
TV—Test vehicle
UAM—Underwater-to-surface missile
XM—Research missile
YM—Prototype missile

Air Force Reserve Personnel Strength—May 31, 1958

READY—240,832
Officers 47,114
Warrant Officers 23
Airmen 193,695

STANDBY—245,335
Officers 78,105
Warrant Officers 789
Airmen 166,441

RETIRED—8,689
Officers 8,217
Warrant Officers 73
Airmen 399

TOTAL AIR FORCE RESERVE—494,856
Officers 133,436
Warrant Officers 885
Airmen 360,535

AIR NATIONAL GUARD PERSONNEL STRENGTH—MAY 31, 1958
Officers 8,373
Airmen 62,065
TOTAL 70,438

(Continued on following page)

USAF Military Personnel—1945-1958

	Continental US	Overseas	Total
Sept. 1947	1,095,017	897,943	1,992,960
Dec. 1945	503,234	385,535	888,769
June 1946	296,964	158,551	455,515
June 1947	206,226	99,601	305,827
June 1948	268,896	118,834	387,730
June 1949	293,870	125,477	419,347
June 1950	317,816	93,461	411,277
June 1951	628,954	159,427	788,381
June 1952	723,163	250,311	973,474
June 1953	681,978	295,615	977,593
June 1954	673,321	274,597	947,918
June 1955	689,635	270,311	959,946
June 1956	652,180	257,515	909,695
June 1957	651,170	268,161	919,331
May 1958	628,447	241,571	870,018

Source: USAF Statistical Digest

Personnel Data on AFROTC

USAF ROTC graduates sent to active military service—FY 57 6,207

- Entering Pilot Training 3,548
- Entering Observer Training 1,409
- Entering Technical Training 521
- Entering Other Training 729

AFROTC Students in School as of May 31, 1958 78,228

- Advanced Students 8,712
  - 4th Year 4,060
  - 3rd Year 4,652
- Beginners 69,516
  - 2nd Year 27,923
  - 1st Year 41,593

Air Force Personnel Assigned to AFROTC Program (As of April 30, 1958)

- Officers 1,322
- Airmen 1,115
- Civilian 61

SECTION D

New Obligating Authority Enacted for the Aircraft and Related Procurement Appropriation in lieu of aircraft appropriations.

Fiscal Year	Millions	Combat and Troop Carrier Wgs.
1949	$ 2,045.1	56
1950	2,217.8	48
1951	6,577.3	87
1952	11,257.8	95
1953	11,000.0	106
1954	3,495.0	115
1955	2,760.0	121
1956	6,306.0	131
1957	6,848.5	137
1958	5,886.0	117

Type Aircraft	Representative Aircraft costs (in Thousands of Dollars)	No. crew members per A/C
B-36	$4,000	13 or 15
B-17	220	9
B-52	8,000	6
B-25	146	6
B-47	2,250	3
P-47 (F-47)	100	1
F-84	500	1
B-58	Not Available	3
F-105	Not Available	1

Aircraft Accident Rates

(Rates Computed on Basis of 100,000 Flying Hours)

Calendar year	Major aircraft accident rate	Aircraft fatality rate
1947	44	17
1948	40	14
1949	37	12
1950	36	16
1951	33	15
1952	29	15
1953	24	11
1954	20	9
1955	17	9
1956	15	8
1957	14	8

Note: Accident data for the Air National Guard are included since 1947. Accident data for Navy units flying for MATS included since 1950.
Source: USAF Statistical Digest.

SECTION E

Round-the-world flights

Name	Date	Miles flown	Aircraft	Time
Capt. Lowell H. Smith and Lt. Erik H. Nelson	April 6, 1924	26,345 miles from Seattle, Wash.	Douglas World Cruiser	15 days, 11 hours, 7 minutes
Col. Joseph Holzapple	November 30, 1949	20,000 miles	B-26 Martin Marauder	96 hours, 50 min.
Maj. James Gallagher	February 26, 1949	23,452 miles from Carswell AFB, Tex.	B-50 Boeing Lucky Lady II	94 hours, 1 min.
Maj. Gen. Archie J. Old, Jr.	January 18, 1957	24,325 miles from March AFB, Calif.	3 Boeing B-52s	45 hours, 19 min.

(Continued on page 225)

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LOS ANGELES AIRWAYS
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MOHAWK AIRLINES
NATIONAL AIRLINES
NEW YORK AIRWAYS
NORTH CENTRAL AIRLINES
NORTHEAST AIRLINES
NORTHERN CONSOLIDATED AIRLINES
NORTHWEST ORIENT AIRLINES
OZARK AIR LINES
PACIFIC AIR LINES
PACIFIC NORTHERN AIRLINES
PIEDMONT AIRLINES
RIDDLE AIR LINES
SOUTHERN AIRWAYS
TRANS-TEXAS AIRWAYS
TRANS WORLD AIRLINES
UNITED AIR LINES
WEST COAST AIRLINES
WESTERN AIR LINES

Altitude Records

Name	Date	Aircraft	Height
Maj. Rudolph W. Schroeder	Feb. 27, 1920	Lepere Liberty 400	33,113 feet
Capt. H. C. Gray	May 4, 1927	Balloon	42,470 feet (unofficial)
Capt. Orvil A. Anderson	Nov. 11, 1935	Balloon	72,395 feet
Capt. Albert W. Stevens		Explorer II	
Maj. Arthur Murray	Aug. 27, 1954	Bell X-1A	90,000 feet
Capt. Iven C. Kincheloe	Sept. 7, 1956	Bell X-2	126,200 feet
Maj. David G. Simons	Aug. 20, 1957	Balloon	102,000 feet
Maj. Howard Johnson	May 7, 1958	F-104 Starfighter	91,249 feet

Speed Records

Name	Date	Aircraft	Speed
Lt. T. F. Dodd	Feb. 14, 1914	Burgess-Renault 70	Set nonstop record of 244.18 miles in 4 hours, 43 minutes
Sgt. H. Marcus			
Maj. Corliss Moseley	Nov. 25, 1920	Verville-Packard 600	Covered 132 miles at 178 mph
Maj. Harry K. Evans	Feb. 3, 1955	F-84F Thunderstreak	Flew from George AFB, Calif., to Langley, Va., at an average speed of 605 mph
Maj. Adrian Drew	Dec. 10, 1957	F-101 Voodoo	Flew 1,207.6 mph over Edwards AFB, Calif.
Capt. Walter W. Irwin	May 16, 1958	F-104 Starfighter	Flew 1,404.19 mph over Edwards AFB, Calif.

SECTION F

Composition of Combat Units, World War II

Type of Unit	Major type of airplane	Number of airplanes (includ. Reserve)	Number of crews (includ. Reserve)	Men per crew	Total	Officers	Enlisted Men
Very Heavy Bombardment Group	B-29	45	60	11	2,078	462	1,616
Heavy Bombardment Group	B-17, B-24	72	96	9-11	2,261	465	1,796
Medium Bombardment Group	B-25, B-26	96	96	5-6	1,759	393	1,366
Light Bombardment Group	A-20, A-26	96	96	3-4	1,304	211	1,093
Single Engine Fighter Group	P-40, P-47, P-51	111-126	108-126	1	994	183	811
Twin Engine Fighter Group	P-38	111-126	108-126	1	1,081	183	898
Night Fighter Squadron	P-61, P-70	18	16	2-3	288	50	238
Troop Carrier Group	C-47	80-110	128	4-5	1,837	514	1,323
Combat Cargo Group	C-46, C-47	125	150	4	883	350	533
Tactical Reconnaissance Squadron	F-6 (P-51), P-39, P-40, L-4, L-5	27	23	1	233	39	194
Photographic Reconnaissance Squadron	F-5 (P-38)	24	21	1	347	50	297
Combat Mapping Squadron	F-7 (B-24) F-9 (B-17)	18	16	9	474	77	397

Source: AAF Statistical Digest, World War II

AAF Combat Sorties Flown, by Theater—World War II

YEAR	TOTAL	Theaters versus Germany			Theaters versus Japan					
		ETO	MTO	TOTAL	POA	FEAF	CBI	ALASKA	20TH AF	TOTAL
1941 (Dec.)	212					212				212
1942	26,688	2,453	7,296	9,749	130	14,311	1,341	1,157		16,939
1943	365,940	63,929	169,594	233,523	1,413	103,147	23,151	4,706		132,417
1944	1,284,195	655,289	356,812	1,012,101	26,364	163,397	78,999	815	2,519	272,094
1945 (Jan.-Aug.)	685,765	312,381	125,811	438,192	31,194	134,912	44,538	640	36,289	247,573
Total	2,362,800	1,034,052	659,513	1,693,565	59,101	415,979	148,029	7,318	38,808	669,235

Tons of Bombs Dropped by AAF Overseas, by Theater—World War II

YEAR	TOTAL	Theaters versus Germany			Theaters versus Japan					
		ETO	MTO	TOTAL	POA	FEAF	CBI	ALASKA	20TH AF	TOTAL
1941 (Dec.)	36					36				36
1942	10,203	1,713	4,410	6,123	35	2,633	697	715		4,080
1943	198,800	55,655	98,462	154,117	1,309	29,705	10,841	2,828		44,683
1944	1,085,978	591,959	346,993	938,952	17,546	92,134	27,987	295	9,064	147,026
1945 (Jan.-Aug.)	762,227	322,435	132,836	455,271	13,843	107,988	22,636	493	161,996	306,956
Total	2,057,244	971,762	582,701	1,554,463	32,733	232,496	62,161	4,331	171,060	502,781

ETO—European Theater of Operations
MTO—Mediterranean Theater of Operations
POA—Pacific Ocean Areas
FEAF—Far East Air Forces
CBI—China-Burma-India Theater of Operations
20th AF—Operated out of China and Marianas Islands

(Source: Army Air Forces Statistical Digest, World War II)
Selected statistical tabulations indicate the scope and intensity of air effort during World War II

(Continued on following page)

AAF Airplane Losses on Combat Missions, by Theater—World War II*

YEAR	TOTAL	Theaters versus Germany			Theaters versus Japan					
		ETO	MTO	TOTAL	POA	FEAF	CBI	ALASKA	20TH AF	TOTAL
1942	482	55	86	141	13	275	35	17		341
1943	3,847	1,261	1,767	3,028	25	539	217	38		819
1944	13,289	7,749	3,869	11,618	116	910	532	18	95	1,671
1945 (Jan.-Aug.)	5,330	2,622	1,009	3,631	224	769	292	15	399	1,699
Total	22,948	11,687	6,731	18,418	378	2,494	1,076	88	494	4,530

*Includes period January, 1942 until VJ-day. Accurate statistics not available for month of December, 1941.

Enemy Aircraft Destroyed, by Theater—World War II*

YEAR	TOTAL	Theaters versus Germany			Theaters versus Japan					
		ETO	MTO	TOTAL	POA	FEAF	CBI	ALASKA	20TH AF	TOTAL
1942 (Feb.-Dec.)	935	169	158	327		518	53	37		608
1943	10,837	3,865	3,740	7,605	96	2,466	636	34		3,232
1944	19,442	10,425	5,239	15,664	226	2,518	772	8	254	3,778
1945 (Jan.-Aug.)	8,477	5,960	291	6,251	472	416	361	6	971	2,226
Total	40,259+	20,419	9,497+	29,916	794	26,298	1,913+	113+	1,225	10,343

* Includes period February, 1942 until VJ-day. No accurate statistics available for period Dec. 7, 1941 to Jan. 31, 1942.
+Includes 568 enemy aircraft destroyed, whose destruction cannot be allocated to specific months: 69 in theaters versus Germany (MTO), 499 in theaters versus Japan (FEAF-380, CBI-91, Alaska-28).

FEAF Statistical Summary of Korean Air War

Enemy Aircraft Losses:

Type	Destroyed	Prob. Destroyed	Other	Damaged
MIG-15s	839	154		919
All types (incl. MIGs)	1,020	182		1,010

USAF Aircraft Losses:

Type	Air-to-Air	Groundfire	Other	Total
Jet	83	259	93	435
Conventional	21	285	60	366
Total	104	544	153	801
Friendly Foreign A/C	6	54	22	82
Shorebased Marine A/C	0	79	38	117
Grand Total	110	677	213	1,000

Sorties and Damage Summary*

Items	USAF	Attached Units	Total
Sorties flown	716,979	119,898	836,877
Vehicles destroyed	74,589	8,331	82,920
Railcars destroyed	9,417	1,072	10,489
Bridges destroyed	869	341	1,210
Tanks destroyed	1,160	171	1,331
Troop casualties	145,416	39,392	184,808
Locomotives destroyed	869	94	963
Buildings destroyed	89,639	29,690	119,329
Gun positions destroyed (not broken down)			18,324
Barges and boats destroyed (not broken down)			592

* Reported figures for USAF and attached units from beginning of Korean war to and including 10 PM July 27, 1953, the hour of cease-fire.

USAF and Attached Units Summary of Deliveries

(As of June 30, 1953)

Tons of bombs	448,366
Rounds of ammunition	182,829,400
Number of rockets	511,329
Gallons of napalm	9,596,798
Tons of personnel and freight	670,000
Passengers	2,700,000
Air evacuees	325,000

SOURCES: FEAF Korean Air War Summary, Immediate Release No. 2700, July 31, 1953, Gen. Otto P. Weyland, "The Air Campaign in Korea," "Air University Quarterly Review, Fall 1953, Vol. VI, No. 3; Air Force Public Information Letter, "Supplement No. 59, Brief History of the United States Air Force, 1907-1953."

Aces—WW I

	Victories
Capt. Edward V. Rickenbacker	26
Lt. Frank Luke, Jr.	18
Maj. Raoul Lufbery	17
Lt. George A. Vaughn	13
Capt. Field E. Kindley	12
Lt. David E. Putnam	12
Capt. Elliott W. Springs	12
Capt. Reed G. Landis	10
Capt. Jacques M. Swaab	10

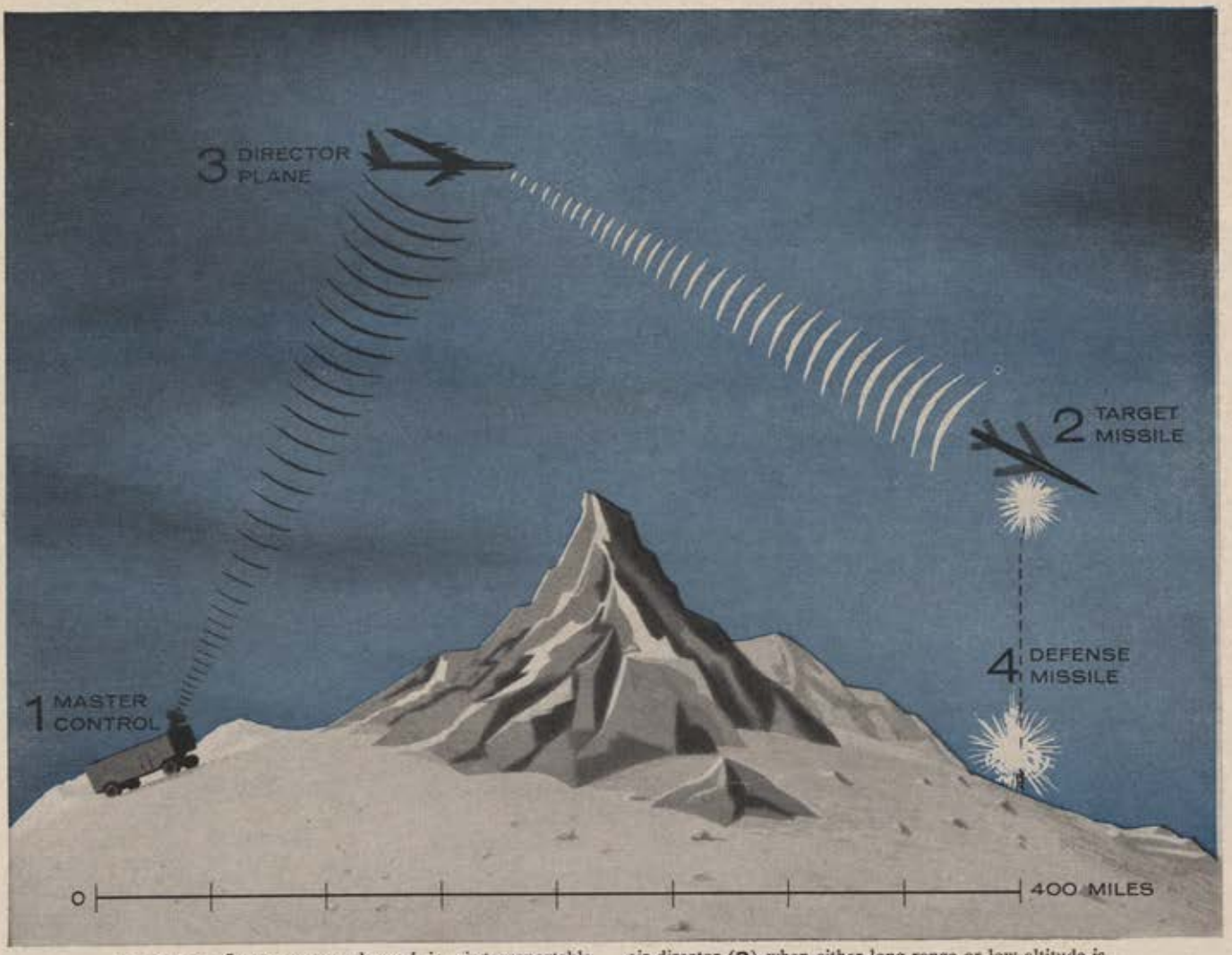
Top Aces—WW II

	Air-to-air Victories
Maj. Richard I. Bong	40
Maj. Thomas B. McGuire, Jr.	38
Col. Francis S. Gabreski	31
Capt. Robert S. Johnson	28
Col. Charles H. MacDonald	27
Maj. George E. Preddy	25.83
Col. John C. Meyer	24
Capt. Don S. Gentile	23
Capt. Ray S. Wetmore	22.59
Col. David C. Schilling	22.5

Top Jet Aces—Korea

	Air-to-air Victories
Capt. James McConnell, Jr.	16
Maj. James Jabara	15
Capt. Manuel J. Fernandez	14.5
Maj. George A. Davis, Jr.	14
Col. Royal N. Baker	13
Maj. Frederick C. Blesse	10
1st Lt. Harold E. Fischer	10
Col. James K. Johnson	10
Lt. Col. Vermont Garrison	10
Capt. Lonnie R. Moore	10
Capt. Ralph S. Parr, Jr.	10

(Continued on page 229)



In action Sperry system, housed in air-transportable trailer (**1**), can command, track and telemeter drone flight data of supersonic target (**2**) either directly or through air director (**3**) when either long range or low altitude is involved. Object is to test readiness of anti-missile defense and accuracy of ground-to-air defense missile (**4**).

DRY RUN FOR USAF ANTI-MISSILE DEFENSE

New Sperry radar guidance system controls drones at 400-mile range

Accurate control of target drone in flight is maintained by operator at microphone through flight instruments on control console. Man in foreground monitors mission. Flight path of distant drone is traced automatically on plotting board at upper right.

A microwave command guidance system designed to help test U. S. defenses against potential enemy weapons has been successfully demonstrated to the Air Force.

Developed by Sperry under contract with the Air Research and Development Command, the system is scheduled for initial use with Q-4A supersonic drones. It is the first command guidance system to be considered for universal use to control other target drones, pilotless aircraft and missiles at high and low altitudes and at great distances.

The system tracks a vehicle, commands its engine and flight controls, and receives flight data—all on a single radar link. At extreme range or in mountainous terrain, the system operates through an air director. Like the master ground control station, this control aircraft is equipped with radar range, tracking, command, plotting and data receiving apparatus. In addition, chain-station operation capability enables long-range drones to be ground-controlled to maximum limits along the range.

This is the latest advance in Sperry's long history in the drone control field. Since 1946 Sperry drone control systems have been applied to many types of aircraft—both reciprocating and jet.

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e·con′o·my: *when round-trip missiles save taxpayers $102,950,000*

Most missiles land head-first – and, like a bomb, just once. This destruction is desired in a missile strike, but it makes development costly. Scores of missiles often are expended before development problems are solved.

Vought's *Regulus I* and *II* reduce this expense by their dual application. Tactical versions of these guided missiles can strike head-on, with a devastating nuclear wallop. Test and training versions, used in development, can be recovered to fly again.

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Regulus I has armed submarines, cruisers and carriers with a nuclear punch since 1955. *Regulus II*, with a range of more than 1,000 miles and able to exceed twice the speed of sound, will join the Navy's underwater and surface Nuclear Fleet.

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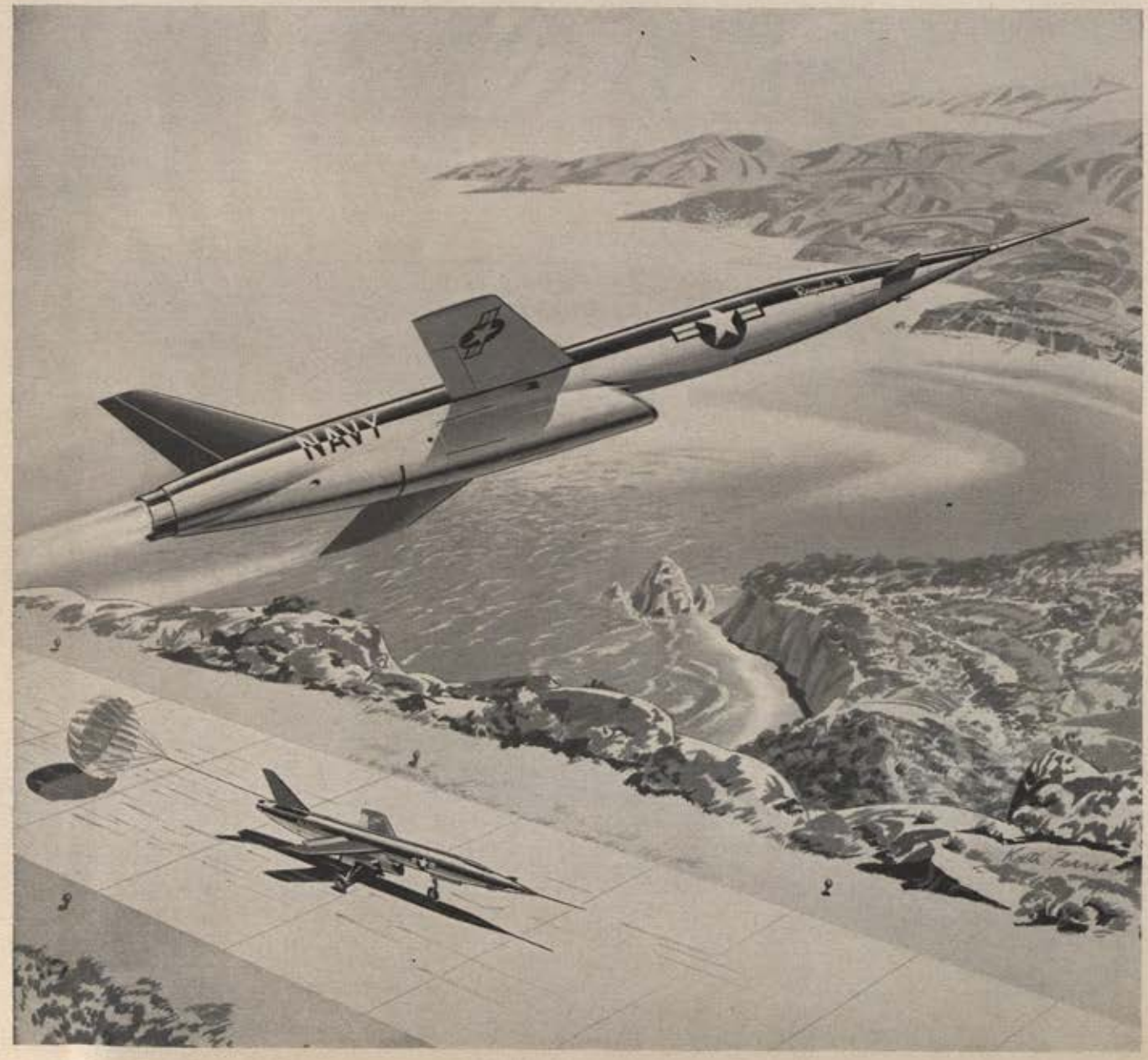

SECTION G

For Heroism—Medal of Honor: Highest of our military decorations. Established in 1862, it is awarded in the name of Congress to an officer or enlisted man who, in actual conflict with the enemy, distinguishes himself by gallantry and intrepidity at the risk of his life above and beyond the call of duty.

Medal of Honor Winners

World War I

1st Lt. Harold E. Goettler, flying with Erwin R. Bleckley, as observer, 50th Aero Sqdn. pilot, was shot down while airlifting supplies to an infantry battalion cut off in the Argonne Forest, and was killed instantly. Oct. 6, 1918

2d Lt. Frank Luke, Jr., 27th Aero Sqdn. pilot, downed by enemy fire after destroying German balloons, was killed on the ground while fighting to avoid capture. Sept. 29, 1918

1st Lt. Edward V. Rickenbacker, 94th Aero Sqdn. pilot, attacked seven German planes while on voluntary patrol over enemy lines and, despite the odds, shot down two. Sept. 25, 1918

Between the Wars

Capt. Charles A. Lindbergh, flying a single-engine plane from New York to Paris, made the first nonstop, solo flight across the Atlantic. May 21, 1927

World War II

Col. James H. Doolittle carried the air war to the Japanese, leading a squadron of carrier-based B-25s, manned by volunteers, against Tokyo, June 9, 1942.

Capt. Harl Pease, Jr., on a voluntary mission to Rabaul, having aborted earlier, bombed his target and destroyed several Japanese planes before he was shot down. Aug. 6, 1942

Maj. Pierpont M. Hamilton, though captured near Port Lyautey, North Africa, Nov. 8, 1942, escaped and managed to locate the French commander to negotiate an armistice. Nov. 8, 1942

Col. Demas T. Craw was killed by machine-gun fire, Nov. 8, 1942, near Port Lyautey, North Africa, while trying to pass through the lines to negotiate an armistice. Nov. 8, 1942

Brig. Gen. Kenneth N. Walker, 5th AF, was forced down over Rabaul in 1943. He had developed a highly efficient technique for bombing when opposed by enemy fighters.

1st Lt. Jack W. Mathis, a lead bombardier, badly wounded by flak at the start of his bomb run, died at his post after bombs away over Germany. Mar. 18, 1943

Sgt. Maynard H. Smith, on May 1, 1943, drove off German fighters that had set his B-17 afire, threw exploding ammo overboard, gave first aid, and beat out the flames by hand, saving the plane. May 1, 1943

2d Lt. Joseph R. Sarnoski shot down two Japanese fighters before dying at his gun, on a photo mission over the Solomon Islands in 1943, when attacked by twenty planes. June 16, 1943

Maj. Jay Zeamer, Jr., though wounded on a photo mission over the Solomon Islands, fought off enemy planes and directed his flight to a base 580 miles away. June 16, 1943

2d Lt. John C. Morgan, B-17 copilot, for two hours flew the bomber while restraining his pilot who had been wounded and crazed, and was attempting to snatch the controls.

Lt. Col. Addison E. Baker, 93d Bomb Group, whose plane was hit by flak over Ploesti, stayed in formation for the bomb run and then crashed in flames. Aug. 1, 1943

2d Lt. Lloyd H. Hughes, 9th AF, though realizing his B-24 was leaking gas, nevertheless flew in low over Ploesti, and bombed the flaming target. Aug. 1, 1943

Maj. John L. Jerstad, 9th AF, volunteered to lead his group against Ploesti. His plane was badly damaged but he kept on course and dropped his bombs before crashing. Aug. 1, 1943

Col. Leon W. Johnson, 9th AF, elected to make the low-level attack on Ploesti despite having lost the element of surprise when separated from others in formation. Aug. 1, 1943

Col. John R. Kane, 9th AF, attacked Ploesti at low level although he had lost the element of surprise when his group was separated from other attackers.

Maj. Ralph Cheli, 5th AF, leading a formation of bombers, crashed his own flaming plane into the ocean, near New Guinea, rather than disrupt the formation. Aug. 18, 1943

Col. Neil E. Kearby, P-47 pilot, led his flight of four fighters against twelve Japanese bombers and thirty-six fighters near New Guinea; Kearby downed five enemy planes. Oct. 11, 1943

Maj. Raymond H. Wilkins, destroyed two Japanese planes near Rabaul although his plane was damaged; he was hit by more flak and crashed into the ocean. Nov. 2, 1943

T/Sgt. Forrest L. Vosler, radio operator wounded in Germany, continued sending SOS signals; when the plane was ditched, he saved the wounded tail gunner. Dec. 20, 1943

Lt. Col. James H. Howard, P-51 pilot, attacked singlehanded more than thirty German planes harassing American bombers over Oschersleben, Germany. Jan. 11, 1944

1st Lt. William R. Lawley, Jr., 8th AF, successfully crash landed his badly damaged B-17, though wounded himself; his copilot was dead and eight crewmen wounded. Feb. 20, 1944

Sgt. Archibald Mathies, 8th AF engineer, with his wounded pilot was unable to bail out of the damaged plane, and died trying to land after helping to fly the plane back to base. Feb. 20, 1944

2d Lt. Walter Truemper, 8th AF navigator, was killed trying to land his damaged plane in an effort to save his wounded pilot; the crew, except the navigator, had bailed out. Feb. 20, 1944

1st Lt. Edward S. Michael, though wounded, continued flying his badly damaged bomber because one crewman had no parachute; he reached England and landed without mishap.

Lt. Col. Leon R. Vance, Jr., 8th AF pilot, though wounded and his plane hit by flak, successfully ditched in the English Channel, believing a crew member was still aboard.

2d Lt. David R. Kingsley, 9th AF, gave up his own parachute for a wounded crew member over Ploesti, and helped him bail China Sea; crashed after his crew had bailed out. Oct. 26, 1944

1st Lt. Donald Pucket unsuccessfully tried to crash land his badly damaged bomber after a Ploesti mission when three of the crew were unable to bail out. July 9, 1944

Capt. Darrell R. Lindsey crashed with his burning B-26 in France after holding the plane in a steady glide to give his crew time to parachute to safety. Aug. 9, 1944

Maj. Horace S. Carswell, Jr., 308th Bomb Group, whose plane was crippled by flak from a convoy he attacked in the South China Sea, crashed after his crew had bailed out. Oct. 26, 1944

2d Lt. Robert E. Femoyer, 711th Bomb Squadron, navigator, though badly wounded by flak, continued directing his bomber back to its English base; he died shortly afterward. Nov. 2, 1944

2d Lt. William E. Metzger, Jr., 8th AF copilot, remained with his damaged B-17 after ordering the able-bodied crew members to bail out; Metzger died when the plane exploded. Nov. 9, 1944

1st Lt. Donald J. Gott, 8th AF, unsuccessfully tried to fly his B-17 to friendly territory with a wounded man aboard; the rest of the crew had been ordered to jump. Nov. 9, 1944

Maj. Richard I. Bong, 5th AF pilot instructor, destroyed eight Japanese planes between Oct. 10 and Nov. 15, 1944, on voluntary flights in the Southwest Pacific area. Nov. 15, 1944

Brig. Gen. Frederick W. Castle, 8th AF, crashed to his death in Belgium after his B-17 caught fire; he took the controls himself, giving the crew time to jump safely. Dec. 24, 1944

Maj. Thomas B. McGuire, Jr., 13th AF P-38 pilot, shot down seven Japanese fighters in the two-day period, Dec. 25 and 26, 1944, over Luzon, P.I.; he later was killed in action. Dec. 26, 1944

Maj. William A. Shomo attacked twelve Japanese fighters escorting a twin-engine bomber over Luzon in 1945; he destroyed the bomber and six of the escorting planes. Jan. 11, 1945

S/Sgt. Henry E. Erwin, 20th AF, carried a burning phosphorus bomb that had ignited prematurely to the copilot's window and threw it out. He was badly burned but saved the B-29.

1st Lt. Raymond L. Knight, P-47 pilot, having accounted for twenty-four German aircraft destroyed April 24 and 25, 1945, in the Po Valley, Italy, crashed and was killed. Apr. 25, 1945

Korean War

Maj. Louis J. Sebille, F-51 pilot, determined to press the attack after his plane was hit by flak on a Korean strafing mission in August 1950, dived into his target. Aug. 5, 1950

Capt. John S. Walmsley, Jr., near Yangdok, Korea, flying a B-26 on a night combat mission, sighted an enemy supply plane, attacked, then led other B-26s to the target; while making a low-level run to guide them, he exposed himself to enemy barrage, his plane was hit and crashed. Sept. 14, 1951

Maj. Charles J. Loring, Jr., near Sniper Ridge, North Korea, while leading a flight of F-80s on a close-support mission, made a dive-bomb run despite heavy ground fire, and dived his aircraft into an enemy gun emplacement. Nov. 22, 1952

Lt. Col. George A. Davis, Jr., near Sinuju-Yalu River area, Korea, while leading a flight of two F-86s near the Manchurian Border, sighted twelve MIGS, attacked and destroyed three; he was hit and crashed in the mountains. Feb. 10, 1952

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1 The United States Air Force Report on the Ballistic Missile

The current selection of the Airpower Book Club—the *first* comprehensive study of the design, the capabilities, the command structure, personnel requirements, and employment of the ballistic missile, written by the USAF men responsible for present and future employment of our newest weapon systems.

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Empty? Not quite. In one of the seats, forgotten, lay a little rag doll.

He reached down and picked it up. It had the floppy, well-squeezed look dolls get when they're really loved. Any father who has helped a curly-head snuggle into bed with a favorite doll would know that here was a real tragedy. So the pilot went to work to find its small owner.

United's vast communications system, which speeds weather data, flight and reservations information coast to coast, can also trace a heartbroken little girl. With the help of willing United people thousands of miles apart, she was found. And a grateful mother wrote: "She has other dolls much newer and prettier. But this little rag doll is the only one close to her heart. I cannot tell you how much your returning it means to her, and to us."

No company rules told that pilot, and all of those who helped him, that finding the owner of a frayed little doll is important. Their action sprang from something far deeper—a genuine interest in people which, on the ground and aloft, results in "service in the Mainliner® Manner"—the extra care you enjoy at no extra fare when you fly United—the Radar Line.

The Year in Airpower Books

THE past year, July 1957-July 1958, has seen an increase in airpower literature unparalleled in aviation history, and the USAF is featured in more than 100 of these.

Forty-one hardbacks and thirteen paperbacks deal exclusively or predominantly with Air Force topics—for an impressive average appearance of *one* new Air Force book a week. The following recap lists some of the highlights of a busy publishing year.

HISTORY

Air Force: A Pictorial History of American Airpower, by Martin Caidin (Rinehart, $10)—A detailed picture-narrative history of the USAF from 1907-1957 in 60,000 words and 400 photos.

Famous Fighters of the Second World War, by William Green (Hanover House, $3.95)—Narrative-photo chronicle of development and operational history of eighteen top World War II fighters.

Lifeline in the Sky, by Clayton Knight (Morrow, $6)—History of MATS and the story of its global operations today.

A History of the United States Air Force, 1907-1957, edited by Alfred Goldberg (D. Van Nostrand, $6.75)—One-volume narrative history of the USAF with a treasure of photos. Thorough, authentic account prepared by official Air Force historians.

Man Unafraid: The Miracle of Military Aviation, by Stephen F. Tillman (Army Times Publishing Co., $3.50)—Detailed, colorful story of the first eight years of the Air Force, 1908-1916.

Five Down and Glory: A History of the American Air Ace, by Capt. Gene Gurney, USAF, edited by 1st Lt. Mark P. Friedlander, USAF Res. (Putnam's, $5.75)—Complete, thorough narrative-statistical history of American air aces of all wars, all services. A record of nearly 1,700 American aces in dramatic prose, with a comprehensive tabular listing.

American Aces in Great Fighter Battles of World War II, by Edward H. Sims (Harper, $3.95)—Graphically written minute-by-minute account of the most spectacular and significant World War II missions flown by each of twelve top surviving Air Force fighter aces.

SAC: The Strategic Air Command, by Richard Hubler (Duell, Sloan & Pearce, $4.50)—The first popular history of SAC. Informal, eminently readable, compelling story of SAC from its beginnings.

U. S. Air Power, by Samuel Taylor Moore (Greenberg, $5.95)—A one-volume illustrated narrative history of American airpower, with primary emphasis on the Air Force, spanning from balloons to nuclear jet bombers and the ICBM.

They Fought for the Sky, by Quentin Reynolds (Rinehart, $3.95)—Highly readable, fascinating history of the first war in the air. Complete accounting of military aircraft, aerial battles of World War I featuring great early air heroes, Allied and German. (Also in paperback, Bantam, 35¢.)

Low Level Mission: The Story of the Ploesti Raids, by Leon Wolff (Doubleday, $4.50)—Informative, hour-by-hour reconstruction of the historic August 1, 1943, low-level B-24 air strike at Romanian oil fields.

BIOGRAPHY

Tom Pittman, USAF, by Rutherford Montgomery (Duell, Sloan & Pearce, $3)—The exciting story of an Air Force B-47 pilot, his brush with death in an Arctic crash, and his successful fight to return to flight status as an amputee.

Mitchell: Pioneer of Airpower, by Isaac Don Levine (Duell, Sloan & Pearce, $6)—New edition of the classic Billy Mitchell biography, first published in 1943.

Escape from Corregidor, by Edgar D. Whitcomb (Regnery, $4.50)—Story of a World War II Air Force navigator who escaped Japanese capture on Corregidor, was recaptured, and outwitted the Japanese to return to the US and back to fight the Japanese.

The Fastest Man Alive, by Lt. Col. Frank K. Everest, Jr., USAF, told to John Guenther (Dutton, $4)—Life story of the famous Air Force jet and rocket test pilot, with emphasis on the X-2 program. Foreword by Maj. Gen. Albert Boyd, USAF (Ret.).

Come North With Me, by Col. Bernt Balchen, USAF (Ret.) (Dutton, $5)—Stirring autobiography of one of the great Arctic air explorers.

FICTION

The Locust Fire, by Eugene Brown (Doubleday, $3.25)—Realistic, descriptive novel of the men who ran Air Transport Command combat cargo operations in South China during World War II.

Radar Trouble Shooter: The Adven-

(Continued on following page)

tures of Sgt. Wilson of the Air Force, by Malcolm Stevenson (Dodd, Mead, $2.75)—Novel of Air Force enlisted aircrews who help keep SAC bombers in the air. For the teen-ager.

The Damned Wear Wings, by David C. Camerer (Doubleday, $3.95)—A novel about the 15th Air Force B-24 crews who methodically leveled the Ploesti oil complex in the latter days of World War II.

Tales of a Flier's Faith, by Ed Mack Miller (Doubleday, $3.50)—Twenty short stories about airmen and their faith.

Wings of Tomorrow, by Marian Talmadge and Iris Gilmore (Dodd, Mead, $2.75)—The adventures of Cadet Frank Barton during his first year at the USAF Academy. For the teen-ager.

Jets Away!, by Rutherford Montgomery (Dodd, Mead, $3)—Adventures of two young SAC airmen, members of a SAC B-47—KC-97 combat team. For teen-agers.

Kent Barstow, Special Agent, by Rutherford Montgomery (Duell, Sloan & Pearce, $3)—First of a series featuring Air Force Capt. Kent Barstow, intelligence agent, on an undercover special assignment behind the Bamboo Curtain in the Far East.

THE LITERATURE OF FLIGHT

The Sound of Wings, by Maj. Joseph B. Roberts, USAF, and Capt. Paul L. Briand, USAF (Holt, $5)—An air anthology of outstanding writings—poetry and prose. Emphasis on Air Force writing and history.

The Airman's World, by Gill Robb Wilson (Random House, $2.95)—Beautifully designed, inspiring volume of thirty-two word-and-picture portraits of the world of the air, by a pioneer airman and distinguished aviation writer.

AIR FORCE TOPICS

The Answer Book on Air Force Social Customs, by Ester Wier and Dorothy Coffin Hickey (Military Service, $3)—An "Emily Post" on Air Force social customs and protocol.

Air Force Airs, by T/Sgt. William Wallrich, USAF (Duell, Sloan & Pearce, $2.95)—The first Air Force song book. Songs, ballads, and parodies created by US airmen through three wars and sung in the barracks, on the flight line, and in the air, in peace and war.

U. S. Air Force Academy: The Life of a Cadet, by Jack Engeman (Lothrop, Lee & Shepard, $3.50)—Picture story of the USAF Academy today. Fourth in a series of service academy picture books.

AIRMANSHIP—REFERENCE—TEXTS

Air Force Officer's Guide, tenth edition (Military Service, $5)—New 1957 edition brings this standard reference up to date.

Airman's Guide, (Military Service, $3)—New revised up-to-date ready reference and guide for airmen.

Modern Airmanship, edited by Col. Neil D. Van Sickle, USAF (D. Van Nostrand, $10)—Comprehensive coverage of fundamentals of modern flying. A definitive text and source book. Highly illustrated.

How to Get Ahead in the Air Force (Military Service, $2.50)—Highly readable reference guidebook for the airman planning a commissioned or noncommissioned service career.

The Junior Airman's Book of Air-

(Continued on page 237)

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The Best Buy—BUY TRAIN!

planes, by Clive Davis (Dodd, Mead, $2.50)—Picture-narrative presentation of all Air Force inventory aircraft: fighters, bombers, transport, trainers.

Guided Missiles: Operations, Design and Theory, (McGraw-Hill, $8)—Commercial edition of Air Force manual 52-31. Technical, basic text on missilry, pegged as tops in its field. Well illustrated.

Histories of the United States Air Force, by C. E. Dornbusch (Hampton Books, $2)—A bibliography of 265 Air Force unit histories of World War I and World War II.

U. S. Army-Air Force Fighter Planes, by Edward J. Farley (Aero, $2.50)—Three-view and cross-section scale drawings and photos of fighter aircraft from the 1925 Curtiss P-1 Hawk to the Republic F-105 Thunderchief.

RESEARCH AND DEVELOPMENT

Supersonic Project Officer, by Lloyd Mallan (David McKay, $3.95)—Dramatic photo-narrative of the mission and test work of the USAF Air Proving Ground Center as told through the project testing of the Century series Convair F-102A Delta Dagger.

Rockets, Missiles and Moons, by Charles Coombs (Morrow, $3.75)—Story of the research and experimentation on rockets, guided and ballistic missiles, and space travel. Illustrated.

DEW Line: Distant Early Warning, the Miracle of America's First Line of Defense, by Richard Morenus (Rand McNally, $3.95)—The story of the conception, planning, construction, and operation of the USAF's DEW Line.

Countdown for Tomorrow, by Martin Caidin (Dutton, $4.95)—Popular history of US missile programs with emphasis on Air Force contribution.

Men, Rockets and Space Rats, by Lloyd Mallan (Messner, $5)—Updated edition of an excellent account of the Air Force's achievements in space exploration.

PAPERBACKS

The Hunters, by James Salter (Bantam, 35¢)—Novel of the Korean air war and the Air Force Sabrejet pilots who defeated the MIG-15s in aerial combat over the Yalu River.

Rescue!, by Elliott Arnold (Bantam, 35¢)—The story of worldwide USAF Air Rescue Service operations told in thirty-three dramatic accounts of the service's feats.

Maybe I'm Dead, by Joe E. Klaas (Dell, 50¢)—Moving novel of the tragic Air Force prisoner-of-war death march in Germany in the last days of World War II.

Samuari!, by Sabura Sakai with Martin Caidin and Fred Saito (Ballantine, 50¢)—The aerial combat in the Pacific told in terms of a top Japanese World War II airman.

Look of the Eagle, by Brig. Gen. Robert L. Scott, USAF (Ret.) (Ace, 35¢)—Fast-moving fiction adventure story of an Air Force jet pilot.

Bomber Crew, by Joseph Landon (Avon, 35¢)—Novel of the Air Force men who flew combat missions over the Ploesti oil fields.

Serenade to the Big Bird, by Bert Stiles (Ballantine, 35¢)—The moving memoirs of a young airman at war. Reprint of an air classic.

Roll Back the Sky, by Lt. Col. Ward Taylor, USAF (Popular Library, 50¢)—Novel about the Pacific air war and the men and their B-29s on low-altitude fire-bomb missions over Japan.

Zero, by Martin Caidin (Ballantine, 50¢)—The air war in the Pacific as seen through Japanese eyes. A good look at Air Force Pacific air operations.

The Big Show, by Pierre Closterman (Ballantine, 35¢)—A solid, informative story of the World War II air war in Europe.

Wing Leader, by Group Captain J. E. "Johnnie" Johnson (Ballantine, 50¢)—An RAF fighter pilot's story of European air combat from the Battle of Britain to the end of the war.

Don't Touch Me, by MacKinlay Kantor (Popular Library, 35¢)—A novel of the Korean air war and the men of the B-29 medium-bomber outfits.

LOOKING FORWARD

More than seventy-four "contracted" air and space books are now under preparation or production for 1958-1959 publication—titles such as the *USAF Report on the Ballistic Missile; Airpower: The Absolute Weapon; The ICBM; Design for Survival; The Air Force Space Weapons Handbook; Compact History of the USAF; Man into Space; Dr. Theodore von Kármán: A Biography;* four major air novels by America's leading novelists, and many others. The appearance of these augment the expanding library of air literature.

—Maj. James F. Sunderman

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Then fill out the coupon and return it *today* to take full advantage of this nonprofit protection designed for *you*.

"The Air Force Association has taken a very fine step in the right direction in providing Flight Pay Protection to individuals on flying status.

"Perhaps one of the less obvious, yet very important elements, is that the existence of this type of protection tends to diminish still further any barriers which may exist between flight surgeon and the flying personnel under his charge. I'm sure that we have had accidents which resulted from flying personnel not taking physicians into their confidence for fear that they would have been removed from flying status. This is a perfectly understandable human reaction. If we can prevent even one mishap through better rapport between our flyers and their flight surgeons, the whole cost of the program may well be written off for the year, not to mention a life saved.

"I hope as time goes on that most of our people will see the wisdom of this. The beauty of the plan may be said to lie in the fact that one doesn't have to die to take advantage of it."

Brig. Gen. A. H. Schwichtenberg
Command Surgeon of Air Defense Command

"You just don't realize the importance of the plan until your flight pay suddenly ceases. It becomes a part of your pay that is counted upon monthly. When you have lost $190 a month it puts a strain on the family budget which is awfully hard to overcome."

Capt. Joseph Levinson

"The only thing that has probably impressed me more than the other is the promptness with which my claim has been processed. In the past I have owned various hospitalization and accident policies on myself and my family, but the receipt of benefits so promptly and with such graciousness was a welcome change from the usual amount of red-tape investigations associated with hospital and accident insurance claims."

Lt. Col. James T. Cousin

SEE NEXT PAGE FOR DETAILS

Here's how AFA's Flight Pay Protection Plan works...

Any person on full-time active duty who receives incentive pay for flying can qualify—provided that he is, or becomes, an AFA member.

When you sign up for protection you pay a premium of two percent (2/100) of your annual flight pay, figured at the current rate. For example, if your current flight pay amounts to $1,800 a year, you pay only $36 for flight pay protection.

(To get your current rate of flight pay, multiply your present monthly flight pay by 12.)

Protection against loss of flight pay due to grounding as a result of accident goes into effect on the last day of the month in which you apply for protection and pay your first premium.

Protection against loss of flight pay for grounding due to disease goes into effect 30 days after the last day of the month in which you apply for protection and pay your first premium.

There's a waiting period before payments start—90 days for groundings due to disease or nonaviation accidents, 180 days for groundings due to aviation accidents—because unless your grounding exceeds these limits you can collect back flight pay from the government by putting in the required flight time.

But if your grounding exceeds these limits, the AFA plan not only thereafter provides regular indemnities for 80% of lost flight pay, *but indemnifies you for 80% of lost flight pay retroactively*, covering the 90-day or 180-day waiting period in the first payment, at the rate reported on your insurance certificate. For example, one colonel, *grounded, got $1,225 indemnity for lost flight pay in his first check.*

Of course, this coverage does not apply in case of war, declared or undeclared, or hostile action, civil war, invasion, or the resulting civil commotion or riots. There are also other exclusions, which may never apply to you, but you are entitled to know them. These exclusions are as follows:

The plan does not cover persons whose primary duty is parachute jumping.

The plan does not cover losses due to a criminal act of the AFA member, or resulting from bodily injury occurring while in a state of insanity (temporary or otherwise); or from mental or nervous disorders; or from officially certified "fear of flight"; or caused by intentional self-injury, attempted suicide, criminal assault committed by the member, or fighting, except in self-defense; or from failure to meet flying proficiency standards unless caused by or aggravated by or attributed to disease or accident; or accidents caused while riding or driving in any kind of race; or by alcohol, drugs, venereal disease, arrest or confinement; or by willful violation of flying regulations resulting in suspension from flying as a punitive measure; or sentence to dismissal from the service by a general court-martial; submitted resignation for the good of the service; or suspension from flying for administrative reasons not due to accident or disease; or voluntary suspension.

The plan does not cover losses to any member resulting from a disease or disability pre-existing the effective date of coverage, or a recurrence of such disease or disability, whether or not a waiver has been authorized by appropriate medical authority in accordance with regulations or directives of the service concerned. Loss of life shall not be deemed as a loss for purposes of this plan.

In the event that you receive the total limit of twenty-four (24) months' indemnity for loss of flight pay due to aviation accident, or twelve (12) months' indemnity for loss of flight pay due to accident other than aviation accident or to disease, your coverage is automatically terminated. You may thereafter reapply for insurance coverage in the same manner as a new member. Coverage, and the payment of indemnities, end with the termination of membership in the AFA, or with resignation, retirement, or pensioning from the service, or at age sixty.

The insurance is renewable at the option of the Aetna Insurance Company.

• • •

Policy Form No. 1-620-3A.

AIR FORCE ASSOCIATION 8-58
FLIGHT PAY PROTECTION PLAN

Underwritten by AETNA INSURANCE COMPANY
55 Elm Street, Hartford, Connecticut

SEND REMITTANCE TO AIR FORCE ASSOCIATION, MILLS BLDG., WASHINGTON 6, D. C.

(Please Print) Rank Name

Serial Number Years Service for Pay Purposes

Mailing Address

Amount of Annual Flight Pay

I certify I am currently on flying status and entitled to receive incentive pay, and that to the best of my knowledge I am in good health, and that no action is pending to remove me from flying status for failure to meet physical standards. I authorize AFA, or AFA representatives, to examine all medical records pertinent to any claim I may submit.

Signature of Applicant Date

☐ I want to join AFA, $6 dues enclosed.

Application must be accompanied by check or money order for annual premium. The annual premium charge is two percent of ANNUAL flight pay.

Apostles of Airpower

ARMED with the facts," the Air Force Association declared in a policy statement last May, "the people of America have always had the intelligence and the courage to do what is necessary and right."

AFA was asking for more facts about the position of the United States *vis-à-vis* the Soviet Union in the technological race for survival. This search for candor can be traced back nearly thirteen years. In October of 1945, Edward P. "Ted" Curtis (World War II major general, recently Special Assistant to the President for Aviation Facilities) called the first meeting of AFA's founders with this precept in mind:

"The present thinking is that this should not be a veterans' organization in the ordinary sense of the word . . . . It is . . . to provide a national organization which will help educate its own members and the public at large in the proper development of airpower."

Basically, the idea came from Gen. H. H. "Hap" Arnold, World War II commander of the Army Air Forces. He knew someone would have to carry on the fight for airpower in time of peace. He and Maj. Gen. Fred Anderson spurred Curtis into launching AFA. AFA's first president was James H. "Jimmy" Doolittle, a natural.

At the first AFA Convention in Columbus, Ohio, in 1947, Gen. Carl A. Spaatz, then Chief of Staff of the Air Force, told the delegates that "from our experience between two wars we learned the value of organization of true believers within a democracy, in which public opinion is the final term of reference. Hence the formation of AFA."

The Statement of Policy adopted at Columbus stressed:

- "We know airpower from first-hand experience.
- "We approach the defense problem as civilians, as taxpayers interested in a dollar's worth of defense for every military dollar expended.
- "We seek no bonus claims, retirement benefits, or job preferences.
- "We have no political axes to grind."

Chartered on February 4, 1946, AFA has adhered to this platform. There are many Air Force veterans among its more than 50,000 members, but AFA is not a "veterans' organization." Its effort has never been diluted by selfish excursions into the areas of veterans' benefits, Reserve programs, or the vested interests of industry. All of these groups are represented in AFA, but only for their contribution to a sound and realistic defense policy.

AIR FORCE, AFA's magazine, is not a commercial publishing venture, dedicated to making an extra dollar for the stockholders. Nor is it a "house organ" for AFA, in the tradition of association publications. It is "The Magazine of American Airpower," dedicated to the same proposition that motivates AFA: the dissemination of facts to "educate its own members and the public at large." The publication is itself an Air Force veteran with a history dating back to 1919; later the wartime service journal of the Army Air Forces, it was taken over in July of 1946, when AFA was only six months old. AIR FORCE, adhering to high journalistic standards, is written and edited by professionals. AIR FORCE Magazine is widely quoted, and it is usually referred to as "unofficial but authoritative."

Individual members of AFA fall into one of four major classifications:

Active Members: Individuals honorably discharged or retired from military service who have been members of, or either assigned or attached to, the Air Force or its predecessor services, or who are currently enrolled in the Air Force Reserve or the Air National Guard.

Service Members (nonvoting, nonofficeholding): Military personnel now assigned or attached to the USAF.

Cadet Members (nonvoting, nonofficeholding): Individuals enrolled as Air Force ROTC Cadets, Civil Air Patrol Cadets, or Cadets of the US Air Force Academy.

Associate Members (nonvoting, nonofficeholding): Individuals not otherwise eligible for membership who have demonstrated their interest in furthering the aims and purposes of the Air Force Association.

The annual dues are $6, including a subscription to AIR FORCE Magazine. In addition to the more than 50,000 member subscriptions, the magazine has nearly 11,000 paid subscribers, at $5 annually, concentrated in industry.

Pursuit of AFA's goal has led to many provocative and farsighted endeavors of the type that led Jimmy Stewart to say it is "the kind of an outfit that can stand up on its hind legs and lay it on the line about airpower." Long before the causes were popular, AFA came out for unification of the armed forces, a seventy-wing Air Force, a defense budget unfettered by political considerations, adequate research and development, and a dozen other causes vital to airpower.

A striking example of AFA's foresight lies in the history of its stand on reorganization of the Department of Defense. When the Eisenhower Administration called for new legislation early this year it was taking a step advocated by AFA for ten years. At the 1948 AFA Convention the delegates said they celebrated the first anniversary of an autonomous Air Force, formed under the National Security Act of 1947, but not as a tribute to unification. The 1947 law, AFA said at this time, is "lacking in strength, rife with duplication, inefficient, and saturated with waste."

In 1949, the AFA policy statement again deplored the low level of defense for the price paid and again put much of the blame on the lack of unification. By 1950 there was war in Korea and AFA kept up the pressure.

By 1956 the Association said bluntly that three services no longer could be tolerated, and called for a single service with one secretariat, one Chief of Staff, and one promotion list. The Eisenhower Defense Reorganization Plan immediately won support from AFA, as representing "the most vigorous and imaginative step yet made in these directions by the Executive Department."

AFA's field organization of 123 local Squadrons, twelve Flights, and twenty-two state Wings participate actively in youth education, national defense discussions, civil defense, and Reserve affairs. There is no limit to their activity. AFA members are found working with Air Explorers, Civil Air Patrol, Ground Observer Corps, airport development, and Air Force recruiting campaigns.

(Continued on following page)

Stuart

Kelly

Men who have led the Air Force Association since its inception in 1946. Left to right, top row, first president, James H. Doolittle (1946-1947); first chairman of the board, Carl A. Spaatz (1946-1947); past presidents: C. R. Smith (1948-1949); Gill Robb Wilson (1955-1956); John P. Henebry (1956-1957); the incumbent president, Peter J. Schenk, elected in 1957. Bottom row, Thomas G. Lanphier (1947-1948); Robert S. Johnson (1949-1951); George C. Kenney (1953-1954); and John R. Alison (1954-1955), all past presidents and chairmen of the board.

At left, two of the past presidents not appearing in the reunion photo above. Harold C. Stuart (1951-1952), and Arthur F. Kelly (1952-1953).

The Air Force Association is run by a Board of Directors elected annually by the members in convention. A President and Chairman of the Board are elected annually, as well as thirteen Regional Vice Presidents. The current President is Peter J. Schenk; Chairman of the Board is John P. Henebry. (Full list of AFA officers on page 246.)

Last year, AFA experimented with a new approach to the task of getting the facts before the public. It organized a Missile Seminar in Washington, offered newspaper, magazine, radio, and TV reporters the opportunity to listen to the nation's top missile experts. The meeting attracted 187 newsmen from forty cities and five countries. In February 450 advertising and public relations executives turned out for a follow-up conference.

In 1956 AFA staged its first National Jet Age Conference, now an annual event. More than 2,000 registrants appear for the meetings, at which top military, civilian, and technical experts discuss such problems as community relations, manpower, education, freedom of information, space technology, and their effect on national defense. Regional Jet Age Conferences, patterned after the main event, have been held in many other cities.

Closely allied to the Jet Age Conferences is the AFA Industrial Associate Program. More than 300 top research and manufacturing companies find AFA the ideal place to keep the security picture in focus. Industry conferences give them firsthand information on how Air Force commands are thinking, what they are looking for, and where they hope to find it. The program fills an important role in USAF-industry communications. Industrial associates are supplied with command photocharts, bulletins on personnel changes, guides to USAF bases, telephone guides, and news on production and procurement.

At AFA's annual convention, the year's major airpower meeting, both regular members and the industrial associates get further insight into the Air Force's machinery. The convention is accepted as the biggest and most important forum of its type in the world, drawing headline speakers from all Air Force commands, industry, universities, and government. The convention's Airpower Panorama is the year's top airpower show.

Other AFA activities include:

- **Flight Pay Protection Plan.** Designed to ease the financial hardships incurred when flying personnel are grounded for physical reasons, the Plan permits rated Air Force personnel to protect their flight pay by paying a premium equal to two percent of their annual flight pay. If the man is grounded for physical reasons, he can collect eighty percent of the lost flight pay for periods up to two years in case of accident and up to one year in case of illness.

- **Airpower Book Club.** Designed to make available the best professional airpower literature at minimum cost, the Book Club offers four selections annually, plus a premium selection on joining, for an annual payment of $15. Thus far the selections include *A History of the United States Air Force* (premium book published commercially at $6.75); *Billy Mitchell, Prophet of Airpower,* published price $6; *USAF Report on the Ballistic Missile,* published price $4. The current selection is Soviet affairs expert Raymond Garthoff's *Soviet Strategy in the Nuclear Age,* pub-

(Continued on page 244)

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lished at $4.50 and already widely praised in the press.

- **Reserve and Guard Affairs.** AFA's National Air Guard Council and National Air Reserve Council, composed of AFA members who are leaders in these programs, keep the membership and the Board of Directors advised as to progress and needs in these fields.
- **Airpower Councils.** Groups of influential public-spirited citizens organized at the community level to learn and teach the facts about airpower.
- **Arnold Air Society.** Honorary professional fraternity of the Air Force Reserve Officers Training Corps, its members are Cadet Members of AFA. The Society is an affiliate of AFA and participates in AFA projects.
- **Space Education Foundation.** A privately financed, nonprofit corporation chartered as an AFA affiliate. Its purpose is to support Space Age education and research.

These programs are administered by a permanent staff at National Headquarters in Washington, under the direction of the national elected officers.

Executive Director of AFA and Publisher of AIR FORCE Magazine is James H. Straubel, a colonel in the Air Force Reserve and wartime editor of AIR FORCE. Straubel hails from Green Bay, Wis., is a former newspaperman (Green Bay *Press-Gazette*, Milwaukee *Journal*).

Program Director Ralph V. Whitener manages the annual convention, Jet Age Conferences, and the Airpower Panorama. He's from West Virginia, served in World War II as a staff sergeant armament expert.

Administrative Director John O. Gray, from Spokane, Wash., is active in the Reserve program as a full colonel, served in the ETO during World War II, in the Pentagon during the Korean War.

Organization Director and Membership Director, Gus Duda, is from Toledo, Ohio. He served as a staff sergeant crew chief with a fighter outfit in the Pacific.

Industrial Relations Director Robert Strobell is a Vermonter, a fighter pilot in the ETO during World War II. He came to AFA from the National Air Museum.

In the new post of Director of Military Relations, Ed Wilson has only recently joined the staff. A retired Air Force colonel, Wilson had been with Chance Vought.

Assistant for Special Events Herbert Kalish is a navigator in the Air Force Reserve, flew out of England in World War II.

The AIR FORCE Magazine staff is headed by Editor John F. Loosbrock, infantry veteran of World War II with combat service in Africa and Sicily. He's from Iowa and, like Straubel, once worked for the Milwaukee *Journal*, in addition to the *Infantry Journal* and *Popular Science*.

Managing Editor Richard M. Skinner is from Illinois, an Air Force veteran of World War II and the Korean War with the rank of tech sergeant.

Senior Editor Claude Witze, from New York, has been aviation editor of the Providence, R.I., *Journal*, director of public relations and advertising for Vertol, and was military editor of *Aviation Week*, before joining AIR FORCE.

Associate Editor William Leavitt is a Bostonian, an Army veteran, and was an editor and publicity specialist for General Electric in New England before coming to AIR FORCE.

Advertising Director Sanford Wolf has been with AIR FORCE almost ever since it became a civilian publication. A New Yorker, he directs the advertising sales from an office in his home town.—END

Make Your Reservations Now for AFA's 1958 Convention in Dallas

HOTELS	SINGLE ROOMS	DOUBLE ROOMS	TWIN ROOMS	SUITES
ADOLPHUS	SOLD OUT	SOLD OUT	SOLD OUT	SOLD OUT
BAKER	SOLD OUT	$7.00—12.00	SOLD OUT	ONE-ROOM PARLOR SUITES
DALLAS	$5.00— 7.00	8.00—10.00	$8.00—12.50	$16.00—24.00
SOUTHLAND	4.50— 7.50	5.50— 8.50	6.50—10.50	16.50—17.50
STATLER HILTON	SOLD OUT	SOLD OUT	SOLD OUT	SOLD OUT
TRAVIS	5.00— 7.00	8.00— 9.00	8.00— 9.00	15.00
WHITE-PLAZA	4.50— 8.50	6.00—10.00	6.00—12.00	15.00—27.00

HOTEL ROOM RESERVATION FORM
AIR FORCE ASSOCIATION CONVENTION

DATE_____

NAME_____

ADDRESS_____

CITY & STATE_____

HOTEL_____ (First Choice) _____ (Second Choice)

_____ (Type Room) ( ) Low ( ) Average ( ) High (Desired Rate)

OTHERS IN ROOM_____

ARRIVAL DATE & HOUR_____

DEPARTURE DATE_____

Three of AFA's major Convention hotels, Statler Hilton, Adolphus, and Baker, are "sold out," except for a few double rooms and some one-room parlors at the Baker. Nice air-conditioned rooms are available at the other hotels listed to the left, as well as the Stoneleigh and Melrose Hotels, which are a short cab ride from the other hotels.

More than 1,500 rooms and suites have been reserved, and reservations are still pouring in. In order that you won't be disappointed, we suggest that you send your reservation request without delay. It is already evident that AFA will use all of Dallas' first-class hotel rooms.

Major Convention events will be held in the new Auditorium; AFA business sessions at the Adolphus Hotel; Reserve Forces Seminar at the Baker.

The Dallas Hotel Association operates AFA's Housing Office. All requests for rooms *must* be sent to the following address:

AFA Housing Office
1101 Commerce Street
Dallas 2, Texas

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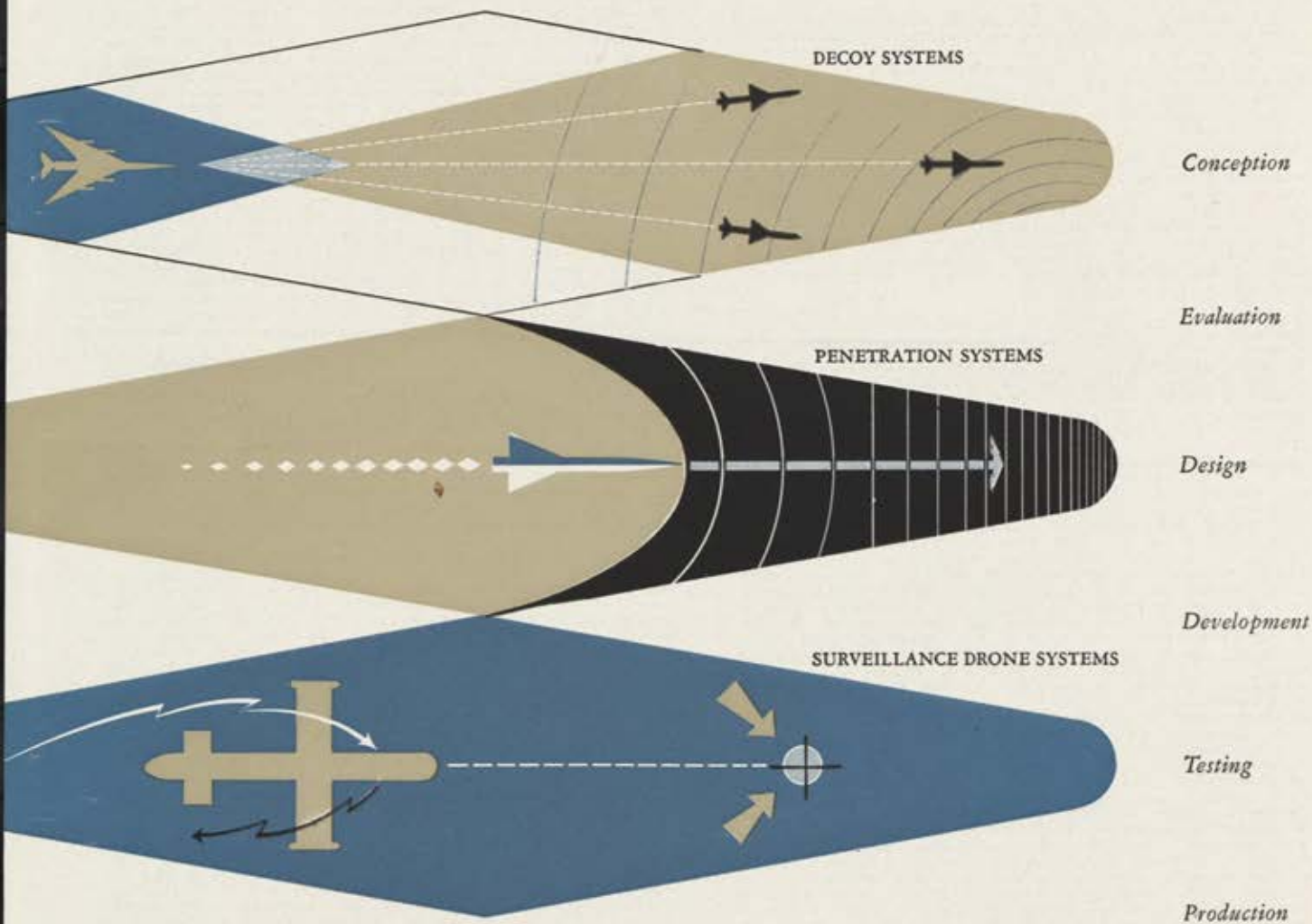

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This is AFA

The Air Force Association is an independent, non-profit, airpower organization with no personal, political, or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

Objectives

• To assist in obtaining and maintaining adequate airpower for national security and world peace. • To keep AFA members and the public abreast of developments in the field of aviation. • To preserve and foster the spirit of fellowship among former and present personnel of the United States Air Force.

Membership

Active Members: Individuals honorably discharged or retired from military service who have been members of, or either assigned or attached to, the USAF or its predecessor services, or who are currently enrolled in the Air Force Reserve or the Air National Guard. $6.00 per year.
Service Members (non-voting, non-office-holding): Military personnel now assigned or attached to the USAF. $6.00 per year.
Cadet Members (non-voting, non-office-holding): Individuals enrolled as Air Force ROTC Cadets, Civil Air Patrol Cadets, or Cadets of the US Air Force Academy. $3.00 per year.
Associate Members (non-voting, non-office-holding): Individuals not otherwise eligible for membership who have demonstrated their interest in furthering the aims and purposes of the Air Force Association. $6.00 per year.
Industrial Associates: Companies affiliating with the Air Force Association on a non-membership status that receive subscriptions to AIR FORCE Magazine, special magazine supplements, and Industrial Service Reports.

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