JANUARY 1958 / 50c

AIR FORCE

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

USAF's THOR

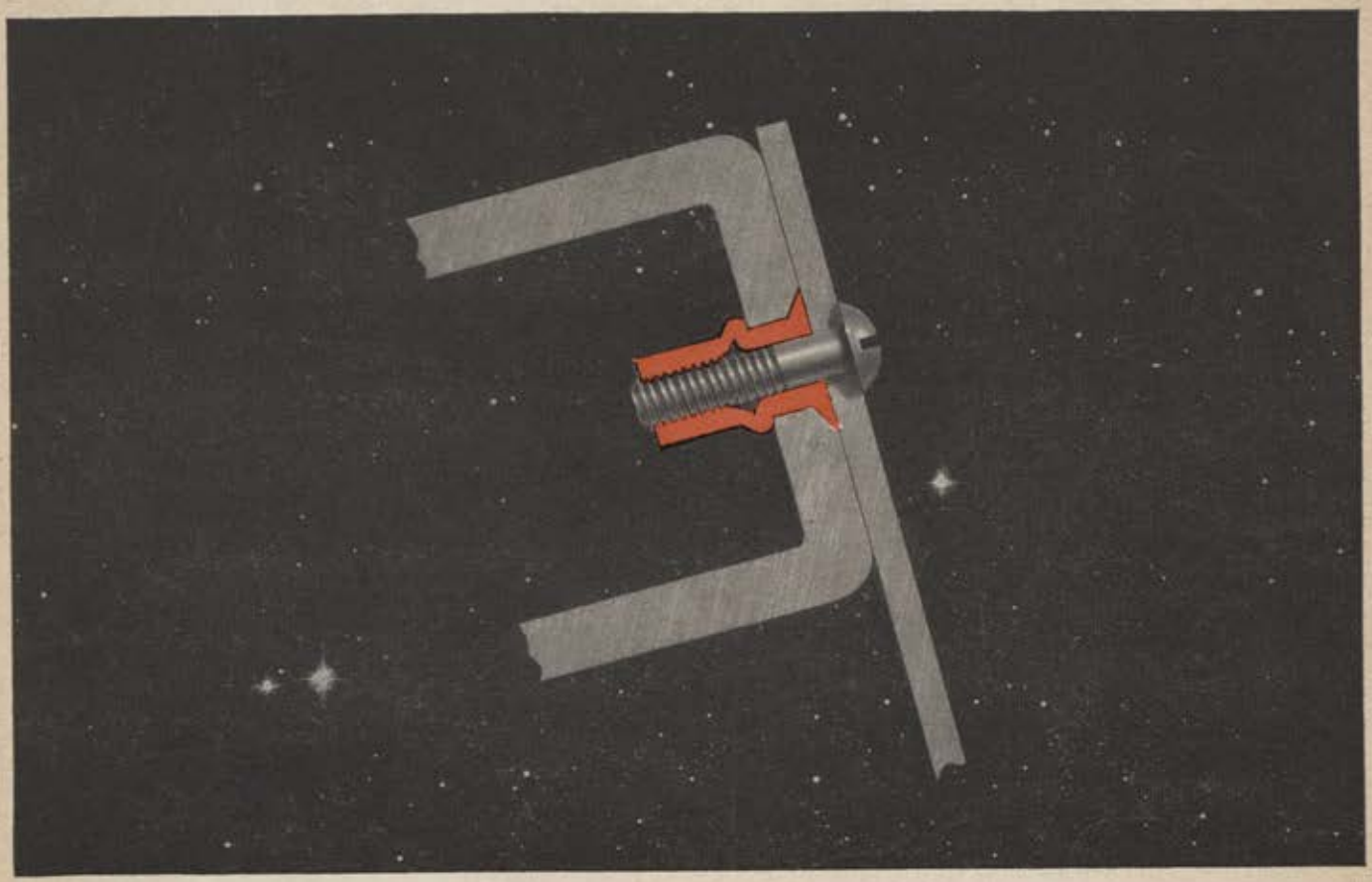
A Sound of New Thunder

ALSO IN THIS ISSUE:

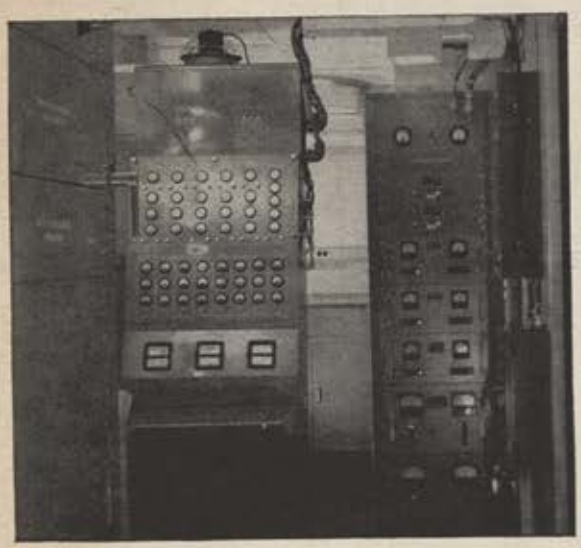
Alaskan Air Command—Top Cover for America

Blowlamp—Soviet Tactical Bomber

B.F.Goodrich Rivnuts® help fasten electronic "ears" that track orbits of man-made moons



Rivnuts provide sturdy blind nutplates for ultra-sensitive equipment that will receive radio impulses from Vanguard Satellite



During the International Geophysical Year, scientists will launch the first American satellite, the Vanguard. To track its orbit around the earth, "Minitrack" stations in North and South America will receive radio signals from the satellite itself, magnify them with ultra-sensitive receivers, and relay position information to the Vanguard Computing Center in Washington.

The photograph (left) shows the inside of a "Minitrack" station, with the receiver rack in the center. Fastening the face panels on this rack posed a problem for Bendix Radio Division, manufacturers of the equipment. Because the frame is made of square tubular aluminum for greater strength, ordinary nuts and bolts could not do the job.

Bendix found the answer in B.F.Goodrich Rivnuts, which provided sturdy, blind nutplates, easy and economical to install. Whatever you manufacture, from complex electronic equipment to simple sheet metal assemblies, B. F. Goodrich Rivnuts may be the answer to your most puzzling fastening problems.

Write for free Rivnut demonstrator, Dept. AF-18

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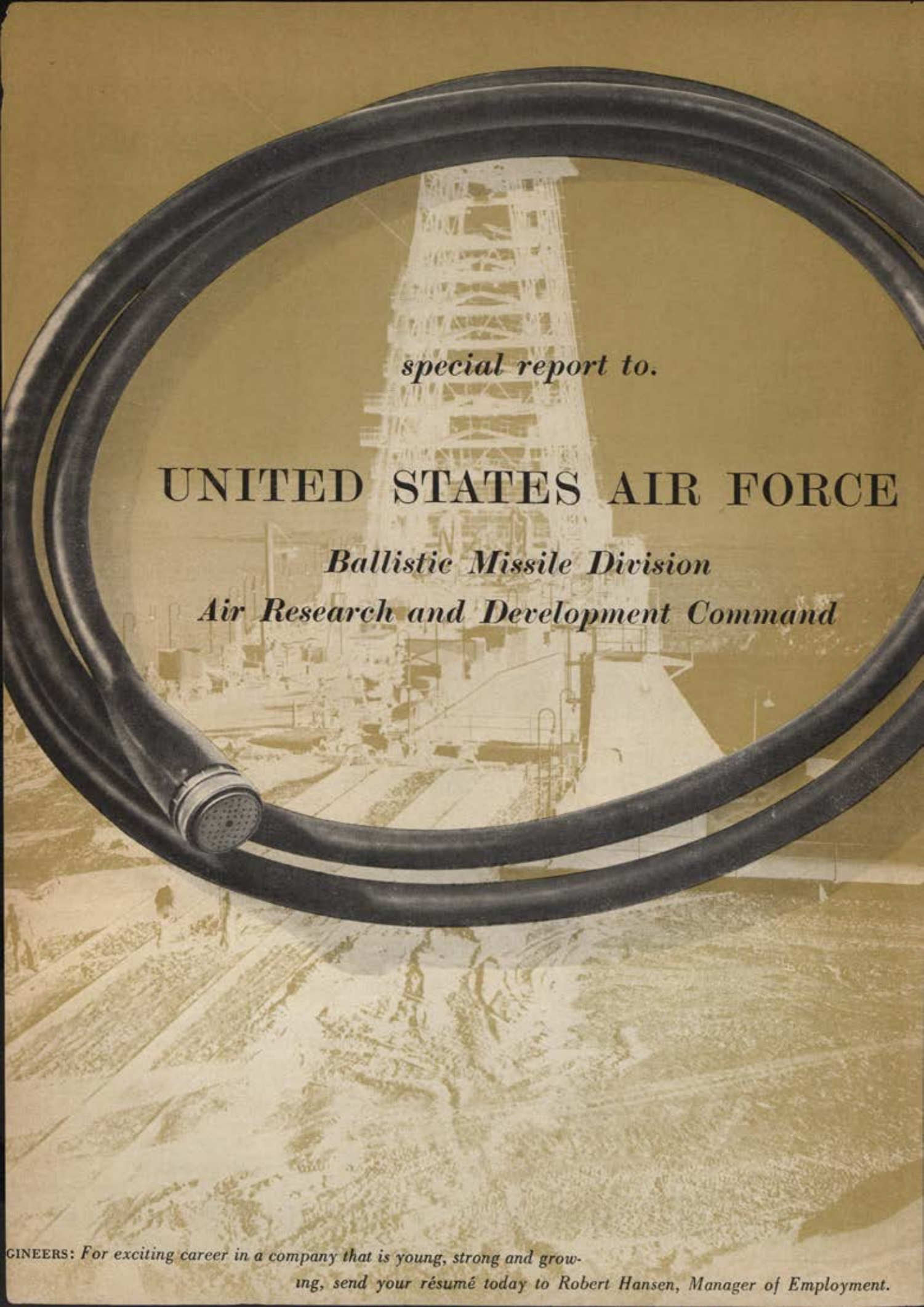
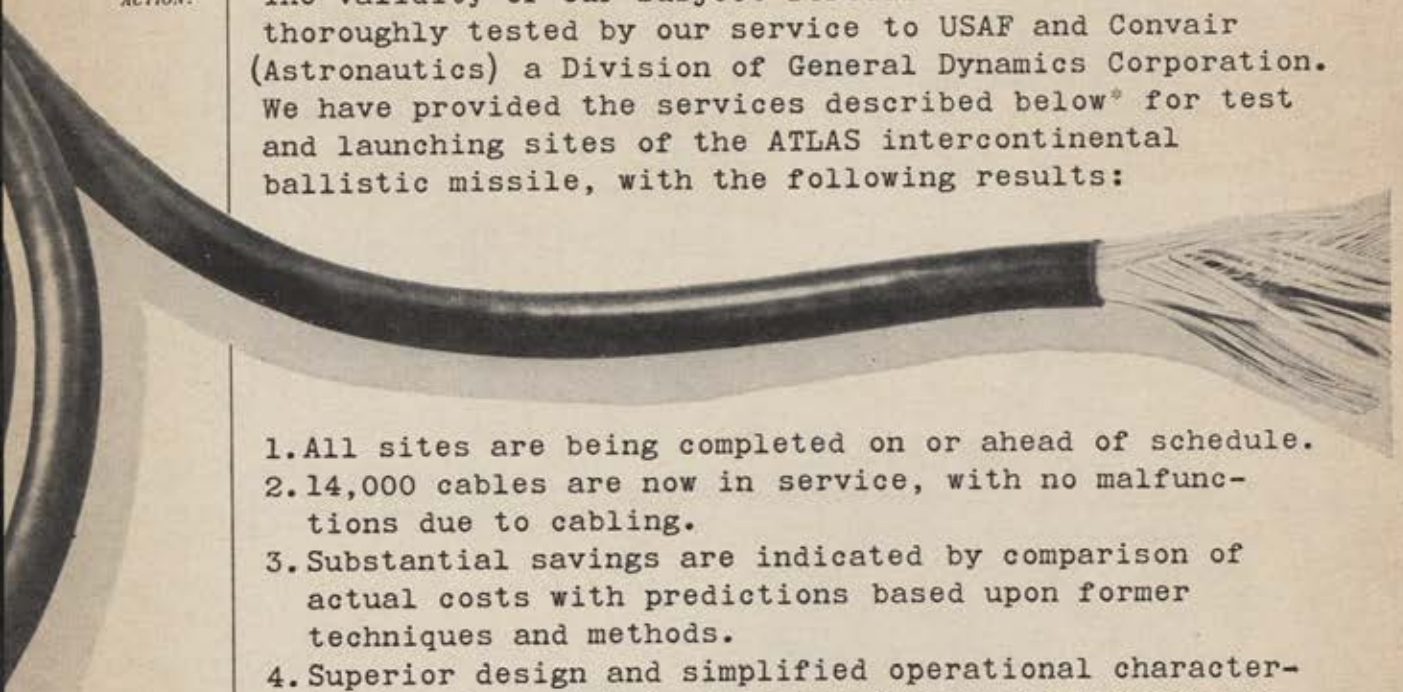


GINEERS: *For exciting career in a company that is young, strong and growing, send your résumé today to Robert Hansen, Manager of Employment.*

SUBJECT: PACIFIC AUTOMATION PRODUCTS, INC. Systems Cabling Program

REFERENCE: Fall 1955 forecasts by PAPI of benefits to be derived from establishment of sole responsibility for missile site cabling and activation.

ACTION: The validity of our subject forecasts has been thoroughly tested by our service to USAF and Convair (Astronautics) a Division of General Dynamics Corporation. We have provided the services described below* for test and launching sites of the ATLAS intercontinental ballistic missile, with the following results:



1. All sites are being completed on or ahead of schedule.
2. 14,000 cables are now in service, with no malfunctions due to cabling.
3. Substantial savings are indicated by comparison of actual costs with predictions based upon former techniques and methods.
4. Superior design and simplified operational characteristics of completed sites are due to our integrated approach to cabling and activation.

CONCLUSION: Original estimates of the benefits to be derived from PAPI services have proven to be conservative--actual performance warrants extension of PAPI services to other missile projects of USAF.

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SYSTEMS DESIGN: *Test Instrumentation, Launch Control* SYSTEMS FABRICATION: *Cable Components, Special Hardware and Checkout equipment* SYSTEMS INSTALLATION: *Instrumentation, Recorders, Transducers Controls, Consoles, Accessories, Inter-Unit Cabling* SYSTEMS CHECKOUT: *Conformity to Circuit Specifications, Instrumentation operation (by systems), Fire and Launch Control Validation* SYSTEMS DOCUMENTATION: *Complete Operational Information in Approved Form*

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AIR FORCE

THE MAGAZINE OF AMERICAN AIRPOWER

Volume 41, Number 1 • January 1958

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Features

Departments

Star track photograph created by time exposure of film while camera was focused on Polaris.

INDEX TO ADVERTISERS

Today's air power in action:*

Somewhere over California a Douglas C-133A heads East toward assignment to our 1607th Air Transport Wing (Heavy) based at Dover, Delaware.

This Air Force giant can swallow an ICBM

The new Douglas C-133A is the only jet age airplane capable of transporting both IRBM and ICBM missile systems. It dwarfs all other U.S. cargo aircraft in productivity, capacity and range, yet operates at the lowest cost in air logistics history.

This huge turboprop air freighter can airlift 100,000 lbs. of payload more than 1,100 miles; it can transport 42,000 lbs. more than 4,000 miles non-stop. Its cargo ton-mile costs are as low as 5¢ on both short and long haul operations. It has the fastest loading and unloading time per ton of any modern airplane. Yet, despite its huge size and 350 mph+speed, it can operate from short runways.

Because of its ability to move the giant new missiles and their supporting equipment anywhere in the world in hours, the C-133A makes it possible to achieve a major increase in the effectiveness of our overseas bases while decreasing their size. It will buy more protection per dollar for the American taxpayer.

***It more than pays for itself!** The turbo-prop C-133A operates at a much lower cost per ton-mile and with far less flight and maintenance personnel per ton-mile than any other air freighter now in service. It is estimated that it will more than pay for itself in reduced operating costs alone in less than 2 years.

Cavernous cargo hold of the Douglas C-133A is capable of transporting the Air Force production IRBM THOR and all other current IRBM and ICBM missiles and their supporting equipment to U. S. bases throughout the world in a matter of hours. .

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The most respected name in Aviation

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air mail

The Colonel

Gentlemen: It was with deep sorrow and interest that I read your farewell to our mutual friend, Pat Paul. It was a merited tribute to one who had given so much devotion to his country.

The events of the day which come as a surprise to so many are just corroboration of the warning message that Pat sought to convey. We shall certainly miss him.

Eugene M. Zuckert
Washington, D. C.

Gentlemen: I naturally read your article entitled "Death of a Colonel," and was quite shocked to find it was about Leo F. Paul.

We went through C-47 transition training together at Del Valle, Austin, Tex., in January and February of 1943. From there we were transferred to Alliance, Neb., 65th Troop Carrier Squadron, 403d Troop Carrier Group, when that Group was in the process of formation.

Many is the time I flew with Pat on missions with the 65th Troop Carrier Squadron in New Guinea, the Schouten Islands, and the Philippines. After twenty months of combat flying in the SWPA, we even returned to the States on the same orders. Later in the tour Pat was transferred to Group headquarters while I stayed with the 65th, flying from 120 to 150 hours a month.

Although I don't believe he ever considered me a real close friend in those days, I always held him in high regard. His death, right in the prime of life, is tragic.

Capt. Robert T. Johnson
Las Vegas, N. M.

Gentlemen: As one who also knew and respected Pat Paul as a patriot and as an airman-statesman, your "Death of a Colonel" rates in my book as one of AIR FORCE's all-time best articles.

Dr. Eugene M. Emme
Maxwell AFB, Ala.

Gentlemen: Your article in the November issue of AIR FORCE, "Death of a Colonel," is certainly outstanding and has caused a very large amount of favorable comment among readers of the California Air National Guard. Your piece and the companion one, "What's the Lead Time?", are certainly timely and we feel need further emphasis. The amount of emphasis placed on flying safety is certainly not consonant with the cuts in flying time. We feel that the present cuts in flying time may be an indication of much more serious cuts in the future which would be extremely hazardous to pilots flying high-performance jet aircraft.

Maj. Gen. Clarence A. Shoop,
Calif. ANG
Culver City, Calif.

Gentlemen: I cannot tell you how proud I was to read that editorial about Pat Paul.

He was a great and good man in his quiet way and the Free World will miss him more than I care to think about.

Sen. Stuart Symington
Creve Coeur, Mo.

Gentlemen: I was touched to read your very fine article on the death of Pat Paul. I am still so staggered at the thought of not having him around any more that I find it difficult to say anything about it.

I was also very glad to see Dave Henderson's story on flying time. This needed to be said for a long time since I always thought it was horribly unfair to give a man a job in which he didn't have time to get his flying done and then expect him to either forfeit his pay or take dreadful chances.

F. M. Sallagar
Los Angeles, Calif.

Gentlemen: I felt impelled to write to thank you for the very appropriate article in the November issue of AIR FORCE Magazine about Pat Paul.

Pat was my friend too, and our professional association in the service and our personal friendship outside the confines of Air Force business caused me, like many others, to admire him.

It was with a sense of great personal loss that I learned of his untimely death, and I am certain that I

(Continued on page 13)

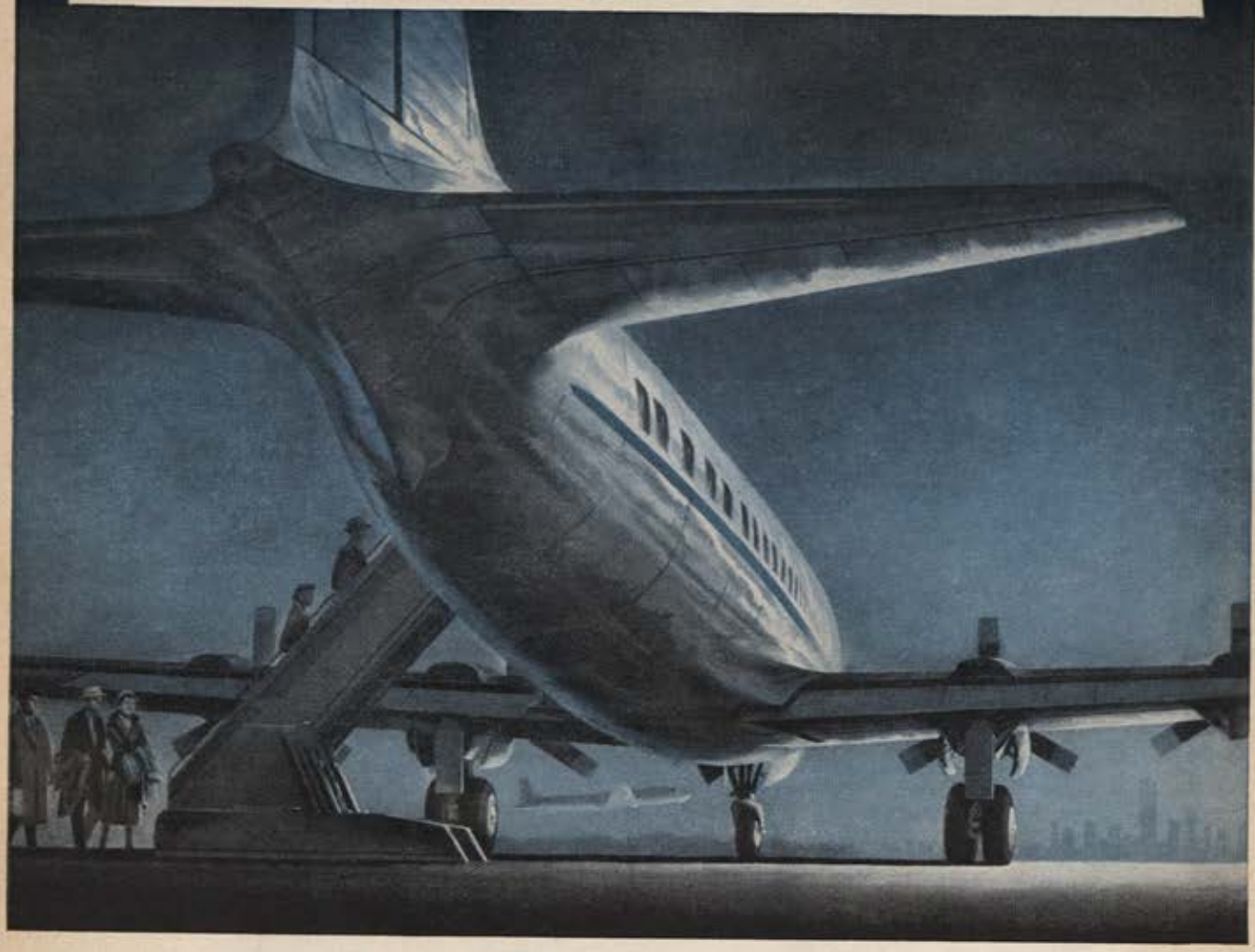
RADAN
SYSTEMS

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, displayed on his flight panel – automatically and continuously.

The system operates entirely without ground aid or celestial fix.

RADAN is the result of GPL's harnessing of Doppler for air navigation—an achievement comparable in magnitude to the breaking of the sound barrier.



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speak for many others when I say how much your public tribute to him was concurred in and appreciated by his friends.

Col. William E. Carpenter
USAF (Ret.)
Hayward, Calif.

Gentlemen: Your article about the life and death of Col. Pat Paul was superb. To me it gave a remarkably vivid impression of Pat as the truly unusual man he was.

The grievous loss to the country and the USAF in the tragic and avoidable death of this dedicated officer transcends the personal bereavement of those of us who knew him well.

Working with Pat was a rare privilege. I for one believe the influence of his imaginative and unparochial devotion to the cause of airpower will long be felt.

L. J. Henderson, Jr., Vice-Pres.
The RAND Corporation
Washington, D.C.

Gentlemen: I appreciate the November issue of AIR FORCE Magazine which contains your warm and objective expression about Pat Paul.

Although Pat enjoyed a wide circle of friends, both in and out of the service, too few of our Air Force family really knew how capable and devoted he was to his family, his country, the Air Force, and his friends. There are too few officers in the Air Force of his caliber, and we can ill afford to lose any of them.

I share your deep feelings about Pat and, like his many friends, appreciate your efforts in informing those who did not have an opportunity to know him, of what a wonderful person he was.

Col. Fred Rhea
Arlington, Va.

Gentlemen: I was impressed with your rendition "Death of a Colonel" in the November issue. I did not know the man, but I am well acquainted with the circumstances that were responsible for his death.

It is unfortunate beyond expression that those circumstances exist. It is so because they are so obvious so long before they strike.

You realize this now because the system has claimed one close to you. It has claimed several that I was close to.

You and your military brethren have not felt that you needed any advice from your commercial civilian cousins; but the fact is, for over twenty years the aviation insurance specialists of this country have been preaching and enforcing exact flight requirements that have prevented untold numbers of losses such as occurred here. And they forecast with harrowing accuracy who will go when, if he does not mend his ways.

Hugh D. Studebaker
Elmhurst, Ill.

Gentlemen: I knew and worked with Pat since 1946 and considered him to be one of the most capable and promising officers I knew. It was a real shock to learn of his death, which was particularly tragic since he did not even contribute to it, but was apparently riding in the rear of the aircraft at the time.

I thought both the article and the box by Colonel Henderson most appropriate.

Col. Richard T. Carlisle
Ent AFB, Colo.

Gentlemen: I have read the article on Pat Paul with deep interest. I was very fond of him and admired him greatly. My first knowledge of his death, strangely enough, was from Field Marshal Montgomery because I missed the article on his death in the New York papers. As you know, the Field Marshal was very much attached to Pat, and he will miss him on his visits to this country.

William V. Griffin
New York, N.Y.

Where's That Lock?

Gentlemen: Congratulations on the superb Golden Anniversary issue. Am watching for details of the forthcoming hard-cover version.

Enjoyed reading "Locks of Death," by W. F. Tolar, in the October issue. I would appreciate enlightenment on either the type Charlie four seven or the position of the pilot when he "raised his right hand above his head and snapped on the tailwheel lock." The tail wheel lock on every C-47 I flew was directly under the throttle quadrant.

John A. Golden
Cordova, Ill.

● *We queried author Tolar on this point—and his answer follows:*

"In trying to recall clearly the details of our flight twelve years ago, and not having flown the C-47 for ten years, I can only say that the boo-boo is entirely mine. Of course the tailwheel lock is under the throttle quadrant. And to think that I spent an hour in the cockpit of a C-47 before writing the story.

"I distinctly remember Fred Box reaching overhead, and having spent the last three years messing with the Cessna T-50 twin, which has the tailwheel lock overhead, I am certain this explains my slip-up. Surprisingly, of the twenty active pilots I recently spoke with, men who last flew the C-47 and Twin Beech in 1945, only one could remember the location of the tailwheel locks on the two machines with certainty."—THE EDITORS.

Good to Hear From You

Gentlemen: My hospitalization incident to my operation on July 31 and my slow but steady recovery have completely upset my correspondence schedule—hence this delay.

I want to congratulate you on the splendid job done in the production of the Anniversary issue of AIR FORCE Magazine.

Today, I may say that my major source of published authentic airpower information is derived from your monthly magazine, and I have no doubt that present AFA policies will continue to keep the magazine in its present position as the country's front-ranking source of authentic airpower information.

Maj. Gen. B. D. Foulois
USAF (Ret.)
Ventnor City, N.J.

Our Remote Defenders

Gentlemen: The vivid and dramatic article titled "90 Seconds to Live" by Michael Gladych in the November issue of your influential magazine was intensely interesting to me. It had the effect of making me feel that I was actually there, albeit without sharing the discomforts and dangers. At this time when so many are saying that our defenses are being neglected, it is indeed comforting to know that at the edge of danger so many men with such devotion are making sure that we are not taken unawares.

I hope you will give us more articles by this author.

Donald M. Smith
Sterling Junction, Mass.

Gentlemen: Greatly enjoyed the article "90 Seconds to Live," in the November number of AIR FORCE. Mr. Gladych has extraordinary ability to make one feel the tension of this outpost and the courageous and gallant way the officers and men endure these hardships.

Give us more of these articles, please.

Arthur R. Kraus
Hyannis, Mass.

Now on the job..

BELL'S 2,000th MODEL 47 HELICOPTER

Watch
"WHIRLYBIRDS"
on TV..consult your local paper for time and station.

Bell has built more helicopters than any other manufacturer. The 2,000th edition of the distinguished 47 model series, the Bell Ranger, has rolled off the assembly line and joined the hundreds of other Bells at work for many of America's best-known companies. In the Armed Services, in business and industry, it's the most widely-used helicopter in the world.

For the Bell 47 represents 2,500,000 hours of flying experience.. the equivalent of almost 300 years of flight time. It has stood not only this *test of time*, but has proven its ability in true-life tests of climate, altitude and terrain in 52 countries.

From its military success on the battlefields of Korea, the Bell has gone straight to commercial success in hundreds of peace-time uses. In such fields as oil, manufacturing, construction, utilities and agriculture, as well as in defense work, the Bell is proving its worth, paying its way, many times over.

And the Bell 47 continues to be lowest in initial cost, lowest in maintenance, longest in service life between overhauls .. and most advanced in operational features. Look to the 2,000th Bell, and the thousands that will follow, for continued leadership.

BELL Helicopter CORPORATION

SUBSIDIARY OF BELL AIRCRAFT CORPORATION • FORT WORTH, TEXAS

wing tips

By Wilfred Owen

Thirty years ago Pan American Airways carried its first six passengers on the ninety-one-mile flight from Key West to Havana. The next year's flights to Haiti required that golf games be canceled to permit landing on the country club course. Today Pan Am serves eighty-two countries around the globe.

° ° °

An estimated 113,000,000 international passengers will be carried by the airlines in the five-year period 1957-1961, according to the International Air Transport Association.

° ° °

The one-man Bensen Gyrocopter, weighing 185 pounds, sells for $2,390 complete, in kit. It takes off in 100 feet with no wind, or can rise vertically with a breeze of fifteen miles per hour.

° ° °

Among the cargo and passengers that have been carried by Qantas Empire Airways in New Guinea are cannibals, missionaries, cattle, kittens,

Bibles, baby shoes, crocodiles, generators, jeeps, and a complete small town.

° ° °

Intercity passenger travel by railroad in the United States last year showed a decline of one-half of one percent compared to the year before, while bus travel was off 1.3 percent and air travel continued to gain by 12.2 percent.

° ° °

Schedules for new jet airliners call for the production of thirty-two planes by mid-1959 and 465 by mid-1961. Top carrying capacity for the jetliners will be 219 passengers.

° ° °

Air cargo volume in the United States will increase 670 percent by 1965, according to a report prepared for the Boeing Airplane Company. This would put total cargo business at 2.68 billion ton-miles compared to 400 million ton-miles in 1956.

AIRPOWER IN THE NEWS

Airpower advances since Sputnik haven't ***all*** been on the Soviet side. Top news across the country as 1957 came to a close was **Defense Secretary Neil McElroy's** announcement that the **USAF Thor** would go into production with hopes for operational capability from bases in the United Kingdom by the end of 1958. Also scheduled for production, he said, is the **Army's Jupiter IRBM,** which will be operated for the Air Force.

To be built by **Douglas** (*see production line photo, below*), the Thor is a land-based, surface-to-surface Mach 10 velocity IRBM, powered by a **North American** liquid fuel rocket engine with an estimated thrust of 120,000 to 140,000 pounds, giving the missile a **range of 1,500 miles. AC Spark Plug** developed the Thor's inertial guidance system, and the nose cone was developed by **General Electric.**

The announcement that Thor would go into production climaxed a series of airpower accomplishments since Sputnik that have highlighted Air Force progress in recent weeks.

As pictured here, on October 21, Air Force scientists fired a research rocket **more than 2,750 miles** into outer space from a balloon-raised launcher 100,000 feet over Eniwetok atoll in the Pacific. The **Farside** launching was a phase of the **Air Force's continuing research** into cosmic conditions and in line with its belief that victories in future warfare may well be determined by **control of the outer reaches.**

(Continued on page 19)

Soon to join the Free World deterrence inventory is the USAF Thor, 1,500-mile-range IRBM. Its production was announced by Secretary of Defense McElroy.

The airframe assembly station at the Douglas Santa Monica, Calif., plant where USAF's Thor will be produced.

The Air Force made Space Age history in October at Eniwetok, site of the Operation Farside launching. At left, the final checkout of the launch system prior to loading it under the carrier balloon. Right, Farside balloon on its way up.

roll it out...

hook it up...

turn it on...

In little more than the time it takes you to read this ad, the Herman Nelson MC-1 portable heater is connected to the Convair F-102A's own ventilating system, turned on and already sending volumes of heated or ventilating air where needed for a quick and proper preflight... another example of the leadership of Herman Nelson Products.

Herman Nelson's 16 years of experience in the portable heating and ventilating field can be put to work on your problem.

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Defense Products Division

Vought Vocabulary

cham′pi·on: *the fighter whose record is written on aviation's most honored trophies*

Again the aviation world salutes the F8U-1 *Crusader*. The Collier Trophy, one of America's highest tributes, has been awarded to the Navy and to Chance Vought for 1957's most significant aviation achievement: development of this record-smashing jet fighter.

The *Crusader's* first triumph was the 1,015 mph national speed record that won the coveted Thompson Trophy. Next came history's first cross-continent, ocean-to-ocean, carrier-to-carrier flight. Following that flight, a *Crusader* streaked across the nation in "Operation Bullet." This 203-minute flight set an official world's record and marked the first supersonic crossing of the U. S.

The blazing performance that has taken aviation's top honors brings unmatched air combat strength to the U. S. Navy. The Vought *Crusader* is now aboard Fleet carriers . . . strengthening America's power for peace.

CHANCE VOUGHT AIRCRAFT
INCORPORATED · DALLAS, TEXAS

That **manned aircraft** are still a vital factor in US deterrence was tellingly proved in the first weeks of November.

On November 11, **Tactical Air Command** pilots flew B-66s the **8,500-mile** distance from **George AFB, Calif.,** to the **Philippines** non-stop with aerial refueling. The Douglas twin-jet bombers were part of a show that included flights of F-100C and F-100D Super Sabres from George AFB to Hawaii in **five-hour-plus times,** noteworthy in view of time taken for aerial refueling.

On the next day, November 12, **Gen. Curtis LeMay** made jet history with his record-breaking non-stop flight from **Westover AFB, Mass.,** to **Buenos Aires,** Argentina, in a Boeing **KC-135 Stratotanker,** military version of the Boeing 707 jetliner. The Air Force Vice Chief of Staff logged **6,325 statute miles** at an average speed of **485 mph.** The trip, longest **non-stop** ever flown in a jet, took **thirteen hours, two minutes, and fifty-one seconds.**

The General's return flight, flown on a direct route of **5,204 miles** from Buenos Aires to Washington's National Airport, took **eleven hours, five minutes,** and **4/5 seconds,** with an average speed of **469.5 mph.** General LeMay's flight, setting a jet speed record between the two capitals, highlighted USAF's participation in Argentina's Aviation Week.

On hand to greet General LeMay at Washington National Airport were **AF Secretary James H. Douglas** and **Chief of Staff Gen. Thomas D. White.** The four-star pilot was awarded the Distinguished Flying Cross for his flights. (For an eyewitness report of the LeMay return flight, see **"South of the Border,"** beginning on page 70.

B-66s en route from California to the Philippines are refueled in the air off Hawaii as they headed non-stop for their destination in TAC's "Mobile Zebra."

Wide World Photos, Inc.

A proud four-star jet pilot, Gen. Curtis LeMay, receives the Distinguished Flying Cross from his chief, Gen. Thomas D. White, as he returns from the Argentine.

USAF B-52s streak across the Brazilian sky over Rio de Janeiro, saluting that Good Neighbor, as they roar toward Argentina to help salute her Aviation Week.

Brazil's President Kubitschek joins supersonic club in a USAF Super Sabre.

Another Good Neighbor nation, **Brazil,** also got a look at US airpower in November as **USAF Boeing B-52s** flew over **Rio de Janeiro** on November 16, en route to Argentina, from which they returned to the US non-stop (*see cut, above*).

A later feature of USAF's salute to Brazil was the flight in an F-100F Super Sabre by **Brazilian President Juscelino Kubitschek,** who joined his neighbor, **President Pedro Aramburu** of Argentina, in the exclusive club of heads of state who have flown supersonically.

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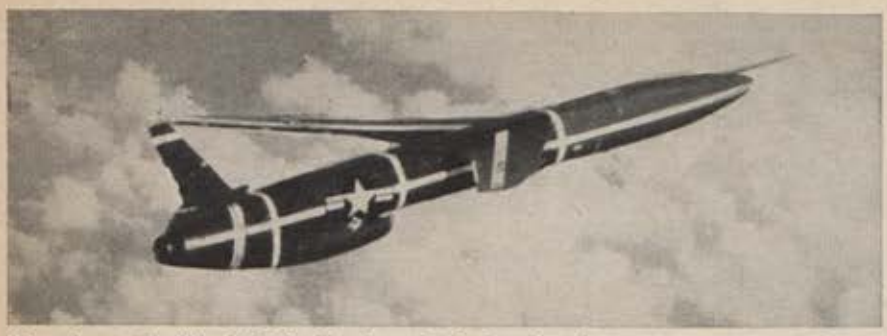


Does its stuff: The USAF's Northrop-built Snark subsonic intercontinental missile demonstrates its capabilities with a 5,000-mile flight to a target site.

Welcome home, although he has been gone but a brief time, is the greeting to record-breaker Capt. Robert Sweet, by Brig. Gen. Stephen B. Mack at March AFB.

As Thor moved toward a place in the American arsenal of deterrence, the **USAF's Snark,** world's first missile to demonstrate **intercontinental capability,** continued to show its stuff. Flying under conditions simulating actual operation (*see cut*) the **Northrop-built** missile "attacked" a target near **Ascension Island,** 5,000 miles southeast of its launching site at the AF Missile Test Center, Cape Canaveral, Fla. The flight, on October 31, demonstrated the Snark's ability to deposit **a nuclear warhead** on targets anywhere in the world from Free World bases.

And on November 27, **USAF RF-101 Voodoo jets,** flying at speeds close to **800 mph,** broke three transcontinental speed records, all formerly held by Navy pilots. The Voodoos were refueled in flight by KC-135s. Fastest of the TAC pilots who made the cross-country flashes was **Capt. Robert Sweet** (*see cut*), who roared in his McDonnell RF-101 **from Los Angeles to New York** and back in **six hours, forty-two minutes, and 6.2 seconds.** On the return leg of the flight, Captain Sweet set a **new east-to-west** record of **three hours, thirty-four minutes, and 8.8 seconds.**

In the same exercise, the Los Angeles to New York speed record was broken by **1st Lt. Gustav Klatt** who flew coast-to-coast in three hours, five minutes, and thirty-nine seconds. **Lieutenant Klatt** and **Capt. Robert Kilpatrick** made only the west-east flight.

Capt. Ray Schrecengost, who also flew from Los Angeles to New York to Los Angeles, bettered the Navy records as did Captain Sweet, but did not quite equal the former's time.

The RF-100, with a top speed in excess of 1,000 mph, is considered the world's **fastest photo-reconnaissance plane.**

Highlighted by the Farside experiments, Air Force Space Age studies continued on other fronts, too. Pictured at right is USAF's new **XMC-2 full pressure space suit,** designed initially for pilots flying the **North American X-15.** It will allow airmen to operate efficiently at extreme heights on extended missions.

The last week in November also saw announcement that the Air Force had fired at least **two shaped pellets beyond the earth's gravity**—first recorded man-made propulsion into interplanetary space.

STAFF CHANGES. . . . Brig. Gen. Austin J. Russell, formerly Cmdr., Fourth AD, SAC, is now assigned as Cmdr., 4080th Strategic Reconnaissance Wing, Laughlin AFB, Tex. . . . **Brig. Gen. Daniel C. Doubleday,** who was Deputy Cmdr., AACS, will become Cmdr., AACS, Scott AFB, Ill., January 14. . . . **Brig. Gen. Joseph R. Holzapple** now is GofS, USAFE, APO 633, N. Y. He had been DCS/O for USAFE. . . . **Brig. Gen. Benjamin O. Davis, Jr.,** who had been CofS, Twelfth AF, succeeds General Holzapple as DCS/O, USAFE, effective December 9. . . . **Maj. Gen. Edward P. Mechling,** formerly Cmdr., AF Armament Center, ARDC, Eglin AFB, Fla., is now assigned to Hq. ARDC, Baltimore, Md., with duty station at Eglin as Special Assistant to Cmdr., ARDC. . . . **Brig. Gen. Edwin S. Chickering,** who was Cmdr., 405th Fighter-Bomber Wing, TAC, Langley AFB, Va., is now Cmdr., 836th AD, same station. . . . **Brig. Gen. William W. Momyer,** formerly Cmdr., 312th Fighter-Bomber Wing, TAC., Cannon AFB, N. M., is now Cmdr., 832d AD, same station. . . . **Maj. Gen. Gabriel F. Disosway,** who had been Cmdr., Twelfth AF, USAFE, now has new duties as Deputy Cmdr., USAFE (Advanced), APO 633, N. Y. . . . **Brig. Gen. Hoyt L. Prindle** has retired in grade of brigadier general.

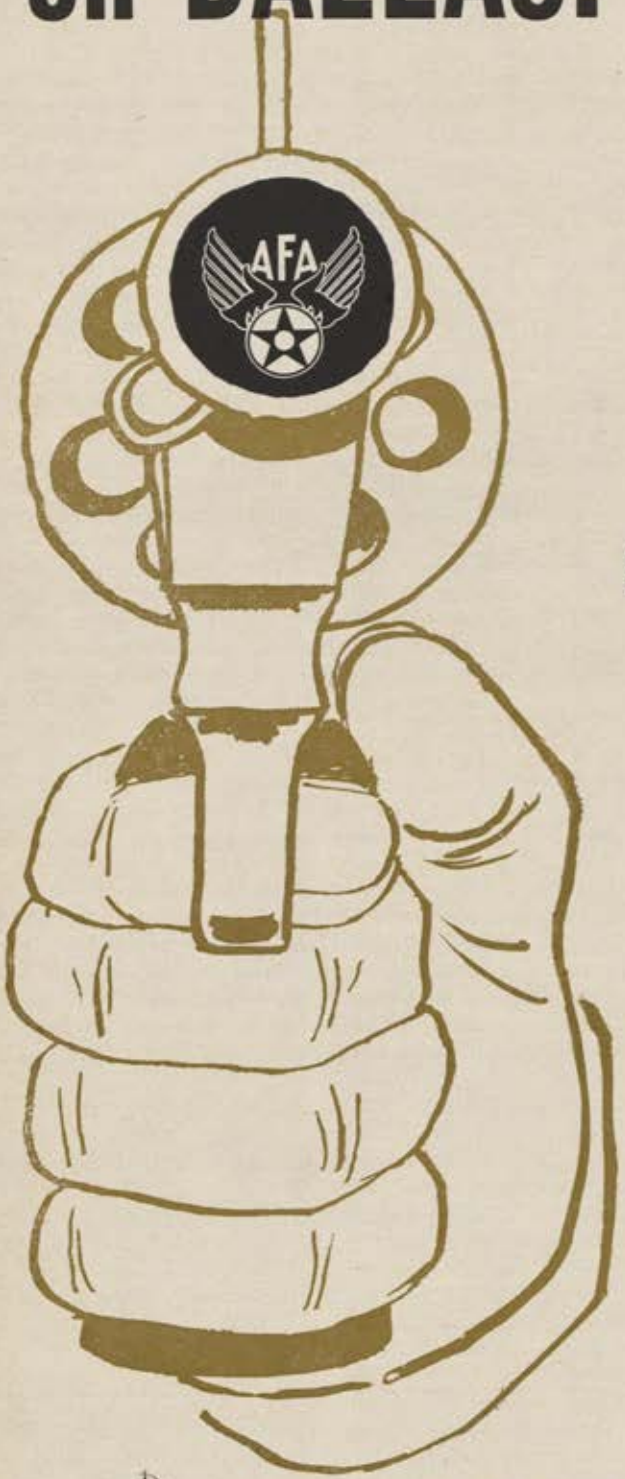
—BILL LEAVITT

What the well-dressed Space Age pilot will wear—AF's new XMC-2 suit.

Set Your Sights on DALLAS!

NOW IS the time to set your sights on "Big D" for next September, when the Air Force Association holds its National Convention and Airpower Panorama in world-famous Dallas. More than 3,000 government, military, and industrial leaders, and members of the Association will attend this event. It will be the largest aviation meeting in the country. The Convention will get under way at 9:00 a.m., Thursday, September 25, and will end at noon, Sunday the 28th. The social program will have a real western theme, with lots of cowboy hats, guns (play types), and maybe a horse or two.

The serious side of the program will include such annual events as the Airpower Symposium and Luncheon, Awards Banquet, Reserve Forces Seminar, Industrial Briefings, and AFA Business Sessions. AFA's Board of Directors will meet Wednesday afternoon, the day before the Convention officially opens. An AFA Leaders Workshop will be held Wednesday afternoon, also. AFA officials should keep these pre-Convention meetings in mind when making hotel reservations.



September 25-28, 1958

The Convention will feature AFA's Airpower Panorama—70,000 square feet of displays of airpower weapons and equipment. More than fifty companies have already reserved space to exhibit their products. The Panorama will be held in Dallas' new $12 million Memorial Auditorium, where many of the Convention events will also be held. The Auditorium is located only three or four short blocks from the Convention hotels. Delegates and guests will be afforded numerous opportunities to visit the Panorama, on their way to and from events.

For years you have heard about Texans, their oil wells, cattle ranches, Cadillacs, and the big way in which they do things. The biggest thing we have noticed, particularly around the Dallas-Fort Worth area, is their friendliness. This will be especially true during the AFA Convention next year. Why not make plans now to be on hand?

SEE PAGE 78 FOR DETAILS ON HOTEL RESERVATIONS

What's New With ★ RED AIRPOWER

Here's a summary of the latest available information on Soviet air intelligence. Because of the nature of this material, we are not able to disclose our sources, nor document the information beyond assurance that the sources are trustworthy.

At the Barcelona astronautical congress last October the Russians quietly extended invitations to members from several small countries to visit Moscow and learn more about Soviet progress in the missile-satellite field, all at Russian expense. One South American country's representative who got an invitation felt highly flattered.

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In this column we have reported (September 1957) that the Soviets would have shown a new fighter at their air show last June if the event had not been canceled.

It has now been confirmed that the Russians have a new supersonic fighter-bomber called the MIG-23. It has been given the NATO code name Backfin. Flight testing has been under way at Ramenskoye, a sort of Edwards Air Force Base of the USSR, not far from Moscow. Top speed is said to be Mach 1.5. Wingspan is about seventy-

Sovfoto

According to the Russians, their new turboprop-powered helicopter, MI-6, can carry seventy to eighty passengers. The Soviets also claim a world's record for the 26,488-pound load the MI-6 has carried to a 7,300-foot altitude.

five feet, with fifty-five degrees of sweepback. The fuselage is about eighty-five feet long. Two turbojet engines are in the fuselage, with wing-root air intakes. The usual boundary layer fence that has come to mark Soviet aircraft is located at a point on the wing that is about half of the span.

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Interesting fact: East German airline pilots are being trained by Russians—in fact, by instructors drawn from the Soviet air forces. The training center is at Rechlitz-Muritz.

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Poland is now building the prototype of a jet military trainer. The work is under way at the Air Technical Institute at Warsaw under the direction of a Diploma-Engineer named T. Soltyk. The aircraft will be used both by the Polish air force and the aviation clubs.

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The Russians haven't said, but information reaching us has it that ten *Ukraina* AN-10 transports are being built for Aeroflot and five of the new *Moskva* IL-18 transports are under construction. Both are powered by turboprop engines. The number of aircraft is interesting, because Aeroflot usually orders new aircraft in lots of twenty-five each. It is quite possible that the AN-10 and IL-18 will have to rack up more operational hours before a real production order is given, and then perhaps only one of the two aircraft will be built in quantity.

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In Czechoslovakia the first prototype of the twin-engine touring aircraft, the L-200, is nearing completion at the Kunowice aircraft factory. It carries five passengers in a roomy compartment. Top speed: 161 mph. The aircraft is meant to tap the export market for executive aircraft.

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New Russian transport, the *Rossia*, mentioned in this column last month, was displayed in Moscow. It is powered by four turboprop engines of about 12,000 eshp each and will carry up to 220 passengers.

One of the most significant things about the new transport is that the Russians have again scaled up their TU-104 airframe. This makes the second time this has been done; first to get the TU-110 four-jet transport and now to get the very large TU-114 turboprop transport. This is just one more conclusive piece of evidence that the Russians like to standardize as much production as possible around one proven design. This saves them tremendous amounts of design-engineering manpower and development effort.

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The Russians also are working on another turbojet-powered transport of unknown designation. They recently predicted in one of their popular science journals that they soon would have a supersonic transport in operation.

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Three of the Communist-bloc countries now are building the MIG-17 Fresco under license from Russia. Red China will reach peak production of MIG-17s very soon, and Poland now is building the airplane to replace its tired-out MIG-15s. Czechoslovakia has been in production on MIG-17s for some time and now has begun production on the new MIG-19.

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To date the USSR has supplied Arab states with about 200 MIG-17 aircraft, either directly or through Czechoslovakia. About 100 went to Egypt, thirty-two to Afghanistan, and sixty to Syria.

Aided and abetted by Soviet air force pilots and technicians, the Syrians now have five MIG-17 fighter squadrons at four bases: Hama, Sahl es Sahra, El Rasafa, and Damascus-Mezze. Further improvements are said to be under way at Aleppo and Chliye so that jet aircraft can be based there in the future.

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In addition to the sixty MIG-17s, the Syrians have some MIG-15s, though the basic jet aircraft of their air force remain the British Gloster Meteor F. Mk. 8 and N.F. Mk. 13; the de Havilland Vampire F.B. Mk. 5, as well as British and Italian old vintage trainers. They also have a transportation unit consisting of C-47s, C-45s, and even a few Junkers JU-52/3Ms.

Syrian air force is under Lt. Col. Sultan Sahmi; the fighter units are under Lt. Col. Musafez Asasa.—END

NEWEST AIR FORCE HELICOPTER

The U. S. Air Force has awarded Kaman Aircraft a production contract for the H-43B shown above. Powered by Lycoming T-53 gas turbines, these 'copters are to be used as local crash-rescue vehicles at Air Force installations, and emergency transport of fire fighting and rescue crews to inaccessible areas.

In addition to H-43Bs, Kaman will also deliver to the Air Force H-43A helicopters, which are powered by Pratt and Whitney R-1340 piston engines. Both types will be equipped to act as aerial ambulances for quick evacuation of both ambulatory and litter cases.

Kaman is proud to be on the Air Force team and to add another contribution to our continuing national defense.

KAMAN

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airman's bookshelf

THE USAF Golden Anniversary was a banner year for air literature. More than sixty books came off the presses to enrich the history, tradition, and lore of airpower—the greatest growth in air literature since the birth of flight. Space prohibits recapitulating the entire output (*see "Airman's Bookshelf," 1957*), but among the 1957 highlights:

- *A History of the United States Air Force, 1907-1957*, edited by Alfred Goldberg (D. Van Nostrand, $6.75)—a comprehensive, picture-packed, one-volume history of the USAF, originally the August issue of AIR FORCE Magazine.
- *Airpower: The Decisive Force in Korea*, edited by Col. James T. Stewart, USAFR (D. Van Nostrand, $6.50)—the role of the USAF in the Korean War.
- *Air Force: A Pictorial History of American Airpower*, by Martin Caidin (Rinehart, $10)—the photographic story of the USAF from Kitty Hawk to missiles.
- *A Picture History of Flight*, by John W. R. Taylor (Pitman, $5.95)—a detailed photo history of aviation with emphasis on European development but with substantial coverage of the USAF.
- *Famous Fighters of the Second World War*, by William Green (Hanover House, $3.95)—the stories of eighteen famous World War II fighters.
- *They Fought for the Sky*, by Quentin Reynolds (Rinehart, $3.95)—story of the first war in the air.
- *Low Level Mission: The Story of the Ploesti Raids*, by Leon Wolff (Doubleday, $4.50)—blow-by-blow account of the historic 1943 Ploesti strike.
- *Air Spy*, by Constance Babington-Smith (Harpers, $4)—a dramatic narrative of photo air reconnaissance in World War II.
- *Lifeline in the Sky*, by Clayton Knight (William Morrow, $6)—the history of MATS and record of its worldwide operations today. (*See review below.*)
- *Man Unafraid*, by Steve Tillman (Army Times, $4)—detailed, personalized history of the US Air Service, 1908-1916.
- *Balloons to Jets*, by Howard Scamehorn (Henry Regnery, $5)—history of a century of aviation in the state of Illinois. (*See review below.*)
- *Global Strategy*, by Air Vice Marshal E. J. Kingston-McCloughry (Praeger, $4.50)—a study of military strategy, strategic concept, and airpower in modern war.
- *The Great Deterrent*, by Air Marshal Sir John Slessor (Praeger, $6)—collection of Slessor's airpower-oriented lectures.
- *Nuclear Weapons and Foreign Policy*, by Henry Kissinger (Harpers, $5)—analysis of impact of A- and H-bombs on military concepts, strategy, and world affairs.
- *Modern Airmanship*, edited by Col. Neil D. Van Sickle (D. Van Nostrand, $9.75)—a comprehensive text covering the fundamentals of modern aviation and flight.
- *The Central Blue*, by Air Marshal Sir John Slessor (Praeger, $7.50)—autobiography of a great airman.
- *Wing Leader*, by Wing Commander J. E. Johnson (Ballantine, $4)—autobiography of England's top World War II ace.
- *Tom Pittman, USAF*, by Rutherford Montgomery (Duell, Sloan and Pearce, $3)—the life story of an outstanding SAC B-47 pilot.
- *Samurai: The Personal Story of Japan's Greatest Living Fighter Ace*, by Saburo Sakai with Martin Caidin (Dutton, $4.95)—the air war from a Japanese viewpoint.
- *The Sound of Wings: Readings for the Air Age*, by AF Maj. Joseph B. Roberts and Capt. Paul L. Briand (Henry Holt, $5)—an anthology of writings about flight and the USAF.
- *The Airman's World*, by Gill Robb Wilson (Random House, $2.95)—a beautiful, inspiring word-and-picture portrait of the world of the air.
- *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, building, and operation of the DEW Line. (*See review below.*)
- *Air Force Airs*, by T/Sgt. William Wallrich, USAF (Duell, Sloan and Pearce, $2.95)—the first Air Force songbook commercially published. Songs, ballads, and parodies sung by US airmen through three wars. (*See review below.*)
- *Jets Away!*, by Rutherford Montgomery (Dodd, Mead, $3)—a novel about SAC.
- *Rockets, Missiles and Moons*, by Charles Coombs (William Morrow, $3.75)—the story of rocket and missile research, development, and test.

The prospects for 1958 are even brighter. Nearly eighty air books are now under commercial publication contract, with a score more approaching the contract stage.

This development of a specialized literature is not unusual. Every age has its culture, and every culture a literature that draws upon the wellsprings of a people's way of life and thinking. What *is* unusual is that a broad, definite literary pattern is emerging only fifty years after the beginnings of the air age.

The Golden Anniversary year also saw a significant contribution by the periodical press. Magazine articles ranged from exclusive picture spreads to book-length articles to whole anniversary editions. Again, a complete rundown is impossible, but a sample includes:

- "A History of the United States Air Force, 1907-1957," AIR FORCE Magazine, August 1957, AF Golden Anniversary edition.
- "Concept: Key to Airpower," by Gill Robb Wilson, a short, book-length conceptual history of airpower in *Flying*, February 1957, USAF Golden Anniversary issue.
- "Memories of a Pioneer," a short, illustrated autobiography of Brig. Gen. Frank Lahm, USAF (Ret.), in *Flying*, August 1957.
- "MATS: America's Long Arm of the Air," by Beverly M. Bowie, *National Geographic*, March 1957.
- "Fledgling Wings of the Air Force," and "History Written in the Skies: Pictorial Highlights of the First 50 Years of the United States Air Force," by Thomas W. McKnew, *National Geographic*, August 1957.
- "Chiefs of the Army/Air Force, 1907-1957," by Walter T. Bonney, a special picture-narrative supplement to *Pegasus*, July 1957.
- "The Air Force Ballistic Missile Issue," *Air University Quarterly Review*, Summer 1957.
- "Global Airpower," USAF Golden Anniversary issue of *Interavia*, November 1957.
- "B-52s Shrink a World: A Historic Show of U. S. Airpower," *Life*, January 28, 1957.
- "A Journey No Man Had Taken," by Maj. David G. Simons, *Life*, September 2, 1957.
- "SAC Never Sleeps," by James Michener, *Reader's Digest*, October 1957.

AF T/Sgt. William Wallrich, Information Services spe-

cialist and occasional AIR FORCE Magazine author, has been pack-ratting AF songs, ballads, parodies, and ditties he's heard in the barracks, on the line, in the air, at the bar, the world over for the past sixteen years. Now he's brought out 170 of them, from the sober to the risque—except those which wouldn't sanitize at all—in the first Air Force songbook to be printed commercially. *Air Force Airs* (Duell, Sloan and Pearce, $2.95) is a unique, pocket-sized (durable hard cover) record of what the airman has been singing through three wars. Whatever you may be looking for, from "Beside a Belgian 'Staminet,'" popular with World War I Air Service flyers, to the "Pusan U" classic of Korea's jet jockeys, you'll find it in Bill's songbook. Maj. Gen. Lloyd P. Hopwood, Commandant of the Air Command and Staff College, Air University, introduces the book, pointing out that singing airmen are happy airmen and their songs play a vital role in maintaining the stamina that makes for military readiness and victory.

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British airmen, unlike most of their American counterparts, are prolific autobiographies. Among some recent works is *Mission Completed,* by Air Chief Marshal Sir Basil Embry (Metheun & Co., London, $6.25, available through the British Book Centre, New York, N. Y.). In late 1955 the Chief Air Marshal ended thirty-five years of distinguished service in the RAF as Commander in Chief of Allied Air Forces, Central Europe, under AF Gen. Lauris Norstad. This book is the detailed, solidly written story of his military career during which Embry became a legendary figure. A dedicated fighter pilot, he flew with the Desert Air Force during the Eighth Army offensive against Rommel and later led the famed No. 2 Group in some of the war's most daring special missions over the continent.

A strong, articulate advocate of airpower, Embry fought high government lethargy in the post-World War II years and as Commander in Chief of RAF Fighter Command was responsible for the buildup of British air defense capability in the face of strong budget opposition.

Embry believes ". . . the future destiny of Western civilization for the next few years rests on the air forces of the West, particularly on the United States Air Force and the Royal Air Force." We must maintain in SAC and the RAF Bomber Command an offensive deterrent "so powerful that any potential enemy would have to choose between peace and complete destruction," he feels.

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There were only two Allied pilots who flew combat against the enemy in World War II after losing both legs. The one, Douglas Bader, told his story in *Reach for the Sky;* the other, Colin Hodgkinson, also of the RAF, relates his in *Best Foot Forward* (W. W. Norton, $3.95). Hodgkinson lost both legs, one above and the other below the knee, while a naval air cadet when his Tiger Moth crashed during training in 1940. Discharged with a pitiable pension, he succeeded in mastering his artificial limbs, and with persistence, doggedness, and a firm determination to fly again, he broke through the red tape of regulations and was accepted by the RAF for flight training. He flew Spitfires in active combat for eleven months and 100 missions before crashlanding in Nazi-controlled France and becoming a POW. After the Normandy invasion he was repatriated and returned to active RAF combat flight status. Today, despite his handicap, he runs a successful business. His story is an inspiring account of courage and determination.

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The life of an airman is a life of adventure, but few can match their experiences and contributions in American aviation with Ruth Nichols, America's foremost woman flyer. Her autobiography, *Wings for Life* (Lippincott, $3.95), is that of a fearless pioneer of the air, a lifetime in the sky that earned for her the respect and admiration of all airpower greats. Today she holds the largest number of "firsts" of any woman pilot and continues active in the cockpit when time permits release from many civic and professional organization duties. One has but to read her startling autobiography to realize there is no longer any place left above the earth that is solely a man's place. After such a starring career in the air it is hoped she will some day get her wish—to be at the controls of a space ship headed for new adventures, new conquests.

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Air history is sliced many ways and four recent volumes serve it up on highly unusual platters. *R.A.F. Biggin Hill,*

USAF Chief of Staff, Gen. Thomas D. White, signs up as charter member number one in the Air Force Association's new Airpower Book Club. AFA President Peter J. Schenk accepts General White's membership and presents him with his copy of *A History of the United States Air Force.*

by Graham Wallace (Putnam, London, $4.50, available through the British Book Centre, New York, N. Y.), carves a neat chunk of RAF documentary through the history of this famous, old air base. Biggin Hill was founded in 1917 when aviation was in the "crate stage," and a year later planes of its Number 141 Squadron made the first aerial enemy kill—a German Gotha. Between wars it was the scene of significant RAF research, development, and test programs, and during World War II Biggin Hill Hurricanes and Spitfires downed some 1,600 enemy aircraft. *Biggin Hill* tells the story of the RAF from the Bristol Fighter of World War I to today's Hawker Hunter jets. A highly unusual and interesting way to get your history.

The history of the Military Air Transport Service and its worldwide operations is descriptively told by old-line aviation pundit Clayton Knight in *Lifeline in the Sky: The Story of MATS* (William Morrow, $6). And he tells it through the medium of a worldwide air travelogue that makes a light, informative, and detail-packed yarn. Clayton spent more than a year traveling the MATS circuit with the air and ground crews and support personnel. He made scores of line drawings and watercolor scenes, which add a fresh, on-the-scene atmosphere. The narrative is neatly interwoven with colorful and descriptive facts about the countries, the peoples, and the customs of our MATS-based neighbors. Readers from fourteen to eighty will enjoy this one.

Third course comes in shape of a monograph, *Balloons to Jets,* by Howard L. Scamehorn (Henry Regnery, $5), a chronological history of the origins, development, and growth of aeronautical activity in the state of Illinois from 1855 to 1955. This unique history was written for the Illinois Department of Aeronautics and published under the aegis of the Illinois State Historical Society. In addi-

(Continued on page 29)

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YOUR free gift, just for becoming a Charter Member of the Airpower Book Club, is this magnificent history of airpower's first 50 years. This is a book that's equal to its subject any way you look at it . . . in it you will find nearly 400 historic photos, many of them collectors' items—more than 2 dozen maps and charts . . . 287 pages of vivid text, including a Foreword by General Thomas D. White, Chief of Staff of the USAF, and a complete index and bibliography for quick reference. Here's a book that is selling to the public for $6.75—*but it costs you nothing.* And, that's not all—

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by Isaac Don Levine

is the definitive study of Mitchell and his fight for recognition of airpower. But it's your first Airpower Book Club selection because it's a brilliant, incisive study of the techniques, and the hazards of getting action on a program at the highest military and political level—or, for that matter, at any command level.

You can follow General Billy Mitchell step by step as he took the case for airpower to his superiors and, ultimately to the people. You can follow his reasoning, the techniques he used, the mistakes he made. You'll put yourself in his place—and decide how you would have done the job under the same circumstances. You'll *enjoy* this book as the biography of a great airman . . . but you'll *profit* from the lessons you'll learn in reading and re-reading it.

"I commend this volume to all who have a deep and abiding interest in American airpower, to those who support Air Force activities in other capacities. It is a proud chronicle of the past and a valuable tool for the future." These words are by Gen. Thomas D. White, USAF Chief of Staff, from his foreword to *A History of the United States Air Force*. It was appropriate that General White should have become the first member of the Airpower Book Club. See page 25 for a photo of AFA President Peter J. Schenk accepting the General's charter membership.

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tion to being the home of several AF bases which go way back in Illinois air history—Scott and Chanute—the state served as an air crossroads much the same as it early became the rail hub of America. All east-west flying homed in on the Chicago area, and one of the colorful periods in Illinois air history is the early airmail flying. Other states could follow Illinois' lead in sponsoring a work of this kind, adding richness and depth to the history of American aviation.

And finally are two English volumes that dish air history in the form of handy, distinguished aircraft manuals. *Aircraft of the Royal Air Force, 1918-1957,* by Owen Thetford (Putnam, London, $12.50, available through British Book Centre, New York, N. Y.) is an encyclopedia of 300 aircraft which have served with the RAF since its organization in April 1918. Although it includes no prototype or truly experimental aircraft, it does treat the various record-breaking planes that have made notable contributions to RAF development. *British Aeroplanes, 1914-1918,* by J. M. Bruce (British Book Centre, $63) deals with all World War I British aircraft, including experimental types. Its 700 illustrations and textual analyses are far more comprehensive than Thetford's work.

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The further in time a war recedes, the more rose-colored becomes the lens through which it is viewed, and the more numerous the popular books about it. Someone once estimated 100,000 volumes have been written about the American Civil War.

One of the better tales from World War II is Sven Hassel's *The Legion of the Damned* (Farrar, Straus and Cudahy, $3.75), an autobiographical novel the author claims is "ninety percent true." Anti-Nazi Hassel was captured trying to escape from Germany and was sentenced to concentration camp. Later he was transferred to one of the Wehrmacht's "penal regiments" on the Russian front where he spent a good part of the war. The story revolves about his experiences with the hardened group he joined—outcasts from Nazi society, political and criminal prisoners, a dismal, desperate, rebellious band of men and women. The portrait of war Hassel paints is tragic.

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From among the serious nonfiction war books currently on the stands Fred Majdalany's *The Battle of Cassino* (Houghton Mifflin, $4), and David Howarth's *The Sledge Patrol* (Macmillan, $4.50), indicate the widening span of World War II literature. The former is actually a six-months' account of all four battles for the historic monastery, including the aerial destruction which paved the way for the Anzio breakout. The author does not dwell on battle strategy, concept, or plan—nor on the moral right or wrong of deadly aerial bombardment of a church sanctuary.

The Sledge Patrol, by the author of the incredible Arctic war survival narrative *We Die Alone,* tells the story of a little-known corner in World War II—the seven-man patrol of a 500-mile stretch of desolate Greenland coastline. A strange footprint in the snow leads to a hidden German radio station, strongly garrisoned for over six months. The story of tracking the enemy down and outwitting him in that bleak, forbidding territory adds an absorbing chapter to the story of World War II.

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With the thought that the "DEW Line may well be our lifeline" in the age of the missile and thermonuclear bomb, Richard Morenus, author of best sellers *Crazy White-Man* and *Alaska Sourdough,* concludes his new book *DEW Line: Distant Early Warning—The Miracle of America's First Line of Defense* (Rand McNally, $3.95). Quite at home in the frozen northland which he loves and writes about, Morenus traveled to DEW Line sites where much of the research for his first "military" book was done.

In the pleasant, clear style that has become his trademark, he records the dramatic story of the 3,000-mile radar rampart stretching from Alaska to Greenland.

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Some of the greatest advances in aeronautical technology have been in the field of aviation medicine. Although frequent magazine coverage is given aeromedicine, both by the big slicks and the professional medical journals, few books have been devoted to it. To the man in the street, the aeromedic is just another doctor. In truth, he is a specialist no less than the atomic or rocket scientist, and his profession is becoming more and more important as man reaches farther into the unknown. With the advent of space travel, the doctor in the sky will become an integral component in the scientific circle. For it is he who must prepare the human body for survival in new environments, under new and yet unknown circumstances, stresses, forces.

Paving the way for flight into space is a decade of intensive research and experiment that has produced the equipment and knowledge that enable pilots to function at the altitudes and speeds flown today. Part of the story of this noble work is told in *Doctors in the Air,* by Wing Commander Robert Maycock (Thomas Nelson and Sons, $3.75). The author is an RAF flying doctor, and his book is principally the story of aeromedical research in England from the late 1930s through the war.

Little attention was paid to this aspect of flight until World War II. Even then, first things came first, and there were battles to win. The flying doctors, without much encouragement, resources, or previous knowledge, worked during the war to prepare flight crews for combat. Cases drawn from operational records illustrate their research and provide interesting continuity to the narrative. RAF doctors flew on fighter, bomber, and transport missions to study first-hand problems of flight fear, tension, cold, and oxygen deficiency. They studied high-altitude flight, violent acceleration, parachute jumping, and exposure in icy waters.

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Libraries, editorial shops, aviation business offices, and science engineers will find three new references handy: The first is a small booklet published by the National Aviation Education Council (1025 Connecticut Ave. NW, Washington, D. C.), entitled *U.S. Aviation Today, 1957.* Retailing for 50¢, it records in words and pictures the achievements in aviation during 1956. It includes military and civilian aircraft, air events, and leading air personalities. Each aircraft pictured has three-view silhouettes along with design and operation specifications and brief production-operational history. Another is Paul H. Wilkinson's *Aircraft Engines of the World, 1957* (privately published, $15). It is an up-to-date encyclopedia of the Western world's aircraft powerplants, with a photo and the most detailed statistics available of each type. Third is a highly technical, comprehensive, and complete text and reference on jet engines entitled *Jet Aircraft Power Systems,* by Jack V. Casamassa and Ralph D. Bent (McGraw-Hill, second edition, $10.75). This well organized, authoritative tome is designed for the engineer, aeronautical technician, or student, and treats the history, theory, construction, and operation of jet propulsion, rockets, rocket systems, ramjets, and gas-turbine engines. It is fully illustrated with photos, engine cutaways, line drawings of systems, circuits, design specifications, engineering formulae, and charts and graphs. Each chapter ends with a list of study questions.

—JAMES F. SUNDERMAN

VIEWS & COMMENT

AFA Holds 'Missile School' for Newsmen

THERE was a time, long gone, when Washington newsmen could call it a hard day's work after turning in skilled coverage of the nuances of Washington politics, news of Presidents, and explorations of the tax load that everyone hoped would be lessened the next year.

But in the new world of jets and missiles, Sputniks and "operational capabilities," the newsman's job has increased radically in scope. And writers, editors, and broadcasters alike—conscious of their responsibilities in informing the American people—are leading their own movement "back to school."

With this aim of self-education in the military-technological facts of life, a group of Washington newsmen asked the Air Force Association if it could help them and their colleagues by bringing together some of our country's leading research and development and scientific people for a no-holds-barred, across-the-board, missile-age seminar, where reporters could obtain needed background for the informing job they must do every writing day.

This request led to AFA's planning for its newsmen's Missile Conference, held on December 16 at Washington, D. C.

And, judging from the turnout—180 journalists from Washington and forty-seven other US cities, from Canada and as far off as Japan—it was just what the newsmen ordered.

On hand at the AFA Conference, in addition to the battery of missile-age experts who spoke briefly and then answered newsmen's questions, was Vice President Richard M. Nixon, who was the opening speaker.

The Vice President, who addressed the Conference as President Eisenhower was meeting with NATO leaders in Paris, told the newsmen that the US has not "lost the overall military advantage which we have enjoyed, do enjoy, and will continue to enjoy for some time in the future."

But, in the face of Soviet advances, what the country needs is a "good dose of realism," the Vice President said.

"We can make no greater error than to fail to maintain the major striking power of the United States, which is our Strategic Air Force," he stressed.

And he added, "You will hear rumblings about interservice rivalry. From the standpoint of the American public, this problem—assuming it does exist—should be discussed openly and frankly."

"There should be no sacred cows as far as the national defense of the United States is concerned," the Vice President said.

Warning against scrapping our present force in being in our rush for operational ICBMs and IRBMs, he told newsmen that "an initial operational capability in missiles" does not mean existing weapon systems can be immediately replaced.

The missile age means a lot of things all at once, and the Conference planners, in assembling the lineup of experts who addressed the newsmen and answered the flood of questions, tried to cover all main areas.

Kicking off the panel with a briefing on ballistic missile airframes was J. R. Dempsey, Manager of the Astronautics Division of the Convair Division of General Dynamics, and Director of Convair's Atlas program. Mr. Dempsey, who indicated the Atlas may be used to launch an earth satellite, set the newsmaking mood of the Conference. Significantly, the next day the Atlas ICBM was successfully test-flown for the first time.

The problems of propulsion and fuel were discussed by Panelist George P. Sutton, President of the American Rocket Society and Chief of Preliminary Design, Rocketdyne Division of North American Aviation. Mr. Sutton was a key scientist in the development of the US's early high-thrust rocket engines. His company makes the engines for the Army's Jupiter and the Air Force's Thor and Atlas.

Morton Price of General Motors' AC Electronics Division, an expert in guidance systems who has worked closely with the Thor, Regulus, and Matador missile projects, told the intricate story of guidance to the conferees. Mr. Price said that the most recent successful firing of the Thor marked the first time an inertial guidance system had been test-fired in an American ballistic missile. He added that the test was successful.

We have at least some of the reentry problems licked, according to President Eisenhower's recent report to the nation. But do the Russians and will they go to the moon in the next few years? This and other questions were dealt with by Dr. Arthur Kantrowitz, nationally recognized pioneer in magnetic hydrodynamics (the new field of science dealing with ultra-high-speed, high-altitude flight).

A former physicist with the National Advisory Committee for Aeronautics, who has taught at Cornell University, Dr. Kantrowitz now is Vice President of the Avco Manufacturing Co. and director of Avco's Research Lab.

Satellites today and tomorrow, and Vanguards—up and down—were discussed by panelist George S. Trimble, whose expert credentials include work in aerodynamics, design development, propulsion research, a post as chief of the Martin Company's studies in pure science, including gravity, nucleonics, rocketry, and space flight. His present job is as Vice President for Engineering at Martin.

Welcoming the throng of newsmen at the seminar was Peter J. Schenk, AFA President and himself one of the day's panelists. Now manager of marketing at General Electric's Technical Military Planning Operation (TEMPO) at Santa Barbara, Calif., Mr. Schenk is a consultant to the USAF's Scientific Advisory Board. As official host, with AFA Executive Director James H. Straubel as panel moderator, Mr. Schenk helped expedite the busy question-and-answer periods that followed each speaker.

To meet the heavy interest of newsmen in the relative strength of the Strategic Air Command as the nation's primary deterrent in the wake of Russian military growth, Gen. Thomas S. Power, SAC Commander in Chief, sent a special address which was read for him at the seminar luncheon by his deputy, Lt. Gen. Francis H. Griswold.

Said General Power:

"In the public's mind, SAC is associated with manned bombers, and bombers are supposedly on their way out. Nothing could be further from the truth. SAC's mission is . . . 'to be prepared to conduct strategic air operations on a global basis so that, in the event of sudden aggression, SAC could immediately mount simultaneous nuclear attacks to destroy the vital elements of the aggressor's war-making capacity to the extent that he would no longer have the will nor ability to wage war.'

"To accomplish this mission effectively, SAC needs three things—organization, men, and weapons. Its organization must include all the elements needed for the planning, support, and conduct of strategic air operations, such as a global communications network and weather service, worldwide intelligence and reconnaissance systems, target analysis and selection, global logistics, and above all, centralized control. All of these elements, individually and in combination, must be flexible enough to be readily adaptable to any new type of weapon system or technique, no matter how revolutionary."

To meet requirements for that kind of service, General Power's speech added that SAC must have "a stable force of experienced professionals—[which] poses one of our most serious problems, as we find it difficult to induce a sufficient number of our skilled personnel to remain in the service."

Also, to stay in its vital business of deterrence, declared the General, SAC needs weapons—"the best and most advanced strategic weapons science and industry can provide. . . . Today, SAC has over 2,700 bombers, with a high percentage of jets, in addition to hundreds of supporting aircraft. But our all-jet B-47s are gradually becoming obsolescent and will be entirely obsolete before they [can] be replaced by adequate quantities of operational missiles."

"There are still many years of service left in our B-52," the General said, "and, in fact, it is such a highly advanced weapon system that we should continue its production beyond the presently contemplated eleven wings. However, it is improbable that the ICBM will be ready to fully replace the B-52 once that bomber, too, reaches obsolescence and will have to be phased out."

To fill what military thinkers are calling the gap between older weapon obsolescence and missile development, in General Power's words:

"We have no choice but to pursue both paths—that is, devote every possible effort to the rapid buildup of a potent strategic missile force as well as the modernization of our bomber force.

"Consequently, we expect to replace our already obsolescent B-47s with the high-performance B-58, which is now in the final testing stages, and at the same time begin phasing in IRBMs. And by the time the B-52 reaches obsolescence, we plan to equip the present B-52 wings with both the highly advanced, hypersonic WS-110A bomber, now in preliminary design, and the ICBM

"But, just as the transition from propellor-driven to all-jet aircraft was a gradual one, so the transition from an all-bomber to a mixed missile-bomber force must be orderly and carefully programmed so as to permit no gaps in our strength, no weakening in our deterrent posture. This transition, in effect, started years ago with the initial planning phase development of missiles and support equipment, and similar preparatory steps."

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From the heavy questioning throughout the briefing, and from opinions like that of the next morning's New York *Herald Tribune*, which called the seminar "an astute public-education . . . move," it was evident that the Conference had helped answer some of the questions of the missile age.

And as they left, newsmen could look forward to AFA's 1958 Jet Age Conference in Washington next month—always a must—this year to be devoted to a full-scale inquiry into missiles and space-age weaponry.

—William Leavitt

There Are Worse Burdens Than Taxes

Are we Americans riding to hell in a foam-rubber-cushioned handbasket? Bernard M. Baruch asked that question, in effect, at the recent New York Herald Tribune *Book and Author luncheon. Some of what he said follows:*

THE BASIC problems confronting us today are not new—they only appear in new guises to each generation. And as I see these problems arise again and again in my lifetime, I feel like a battered old veteran coming back from the wars, who, if he cannot point out the road to victory, can at least show how to avoid the path which leads to defeat.

Sometimes, it seems to me, this path is widening into a superhighway, along which we speed apparently unconcerned with our destination as long as we get there on foam-rubber seats and pushbutton drive. If America ever crashes, it will be in a two-tone convertible.

While we devote our industrial and technological power to producing new model automobiles and more gadgets, the Soviet Union is conquering space. While America grumbles over taxes and cuts the cloak of its defenses to the cloth of its budget, Russia is launching intercontinental missiles. Suddenly, rudely, we are awakened to the fact that the Russians have outdistanced us in a race which we thought we were winning. It is Russia, not the US, which has had the imagination to hitch its wagon to the stars and the skill to reach for the moon and all but grasp it.

America is worried. It should be. We have been set back severely not only in matters of defense and security, but in the contest for the support and confidence of peoples throughout the world.

Still there is no reason to panic. What human folly commits, human ingenuity can overcome. We can overcome our mistakes, our delays, our incompetence but this requires hard work and sacrifices and putting first things first.

I have no patience with those who claim that our economy cannot stand the strain of meeting the Soviet challenge and complain that taxes are too burdensome. There are worse burdens than taxes. The cost of preserving the peace is infinitely less than the cost of fighting a war. I, for one, will never concede that we cannot do as much in the defense of our freedoms as any potential enemy may be doing to destroy those freedoms.

Sputnik is more than a satellite hurtling through space, more than a warning of leadership jeopardized and security imperiled. Sputnik represents the test of democracy. Do we meet this challenge—regain our leadership, assure our security? Do we discipline ourselves to protect our freedoms? If we do not, we will bear the far harsher disciplines which our enemies will impose on us.—End

ANTI-MISSILE SYSTEMS

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NEW INTEREST . . .

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Opening witness at the Senate Preparedness Subcommittee hearings was Dr. Edward Teller, "Father of the H-bomb."

Same Old Crisis

By William Leavitt
ASSOCIATE EDITOR

THAT there should be expressions of official dismay at the creeping decline of US airpower *vis à vis* that of the Soviets should in itself be a matter of wonder. For the only really new aspects of a situation that has been repeatedly reported on these pages are the physical manifestations of the rapidly expanding rate of Soviet military and technical progress and, in relation to the pace of that Russian sweep, our own decline in strength.

What the public has been hearing in recent weeks through the medium of the Senate Preparedness Subcommittee hearings is not, in a broad sense, new information. Rather it is updated and presented in a new context of urgency—an urgency that has been apparent in the line of questioning by the members of Senator Johnson's subcommittee as they have heard testimony by such scientists and defense officials as Dr. Edward Teller, Dr. Vannevar Bush, Gen. James H. Doolittle, Defense Secretary Neil McElroy, and his deputy, Donald Quarles.

The testimony elicited by the subcommittee has indicated a new and stronger consciousness of what our country must face as a fact sooner or later (with the inference that later may be *too* late)—the fact that we are in a race on many fronts—military, technological, political, and economic—with the Soviet Union.

The testimony of the opening witness, Dr. Teller, again put him in the unhappy position of being right about earlier unhappy predictions. He said once more what he has so often stressed, that the US scientific effort is lagging behind that of the Soviets. And he warned that the present rapid rate of Russian progress, unless the US increased its own effort, could eventually assure their superiority on all fronts. That, asserted Dr. Teller, could lead to our defeat without war, through American decay to a second-class power. The inference, of course, is that today there can be no question of a second-best America.

Dr. Teller gave a striking projection of a future under the shadow of dominant Soviet technology. Suppose, for example, the Soviets attain weather control. Then, likely as not, our farms could die for the lack of rain as the Soviets blandly apologized that their dedication to the search for knowledge must, of course, serve first the "Socialist peoples."

Dr. Teller decried the low estate of science and of education for science in the US and contrasted with it the adulation and prestige accorded scientists in the Soviet Union. To restore a balance between the US and the Soviets, he called for an overhaul of science instruction in our public schools and increases in science teachers' salaries to attract the best possible persons. The real weakness, said Dr. Teller, is in the lower levels of education, and it is there the preparation must be given to the youngsters who will inherit the burden of the Cold War.

As Dr. Teller put it, in our society, "the young scientist, the twelve-year old" should get at least as much admiration "as a football player."

"The main strength of our defenses in the future will have to rest with the professionals," said the father of the H-bomb. Only well-trained specialists will be able to fill the hard roles of tomorrow.

(Continued on following page)

Wide World Photos, Inc.

"Unwarranted" fear of military hierarchy is present bar to eventually needed general staff system, Gen. James H. Doolittle told members of subcommittee at the hearings.

The testimony of Dr. Teller, Dr. Bush, and General Doolittle was in general agreement on immediate steps needed to meet the now-expanded Soviet threats.

Their program called for:

1. Provision of more money where needed to bolster our present force in being—particularly the Strategic Air Command, plus, in Dr. Teller's words, "expanded" and "accelerated" attention to our missile programs.

2. Wide expansion of US scientific and technological education—considered by all three witnesses as the crux of the country's problem in the race with the Soviets.

3. Improvement in the organization of our defense structure—yet without such violent reorganization that present efforts might be dislocated. In this connection all three agreed on the need for quicker decision-making, but emphasized that new offices would not miraculously solve that problem. They felt, rather, that existing organizations could make the decisions with greater dispatch.

(On this general point, both Dr. Bush and General Doolittle had interesting suggestions. Dr. Bush told the subcommittee he would like to see a central planning board of military elder statesmen working on unified war plans, since he believes the Joint Chiefs, with their command roles in separate services, cannot reach unanimity often enough. General Doolittle had a different approach. He said one method would be a staff of "young, aggressive" military advisers to the Secretary of Defense. These advisers would be relatively free from the pressures of their services.)

Doolittle looked into the future with his testimony that, "someday, I believe, we will have to have an old-type general staff, with a head."

He added: "We may not yet be ready for that, because there is a great fear, which I consider unwarranted, of a military hierarchy."

In this connection, the point made in the 1956 Air Force Association Statement of Policy is worth reexamining. Part of that Statement follows:

"Our present system of three separate military services compels patriotic men to strive for objectivity in an atmosphere of service partisanship. The system too often ties military careers, and therefore military operations, to obsolescent weapons and concepts. The system encourages the postponement of basic decisions by piling compromise on compromise, committee on committee. It includes jurisdictional disputes harmful to national security. It is wasteful of time, money, and manpower.

"The three-service system can no longer be tolerated. The goal must be one program for utilizing national resources in the national defense. We must have one defense plan. We must have a single military service with one secretariat, one Chief of Staff, one promotion list.

"We must achieve this singleness of purpose, organization, and operation at the earliest possible moment. We must achieve this goal without compromising essential competition of ideas in defense planning and weapons development, while eliminating uncontrolled and wasteful competition for scarce manpower, money, and material."

Specific steps urged by General Doolittle included an all-out effort in the development of anti-missile missiles and improvement in radar detection as bolsters to air defense, improvement in Army airlift to assure quick movement of troops to any trouble spot in the world, and improvement of Air Defense Command and TAC aircraft.

The General pointed up the seriousness of today's situation with his comment that our country must be prepared for a cold war that might last "one, five, ten, fifty, or a hundred years." He contrasted the estimated Russian investment of twenty-five percent of its gross national product in arms against an American investment of 8.5 percent. This, the General said, makes ours a "butter economy" in an all-too-dangerous world.

He illustrated the rapid Soviet industrial growth with figures showing that, in 1947, their industrial base was approximately one-seventh of ours. Today, he said, theirs is about one-third of ours and it is increasing twice as fast. The Russian gross national product is now about one-third of ours "and increasing half again as fast."

The testimony of still another witness, Dr. John P. Hagen, Director of Project Vanguard, supported the Teller-Bush-Doolittle views on the urgent need for US attention to scientific development, including accelerated space projects. Dr. Hagen said the US must establish a single agency to direct all such efforts ". . . if we intend to go anywhere in this area."

Further telling illustration of Soviet advances was given by MIT's Dr. John Chipman, who told the senators of his visits to Soviet steel installations. They were "every inch as good" in basic techniques as anything we have, he said. And he added that while the US graduates perhaps 650 metallurgists each year, the Russian figure is something like 4,500, many of whom are women. Indeed, the number of Soviet female metallurgists alone exceeds our entire annual crop of graduates.

The science witnesses were followed by Neil McElroy, still new in his job as Defense Secretary, and Deputy Secretary Quarles, a comparatively old Pentagon hand.

Secretary McElroy's testimony opened with a prepared announcement on the decision to produce both the Thor and Jupiter IRBMs. The crux of the Secretary's testimony was acknowledgment that we are definitely in a race with the Soviets. He told the senators that, although he could not say he believed the Russians were ahead on all fronts, his approach as Secretary would be based on our need to match and overtake the Soviets, in all areas. He added that the decision to produce both Thor and Jupiter now might assure an operational capability by "the end of 1958" of IRBMs at bases in the United Kingdom and "other appropriate locations."

The senators' heaviest questioning was directed at

(Continued on page 37)

SUPERSONIC SCORE KEEPER—Seek-and-kill power of United States air defense weapons of the future will be tested by modern aerial target systems like the supersonic USAF XQ-4 developed by Radioplane Division of Northrop Aircraft, Inc. The XQ-4 can duplicate the performance of a modern high-altitude bomber or missile. Latest of a long series of Radioplane aerial target systems, it tallies up the score of theoretical hits and near misses and is recovered by parachute for repeated use. Today, other Northrop divisions are building the first intercontinental guided missile, the USAF Snark SM-62; the revolutionary supersonic twin-jet USAF T-38, first of an entirely new family of light-weight, low-cost aircraft; and the new low-altitude ground-to-air missile, U.S. Army Hawk, with Raytheon Manufacturing Company. Advanced Northrop engineering and production techniques will continue to lead the aircraft and missile industry in providing low-cost solutions to defense problems.

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Deputy Defense Secretary Quarles. He disclosed that the Administration would ask for additional funds to put the Strategic Air Command in a higher state of readiness, which meant greater dispersal of planes and movements of aerial tankers to the north.

Under pressure, Mr. Quarles admitted that he was "not happy" with the progress of the US missile program. But he consistently contended that budgetary considerations had not slowed up priority ballistic missile projects, although he acknowledged that other programs might have been stretched out. On the matter of budgetary limitations, Senator Symington, a member of the subcommittee, particularly differed with the Deputy Secretary.

One bright development was Mr. Quarles' statement to the senators that the Administration would now strongly support the Cordiner proposals for raises in military pay on a quality rather than a longevity basis. The last session of Congress had seen introduction of the Symington-Goldwater bill to push through the Cordiner recommendations, but, as Mr. Quarles put it, at that time the Administration had declined to support the proposals.

The initial hearings closed with Mr. Quarles' appearance and, of course, have since resumed with the testimony of William M. Holaday, from his vantage point as Defense Department Director of Guided Missiles, and the subsequent testimony of Army, Navy, and Air Force commanders, too late to be reported in this space.

But the hearings from the outset—the description of crisis, in the blunt words of Dr. Teller or the measured tones of Mr. Quarles—have given observers a sense of crisis revisited. What has been said in recent weeks in the Capitol was said before and eloquently by 100 witnesses and in a million words of testimony last year at the memorable airpower hearings of the subcommittee chaired by Senator Symington.

To quote this magazine's report on last year's Symington hearings, with conclusions reached from testimony at that time from witnesses ranging from Gen. Curtis LeMay to Dr. Wernher von Braun:

"*Concerning the present and prospective position of the United States* vis-à-vis *the Soviets as to the principal elements of airpower.*

"In this connection, the evidence shows:

"Aircraft production. At the present time the Soviet is producing more combat aircraft than the United States, and in the past three years the Soviet has outproduced the United States in modern combat aircraft.

"Aircraft in operational units. At the present time Russia has thousands more fighter planes in combat units than the United States.

"Fighter planes. The Soviet is currently producing about ten times more fighter planes than the United States and has more jet fighters in operational units than all types of jet aircraft combined in United States operational units.

"Light bombers. The Soviet has many more light jet bombers in operation than the United States.

"Medium bombers. The United States has several times as many medium jet bombers as the Soviet.

"Heavy bombers. The Soviet now has more jet heavy bombers than the United States and is producing these bombers at a faster rate.

"Research and development:

- "General: The Soviets are progressing in this field at a faster rate than the United States in the development and production of new type scientific weapons and, if present plans and programs of the United States are not changed, the USSR will attain superiority in this field.
- "Scientific and engineering personnel: Russia is currently graduating twice as many trained scientists and engineers per year as the United States.
- "The Soviet has high energy physics research facilities superior to any others in the world, and Soviet researchers are very capable.
- "Missiles: Russia started earlier in the development of ballistic missiles than did the United States and is believed to have made substantial progress in this field, to the extent of having exceeded the United States at least in some aspects of the ICBM and IRBM.
- "The Soviet has, in operational aircraft, jet engines with substantially more thrust than any the United States has in operation."

In short, the facts gathered this year were available last year, too. There was no lack then, as there is no lack now, of resolve on the part of congressional inquirers.

Indeed, it was a unique feature of the Symington airpower hearings of 1956-57 that the witnesses started from the lower echelons and proceeded to the higher areas of authority, so that trepidation in testimony would be minimized.

Then, as now, in post-Sputnik 1958, the military leaders of the services and the scientists have not stinted in their descriptions of the needs of adequate defense. It is to their credit that with what they have been given to work with, they have performed so well.

Now and in the critical years ahead, progress toward adequate defense is really a matter of mood, a matter of acceptance by the legislative and executive branches of the need to think in terms of defense ahead of a balanced budget. It is clear that balanced budgets will be of no value to a defeated US.

Thus, at least twice has the Congress gathered information showing it is imperative that we bend greater efforts, that cost alone cannot determine the course of our defense.

The Congress is now doubly armed with facts it has gathered for its own edification. Surely it will act upon them and in response to the growing public demand for stronger defenses in a grim world. Towards that end, perhaps now is a good time to look again at the words of President Eisenhower in his November 13 speech at Oklahoma City:

"To continue over the years just ahead, to maintain the Strategic Air Command in a state of maximum safety, strength, and alert. . . . This means accelerating the dispersal of SAC to additional bases. This work, which has been going forward for several years, ought now to be speeded up. . . .

"Also, with missiles and faster bombers, warning times will grow shorter. Therefore, we have been providing facilities for quicker response to emergency alarm. This, too, should be speeded up—through standby combat crews, more runways, fueling stations, and housing. . . .

"To achieve maximum possible warnings of any future attack, we must carry on additional improvements throughout our warning line that are now scientifically feasible.

"Another need is to develop an active missile defense against missiles. This item is undergoing intensive research and development."

On service pay, the President said:

"The military services are underpaid. We must be fair with them. Justice demands this, but also compelling is the factor of efficiency in our defense forces. We cannot obtain and retain the necessary level of technical proficiency unless officers and men, in sufficient numbers, will make the armed services their careers."

The facts and formulae are on hand. What is needed now is firm resolve to do what must be done.—END

An Economist's View of the

"If the country is worth saving, no expense should be spared to protect it."

Those words are from an intensive study made by SAC's Fifteenth Air Force of the increasingly serious retention problem. More than 30,000 officers and airmen answered questionnaires to supply data for conclusions that again told a story Congress and the Administration have heard repeatedly—that pay *is still the number one key to retention of the skilled personnel needed to maintain an adequate force in being for the defense of our country. Long hours, poor housing, separation from family, all of the disadvantages of service life, although* they too *should be alleviated, could be better tolerated, the respond-*

THE recommendations of the Department of Defense Advisory Committee on military pay, headed by Ralph J. Cordiner of General Electric, will again be under consideration by a special Senate Armed Services Subcommittee when Congress reconvenes.

Let's look at the proposals from the point of view of the taxpaying citizens whose interests are best served by an economically or efficiently managed military establishment. From their standpoint, one criterion for military pay is of predominant importance: within any given military budget, salary scales should be chosen in such a way as to create maximum effectiveness in the military services. With this criterion, salary levels may be judged too high if more is being paid than is necessary for particular skills, and they may be judged too low if not enough is being offered to attract men whose services are needed. In other words, what do the Cordiner proposals do to solve the military's most pressing problem—recruitment and retention, in a competitive economy, of qualified technical personnel?

Pay, of course, is not the only factor affecting the retention. Patriotism and a desire to serve, a sense of purpose and belonging, and a feeling of pride in membership in an outstanding organization are of great importance. In the words of the Cordiner report, "Without basic patriotism on the part of its members there can be no armed forces." But these considerations should not be permitted to cloud the fact that salaries *are* important. Other professions have their moral compensations, too (consider, for example, teaching and medicine), and even the most devoted of military men have families to feed, clothe, and educate. The fact is that unlike patriotism and devotion, *pay can be increased substantially by legislative action.* This is unquestionable.

But the matter of pay does give rise to many misconceptions. For example, the services have queried enlisted men who have decided not to reenlist, in an attempt to determine the various factors affecting their decision. The men are asked to rank a list of factors in order of importance. Plans to go to school, dislike of military life, and dislike of station assignments typically are ranked ahead of pay. From this it has mistakenly been concluded that pay is *not* an important cause of the reenlistment problem and that we must look elsewhere for a solution. Although other factors may be important to enlisted men, *pay can be used* to offset them. Although there is very little that can be done to make military life more palatable to a man who dislikes it, there *are* simple and obvious ways of increasing his pay.

This is related to another frequent misconception. The fact that some men leave the service even though they can earn no more than their military pay in civilian life is often used as evidence that pay is irrelevant. This notion is wrong, too. It is based upon the incorrect assumption that given equal income, most men would prefer the military to civilian life. Actually, considering the added demands and inconveniences of military life, it would not be at all surprising to find it necessary to offer many men *more* pay than they could earn as civilians in order to retain them. This is particularly true now that such large standing forces must be maintained.

A third fact which needs emphasis is that salary differentials *already exist*. The pilot is paid more than the crew chief. The first lieutenant with fourteen years of service receives over half again as much pay as the beginning first lieutenant. In fact, he receives substantially more than do some captains. Bomber pilots receive more than their classmates who remain on the ground. This fact demolishes any argument over salary differentials, since they already exist and there is no question of abolishing them. *The real issue is to whom should the higher salaries be paid.*

And the key to the question is the fact that there are differences in supply and demand conditions in different categories of manpower. The average first-term reenlistment rate for airmen in the highly technical specialties is about twenty-six percent, falling as low as fourteen percent for weather specialists. On the other hand, the comparable rate for non-technical airmen in general is forty percent; for air police, forty-six percent. The wide difference persists despite the already superior advancement opportunities open to the technicians within the Air Force, but it is not surprising. Highly technical personnel are in heavy demand by industry, and those who leave the service can look forward to large increases in their incomes. For non-technical airmen, there is less assurance that they will be able to improve their lot by leaving the service. The services would like to see the positions of the reenlistment rates reversed. Because of the large initial investment in training, the optimum reenlistment rate for technicians is high, whereas in the non-technical areas, high turnover means a younger force which costs less to maintain.

From the supply and demand standpoint the most important objective is obvious. Our goal should be to maximize the combat effectiveness of the services as fighting forces, within the limitations of the budget.

In general, the services or the Defense Department can decide whether the payroll is being divided in the most

Cordiner Recommendations

ents said, if they could be assured of better financial security for their families—a security many would be able to find, to the service's loss, in industry.

Already, there are six bills in the House of Representatives and one in the Senate which cover the Cordiner recommendation for increased pay on the basis of proficiency rather than longevity, and the Administration is expected to submit a bill at the coming session of Congress.

Among other reasons, the simple rules of economic supply and demand for skilled personnel provide a strong argument for the new approach. Following is a compelling case for passage of the Cordiner recommendations on those grounds.

By Alain C. Enthoven

effective way by making conceptual experiments of the following sort: Suppose that slightly less were offered for the services of men in one category. Then fewer of those men would remain in the service, and the over-all effectiveness of the service would decline. Suppose that the money saved were offered to attract more men in another category. If the increase in effectiveness which is contributed by these additional men exceeds the decrease resulting from the loss of men in the first category, then the experiment indicates that the over-all effectiveness of the service could be improved at no extra cost. Hence, the budget has previously not been divided in the most efficient way. If, on the other hand, repeated experiments of this sort indicate that no such improvement is possible, then it is safe to conclude that the personnel budget has been divided in such a way as to maximize over-all effectiveness.

Notice the comparison. We think in terms of only the few men who would be lost because of a small pay cut in one category and the few who would be gained by a small pay increase in another. We consider the contribution toward our objective made by those last few men in the first category, and we relate it to the cost of retaining them or the savings from releasing them. Then we evaluate the improvement in the over-all effectiveness of the service which would result from hiring a few more men in the second category, and we relate it to the cost of buying their services.

Finally, if the contribution of the extra men in the second category is greater in proportion to the cost of hiring them than is the contribution of the last few men in the first category in relation to the cost of hiring them, then we decide to go ahead and reallocate the money accordingly. When improvements of this sort are no longer possible, then it must be the case that the contribution of the last man hired in each category is proportional to the cost of hiring him, and we have achieved an optimum pattern of salary differentials. Responsibility, devotion to duty, and experience are only relevant insofar as they influence the contribution of each individual to over-all military capability.

This analysis and the facts outlined earlier lend strong support to the proposals for differential pay. When there are large differences in supply and demand in different categories, it is wasteful to pay the same salary scales across the board. But this is what the present pay system forces the services to do. Any SAC commander would welcome the opportunity to trade some of his non-technical enlisted men for some electronics specialists, and rightly so. But the present pay system denies him the only method available for doing this in a free country: he isn't allowed to offer the technician more money.

Differentials are only a part of the military pay problem. It is clear that it would be possible to achieve a greater level of military effectiveness by a more rational allocation of the present total payroll. There is also strong evidence to indicate that major improvements in combat capability could be obtained at no extra cost by spending more on personnel and less on other things. *In other words, the present balance between manpower and equipment is wasteful.* If a million dollars now being spent on equipment were spent on personnel instead, we would have a more powerful defense force. And this would be true for many millions of dollars. In the words of General LeMay, "You must have bases and people to properly utilize the equipment. By and large we are not doing that now. We are not operating the equipment we have in as efficient a manner as we could."

An excellent illustration of this point emerged in the testimony of Brig. Gen. Horace Wade before the Symington Committee. In 1955 the over-all reenlistment rate for airmen who maintain SAC aircraft was twenty-five percent. With this force, SAC was able, on the average, to keep sixty-five percent of its bombers in commission. *SAC has estimated that if the reenlistment rate were increased to sixty-five percent, it could keep eighty percent of its bombers in commission. This would be a twenty percent increase in the effective number of SAC aircraft.* In terms of the thirty-three wings of B-47s in SAC, it would represent an increase of more than 6⅔ wings.

These calculations illustrate an important fact. If we take the number of bombers in commission, instead of the total number of bombers, as our measure of real military power, then we have two methods available for strengthening SAC: spending more on personnel and spending more on bombers. By spending more on personnel, we could raise the reenlistment rate in SAC to sixty-five percent and the bombers in commission to eighty percent, thereby increasing the strength of SAC by 6⅔ wings. This would cost millions of dollars. Alternately, we could buy 6⅔ wings of new aircraft and train the personnel to man them. This would cost billions of dollars. Yet the two policies would add the same amount to the combat effectiveness of SAC.

The remarkable fact is that today we are spending the billions for bombers instead of the millions for personnel.

Many such instances of waste could be prevented by more enlightened personnel policies. All of the services are

(Continued on page 41)

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

SEA DUTY—Largest helicopter ever operated from an aircraft carrier is the twin-engined Marine Corps HR2S-1 (Sikorsky S-56), shown here landing aboard the carrier *Valley Forge*. Sikorsky HRS and HSS helicopters, seagoing veterans on a variety of Navy and Marine Corps missions, also flew from the carrier during recent fleet maneuvers off Guantanamo Bay, Cuba.

MISSILE MOVER—Army tests have demonstrated the ability of the big H-37 (S-56 type) to transport missiles, launchers, and support equipment as well as vehicles and other cargo. Here it unloads an Honest John missile. The H-37 normally carries 26 combat troops or about 3 tons of cargo.

FOR EMERGENCIES—Chance Vought Aircraft will use this Sikorsky S-58 for supporting the company's flight program, and for search, rescue, and salvage duties. The S-58 will also be available in the Dallas area for disaster relief and other public services, and will transport high priority passengers and cargo.

SIKORSKY AIRCRAFT
STRATFORD, CONNECTICUT
One of the Divisions of United Aircraft Corporation

experiencing a serious shortage of officers in the four- to fourteen-years' service bracket and a surplus of junior obligated officers with three years or less of service. It should be clear that an improvement in the attractiveness of the "middle years" in the officer's career and an increased amount of selectivity in the commissioning of junior officers would improve the over-all effectiveness of the corps. Too much money is being spent on the recruiting and training of junior officers and not enough is being spent on inducing them (with better pay) to remain in the service. As a result, a great deal of valuable talent and experience is lost to the services.

The experience of all of the services with men completing their first enlistment in fiscal 1956 provides another illustration. The men in this category trained in various aspects of electronics reenlisted at the rate of thirteen percent, twenty percent below the optimum rate from the point of view of a balanced force (once the force has been built up). On the other hand, the first termers in supporting services reenlisted at a rate two percent above the optimum rate. "Supporting services" include vehicle drivers, military police, and food service. It should be clear that it would improve the quality of the armed forces if the personnel budget were reallocated with less being paid to the men in the supporting services and more to the men in electronics.

As previously stated, the Air Force values the services of one bombing system repairman at $15,000 per year. Assume that at the end of their first enlistment, more of this kind of technician were to reenlist in the grade of airman first class. Over the next four years of their enlistment, each would receive an annual base pay averaging about $2,500, or a total of $10,000 in wages. To support each man for four years, it costs the Air Force an additional $10,000. For wages and support of each man, allow $20,000. But each man is worth $15,000 a year, or $60,000 for four years. Subtract $20,000 from $60,000 and you see that there is a difference of $40,000. This is the amount the Air Force gains with each reenlistment. By giving each technician, such as bombing system repairmen, a reenlistment bonus considerably less than $40,000, the Air Force would be able to realize a large part of these potential savings.

A frequent objection to differential pay and to special reenlistment bonuses for technicians is that they would create a morale problem, but, as we know, differentials already do exist between the earnings of men of the same rank, of the same age, and of the same length of service. Yet they have not destroyed the morale of the services. Nor is there any reason to think that a system of pay increases rewarding superior performance would cause any net decrease in service morale. On the contrary, it would tend to improve the morale of just the men the nation should want to reward.

Furthermore, in evaluating the justice of his earnings, the sergeant who repairs radar is as likely to make comparisons with the earnings of civilian electronics experts as he is with the earnings of, say, a man with equal length of service who is a cook.

Finally, a reasonable interpretation of the "morale problem" would be that it is changes in salary levels favoring different people and not differences in the levels themselves which might cause a temporary morale problem. If this is correct, then once the new salary pattern is well established, there is no more reason to think that the morale of men in "soft skills" will suffer because they earn less than men in "hard skills" than because they earn less than bomber pilots.

An objection to higher military salaries in general was raised by the Bureau of the Budget in rejecting the Cordiner recommendations. The Bureau claimed that higher salaries would increase total federal expenditures, thereby promoting inflation. The reasoning is naive. Higher pay would cost more if we were to fail to take advantage of its benefits. The important point is that the total defense budget could be reduced with no loss in combat capability if we would take advantage of the *higher personnel retention* rates and *reduce the training establishment.*

We could have a more powerful Air Force with fewer men and fewer aircraft if the men we had were more experienced and if, as a result, more of the aircraft were combat ready. The mistake of the Budget Bureau is to confuse arbitrary budget cutting with real economizing. Genuine economy in the defense establishment means the achievement of maximum combat capability or military worth at a stated budget level. The Budget Bureau has failed to distinguish between combat-ready aircraft and total aircraft and between fully trained manpower and total manpower.

One of the implications of the Cordiner proposals deserves special comment. Since the end of World War II, our armed forces have included large numbers of amateurs. Most of the young men entering since the war were either drafted or were induced to join by the presence of the draft. The majority of them have no intention of making the service a career. The very low first-term reenlistment rates are ample evidence of this. The fact that so many members of the services regard their membership as temporary and against their wills inevitably has a corrosive effect on morale in general. This amateurism conflicts with the mission of our military establishment as protector of the Free World. Our national responsibilities are heavy, and they will be with us for many years. A task of such gravity and duration is not well performed by an amateur organization.

Furthermore, military technology is becoming more and more complex. Even the infantry uses radar now. The day of the amateur soldier, sailor, or airman is drawing to a close. Patriotism and enthusiasm are not substitutes for technical competence. In these circumstances, we need a truly professional military establishment which will operate with long-run military superiority at low cost as its goal. The Cordiner Committee has proposed a system of rational salary scales that are competitive with industry and which are designed to attract and hold a professional military force. If the United States is to maintain its military superiority in the long run at a reasonable cost, its reforms are essential.

Whether or not we might wish it otherwise, the services have serious competition for manpower. This competition is not a bad thing. On the contrary, competition has a logic of its own. It compels the efficient use of resources. If the price of technicians and executives is rising, it is because the demand for their services is increasing. This is a sign for all employers of these men to use them more sparingly. The appropriate behavior in a competitive situation is efficient behavior.—END

ABOUT THE AUTHOR

Dr. Enthoven is a member of the Economics Analysis Department of the RAND Corp., at Santa Monica, Calif., where he specializes on Air Force problems of weapon system selection. Holder of a Ph.D. in economics from MIT and a Bachelor of Philosophy degree from Oxford, he was also a Rhodes Scholar. He is the author of numerous articles on varied aspects of economics, and public policy questions.

SHOOTING THE BREEZE

WITH THE EDITORS OF AIR FORCE MAGAZINE

An old-fashioned propulsion system in the new-fashioned Space Age is the tandem bicycle being used by A/2C James Siefkin and A/3C Robert Ness of the 28th Air Base Group at Ellsworth AFB, S. D. Not only have they solved their daily transportation problem from quarters to the job, but also they're getting valuable daily exercise by pedaling, in unison, two miles each way every work day.

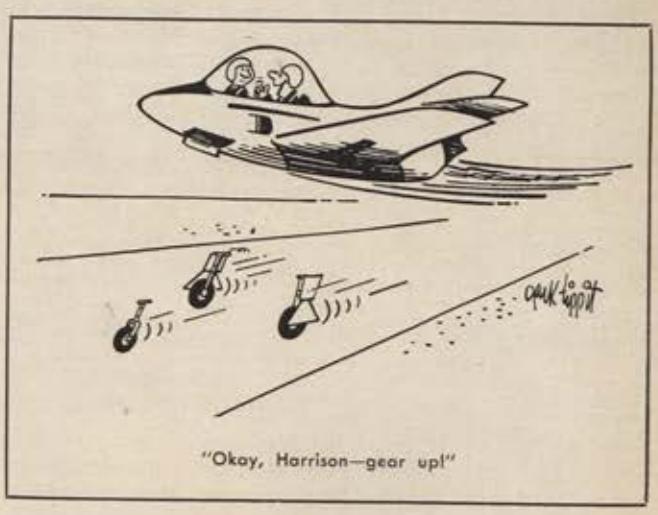
☆

With the flood of Air Force headlines (*see "Airpower in the News," page 16*), we've been hard put to squeeze *all* the stories into AIR FORCE Magazine and make our printer's deadline, too.

A case in point. Just after we closed the "Airpower" column, USAF announced that Maj. Adrian E. Drew, flying a McDonnell F-101A Voodoo fighter-bomber, had broken the world speed record by streaking 1,207.6 mph over a measured course at Edwards AFB, Calif.

The new record was announced at a news conference at which Major Drew received the DFC, presented by Maj. Gen. Chester E. McCarty, 18th AF commander.

The run by Major Drew, which was officially timed by the National Aeronautic Association, broke the British-held record of 1,132 mph set in 1956.



"Okay, Harrison—gear up!"

☆

"One final thought I would leave with you: the rapidity of change in our modern world. There are many examples, of course, but two, one industrial and one military, stand out in the context of what I have said.

"The industrial one is Near East oil. . . . It was this chance discovery, which in the short span of fifty years had a more profound effect on the industrial life of Europe and on world international affairs than had, perhaps, the events of any similar period in modern history. . . .

"The second example, the military one, is our own Air Force. On August 1, 1907, the War Department created an Aeronautical Division under the Chief Signal Officer. This Division consisted of one officer and two enlisted men. Only forty years later that three-man organization had expanded to become the predominant military arm of the United States. Never before in all history has so tremendous a military change taken place in so short a time."

From an address by Rear Adm. Hyman G. Rickover, USN, to the Overseas Press Club, December 5, in NYC.

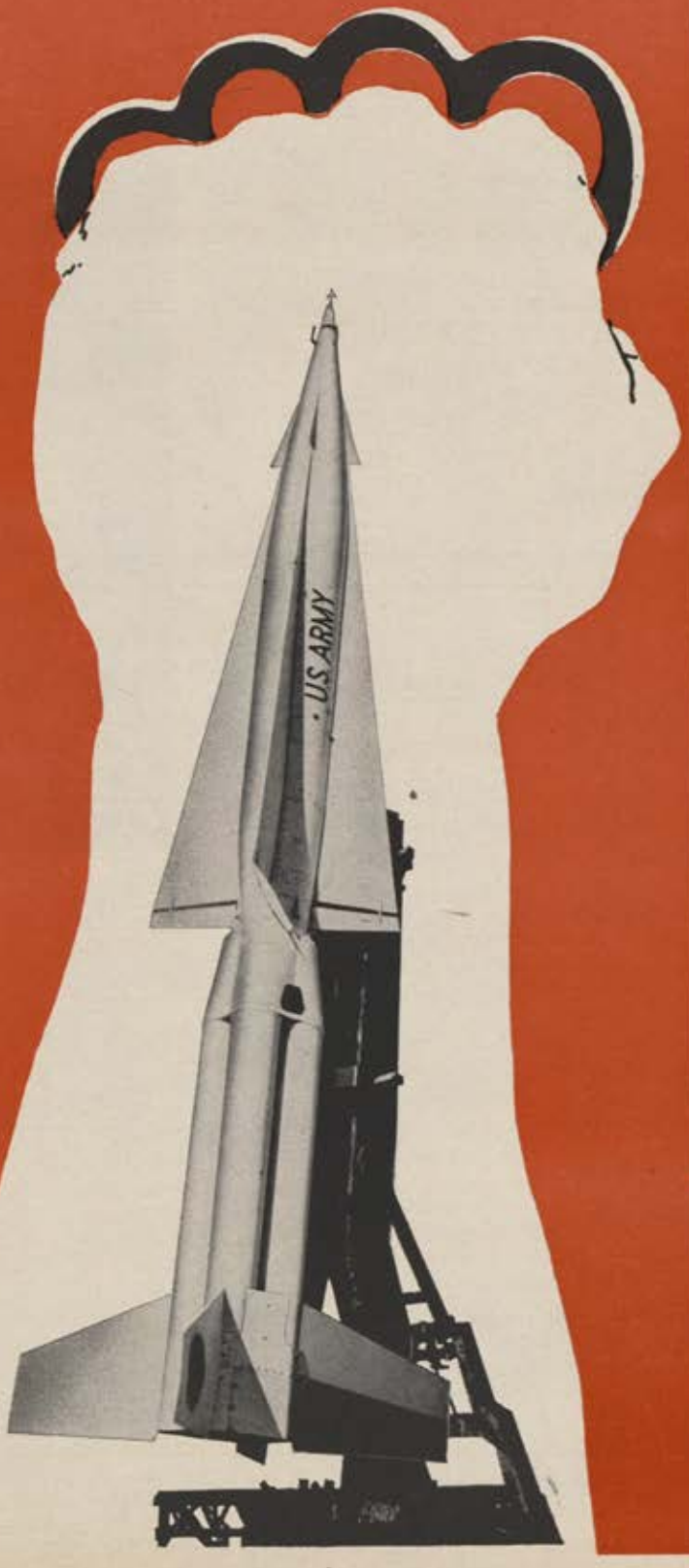
☆

"The energy and perseverance with which he has consistently fought for airpower objectives, his high statesmanship, and his outstanding public service, all combine to make him a most deserving recipient of the trophy."

These were the words from the citation accompanying the award of the 1957 Wright Brothers Memorial Trophy to Sen. Stuart Symington (D.-Mo.), who received the coveted honor at the Wright Day Dinner of the Aero Club of Washington on December 17.—END

A SUNDAY PUNCH FOR DAILY USE!

Army's Nike-Hercules



An Army missile with a lethal wallop, the Nike-Hercules will deliver a knock-out blow to enemy air aggression—Sunday and every day, around the clock. Nike's knuckle-duster is its warhead—loaded and tested, developed and delivered by Aerojet-General's Explosive Ordnance Division.

Aerojet-General

CORPORATION

A Subsidiary of The General Tire & Rubber Company

THE GENERAL TIRE

AZUSA AND SACRAMENTO, CALIFORNIA

U.S. ARMY PHOTOGRAPH

he 'triggers off' the BIG ONES!

The push of a button . . . a roar that shakes the earth . . . and another giant missile rises smoothly on a cushion of flame to heights beyond the range of human vision!

where

AC

fits in this picture

An almost impregnable blockhouse at Cape Canaveral, Florida, protects one of the most complex assemblies of electro-mechanical equipment ever assembled, and the men who operate it. Their purpose—to launch and study in flight the missiles of the ICBM, IRBM, and "Air-Breathing" Missile Programs.

Here, the greatest missile experts of the free world gather as the count-down begins. The air becomes electric and the tension builds to an almost unbearable pitch as the moments slip by. Finally, firing time arrives. The weird iron skeleton surrounding the missile is wheeled back. The missile itself, an enormous white pencil, is left standing alone. The blockhouse is sealed . . . the area cleared . . . and the final seconds tick away as an impersonal voice calls off the count. Within the blockhouse, a hundred eyes watch television screens and study the maze of instruments which record invaluable data from every second of flight. Suddenly the first flames lick out, and the earth trembles as the missile rises slowly from its firing pad . . . streaks straight up and out of sight with only the ponderous thunder of its engines to remind you that what you saw is real.

What is AC's role?

AC's part in this tremendous project is to produce an inertial guidance system capable of directing missiles on their course over tremendous distances and with fantastic accuracy. This system, known as the AChiever, has proved its ability to withstand the tremendous shock of launching and to operate within required limits under all the conditions to be found within a missile in flight.

AC engineers together with research groups in American universities, scientists in industry, and in our armed forces, form a team whose responsibility it is to design, test and produce operational missiles. Today, the AChiever stands ready—fully capable of directing a missile to a target anywhere in the world—or far out into space. It is entirely self-contained and independent. Nor can it be affected by man-made interference—electronic, radar or infra-red.

If you are an engineer with electronic or mechanical experience and feel you could contribute to this program—and, if you are not now in the armed forces—write the personnel section of AC in Milwaukee.

AC ✿ THE ELECTRONICS DIVISION OF GENERAL MOTORS

PHILLIPS SOLID PROPELLANTS CAN BE LONG-BURNING!

Phillips accomplished an important scientific breakthrough with the design of a new type of solid propellant rocket motor capable of firing durations in excess of *eight minutes*.

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Other significant Phillips achievements in this field include . . . the design and manufacture of the highest thrust single solid propellant motor known, and the development of numerous high-performance pusher, booster and auxiliary power rockets for aircraft, supersonic sleds and long-range missiles. Some of Phillips most interesting current projects are in the gas generator field—both military and commercial applications. You will find that Phillips research, development, production facilities and hardware all have one thing in common . . . *a high degree of capability*.

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Or call one of our regional representatives: Washington, D. C.—E. L. Klein, EXecutive 3-3050; Los Angeles—R. O. Gose, GRanite 2-0218; Dayton, Ohio—C. W. Strayer, AXminster 3-3263.

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AIR FORCE
JANUARY 1958

USAF Doctrine and National Policy

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

AIR Force doctrine is a much-maligned topic. The Air Force has so recently achieved its full stature as to be something of a doctrinal mystery in comparison with the older, more familiar services. As a result, there is insufficient public knowledge of the facts to support casual analysis of bed-rock Air Force doctrine.

This produces such handy—but inaccurate—tags for the Air Force as being "believers in obliteration"—having no finesse for local war, should one be thrust upon us—lacking appreciation of likely political constraints—and a host of others, in similar vein.

Let me make one thing crystal clear. Air Force doctrine is not a thing apart nor a code sufficient unto itself. The Air Force is a national instrument and evolves no doctrine, makes no plans, and makes no preparations other than those clearly and unmistakably called for or anticipated by the national policy.

Despite this fact, bits and pieces of studies, guesses, and, most of all, *capabilities* get tagged as doctrine.

There are a lot of things the Air Force *could* do—but these capabilities are not Air Force doctrine.

We are sometimes *asked* what we *could* do—and a complete answer includes the capability to destroy the Soviet Union. But this does *not* mean that the destruction of the Soviet Union is the basis of Air Force doctrine and the answer to all the evils of this troubled age.

Air Force Doctrine

So much for what Air Force doctrine is *not*. Let us look briefly at what Air Force doctrine *is*. I believe this doctrine is wholly responsive to the primary aim of serving the national policy.

- The Air Force must serve to advance the national policy.
- Victory in military operations is not an end in itself but a means to an end. Success is measured only by achieving specific military objectives in support of national policy.
- Military force can deter, persuade, neutralize, deny, destroy, or capture.
- The greatest service military forces can perform, in peace or war, is to provide a deterrent atmosphere in which the US, working in close teamwork with its Free World allies, can exercise a compelling initiative for peace and justice in world affairs.
- Air forces can directly affect all components of the

(Continued on following page)

enemy's strength, from individual forces to whole populations.

- The basic determinant of success in air operations is not the weight of effort or the amount of destruction—it is the degree of contribution to the desired national objectives.
- Air operations have no geographical limit.
- Air operations achieve preeminence in national defense because their versatility, with or without armed conflict, and immediate worldwide *capability* can produce a wide variety of desired results.

Key Issue: Air Force Doctrine in Local War

There is general agreement that this doctrine is responsive to the national policy when the issue under discussion is general war. The key deterrent role of nuclear airpower is recognized by the US government, by the American people, and abroad.

It is in the local conflict area that the Air Force is suspect. We believe, however, that Air Force doctrine is ideally suited to the military implementation of national policy in local war as well as in general war.

The Air Force believes that much of what has been written and said about local war lacks only critical measurement against political, economic, and military reality to make the kind of lasting sense that permits unified progress in solving problems.

National Policy

Simply stated, the national policy in local war is, first, to deter conflict, and second, failing that deterrence, to cope with it successfully. The degree of "success" to be achieved involves a wide range of possibilities. We here, can assume that this "success" ranges from diplomatic protest and moral condemnation at the most moderate end of the scale, upwards through destruction of the attacking forces, to actual punishment of the basic strengths of the aggressor. In actual practice, the punishment would be made to order to fit the crime.

To complete the policy picture we must add a qualifier.

I believe we agree that the policy of *any* nation, especially in the nuclear age, demands that, if conflict *must* be waged, it be done so as to invoke the least risk of aggravating the conflict into general war.

In the successful resolution of conflict this requirement ranks second only to the preservation of national security.

The basic principles which guide planning for local conflict, so as to invoke the least risk of general war, are these:

- The *rapid* application of force—in hours, or days, not weeks, months, or years.
- The *resolute* application of force—enough, neither too little nor too much.

These principles call for a military capability, *within* and not separate from or in addition to total US forces, which is *instantly* ready, flexible, and selective, including nuclear firepower.

The essentials of the national local war strategy in no way present either a conceptual or practical problem within the Air Force. We believe in this strategy. We do not believe it requires change to assure US security.

As a corporate body, the military establishment wholly agrees with this national strategy.

So, with the tasks of, first, deterrence and second, favorable resolution in mind, let us now examine the essential elements of each task in an effort to visualize the specific types of forces required to perform these tasks.

Elements of Deterrence

An examination of the first task—that is, the military contribution to deterrence—hinges on these generally agreed essentials:

First, adequate armed force.

Second, manifest determination to use that force.

And last, the aggressor's belief that the force and the determination exist.

The first of these, adequate armed force, is an immediate temptation for discussion of size, shape, and capability. Let us postpone that for the moment. I will return to it later.

Determination

This, then, brings us to the requirement for determination.

The determination I refer to, in the local war context, is not that which would emerge, spontaneously, as a result of surprise attack on the United States. It is the governmental determination to risk American lives, in resolution of a conflict which may not attract unanimous US or international public approval in advance.

The United States is *determined* to halt aggression. This determination must be manifest if we are to deter the aggression in the first place.

What foundation is there for this statement?

The foundation for American determination to deter or halt local aggression is an awareness that small conflicts, unresolved, can provoke larger conflicts and increasing dangers. Additionally, appreciation of the possibility of piecemeal defeat, or defeat by default, is a growing concern in the official consciousness to a degree which calls for the measurement of *any* aggression against United States security.

The global coverage of news, the wide awareness of political, economic, and psychological factors, the diminishing credence given the isolationist—*all* of these combine to spotlight distant, seeming remote, aggression and cause its immediate examination in the light of ultimate, as well as immediate, US security interests.

Add to these factors our commitments by treaties and agreements the world over and there is a firm foundation for real determination to resist aggression.

It is said that the enemy will seek out instances where our determination is at its weakest, where the issues are too small or too vague, where conditions will mask the real issue and handcuff our will to resist.

This is most likely and, at the same time, increasingly difficult for the enemy. The US is now aware of, or interested in, *or involved in*, the affairs of the nations of the globe, to an unprecedented degree. The enemy will be increasingly hard put to mount overt aggression without provoking US response.

These circumstances spell a determination to resist remote aggression which is new in American history.

There are many factors alleged to be sapping this determination.

It is said, for example, that the very prospect of having to use nuclear firepower against aggression will inhibit US determination to act with resolution.

I believe that the prospect of sending American manpower, armed only with TNT weapons, against remote aggression would most seriously inhibit US determination. It is apparent that dependence on outmoded elements of force, to the exclusion of nuclear firepower where this capability is needed, would be suicidal in this day and age.

Belief

The third requirement (that the probable enemy be convinced of the existence of adequate US force and determination) amounts to the degree of "belief" we can achieve.

The belief we must establish in the enemy's consciousness is not that a military commander would fight to preserve an advanced position, but that the US government would order the use of sufficient armed force, quickly, in the case of overt aggression.

I believe that there *is* firm and growing US determination to resist aggression, and that this determination *is* credible to the potential aggressor.

This state of affairs is relative and not fixed. Determination and the resulting credibility will not automatically grow stronger, but must be nourished.

The USAF believes there is a clear obligation to assist in the nourishment of this determination. *We* must do so by providing, within the resources given us, a key element of the armed force needed for the quick and resolute application of the required national effort.

Adequate Armed Force

You will recall that I named the three requirements of deterrence as being adequate armed force, determination, and belief. I have discussed the last two of these first, and now return to the subject of armed force.

This I will discuss from two standpoints:

First, adequate armed force in deterrence; and

Second, adequate armed force in successfully resolving local conflict.

I do so, because there may be a decided difference between adequate *deterrent* forces and adequate *fighting* forces, in local conflicts, depending primarily on the political objectives established.

Adequate Deterrent Force

I previously indicated that the Air Force considers that offensive nuclear force deters local conflict. This does not mean that there never has been nor ever will be local conflict *in spite of* the nuclear deterrent.

There has been local conflict through all of recorded history.

But how much *more* local conflict, how much more *serious* local conflict, would there be were there no nuclear deterrent?

The real deterrent to significant local conflict is nuclear firepower. The whole of this firepower is our general war deterrent. That portion of this firepower, up to the total necessary to achieve resolution, is the adequate force for local warfare.

It is the Air Force view that, just as nuclear delivery capability constitutes an agreed deterrent to general war, so can this total firepower deter local war. The right *measure* of this total firepower can, in turn, resolve local conflict if we fail to deter the aggression.

Adequate Force for Conflict

What, then, is the right measure of force for local conflict?

Too often the assumption is made that the Air Force considers total nuclear force as the sole and proper instrument for successfully resolving all local conflict.

We have no doubt that total nuclear force *would* resolve local conflict, were the need solely one of guaranteed delivery of overwhelming force. But this is not always the issue in local conflict, as it is in general war.

The Air Force does not propose that SAC be unleashed in response to a minor emergency.

On the other hand, if there is *significant* local conflict, requiring the rapid, sure, all-weather delivery of calculated force to warn, repulse, or destroy, then one aircraft or two or ten could strike.

Tactical aircraft could strike alone or in concert with SAC.

Navy aircraft could strike; Army or Marine troops could be required to separate the combatants; Air Force or Marine aircraft could support these troops—in short, the full range of US capabilities will be available, and must be used—promptly and effectively—as needed.

Minor conflicts are possible in which *no* airpower would be required. Certainly such conflicts could be resolved with the minimum diversion of essential general war strength.

This is precisely the difference between adequate armed force in deterrence and in *use*. We *deter* with our total capability, including all lesser facets thereof. We will elect *to use* that portion required and best suited to the resolution of the particular conflict.

Examples of Adequate Forces

There are specific examples to document the deterrent aspect of the total offensive nuclear force—and to illustrate the selective use of armed force, from within the general war capability, to actually resolve aggression.

In NATO, where an attack on one is an attack on all, the total nuclear offensive force is a deterrent to local aggression. There are many factors at play in this circumstance, but the fact is that this is an area where aggression involves more than just *risk* of general war. General war forces, characterized by elements both in place and behind the scenes, are in deterrent posture against local aggression. The North Atlantic Alliance is a concrete expression of the determination which instills belief and is, in essence, deterrence.

Look now to the situation in the Far East, and ponder whether aggression there involves identical circumstances. Clearly, there is less *risk* of general war in some underdeveloped areas. But there *is risk*, and to the degree that there is risk then so do general war forces deter conflict.

For another example of adequate armed force in deterrence, look to Korea. It is clear that the Communists intend to possess the Korean peninsula. This they tried to do and failed. We have rebuilt the South Korean armed forces into a relatively large military establishment.

The United States has also declared that in the event of renewed aggression the conflict might not be confined to Korea. The forces required are, therefore, more than just those on hand in Korea and certainly less than those required to cope with general war.

From this examination we conclude that serious conflict inspired by the USSR cannot be deterred without adequate general war force. We also see that the total deterrent force need not be the force used in local conflict.

Local War Concepts

For some time now there has been discussion on the use of nuclear weapons in local conflict. Opinions vary but these sentiments have dominated, not necessarily in this order nor in these exact measures, but along these lines:

(Continued on following page)

First, local war *could* spread into general war. (I believe this is a reasonable statement. It is dangerous when it becomes an axiom, to the effect that *all* local wars *will* spread into general war.)

Second, nuclear weapons *could* promote the spread of local war. (This too is a possibility—but it does not mean that nuclear weapons *will automatically promote* the spread of local war. TNT weapons could also promote the spread of local war. In both cases it depends on how, where, and when they are used.)

Third, some local wars can be fought without using nuclear weapons. (We agree that there could be local wars not requiring nuclear weapons. If the conflict is so small as to obviate the need for the balancing power of nuclear weapons, then the US certainly has the capability to handle the conflict. But this is *not* the same as saying that *all* local wars *can*, *must* or *should* be fought without nuclear weapons.)

What does the national policy have to say of this?

In a recent expression Secretary Dulles went into some detail to explain the difference between massive retaliation and the use of nuclear weapons. He indicated that the use of nuclear weapons in local conflict "need not involve vast destruction and widespread harm to humanity. . . ." Hence, ". . . it may be possible to defend countries by nuclear weapons so mobile, or so placed, as to make military invasion with conventional forces a hazardous attempt."

This is precisely the view the Air Force holds and has made careful preparations to implement. The military establishment as a whole has done likewise. It is axiomatic that the delivery system best suited to the nuclear delivery problem should be used in local war.

Mr. Dulles, in the same context, turned the problem around, as the Air Force in fact sees it to be, when he said: "Thus the tables may be turned, in the sense that instead of those who are nonaggressive having to rely upon all-out nuclear retaliatory power for their protection, would-be aggressors will be unable to count on conventional aggression, but must themselves weigh the consequences of invoking nuclear war."

Lest there be any lingering doubt as to what the Air Force considers to be the "mobile nuclear weapon" to which the Secretary of State referred, let me say that nuclear weapon delivery by aircraft is the best delivery system *now* available. Missile delivery systems will not achieve equal mobility in the immediate future—no other delivery system has it today nor has it in the offing. When missiles have this mobility, as a practical matter, or achieve the needed flexibility, you can be sure they will be in the military inventory.

Add to these statements such facts as these: the gradual revamping of traditional US military force since World War II, with emphasis on technology, not on manpower; the tremendous strides in all services toward nuclear capabilities; the *conventional* tag now placed on nuclear weapons themselves. Add these, and the many other signs, and it is apparent that, if we are engaged in conflict requiring nuclear force for resolution, *even limited resolution*, then nuclear force, adapted to the need, will be used. That force, in adequate measure for local conflict, is presently available. I trust that it will be maintained.

The following question now arises:

"But what about our allies; will they welcome defense by nuclear weapons?"

This is a valid question. But the overwhelming indication from our allies has been to the effect that they fear Communist domination more than they fear nuclear defense. In NATO, there has been a realistic appraisal of the role of nuclear weapons. True, the context is general rather than local war, but if paralyzing fear of nuclear defense were in the ascendency it would be evident.

This is not to say that any ally or for that matter any individual *wants* to use nuclear weapons. It is to say that most allies *and* individuals want to self-determine rather than bow to Communist rule.

I have heard reference to an alleged fear by our allies of nuclear weapons. I sense, on the contrary, that our allies dread failure to use the *required force*, whatever it may be, in their defense.

The Secretary of State recently commented on this subject, saying, "However, as nuclear weapons become more tactical in character and thus more adaptable to area defense, there will inevitably be a desire on the part of those allies which are technically qualified to participate more directly in this defense *and to have a greater assurance that this defensive power will in fact be used.*"

Local War Conventional Forces

At this point, it is natural to wonder whether it would not be safer to maintain adequate armed force *without* reliance on nuclear weapons. The affirmative conclusion usually is that "if the US is not to court defeat in the process of upholding its rights, it must make available to the armed forces an ample measure of conventional as well as nuclear power."

I hesitate to comment on this conclusion in less than full detail and yet it should not stand unexamined.

I would ask these questions:

- Has anyone accurately defined "ample conventional power," counting the whole Free World, and measuring likely requirements, with such precision as to deny its existence in our present military establishment?
- If "ample" is significantly more than what is on hand, does this mean we must match the Communist Bloc man for man, machine for machine, while we maintain the essential total nuclear offensive capability and simultaneously advance into the missile and the space era?
- Assuming this or something similar to be the requirement, is such a force achievable in peacetime in the US—economically? Politically? Is it feasible in the United Kingdom? In other countries?
- Assuming this requirement *is* intended and assuming it *is* feasible, is it *really* necessary? Would it alter the balance of power and bring the Communist Bloc to a more reasonable and less aggressive position?
- For how long could we maintain this posture and preserve our institutions and way of life?
- By "ample conventional" power are we holding to the past and ignoring the present-day *conventional* aspect of nuclear power? Are we attempting to deny progress? Progress in destructive firepower to be sure, but *military* progress nevertheless.
- Would not the existence of this so-called conventional power, evidently presumed to be comparatively "safe" to use, promote conflicts which nuclear power has deterred?

The answers to these and other questions do not convince me that it is necessary, wise, or feasible to have two tremendous capabilities to ensure survival in the nuclear-space age.

At least one last ghost requires examination.

I refer now to the fact that in the years since World War II there have been numerous small wars in which the Communists have been involved. From this fact is deduced the conclusion that nuclear strength did not prevent

aggression in Korea, Greece, and Vietnam. The implication is left that nuclear strength cannot deter aggression.

These wars have occurred. But I would turn the implication inside out, and ask whether they would have occurred had the US established belief in our determination to use nuclear strength or even our determination to intervene militarily with conventional weapons? Would these wars have run their painful courses had nuclear strength been involved?

Examples of Adequate Local War Forces

It now follows that we delineate adequate armed force, not as a deterrent, but in terms of actual use, once the deterrent has failed.

With the knowledge that political objectives will dominate, that the least force required will be utilized, and that once the decision to engage is made, then *adequate* force, not inadequate force, will be selected, I believe we can roughly illustrate its composition and characteristics.

To do so we must look ahead, with our central purpose in mind. The ground rule is laid down for us—to deter conflict in the nuclear age; failing deterrence, to resolve it without provoking general war.

The Air Force has examined possible areas of conflict in minute detail in recent months. We have studied these areas in terms of conflict in 1958 or 1960. We applied limitations to the assumed US national objectives and assumed that these conflicts were to be conducted with the *minimal* aim of restoring the *status quo ante bellum*. That is, not to defeat or destroy the aggressor nation but to end the aggression. This assumption makes the military task more delicate, and this is precisely why it was made. This is not to say that such a minimal aim is or is not desirable.

We looked at enemy forces and the entire range of US capabilities. From those studies we derived conclusions in the local war area.

One conclusion emerged paramount.

Airpower is essential in rapid, selective, and effective response to significant aggression.

Rapid, effective response to aggression is needed or else the aggression will have succeeded, and the *fait accompli* will be impossible to undo.

There are related conclusions. The first is that air-delivered nuclear weapons are essential to give the allied response rapid and resolute strength where significant aggression is involved.

Were TNT weapons to be used it could be a matter of years before sufficient forces could be built, brought to bear, and take effect. All of this would be defense of an ally, not by limited nuclear means, but by full-scale attack in the face of determined air opposition over a period of years, *after* the aggression succeeded. The suffering involved would be indescribable. The American investment in lives, resource, and effort would be tremendous. Were this our only recourse I suspect the result would be early capitulation by our allies in the absence of any hope of relief before the fact.

Instead, in a matter of hours, without unacceptably straining our deterrent to general war, it should be possible to bring to bear land, sea, and airpower so as to immobilize or destroy the invasion forces. Such ground forces as are required in this effort should be largely available in the indigenous forces of the countries concerned. Not ground forces to *defeat* major Communist assault, but forces adequate to force recognition of aggression and to give coherence and unity to the legitimate governments seeking Free World assistance.

We derive these additional conclusions:

- Air Force requirements in any likely local war situation can be met with forces provided for general war purposes *under existing* conditions. Any further curtailment of Air Force resource may alter this conclusion.
- The almost infinite variety of possible local war contingencies require tailoring our effort in the light of the specific situation and the resultant national objective. No pre-tailored force, pre-conceived and prejudiced to a planned task, can give us the flexibility to help resolve minor disputes, assist in guerrilla warfare, intervene between contestants, or conclusively halt larger aggressions. Instead, we will have to select and perhaps even adapt a portion of our joint and allied general war capability and use it as the political requirements dictate at the time.
- The Air Force has in being varied forces to meet, in conjunction with US, indigenous, and allied forces as necessary, the national requirements for airpower participation in any likely local war situation. These forces include:

(1) The in-being forces now deployed overseas with both tactical and strategic capabilities. As time goes on these forces may diminish in number as their capability is improved, including missile firepower. For the present, the capability of these forces and their physical presence serves the national policy, makes the total deterrent more credible to friend and foe alike, and lends the vital nuclear authority to deployed and otherwise unprotected conventional forces.

(2) Additionally there is the Tactical Air Command in the US, which can redeploy rapidly by air and is otherwise prepared to participate without prior notice in local war and to deliver the mobile selective firepower the Secretary of State referred to. Although all tactical forces are trained for rapid deployment, as reserves, backup, or as a strike force, a special segment of Tactical Air Command specializes in this business. This segment of tactical airpower is alert, mobile, and in constant maneuver to improve its worldwide deployment capability. We have flown this force across both oceans.

(3) Finally, there is the Strategic Air Command, in the US, overseas, and constantly on the move. SAC is prepared to participate in local war situations, from general war positions, to the extent and in the manner required by our national objectives.

These Air Force power elements at home and overseas are equipped to deliver minimal or maximum firepower with precision, day or night, in any weather, with a speed of response unparalleled heretofore. Missiles are being integrated into this force as a matter of priority.

I ask you to reflect on the national policy as I have described it and as I now review its characteristics briefly:

First, to deter *all* conflict, principally general war.

Second, to resolve local conflict, quickly and resolutely, so that it will have the least likelihood of developing into general war.

Third, to use nuclear firepower where needed and in a manner best suited to the objectives at the time.

We believe that Air Force doctrine is in accord with the national policy, is in fact in anticipation of that policy, and has a force molded to its military implementation with full consideration of the political requirements that are involved.—END

The foregoing article was slightly condensed from an unclassified version of a speech by Gen. Thomas D. White, USAF Chief of Staff, before the meeting last month of the USAF Scientific Advisory Board. The meeting was held at Chandler, Ariz.

Top Cover for America . . .

Landings aren't easy in rugged Alaska. Here a C-124 starts uphill on the Sparrevohn runway. Pilot had to complete downhill run at runway start in background.

Symbol of Alaska, the totem pole at Elmendorf AFB entrance, favorite photo subject for Alaska-based airmen.

IN THIS age of afterburners and A-bombs, an attack against the US —when and if it comes—may well be launched along the Arctic air lanes across the top of the world. This deep-freeze segment of the Great Circle Route offers an attacker the planet's shortest aerial highway between Communist soil and the North American continent.

It is appropriate, then, that in Alaska, where a strong-armed pitcher could very nearly lob a baseball into the Red outfield, Air Force Gen. Frank A. Armstrong commands the joint defense operation.

To air-minded Alaska the fact is as logical as salmon in the smokehouse. The airplane has a long and honored history in the Territory.

One element of the joint Alaskan command is the Alaskan Air Command headed by Brig. Gen. Kenneth H. Gibson (*see Photochart*), which has a threefold mission: furnish early warning of any aggressor attack aimed at the continental United States; defend Alaska and all its holdings in the air; and provide a launching platform for retaliatory Strategic Air Command bombers. It's a mouthful of mission.

Compounding that mission are the

ALASKAN AIR COMMAND

By T/ Sgt. James R. Doherty

forces of nature. Alaska, about one-fourth the size of the US, lies in the shadow of the polar weather factory. In season, Arctic-spawned storms send the mercury tumbling to abysmal depths in the Territory's interior, where temperatures of from fifty to sixty below zero are not uncommon.

Winter cold is only one problem. Alaska's terrain is another. By all odds, AAC pilots fly above some of the world's most rugged real estate. They range a coastline longer than that of the continental US—one that borders a land area of 586,400 square miles.

It is a country of contrasts. In or near Alaska are the highest mountains in North America, a glacier larger than Rhode Island, lush, forested lowlands, tundra plains, islands, and ice caps. Its rugged citizens own and fly more airplanes per capita than the residents of any other comparable area on the face of the globe.

Alaska is one of America's last frontiers. And the airplane is to the Territory what the covered wagon was to the old West.

An early aerial trail blazer was Col. Carl Ben Eielson. With Sir George Hubert Wilkins, noted Arctic explorer, Eielson is credited with the first flight from Alaska to Norway, over the Pole. Eielson AFB, the sprawling AAC installation near Fairbanks, is named for him, a tribute to the former North Dakota schoolteacher.

Gen. "Hap" Arnold was another who early realized that the future of Alaska was tied to prop hubs and tailwheels. In 1941, he ordered into existence the forerunner of today's giant Arctic test center at Ladd Air Force Base, a stone's throw from the heart of Fairbanks.

But as late as 1940, strategically important Alaska was still devoid of anything resembling a first-class air base, and was still the recipient of military hand-me-downs from stateside planners. That was the military status of Alaska on the eve of Pearl Harbor.

Then Japan's invasion of the Aleutians dramatized Alaska's vital position. In 1942, the enemy occupied Kiska and Attu, a couple of bleak rock outcroppings at the tip end of the Aleutian Chain. This was assumed to be the extension of Japanese aggression into North America, an action that overnight triggered the establishment of the Alaskan Defense Command.

The Alaskan Defense Command was a hurriedly organized assemblage of ground, sea, and air might. Its latter arm, the Eleventh Air Force, went into action almost before the ink was dry on its unit general orders. Operating from such places as Cold Bay, Umnak, and Shemya, the Eleventh's B-26s blasted the possibility of the Japanese using the Aleutions as stepping stones to the mainland.

The war made one fact distressingly clear: aircraft could fly with remarkable ease from Alaska to Russia across the forty-mile-wide Bering Strait. With scarcely a mishap, hundreds of lend-lease fighters were ferried from Nome to Siberia by Soviet pilots.

On December 21, 1945, the Eleventh Air Force passed from the northland scene. In its stead, the Alaskan Air Command, with headquarters at Davis Air Force Base on the island of Adak, came into being.

In AAC's twelve-year history not much more than the name has remained the same. Today, AAC headquarters are at Elmendorf AFB, near Anchorage. In 1940 Hap Arnold referred to Anchorage as the "village of 3,200 souls." The 1956 census shows that upward of 100,000 now live and work in the Greater Anchorage area. The growth of Alaskan Air Command has been almost as meteoric. Frequent reorganizations, fighter conversions, and a continual expansion program have characterized AAC history. Current strength is about 17,000 uniformed personnel. In addition, the command employs 2,800 Territorial civilians. This in an area where the total population figure falls considerably short of the quarter-million mark.

From his Elmendorf headquarters, General Gibson commands a complex of two air divisions, and nearly 100 Aircraft Control and Warning (AC&W) stations, DEW Line sites, and White Alice installations. The last are units of the far-flung Alaskan Communications Network, operated by the Federal Electric Corporation, but Air Force-supported.

First AAC commander, Brig. Gen. Edmund C. Lynch, now retired, was succeeded in 1946 by Lt. Gen. Joseph H. Atkinson—now Commander, Air Defense Command—who gave way in 1948 to Lt. Gen. Frank A. Armstrong. A "sourdough" by inclination, General Armstrong found Alaska to his liking. After a two-year stint as AAC Commander, he went to SAC, but has since returned to the Territory, and now serves as Commander in Chief, Alaska, heading up the joint operation in which AAC is a member with the Army and Navy.

Maj. Gen. William D. Old succeeded General Armstrong at AAC in 1950 and served two years in the Territory, retiring a short time later. He was followed by Maj. Gen. George R. Acheson who held the post until 1955, when Maj. Gen. James H. Davies took over. General Gibson, who won his wings at Kelly Field in 1936, assumed command last summer.

It was an inauspicious time to be picking up the reins. There was much talk of cutbacks; the command was slated to undergo another aircraft conversion; problems were plentiful. But tall, graying General Gibson was no stranger to the new and untried. A seasoned combat pilot, he had served in China and India, the South Pacific and the Aleutians—and had held his share of Pentagon posts. As project officer for "Operation Crossroads" he helped split the atom at Bikini and later headed ADC's 8th Air Division at McClellan AFB, Calif.

General Gibson ordered an immediate streamlining of his new command.

As it had in the past, Alaska's vastness and natural geography dictated a new alignment of AAC forces in the face of changing needs. The scope of its responsibility still encompassed all mapped reaches of the Territory, and now they included the 1,000-island Aleutian Archipelago and a number of other pinpoints of land sprinkled along the International Dateline. As always, defense responsibility for the large island of Kodiak was held jointly with the sea-air forces of the Navy.

(Continued on following page)

The ALASKAN AIR COMMAND

Hq., Elmendorf AFB, Alaska

Commander
Brig. Gen.
Kenneth H. Gibson

Chief of Staff
Col. Louis W. Proper

Adjutant
Lt. Col.
Jack A. Brown

Commandant, Hq. Sq. Section
Maj. Jimmie Wax

DCS, Comptroller
Col.
Wendell E. Carter

DCS, Materiel
Col.
Charles W. Coleman

DCS, Operations
Col. Louis E. Coira

DCS, Installations
Col. Francis R. Hoehl

DCS, Personnel
Col.
George R. Goodwin

Staff Judge Advocate
Col. Ellison
S. C. Summerfield

Surgeon
Brig. Gen.
John R. Copenhaver

Staff Chaplain
Col. Martin C. Poch

Director, Integrated Communication System, Alaska
Col. Victor H. Wagner

Chief, Office of Information Services
Maj.
Francis H. Dawson

Inspector General
Col. Cletus Wray

Staff Weather Officer
Col. Robert F. Long

Asst. Chief of Staff, Intelligence
Col. William B. Taylor

Commander
Col. John T. Shields

Commander
Brig. Gen.
Conrad F. Necrason

An AIR FORCE Magazine Photochart
CORRECTED AS OF NOVEMBER 20, 1957

Hq., 10th Air Division (Defense) Elmendorf AFB, Alaska


Inspector General
Lt. Col.
Gale S. Glenny


Executive Officer
Lt. Col.
William P. Rupert


Information Services Officer
Capt.
James L. O'Leary


Provost Marshal
Maj.
Howard J. Musgrave


Judge Advocate
Lt. Col. John F. Bell


Surgeon
Col. Emmert C. Lentz


Comptroller
Lt. Col.
Lawrence T. Myers


Deputy Commander
Col.
Donald W. Graham


Director of Personnel
Col. John F. Fletcher


Director of Operations
Lt. Col. Jack C. Price


Director of Materiel
Lt. Col.
James R. Root


Commander, 5040th AC&W Group
Lt. Col.
Richard E. Bynum, Jr.


Commander, 5040th Air Base Wing
Col.
George J. La Breche


Commander, 31st Fighter-Interceptor Squadron
Maj.
Robert W. Casey


Commander, 317th Fighter-Interceptor Squadron
Lt. Col.
Walter O. Beane, Jr.


Commander, 5040th USAF Hospital
Col. Emmert C. Lentz


Chaplain
Maj.
Harry P. Henderson


Inspector General
Lt. Col.
Robert B. Short


Information Services Officer
Capt.
Ralph C. Evans, Jr.


Safety Officer
Capt.
Rexford W. Parfitt


Judge Advocate
Maj. John J. Ensley


Surgeon
Col.
Carlos C. Alden, Jr.


Adjutant
Maj. Vitalis I. Cole


Provost Marshal
Maj.
David F. Strohm


Deputy Commander
Col.
Lewis W. Stocking


Director of Personnel
Lt. Col.
Stephen Sukovich


Comptroller
Lt. Col.
George L. Colley


Director of Operations
Col.
Thomas J. Classen


Director of Materiel
Lt. Col.
Robert L. Cox

Hq., 11th Air Division (Defense) Ladd AFB, Alaska


Commander, 5010th Air Base Wing
Eielsnn AFB, Alaska
Col.
Anthony G. Hunter


Commander, 5060th Air Base Wing
Col. Jack S. DeWitt


Commander, 449th Fighter-Interceptor Squadron
Maj.
Kenneth B. Taylor


Commander, 5060th AC&W Group
Col.
Jack W. Williams


Commander, 5060th USAF Hospital
Col.
Carlos C. Alden, Jr.

Admittedly, AAC strength today is spread paper-thin in spots. But the new force, spearheaded by the supersonic Convair F-102, is highly mobile.

On the mainland, the 10th and 11th Air Divisions divide their areas of defense responsibility by an arbitrary east-west line. Roughly, the line halves the Territory, paralleling the Alaska Range of mountains.

Two of the command's three main bases are located "north of the range," and controlled by the 11th Air Division, with headquarters at Ladd AFB. Twenty-six miles south of Fairbanks and Ladd, the tundra is split by Eielson's 15,000-foot runway, built to handle SAC's heaviest aircraft.

Permanently assigned to Eielson is the landlord 5010th Air Base Wing. Here, too, until late 1957, was the 58th Weather Recon Squadron, which had written a colorful decade of aviation history with its daily WB-50 flights to the North Pole.

Eielson is the AAC-supported retaliatory launching platform for SAC bombers. Maintaining this northland facility for SAC units on temporary duty is a vital part of the AAC mission. If attack comes, SAC bombers will be aloft simultaneously with AAC interceptors.

In the fall of 1957, the delta-wing F-102 replaced the Northrop Scorpion at Elmendorf AFB, while the 449th Fighter-Interceptor Squadron at Ladd received a new, improved model of the F-89. This "J" model Scorpion has an improved weapons capability and electronic armament system.

The 10th Air Division, with its headquarters at Elmendorf, controls the 31st and the 317th Fighter-Interceptor Squadrons, both equipped with the F-102. In addition, the 10th directs the activities of the 5040th Air Base Wing and the 5040th AC&W Group. The 5040th is responsible for the administration and supply of eight remote AC&W sites located south of the range.

At Ladd, a similar organization exists. The 5060th Air Base Wing and the 5060th Aircraft Control and Warning Group perform parallel jobs in the theater's northern section.

The command's AC&W stations are wilderness pinpoints calculated to jab America into a state of alertness if attack comes. Coupled with DEW Line outposts strung along the rim of the Arctic Circle, they represent precious hours of advance notice—purchased at the cost of many millions of dollars.

Most AC&W sites have been built on the ruggedest real estate imaginable. Manning them and furnishing them logistical support is a formidable job. In the cockpit and in the "bush" it makes pilots out of airplane drivers, sourdoughs out of tenderfeet.

Recently, Elmendorf's 5040th Air Transport Squadron traded in their aging C-119s for the high-tailed C-123 Provider, also built by Fairchild. This airplane is a bush pilot's dream. Its short field landing and takeoff characteristics make it perfect for northland operation. Besides the Provider, the 5040th uses the H-21 helicopter, and a number of de Havilland L-20 Beavers. With Elmendorf as home base, this bush armada supplies 10th Air Division's remote sites with everything from spare radar parts to toothpaste—and its flying safety record is excellent.

The 5060th Air Transport Squadron, at Ladd, performs identical chores north of the range for the 11th Air Division.

The remote sites are studies in loneliness, especially when viewed from the air. Their trademark: the ubiquitous radome perched on some high wilderness peak. These are the buildings that shelter the unblinking electronic eyes that guard Arctic flyways twenty-four hours a day.

Scarring the slope from radomes to living quarters below are the indispensable tramways. Without them, when snow piles up house-high across roadways and canyons, crews would be immobilized.

Mess hall, barracks, repair shops, and garages cluster at the mountain's base. Connected by covered passageways, they are architectural eyesores, but nonetheless serviceable.

Site runways are where the pilot finds them. Some are canted perilously on hillsides, others are tucked into wind-lashed valleys, a few feature roller-coaster inclines along their length.

The strip at Cape Newenham is a good example. Located in southwestern Alaska, the Newenham radome decorates a knife-like ridge that rises abruptly from the Bering Sea to the height of 3,000 feet. The strip itself is nestled in a sharp dip in the cliff's face, terminating atop a mere 100-foot bluff along the shore.

Winds in the area are vicious and variable. On final approach to Newenham, pilots are cautioned to maintain their aircraft in a 500-feet-per-minute climbing attitude—for the runway travels inland at a twelve-degree uphill angle. Low clouds, fog, rain, and snow storms are only incidental hazards.

Sparrevohn, one AC&W site in Alaska's interior, also has a startlingly unique runway. It curves downhill AND up, with a heart-stopping low in the middle. Entry is made through a narrow pass at one end and the runway comes to a screeching halt at the foot of a granite mountain.

An F-102A undergoing Arctic testing at Ladd AFB. After a cold soaking that lasted twenty-four hours, the aircraft was flown, to prove fitness for Alaska.

Sparrevohn, like numerous other interior sites, is positioned to afford the maximum control possible of airborne interceptors protecting Alaska's principal target areas. Seaward sites, with their long-range radars, serve as early warning devices, much like the DEW Line outposts.

During his twelve-month tour of duty, life for the siteman revolves around the radome. Day in, day out, shifts change, fresh operators take their places in front of scopes, new technicians resume their continual check and recheck of radar mechanisms.

It's a tough assignment, at times, as witness the following entries from Sparrevohn's official logbook. The jottings were made during the winter of 1956, at the height of an Alaskan "blue norther."

0053—Work stopped due to very high winds; walls of radome pushed in to within six to twelve inches of antenna.

0615—Snow drifting through wall behind maintenance bench.

One end of the vast Elmendorf AFB flight line. The F-89 Scorpions lined up in rows along the ramp have since been replaced by Convair F-102s. Rising in the background are the Chugach Mountains. Steam plants are in foreground.

0630—Wind subsided slightly; work resumed.

1200—Wind rising; radio antenna blown down.

1600—Equipment in tower vibrating dangerously.

1610—Windows in radome blown in; repaired.

1630—Main doors blowing in; loose equipment being secured.

1745—Wall behind maintenance bench blown in.

1900—Remaining walls still holding; wall section on second floor badly damaged, expected to let go.

Strange things happen in this weird world of cold. Automobile and aircraft tires freeze flat on the bottom when vehicles are parked for any length of time. Engine oil thickens to the consistency of tar; batteries and electronic equipment exhibit undiagnosable quirks.

Problems like these led to the establishment of the Air Force's first cold-weather testing station at Ladd. There, technicians and scientists from the Air Proving Ground are learning the needs and methods of Arctic operations.

The F-102 was given its cold-weather acceptance tests at Ladd. The C-123, too. Both passed with flying colors. Nowadays, with the accent on the Arctic's strategic importance, an aircraft's performance in the Fairbanks deepfreeze may well determine its future—or lack of same—with the Air Force.

Five hundred miles north of Ladd, where the tundra meets the polar ice cap, America's Distant Early Warning Line cuts across Alaska. Hugging the world's most inhospitable coast, it stretches from Cape Lisburne, on the Territory's northwest shoulder, to Barter Island, near the Canadian border.

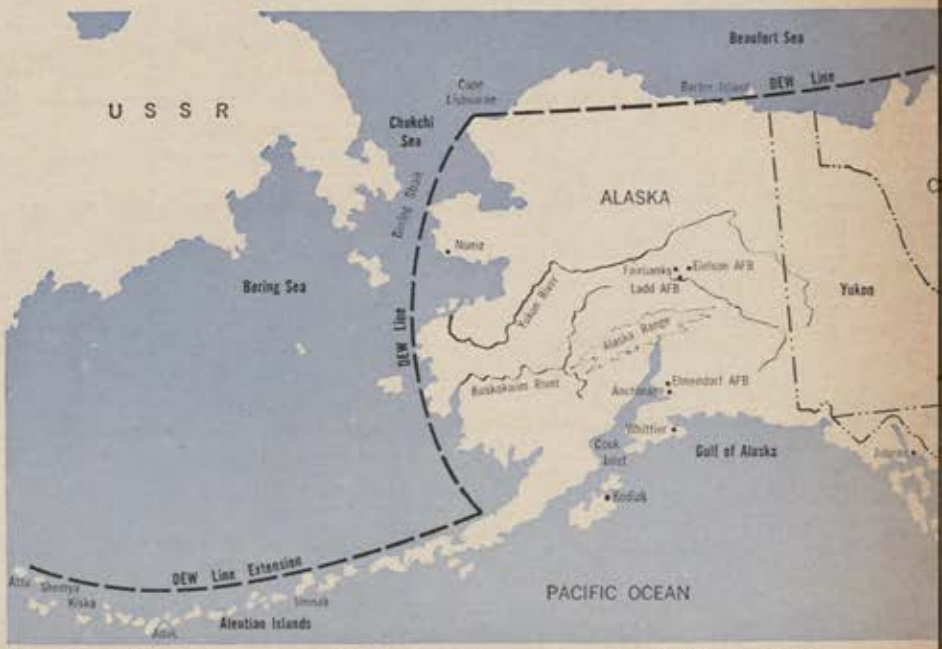
This fantastic burglar alarm, constructed at a cost of about $540 million, is the most northerly of our electronic devices designed to give early warning in the event of aggressor attack. Stretching 3,000 miles across the collarbone of Alaska and Canada, it is a triumph of man over nature. Nearly 1,000 miles of the DEW Line are contained within Alaskan borders. The Alaskan Air Command, however, is responsible for an additional Canadian segment also.

In essence, the line is a high-frequency electronic fence guarding the approaches to North America. While admittedly not impregnable, it's the next best thing. Stations are equipped with both surveillance and "flutter" radars, designed to warn of intruders both high and low. So sensitive is the system that automatic alarms are occasionally set off by flocks of southbound geese. To date, in numerous tests run against the line by SAC aircraft, none has succeeded in eluding detection.

Opinions vary on the amount of early warning the DEW Line outposts could supply. The consensus is approximately six hours. The advance notice will enable SAC's retaliatory force to become airborne—and a swarm of fighter-interceptors to take off.

Terrain and climate conspired to make DEW Line construction a nightmare. One-hundred-mile-an-hour winds, drifting snow, permafrost, and tundra were only some of the obstacles.

(Continued on following page)



Air defense in afterburner age is illustrated in map showing AAC bases, DEW line.

A C-123, the Fairchild cargo workhorse, flies over some typical Alaskan terrain near Anchorage. AAC pilots, engaged in remote supply chores, travel some of the world's most rugged real estate keeping airmen in stores, equipment.

Air transport helped mightily. In the absence of roads and in some cases waterways, huge earthmoving machines were parachuted from C-124 Globemasters to gouge out landing strips. Although an annual seagoing expedition now furnishes the bulk of supplies to DEW Line outposts, it was the beginning of a gigantic airlift that is still going on.

Recently, construction began on an Aleutian Islands DEW Line. This seaward extension, coupled with Navy picket ships operating in polar waters, will add to defenses. It, too, has long since become an AAC responsibility.

DEW Line sites are manned by personnel employed by the Federal Electric Corporation. Logistic support, however, is another Air Force—and AAC—responsibility.

In 1954, construction began on a third project of herculean proportions in Alaska. An imaginative project officer nicknamed it "White Alice."

Inspired by Alaska's vastness, White Alice is the microwave communications system (*see* "White Alice Goes Over the Hill," AIR FORCE, May '57) that ties the Territory's remote sites together. Like the DEW Line, it was built by Western Electric Corporation, and is operated by Federal Electric Corporation.

Whenever possible, White Alice antennae have been erected close to AC&W installations. Here again, AAC proffers logistic support. The network has available to it more than 170,000 voice circuit miles, and an estimated 50,000 miles of teletype circuits. Total construction costs neared $140 million.

White Alice's scoop-shaped, sixty-foot-high antennae are fast becoming landmarks for Alaska's wilderness pilots. And they've given the frontier a new voice. Now, regardless of weather conditions, AC&W sites as well as DEW Line installations can report promptly to Alaskan Air Command combat control centers.

In addition, the system will serve the Army and Navy, the Civil Aeronautics Administration—and the people of the Territory. At long last, bush-bound Alaskans are being afforded dependable telephone communication with the outside world.

With DEW Line, White Alice, and the AC&W network functioning as a well-knit unit, North America's radar wall contains few loopholes. When construction of the Aleutian DEW Line extension is finished the system will be complete.

AAC's combat control center at Elmendorf AFB is in frequent touch by hot-line telephone with North American Air Defense Command at Colorado Springs. "Unknowns" that can't be promptly checked out are reported to the stateside center. Usually they prove to be off-course airliners, or perhaps an occasional bush pilot picking his way through a snow storm.

Snow goggles are a must for outdoor construction workers like this airman.

An automatic alarm, however, is no respecter of persons—and site technicians take no chances. Every unknown is treated as a potential invading aircraft until positive identification is obtained.

If all other means of identification fail, AAC's jet interceptors are "scrambled" to have a look. To date, the command's pilots haven't fired a rocket in anger—but they're prepared to, every minute of every day.

As a rule, newcomers to the Territory are slightly nonplused upon landing at Elmendorf's Military Air Transport terminal. This is the first stop for personnel who fly "military" from the states—no matter where they are bound in Alaska.

Before he touches the ground, the *cheechako's* rude awakening has begun. Instead of a wilderness village, he's planed in across bustling Anchorage, and chances are he's mentally compared it with Fresno, Calif.; Beaumont, Tex.; or Canton, Ohio. He's seen a sizable marshaling yard, business district, and broad residential areas.

On the edge of town, his plane has skimmed over Government Hill and its vast lineup of two-story housing projects. He's been hard put to determine where the city ends and the base begins. The latter could just as well be Wright-Patterson or Lackland Air Force Base—except for the ranks of snow-mantled peaks—purely Alaskan—in the background.

Elmendorf's principal runway terminates near the edge of a towering bluff overlooking Cook Inlet. Approaches are unobstructed.

On his landing roll, the *cheechako* sees a flight line cluttered with aircraft that testify to the diversity of the AAC mission. There are MATS transports, rows of high-tailed C-123s, helicopters, and a sprinkling of bush air-

Arctic survival instructor poses in —or on—his classroom, an ice pack.

Of course it isn't always winter in Alaska. Summer is beautiful and comfortable, as witness the fun these AF dependents are having at Green Lake on Elmendorf AFB.

craft. Dominating one end of the field are rows of KC-97s, the workhorse SAC refueler, stationed here to extend the range of the outfit's restless B-47s and B-52s.

Principal landmarks off the flight line are numbers of huge three-story concrete barracks that serve as headquarters for the 5040th Air Base Wing and its supporting elements. Nearby is the world's busiest Air Force commissary. A few blocks away are base exchanges, theaters, clubs, libraries, and chapels—facilities exceeded by those of few AF installations.

To help cover the high cost of Territorial living, service personnel in Alaska receive substantially greater allowances than their stateside counterparts. Fairbanks, for example, can point with dubious pride to the highest cost-of-living index under the American flag. Anchorage residents are slightly more fortunate. Southeastern Alaska indexes average a mere twenty-five percent higher than those common in the Pacific Northwest.

Well-stocked commissaries and exchanges go a long way toward balancing the financial score. It is estimated that half the military payroll in Alaska is spent on base.

Housing is generally scarce throughout the Territory during the short summer season. In October, however, when the snow or "termination dust" begins to fly, the exodus of construction workers and vacationers begins.

Instead of a respite the onslaught of winter means a backbreaking increase in the workload for AAC's maintenance echelons. Fleets of graders move up and down runways and along base streets day and night. The problem of snow removal is one maintenance crews will be battling until mid-spring when the "chinook" winds begin to blow.

Nowadays, the majority of inbound personnel travel to Alaska by air. Some do come by private conveyance up the famed Alaska Highway and a few arrive at the port of Whittier by Military Sea Transport. However they come, it's an adventure—and many elect to extend their tours of duty in the Territory.

Most outdoorsmen fall in this category. Alaska's hunting and fishing is legendary, and the Air Force maintains an aggressive conservation program to ensure that it remains so.

The Arctic Aeromedical Laboratory at Ladd AFB is one vital AAC-supported function. In conjunction with the Air Proving Ground Materiel Testing Unit, Aeromed Laboratory technicians work on evaluation of physiological and psychological aspects of Arctic military life. Here, experts test diet and clothing for their effect upon health and survival. AAC pilots respect their findings. Survival in the Arctic, even during comparatively mild weather, is no laughing matter.

Aeromed Lab physicians interviewed all applicants for "Operation Ice Skate," the International Geophysical Year camp established last summer on a drifting floe in the Arctic Ocean.

The Ice Skate story is a saga of man against the elements. During their eighteen-month tour, this tiny band of AAC men and a like number of civilian scientists will be pitting their survival know-how against the Arctic.

The 11th has its hands full when Alaska's spring floods turn the northland into a vast, ice-cluttered lake. Hardest hit are the delta regions at the foot of the mighty Yukon. Another river that goes on an annual spring rampage is the commercially important Kuskokwim. Combined, the two inundate dozens of Eskimo villages, periling hundreds of natives. And breaking ice frequently collects to form jumbled dams that back flood waters up for hundreds of miles behind them. In such cases, it's invariably AAC to the rescue.

Floods in the spring of 1956 were particularly severe. WB-50s from Ladd were pressed into service—to bomb the ice dams and offer the torrents a pathway to the sea.

Three missions were flown, during which dozens of standard 500-pound high-explosive bombs were dropped on the ice pack. On the evening of the third day a half-dozen dams began breaking up with a roar. By morning, the waters had begun to fall.

Accounts of times when AAC rushed to the aid of Alaska's civilian communities would fill a book. It's not surprising then that the command is popular with the sourdough population.

Predicting the whims of northland elements is considerably more difficult than foretelling Alaska's military future. With the ICBM nearing perfection, Alaska looms large as a first-rate missile staging area. Launching platforms on the outskirts of stone-age Eskimo villages will add the final incongruous note in a mighty land where contrast is the rule of thumb.

But whatever the future holds, it's a good bet that Alaskan Air Command will be in the thick of it.—END

ABOUT THE AUTHOR

A veteran of the Army Air Corps, the Coast Guard, and, since 1954, the USAF, author Doherty has written for California dailies as well as Parade, Flying, Ebony, *and* TV Guide. *His present assignment is with AAC's ISO. A native of St. Louis, Sergeant Doherty says Alaskan fishing is fine.*

Outer Space: Fourth Frontier of Freedom

The day approaches when command of space may be essential to our national security

Today, our soldiers and sailors and airmen stand guard on the ramparts of the free world ...but at the same time our civilian and military scientists and engineers are hard at work building our defenses on a new frontier. That frontier is Outer Space. There, someday soon, will lie the power to keep the world free—or enslave it.

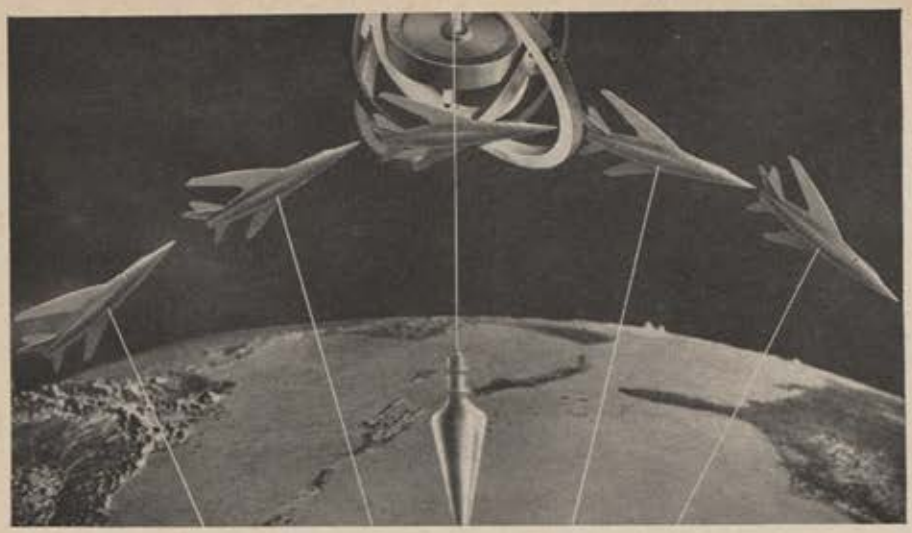
North American Aviation is in the thick of this secret struggle. Its experience with supersonic aircraft and missiles is the greatest in the free world. For several years now this experience has been coming to grips with the toughest challenge of our time—perfecting weapons that will not only span the planet Earth, but also penetrate the airless void around it.

Space Flight Starts Here

First basic essential in the stupendous task of putting an inhabited vehicle into space is an engine with enough propulsive thrust to drive it up through and beyond the atmosphere on which conventional power plants rely. In essence, this is the same problem that NAA's Rocketdyne Division has already solved in its trail-blazing work for our major missile programs—Atlas, Jupiter, Thor, and Redstone.

Naturally, the performance of these large rocket engines is classified. But this much can be said: rocket engines of the necessary power and efficiency to hurl a heavy payload into an earth-circling orbit have been available from NAA's Rocketdyne Division for several years. But these engines are built for specific defense assignments under the direction of the Armed Services. The nation's military capability wisely has not been diverted to the satellite program, which has been handled as a separate scientific project.

Rocketdyne is already at work on novel propulsion systems even more highly specialized for use in true space. It is to a combination of these with the high-thrust chemical rocket engines already being built in quantity that man can look for a vehicle that will actually navigate in space.



INERTIAL NAVIGATION is the new art of guiding an aircraft to a pinpoint—without the help of stars, radio beams, or radar. NAA's Autonetics Division is a world leader in the development of inertial navigation and other automatic flight control systems.

Man Into Space

At North American's Los Angeles Division, the first flying model of a new kind of craft is being readied for flight test. It is a stub-winged bullet of a machine, with a shape reminiscent of the guided missile configurations that have been illustrated in the press in recent years. But it will carry a man.

This is the X-15, powered by liquid-fuel rocket engines immensely more powerful than any airplane engine of the past. It is designed to carry man faster and higher than he has ever flown before.

One day soon, the first X-15 will thrust off and point its needle-nose toward infinity. Up through fast-thinning atmosphere it will rocket, through the inferno of the heat barrier, into the upper altitudes where an unprotected man would disintegrate, on to the moment of weightlessness, the little-known phenomenon that will tell the pilot he is flying through space.

Other bold new concepts now in development at North American Aviation, Inc., include the YF-108, a long-range interceptor for the Air Force, which is now in the preliminary design phase at the Los Angeles Division; and the carrier-based A3J, first supersonic attack weapon system for the Navy, which is now being built at the Columbus Division.

These are the planes, based on the experience North American has gained in building more supersonic airplanes than all other companies combined, that will set the pattern for tomorrow. For over twenty years North American has proved its ability to meet the nation's air needs—in quantity, on schedule, and at lowest possible cost.

The Age of Automatic Flight

At this very moment, advanced aircraft—both manned and unmanned—are flying at speeds so far beyond what we now call supersonic that they must be controlled almost entirely by automatic electronic systems. In both types, manned and unmanned, the control system is vital to the success of the mission. NAA's Autonetics Division is a world leader in creating these new automatic systems: flight controls, armament controls, inertial navigation, computers, and other complete control systems for the military and industry.

Of even greater significance, however, is the technique Autonetics has developed for *producing them in quantity*. For these airborne systems are so tiny that what would be a trunkful of standard gear must be miniaturized to fit into a cigar box... so rugged that they can perform with pinpoint precision even in the violent phenomena of supersonic flight through air and space... so reliable, as a result of Autonetics' components testing procedures, that a pilot can trust them with his life—and our security. Autonetics is unique in its ability to mass-produce them with complete reliability.

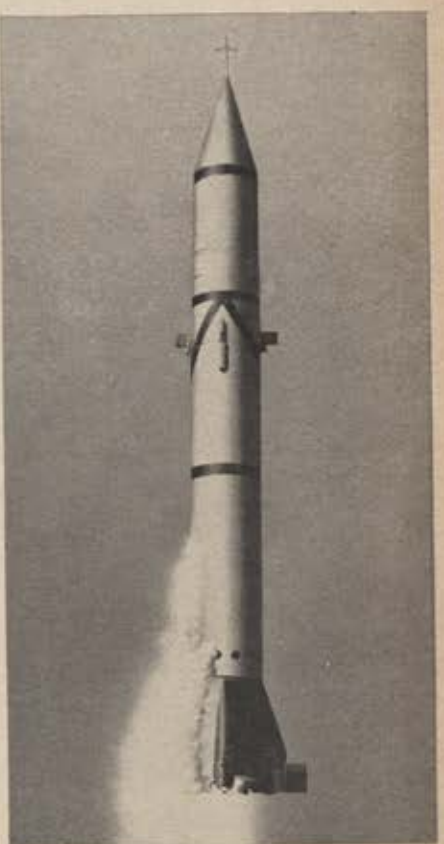
Nuclear Reactors: Power from the Atom

For over ten years the Atomics International Division of North American has been advancing the techniques for deriving practical power from the atom. Two of the most important power concepts under the Atomic Energy Commission's program have been pioneered by the division.

Since last July the Sodium Reactor Experiment in the Santa Susana Mountains near Los Angeles has been supplying electricity on an experimental basis to the homes and factories of the San Fernando Valley. The experiment will supply data for the 75,000 kilowatt station soon to be built for Consumers Public Power District of Nebraska. And on September 17, the Organic Moderated Experiment in Idaho Falls was brought to sustained nuclear fission. It is the basis for two additional proposals for power plants—one in Piqua, Ohio, the other for a Latin American country.

America is sharing the promise of the Peaceful Atom with other lands through AI-built reactors in Japan, Denmark, Germany, and Italy.

Here, in North American, you'll find as potent a combination of scientific, engineering, and production skills as any in American industry. Because the efforts of these men are being spurred by the urgency of national defense, they are constantly forging ahead into new "fields of the future." Much of their work holds immense promise for science and industry.



ROCKET ENGINES—mightiest power packages ever made—are rolling off the production line at NAA's Rocketdyne Division. They launch America's major missiles: Atlas, Thor, Jupiter, Redstone.

NORTH AMERICAN AVIATION, INC.

SERVES THE NATION'S INTERESTS FIRST—THROUGH THESE DIVISIONS:

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Cessna T-37 is nearly twice as fast as the huge, humpbacked North American T-28 it is replacing in USAF training.

Classroom in the Sky

USAF'S NEW CESSNA T-37 JET TRAINER

By Louis Alexander

A GLEAM of daring illumined Tom Beaghen's eyes. He was taking off for his first lesson in a jet airplane.

As he climbed into the cockpit at Bainbridge AB, Ga., Beaghen had only thirty hours of flying time behind him—not enough to qualify for a civilian pilot's license. Yet he was taking up a twin-jet airplane that has about the same power and performance as most of the hottest World War II fighters.

Second Lieutenant Beaghen was the first student officer ready to go jet in the USAF's first regular primary school class in pilot training. His lesson in the jet trainer, a few months ago, was the first such lesson in Air Force history.

You'd have thought it was his commanding officer's first jet lesson, too, judging from the enthusiasm of Maj. Angelo Boutselis of Lowell, Mass. Yet he has had hundreds of hours of jet time. Boutselis is commander of Project Palm, teaching students to fly jets while they are still in primary training.

With Beaghen's historic first flight in that jet trainer, USAF flight training leaped out of the age of Maytag Messerschmitts and ninety-five-mph training planes. Flight training began to catch up with the rest of the Air Force.

Postwar instructors had long complained that the training of pilots wasn't realistic. Most students would eventually fly the latest jets, yet they prepared in slow, propeller-driven planes until they graduated—with a real shock—into handling jet craft.

Recruiting of pilot students suffered, too, partially because prospective airmen learned that it would be a year or two—if ever, in some cases—before they got into the seat of a hot jet fighter.

Instructors lost interest, and communicated their lack of enthusiasm to their students.

Like the youngest brother in any big family, the Air Training Command has always been plagued by having to retailor hand-me-downs to fit its needs. Many a war-weary aircraft has become a training type by the removal of combat operational equipment and lightweight modifications.

The transition to jet trainers began in that retailoring fashion with addition of an extra seat and dual controls plus a lengthening of the midsection of the Lockheed F-80, which emerged as the present single-engined basic jet trainer, the T-33.

Meanwhile, Cessna's T-37, which Beaghen was flying, was being planned as the first jet designed from the drawing board up specifically for teaching. And it is now phasing in as the Air Force's official primary training plane. It replaces the huge, humpbacked, piston-engined North American T-28, which towers over it but which is comparatively primitive in performance.

Cessna's new trainer, the T-37, is revolutionizing flight training methods. The instructor sits next to the student instead of out of reach behind him. He touches the student's fingers, shows him what to do—instead of providing indirect control from the rear.

In preparation for all-jet training, the Air Force has put an experimental group at Laredo Air Force Base, Tex., through flight training in T-33s. Training officers are sizing up the effect upon student achievements of flying the 300-knot, tandem-seat T-33. Meanwhile, in March, the Air Force will receive an evaluation from Project Palm of what the advent of the brand new T-37, with side-by-side seating and combat characteristics, will do to its training program.

All of this will lead soon to starting new students—with no previous fly-

ing time whatsoever—in T-37s for their first training flights. With the T-37 adopted as the Air Force's official primary trainer, the T-33 in basic, and the coming supersonic Northrop T-38, students will bypass piston-engine planes completely—except for history courses. The T-28 will join the long-lived T-6, the F-51 Mustang, and the B-17 Flying Fortress in the pages of history.

"Ultimately we will have all jets here," says Hugh Davis, general manager of the Southern Airways school at Bainbridge's Project Palm. "We hope to introduce the students to flying in the T-37, and advance them to the Northrop T-38 supersonic trainer."

What's the T-37 like? A walk-around inspection shows it is no bigger than the old AT-6 trainer. It has two Continental J-69 turbojet engines, of 920 pounds' thrust each. It cruises comfortably on one engine, so much so that students and even instructors have been caught napping by the loss of half their power.

When Beaghen took off on that first training flight in his T-37, he cruised at 240 knots indicated airspeed, and began his training maneuvers at 15,000 feet—a medium altitude, according to Maj. Ray W. Rogers, assistant project officer at Palm. By the third flight lesson Beaghen was climbing to 20,000 feet to learn spins.

With a scream and a roar like a thousand vacuum cleaners, the trainer hurries to get off the ground. It doesn't wait for a runup at the end of the runway. In the air the T-37 would rather climb than dive. Students in prop-driven planes are concerned about going *down* through a cloud, instructors point out. In the T-37 at 15,000 feet, the big problem is going *up* through the cloud.

To the student the jet trainer is a control stick plane. You fly it with the stick, and you call on the rudders only for an uncoordinated turn or a crosswind landing.

You get precision control with the trim tab—mounted on the top of the control stick, which is a typical fighter plane stick. One test pilot has worn out the thumb on five pairs of gloves this year.

The T-37 makes big, gentle turns. A four-minute turn is standard, not a two-minute turn. One glance at the airspeed indicator, which is registering 240 knots, explains the gentle turns. Make a steep turn and unless you handle the plane with the lightest of finger-tip control, extensive altitude changes occur. Lazy eights are lazier, Beaghen says, and smoother. They cover more sky.

In the T-37 you just set the throttle at "percent of power" (ninety-five percent for cruise), and once you've set the lever (or pair of levers on the twin engines, fitting closely together), you rarely move it. You just sit there with your left hand in your lap.

With no troublesome torque to cope with, without having to reset a propeller pitch or fuel mixture and manifold pressure, the T-37 is much easier to fly, students report.

"The difference in learning is in the airplane," says student Barry Molnar, a second lieutenant from Rutgers University and Somerville, N. J. "You're not spending time manhandling the T-37. The guys still using T-28s are still talking about their trouble with torque."

The plane handles easily through the entire range of speeds, instructors report. It doesn't get heavy on the controls when it approaches 350 knots. The T-37 has milder stall characteristics, too, without sacrificing combat characteristics.

The T-37 has a top cruising speed of 345 knots at 18,000 feet (397 miles per hour), according to the conservative estimate of Cessna engineers. Not much faster was the published top speed for the World War II F-51 Mustang of 460 mph at the same altitude. One Air Force tech order shows the Cessna jet trainer's top speed at 439 mph (382 knots) at 10,000 feet. The plane's service ceiling is 35,400 feet.

With such a fast-moving plane for training (it even taxies fast without "S-ing" because of good forward visibility) the student has to stay ahead of the T-37. You can't wait for it to react; you have to expect it to react.

With their higher speeds, jets need improved navigation equipment, and some instructors believe navigation should be introduced earlier in the training course.

What the instructors particularly like is the T-37's side-by-side seating arrangement. They say it's much easier to correct students and follow reactions.

"You can reach over and show your student what to do. It's much better than having to judge his reactions from the back seat, where all you can see is the back of his neck," one instructor reports.

Showing the student from a vantage point next to him is far better than talking through a poor interphone connection from the rear seat, most instructors find. The presence of the instructor beside him gives the student considerable confidence.

An added benefit is that the usual disadvantage of side-by-side training

(Continued on following page)

T-37's side-by-side seating makes the job of the instructor easier.

Tandem seating is a feature of the Lockheed T-33 jet trainer. Here AFROTC cadets get acquainted with T-33's cockpit during summer training.

—the horizon is in a different position for turns to the right, as the student sees it, than for turns to the left—is not apparent in the Air Force's new primary trainer.

Another feature of the T-37 trainer is the provision of oxygen masks, crash helmets, and a "hot mike" through which the instructor can hear every breath the student takes, enabling him to gauge tension.

The whistle of the student's breath comes over to both occupants of the cockpit louder than the muted roar of 1,840 pounds of thrust just outside.

"On those first few flights the students are puffing like steam engines," one instructor reports. "We could see why they get hyper-ventilated and come close to keeling over."

"It's normal with all students," another says. "They're tense and nervous."

"Instructors have always been told this fact, and we all know it in an indirect sort of way. But we never really realized the extent of student tension and nervousness until we got the hot mike."

The instructor can tell when you tense up, students agree.

But the hot mike is a two-way operation. The pilots can hear the instructors breathing hard, too, when they're demonstrating a spin.

The T-37 has excellent flight characteristics on one engine, too, according to Derby Frye, director of military relations for the Cessna Aircraft Co.

"I'll say," agrees A. K. Sluyter, Beaghen's instructor. "I took a couple of instructors from Hondo up for rides one day. At one point, I chopped one engine.

"They thought the T-37 would spin around. But it pulled so slightly it was hardly worth trimming the aircraft for."

One student's foible created a new name for one kind of erratic pilot behavior. The student parked his jet with the tailpipe pointed at the mobile control tower not far away. In starting up, he peeled the paint off the control unit with the hot blast of the tailpipe.

When a piston airplane blasts a building with its airstream, the pilot is mockingly accused of doing a "dusting off job." With the T-37, observers coined the term "singe job."

Maintenance personnel report that the T-37 causes them less *unscheduled* maintenance work. It requires less sheet metal work than the T-28, says Clyde E. Gobbel, director of maintenance at Project Palm.

But its two engines mean twice as much shop work than the single-engine T-28. During the evaluation of the T-37 as a training airplane, Gobbel's men were doing the periodic engine teardowns. This is a job usually done at the factory or depot on piston-engined planes.

Students, instructors, and maintenance personnel spotted brake troubles, brake system troubles, and other kinds of trouble during the evaluation. Much of it was fixed, and the "fixes" were scheduled into the production of subsequent production models.

One problem—the hydraulic brake system had some "bugs." A factory fix had corrected some erratic behavior, but grabby brakes defied solution for some time, and neither factory, operational personnel, nor subcontractor could get together on the best way to redo the brake discs to prevent grabbing.

A high-pressure tire replaced the soft doughnut on the nose gear of the first models. But students still sometimes blow out the soft doughnut by making sharp turns on the ground.

Student reports stressed the need for a stronger omnirange radio-direction finding set. The evaluation in March of this year to the Air Force may contain a recommendation on this.

After the Air Force ruled that students should learn aggravated spins (the straight down, wind-'em-up type), the increased centrifugal force of these turns popped wingtip section rivets when the rubberized wing fuel tanks were nearly full. To alleviate this problem instructors demonstrate the maneuver when there is less than 1,000 pounds of fuel left in the tanks. Less strain results.

Maintenance personnel rotate between the conventional T-28 and T-34 shop work and the Project Palm work on jet planes and engines. And they like the T-37 after they learn what labyrinth seals are, and where the baskets and buckets go.

As far as pilots like Tom Beaghen and Barry Molnar are concerned, FTAF couldn't do a wiser thing than phase out the reciprocating engine planes. The absence of prop-driven aircraft would suit Molnar fine. He would like to fly the hottest single-engine jet the Air Force has when he graduates from flying school.

Motivation, as a problem, has vanished with the disappearance of the piston engine. Beaghen's enthusiasm, for instance, communicated itself over a thousand miles from the air base in southwestern Georgia to his mother in Mount Vernon, N. Y.

Tom's letters and phone calls ("No conversation goes more than five minutes in our house without Tom turning it to airplanes") finally convinced her to come down and see some jets.

One weekend she boarded an airliner in New York for the first airplane trip of her life, and flew to Georgia to see her son . . . and his plane.

"It's smaller than I thought," she commented when he led her around the T-37.

Mrs. Beaghen brought with her the girl Beaghen would like to marry, Joanne Palmer of Eastchester, N. Y. Tom's enthusiasm washed off on her, too, and now she hopes to become an airline stewardess for United.

For as Tom Beaghen explained as he proudly led them both around the T-37, this is the little jet airplane with which the Flying Training Air Force has caught up with the jet age.—END

Tom Beaghen shows off the T-37 to his mother and his girl friend during their visit to Bainbridge AB.

ABOUT THE AUTHOR

Lou Alexander is on the staff of the Houston, Tex., Chronicle. *An Air Force Reservist, he teaches at an airport ground school near Houston. He is an active freelance writer and appears regularly in* AIR FORCE, *most recently in October '56 ("The AF's Wife Insurance"). Married, he has two daughters.*

All-weather flight for Helicopters

Sperry Announces Advanced Developments in Controls

To increase the all-weather capability of helicopter flight has been a continuous research and development program at Sperry. The newest development is a Stabilizing Control System adaptable to all types of rotary wing aircraft.

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Control stick steering. The pilot generates command signals by moving stick in conventional manner.

Other Sperry developments for helicopters include a new Sperry All-Weather Integrated Instrument System. Providing simplified display of all data for manual control, it includes Flight Director Computer, Horizon Flight Director Indicator, Navigation Computer, Compass Pictorial Displacement Indicator, Altitude Vertical Rate Indicator and RPM Control System (also available individually). If you have a requirement in helicopter controls and instrumentation, write our Aeronautical Equipment Division.

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NATO Allies

RAF cadets with Jet Provost trainers.

GO JET for Training, TOO

By Robert R. Rodwell

THE US Air Force's change to an all-jet curriculum (*see page 62*) represents a drastic change in flight training, and it is worthwhile to look at the experience of other NATO countries which have already made, or are making, similar changes. Among the air forces of the Free World, Britain's Royal Air Force and the French Air Force have the most experience in all-jet training methods, and both already have a number of operational combat pilots trained completely in jets. Both the British and French are now committed to all-jet training.

Air staffs of both countries have proved to their satisfaction that the pilot trained from the outset in jets is better suited to the demands of modern operational flying than the pilot trained initially on piston-engined airplanes. The staffs of other major allied air forces have been convinced of this by British and French successes, and are currently appraising available jet primary trainers.

Here's how jet training has worked for the RAF.

In June 1954, Hunting Percival Aircraft, Ltd., produced a jet version of their 550-hp piston-engined Provost, then in full production for the RAF, and still the standard primary trainer. The Jet Provost, as the new aircraft was named, used piston Provost flying surfaces and modified rear fuselage, and was powered by an Armstrong Siddeley Viper ASV.5 turbojet, of 1,640 pounds' thrust. The fixed undercarriage was replaced by a retracting gear.

The RAF showed early interest in the jet trainer, and a small number of pre-production Mk. 1s were put in service in September 1955, with one flight at the RAF Hullavington flight training school to evaluate the aircraft and to see what benefits could be derived from all-jet training. At this writing two classes had been trained on the airplane and a third group was under training.

Standard RAF training involves 120 hours on the piston Provost, after which pupils fly 110 hours on the jet-powered, two-place Vampire T-11 and the single-place de Havilland Vampire FB-5, a retired fighter bomber. The figure originally set for the first Jet Provost student was 160 hours before proceeding to advanced training. But after only eighty-five hours their flying ability was so good that the course was shortened. Half of the students were switched to Vampires, while the others went on to complete 125 hours in the Jet Provost. It appears that future Jet Provost courses will be standardized at about 125 hours.

Even with higher altitude and speed capabilities, the Jet Provosts were not too much for novices. The better power-to-weight ratio of the jet gives it a wide speed range, with a top speed of more than 300 knots, while the landing speed of sixty-three knots is only ten knots higher than that of the piston trainer. The low wing loading gives a high rate of climb, and a high proportion of sortie time can be spent at altitudes above 15,000 feet. Under dual instruction, students fly as high as 30,000 feet.

The high-altitude capabilities give greater independence of weather, and exercises can often be flown above the stratus clouds that so often hinder flying training in Britain and frequently ground piston-engined primary trainers. The familiarity with instrument flying imparted to pupils on the jet trainer gives them an elementary "white" instrument rating before they proceed to advanced training, whereas piston pupils need to take this after beginning their jet training on Vampires.

British training relies on two training aircraft to ready the pilots for operational training, and a new advanced trainer will be needed to complement the Jet Provost when it enters large-scale service, to replace the subsonic Vampire T-11, which, although as big an advance as the piston-trained cadet can be expected to handle, cannot offer the superior jet-trained pupil a sufficient increase in performance over the Jet Provost.

There were two possibilities for this kind of advanced trainer—a version of the Hawker Hunter T-7, stripped of much complex navigation gear and armament, and a two-place development of the Folland Gnat lightweight interceptor. Folland had carried out preliminary design work on this proposed transonic trainer as a private venture, when last August they were awarded an official development contract, to culminate in a production order. This was rather a surprising decision, as previous interest shown by British military authorities in the Gnat had been slight.

Points that seemed overwhelmingly in favor of the Hunter T-7 were that it could be produced on existing assembly lines, or even converted from obsolescent single-place Hunter interceptors, and spares holdings could be minimized. But the most surprising thing of all about the apparent adoption of the Gnat is that the RAF had abandoned its previous insistence on side-by-side seating. The Gnat's small size requires tandem seating.

A Hunting Percival Jet Provost trainer (foreground) flies formation with one of the piston-engined basic aircraft whose place it is taking in RAF training.

De Havilland T-11 Vampire is now the RAF's standard advanced jet trainer.

The sleek Fouga Magister is the basic jet trainer of the French Air Force.

The French Air Force training differs in one major respect from the RAF's, using only one aircraft to train pupils up to combat training standard. The FAF uses the Fouga Magister light jet trainer, which has logged some 10,000 hours of instructional flying, making the FAF far and away the most experienced NATO air force in all-jet training.

While the Provost was designed as a primary trainer, the Magister was created as a trainer on which pupils could receive pure flying instruction from the beginning to advanced standard, and also perform certain operational exercises. For this reason, the Magister has a very wide performance range, with a top speed of 445 mph at 30,000 feet and a sea-level rate of climb of 3,500 feet per minute.

The aircraft has tandem seating and is powered by two Marboré II engines of 800 pounds' thrust. It carries two light machine guns and a gun camera and is fitted with racks for such underwing armament as rocket projectiles or fifty-kilogram bombs.

After 160 hours of Magister flight time, pupils pass on to single-place Marcel Dassault Ouragan combat trainers. In this way, the FAF obviates the need for an intermediate two-place trainer equivalent to the RAF's Vampire T-11, although the requirement also arises in the French Air Force for a transonic or supersonic two-place machine.

The Fouga Magister has proved itself to be a sound training plane, and has left no doubt that the one training concept it represents is a practical possibility. It has the support of NATO authorities. The Military Standardization Agency recommended in 1954 that NATO forces should standardize aircraft for basic and intermediate training. In addition to the FAF, which has ordered 325 Magisters, and the French Navy, for which a naval version, the Fouga CM-175, is under development, West Germany's Luftwaffe has ordered 382 Magisters, most to be license-built in Germany by the revived Messerschmitt Company. Until delivery begins the Luftwaffe training organization for transport and liaison pilots is using Italian Piaggio P-149 piston-engined basic trainers. Meanwhile, training of German combat pilots will be by the USAF and Royal Canadian Air Force until the establishment of Magister-equipped training schools next year.

Other NATO air forces have not yet decided on the forms their all-jet training programs will take, and are considering a variety of trainers. While the Military Standardization Agency's recommendation of the Magister will carry considerable weight, the long-standing question of tandem vs. side-by-side seats still prevails.

The French, before adopting the Magister, flew a side-by-side light jet trainer, the Morane Saulnier 755. Then the FAF came out firmly for tandem seating, holding that the pupil sitting in the forward cockpit is oblivious of the instructor's presence and becomes immediately familiar with a single-place cockpit.

The USAF's adoption of the Cessna T-37A rather than the Beech Model 73 Jet Mentor, as its standard jet primary trainer, is a compromise in this argument since side-by-side seating will be used for primary training, and the tandem configuration for advanced training, in both the T-33 and its proposed successor, the supersonic Northrop T-38.

The higher capital outlay and fuel costs of a jet trainer may well be offset by their simpler maintenance over aircraft with reciprocating engines. Certain small turbojets, such as the Viper and the Turboméca Marboré, have built up great reputations for long, trouble-free running.

By reducing the numbers of types needed to train a pilot to operational standards, the light jet trainers can certainly offer economies in procurement costs for complete aircraft and for spares holdings.

Economy could be applied in the Royal Netherlands Air Force, which now trains from the outset on the Fokker S-11 Instructor, a side-by-side, two-place aircraft with a 190-hp Lycoming engine. After spending sixty hours on the Instructor, students fly 120 hours on Harvards. Advanced and operational training are given on Gloster Meteor 7s and Lockheed T-33s. The Fokker S-14 Mach Trainer, with side-by-side seating and a Nene engine, is used for gunnery and tactical training, and for dual checks, but it does not have a place in the pure flight training syllabus. Still another training aircraft will be added when the RNAF accepts delivery of the Hawker Hunter T-7s it has ordered. These will be used purely as conversion trainers for the pilots of RNAF Hunter interceptor squadrons.

The Royal Netherlands Air Force provides a clear illustration of the way in which many aircraft are put to use in training NATO's combat pilots, and gives an indication of the economic and logistic advantages that would accrue from a standardized flight training program, employing light jet trainers, among the NATO powers.—End

ABOUT THE AUTHOR

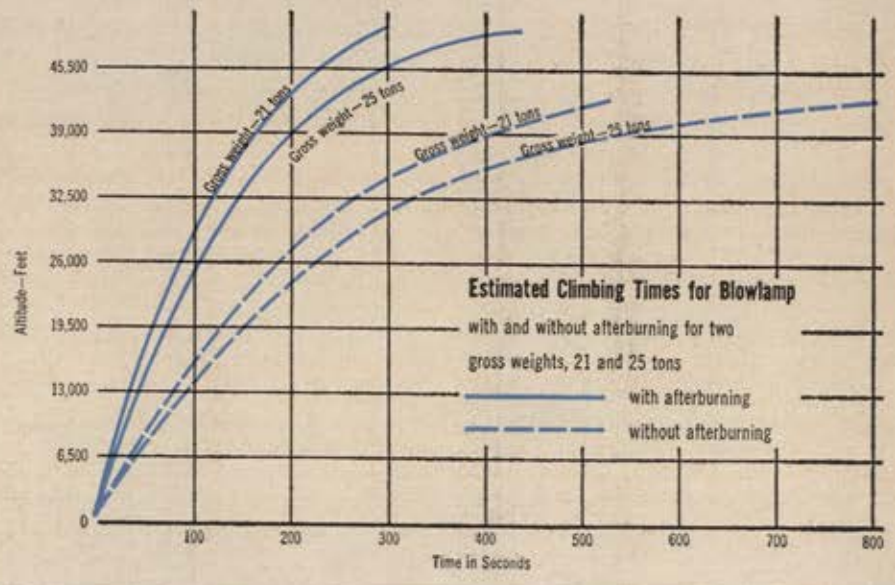
Mr. Rodwell is a staff writer for the British monthly magazine Aeronautics, *specializing in military topics. He served three years in the Royal Air Force, most of this time on duty in Germany. His particular aeronautical interests are gliding and parachuting. Mr. Rodwell's ultimate ambition, he says, is to qualify for commercial flying. Now twenty-two years old, he lives in London and in addition to his magazine duties is a freelance writer.*

A Red Airpower Feature

BLOWLAMP

A comprehensive look at the Soviet supersonic bomber that is expected to take the place of the IL-28—a product of the capable designing hands of S. V. Ilyushin and Company

Artist's general conception of how Blowlamp could look in terms of configuration. Note that this drawing differs considerably in detail from the sketches on opposite page, which experts have considered more accurate.



WHEN they visited the USSR in June of 1956, Gen. Nathan F. Twining, then Air Force Chief of Staff, and his accompanying AF officers were shown a new Russian supersonic bomber. They were allowed to look at it on the ground, but did not see the airplane in flight. NATO has given the aircraft the code name "Blowlamp," and AIR FORCE here presents exclusive details on the craft, meant as a future replacement for the well-known IL-28 subsonic light bomber.

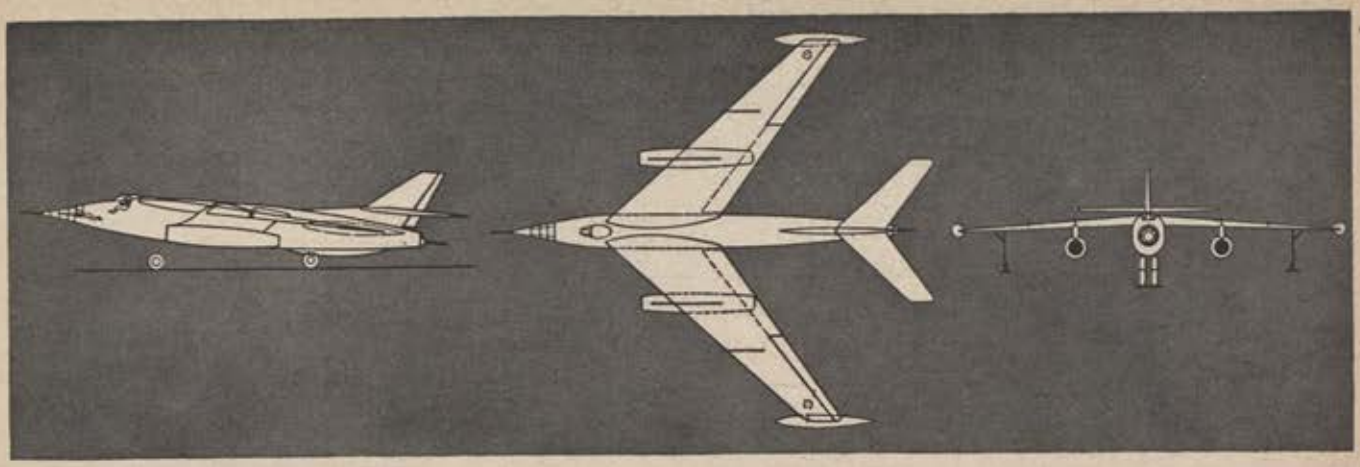
The Soviets gave the new airplane the designation IL-140, a high number, indicating that perhaps it is not yet operational in the Soviet air forces and therefore retains its design bureau designation. Blowlamp is the product of a design bureau headed by S. V. Ilyushin, creator of the famed World War II *Stormovik* or IL-10.

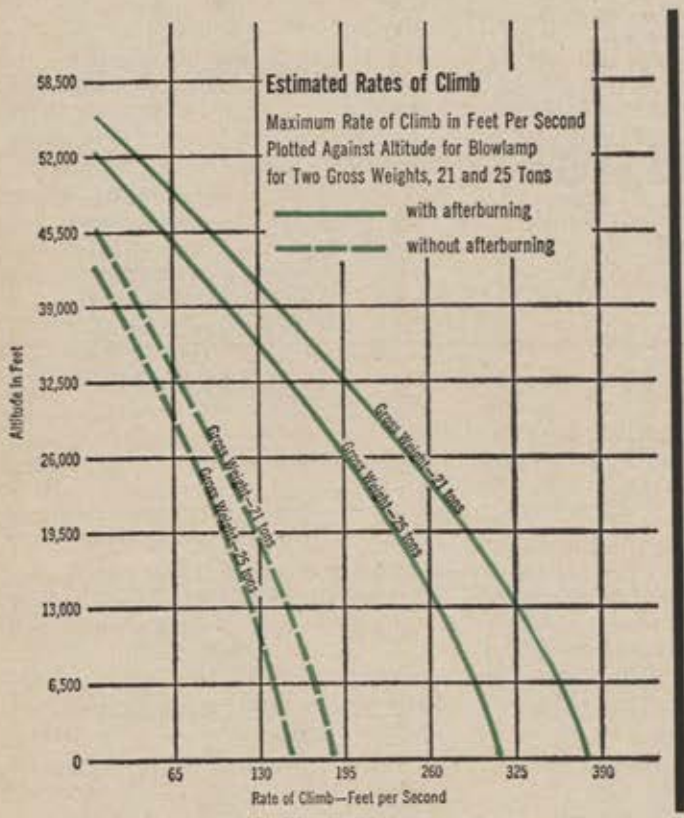
Blowlamp closely approximates the airplane shown in outline on the next page. Its wings are swept back forty-five degrees, and each wing has two boundary layer flow fences. The fence above each engine is part of the engine support extended above the surface of the wing.

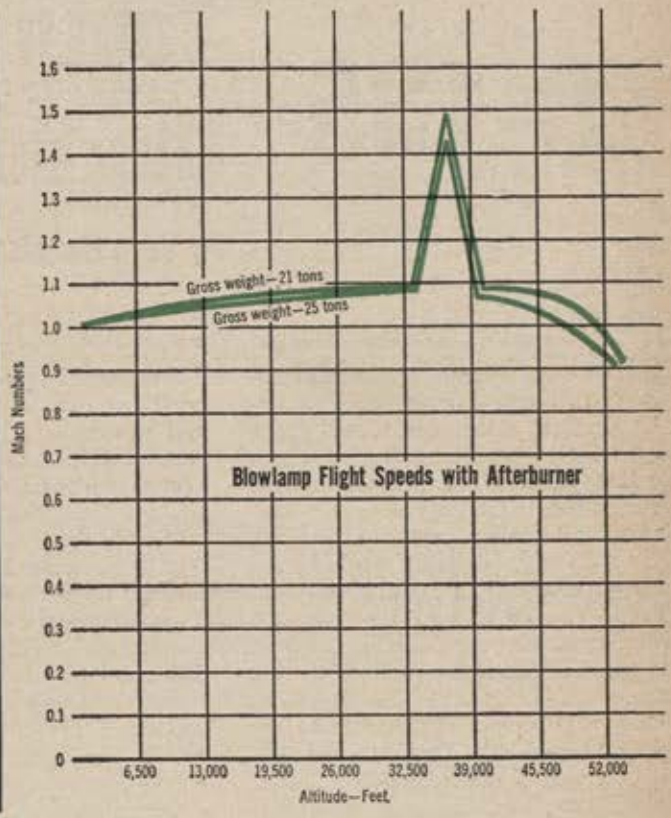
The plane has a twin tandem landing gear, with smaller single gear in each of the wingtips similar to USAF types with tandem gear arrangements. The nose is glass enclosed and equipped to accommodate the bombardier in a prone or semi-prone position. Remote or radar-controlled guns are mounted in the tail. The underside-aft portion of the fuselage carries a vertical stabilizer, a familiar installation on Soviet aircraft.

The plane is equipped with two air brakes which may be extended in flight, and it can carry auxiliary fuel tanks on the wingtips.

Its two engines, designated MR-40s by the Russians, deliver 11,000 pounds of thrust each. With afterburning (the engines are thought to have short afterburners) they perhaps develop as much as 17,100 pounds of thrust each. At a maximum gross weight of twenty-five tons, the aircraft is believed capable of clearing a fifty-foot obstacle in 3,000 feet with afterburner; in 4,100 feet without afterburning.







The airplane apparently has been optimized for relatively low-altitude performance. At a twenty-one-ton gross weight (maximum gross weight is twenty-five tons) and around 36,000 feet, it is capable of its maximum speed, which is about Mach 1.5 with afterburning. For altitudes above and below 36,000 feet, maximum speeds fall off sharply, according to calculations from such reliable data as are available. The plot of flight speeds shows how sharply the aircraft's performance changes with altitude, indicating a very critical performance characteristic, if the limited data available are correct.

At the same altitude and gross weight (twenty-one tons and approximately 36,000 feet), but without afterburning, the airplane has a top speed of Mach 0.985.

In keeping with usual Soviet practice, Blowlamp is thought to have a relatively short range. Assuming top speed, it is believed to be capable of ranges no greater than 1,000 miles and perhaps less. At twenty-five tons' maximum gross weight, with afterburning, the airplane has a service ceiling of 52,000 feet.

Landing speed is 135 mph, and insofar as is known it is not equipped with braking parachutes.

One very significant fact about the airplane is that it is capable of carrying a payload of about two tons. This payload would, of course, be sufficient for the carrying of a nuclear weapon.—END

BLOWLAMP DIMENSIONS

Over-all length	75.4 feet
Height	16.0 feet
Wingspread	65.6 feet
Wing area	856.0 square feet
Wing chord at root	19.0 feet
Wing chord at tip	6.4 feet

BLOWLAMP WEIGHTS

Empty weight	15 tons
Fuel	8 tons
Payload	2 tons
Maximum gross weight	25 tons

General LeMay, settling down in the cockpit, prior to his return trip takeoff.

KC-135

South of the Border

By Vern Haugland

THE word went around the Pentagon; if you want to see Curt LeMay set a distance record for a non-refueled jet flight, jog on down to Buenos Aires, but quick. Could be, too, that down in Argentina the General would offer you a ride back home, on what probably would be another record-setting flight.

The former boss of the Strategic Air Command, now Vice Chief of Staff of the US Air Force, was to fly the Boeing KC-135, world's first jet tanker. There was special significance to the project because the KC-135 is the military version of the Boeing 707 Stratoliner, America's first commercial jetliner. What the KC-135 did on its globe-shrinking dash would lift the lid more than a little on tomorrow's airline schedules. And of course the military significance was obvious. Latin America particularly, and the rest of the world as well, was to be reminded that Soviet Russia, even with its Sputniks, still has no aircraft with the performance and versatility of the new Boeing tanker.

I hurried down to Argentina in one of those rugged, dependable, $1.8 million flying haylofts, a Douglas C-124 Globemaster. The propeller-driven C-124 is no speed demon. But it gets you there—you and a whale of a lot of bulky, heavy cargo. There were crew rests overnight at Trinidad and Rio de Janeiro. I arrived in Buenos Aires a safe twenty-four hours ahead of LeMay's arrival time.

Ezeiza Airport, an hour's drive from downtown Buenos Aires, was isolated from the city. A strike was on, and telephone cables had been cut. Argentina was celebrating its Aviation Week, with US participation. The USAF's Thunderbirds, the ultimate in precision flying, were hurling their North American F-100 Super Sabres through amazing aerial paces. Argentina's President Pedro Aramburu climbed into an F-100F and became the first chief of state to fly faster than sound. Said one American officer: "If you don't think it's a trick to put on an air show like this without telephone service, try it some time."

On Tuesday morning, November 12, at 7:50 a.m., LeMay's KC-135 raced in from Westover AFB near Springfield, Mass., the long way—via Fortaleza, far out on the bulge of Brazil (*see map, page 73*). Some 6,325 miles, thirteen hours, two minutes, and fifty-one seconds, without refueling. An average speed of 485 miles an hour—the longest jet transport flight on record. Until now the longest nonstop flight by a jet, without refueling, had been the 1,448 miles flown by a French Mistrel in 1955.

LeMay had been at the controls for eight of the thirteen hours, but he looked fresh and rested as he shook hands with the welcoming party—US Ambassador Willard Beaulac; Brig. Gen. Alfredo Juan Vedoya, commander in chief of the Argentine Air Force; Brig. Gen. Paul Emrick, commander of SAC's 6th Air Division at MacDill AFB, Tampa, Fla.; and others—and as he reviewed assembled Argentine Air Force troops. Later LeMay told a press conference it was "a very pleasant flight—just another cross-country." He said crosswinds as high as 125 knots slowed him down a bit. And he made Boeing representatives wince when he said the KC-135 is "a nice plane to handle—it flies like a DC-4." The DC-4 is *not* a Boeing product.

LeMay delivered to President Aramburu a letter from President Eisenhower pointing out that in the near future travel between the United States and Argentina will require less than half a day. The Argentine president expressed amazement that LeMay's flight south had taken only as long as a train ride from Buenos Aires to the city of Cordoba, 500 miles inland.

At a reception at the US Embassy that evening, LeMay said he planned to start back at dawn the next morning, and that the temperatures and winds then prevailing would determine how many extra passengers (if any) he could take aboard. He said the 8,300 feet of runway at Ezeiza were critical for the tremendously heavy fuel load he would carry. If necessary, to assure a safe takeoff, he said he might even leave behind some of the nineteen men who accompanied him south. "If you want to take a chance on getting a ride, be at the airport before daybreak," he said.

Luck was with me. Wednesday, November 13, 1957, started with a chilly dawn in Buenos Aires, and there was a brisk wind blowing. Sure enough, LeMay invited me aboard. Two members of the southbound party stayed behind in Buenos Aires to supervise the return of some heavy radio equipment that had been unloaded there. Including the famous skipper there were twenty-three persons on board for the northbound flight. And, pleasantly from the competitive standpoint, the passenger list included no other newspapermen, no representatives of rival news services—only writers for two weekly magazines. For on-the-spot eyewitness wire service reporting, this would be exclusive.

Inside, the KC-135 looked wider, roomier than today's airliners. This one had thirty large, comfortable, airline-type reclining seats in the main compartment, half a dozen bunks in an aft compartment, a counter up forward along one side, with foam-rubber seats ranged along it for three radio operators. The radio equipment was something special; one function of this flight was to test it. With this radio installation LeMay had a flying command post, an unmatched aerial

(Continued on page 73)

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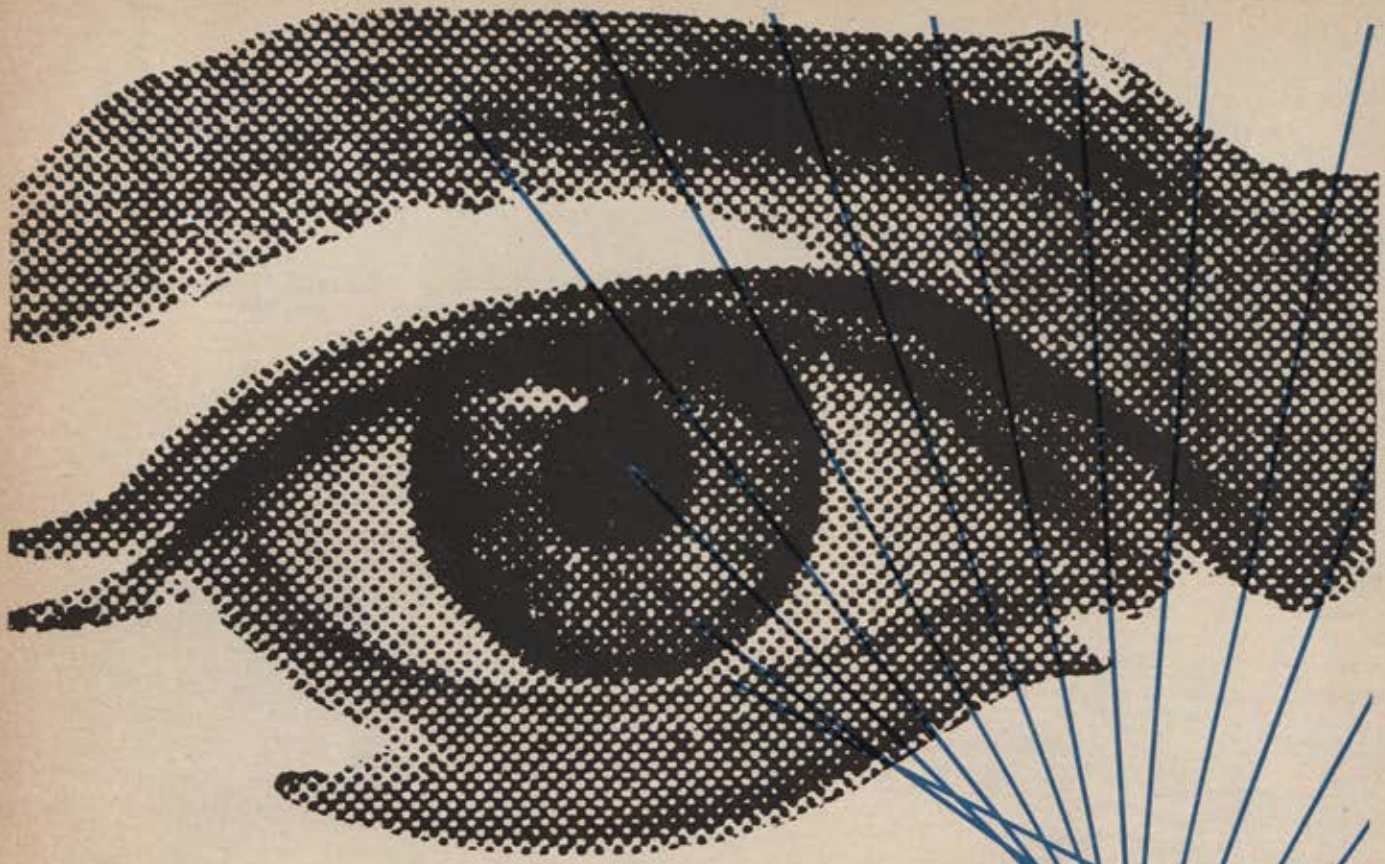

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operations headquarters in the event of an emergency. We could talk with Air Force installations around the world—could, in fact, communicate with any place that can be reached by telephone.

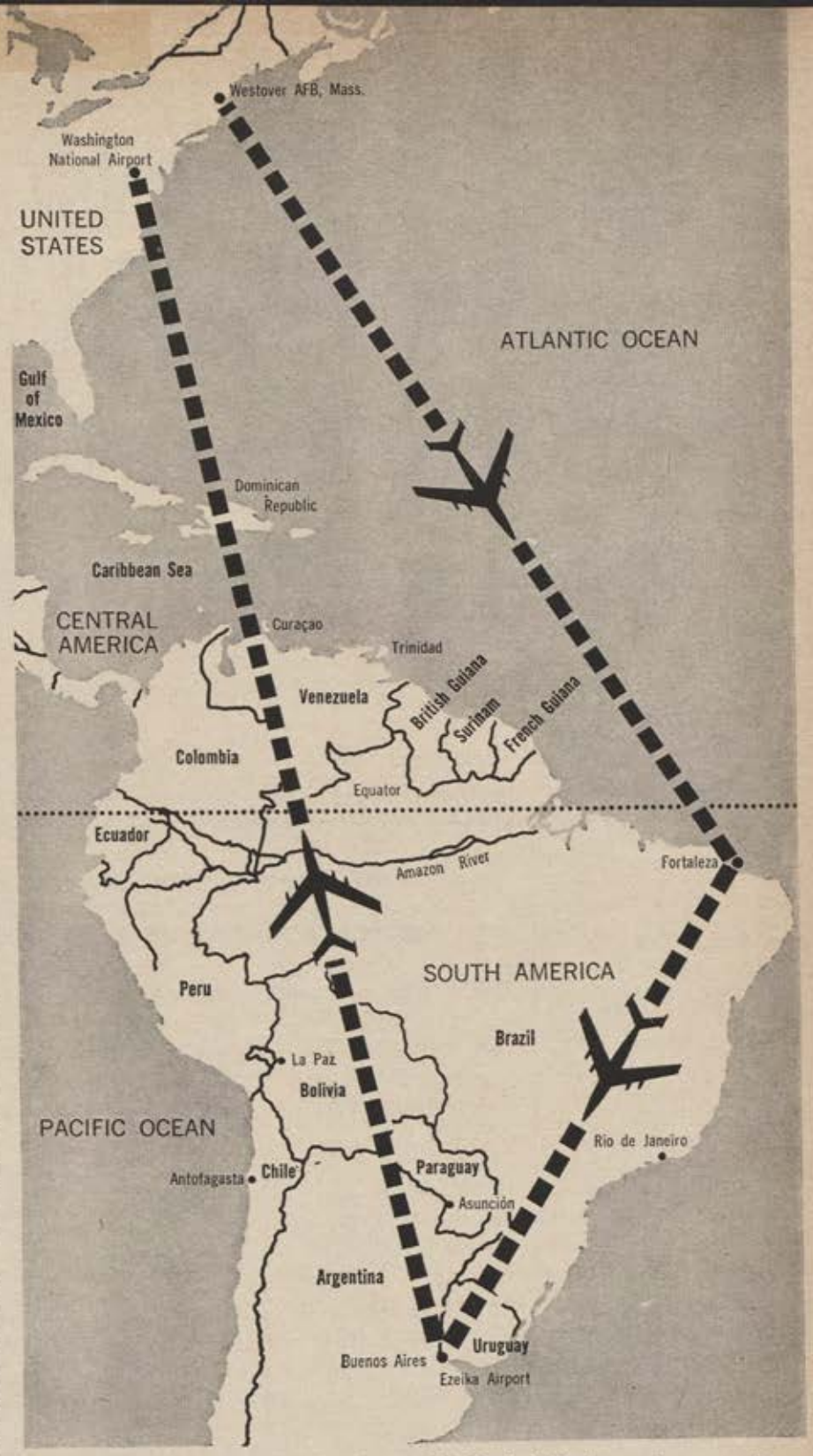
Said Capt. Eugene J. McElroy, chief radio operator: "You'll be able to file your story, or talk with your office, as soon as we take off—and as soon as we clear a couple of priority messages for the General."

Unlike Boeing's 707, which has a stitching of small windows the length of the fuselage, the KC-135 has only two tiny portholes, one on each side, for the main cabin. You are, in fact, in a well-lighted cavern. The KC-135 has a gross weight of more than 250,000 pounds, can carry eighty passengers or twenty-five tons of cargo, or a combination of both. All refueling equipment is on a lower deck and fuel is carried below deck or in the wings, so that the upper deck is completely clear for cargo or troops—or for luxurious airline seats as in this model. This particular plane even had carpets on the floor and soundproofing in the walls.

At 6:27.48 a.m. local time (4:27.48 Eastern Standard) General LeMay, an unlighted cigar in his mouth, started the engines. Charles S. Logsdon, official timer for the National Aeronautic Association, noted the exact moment with his stop watch. The big tanker accelerated slowly at first. At 6:28.17 it crossed the official starting line in the geodetic center of the east-west runway. The four Pratt & Whitney J-57 engines thundered out their 40,000 pounds of combined thrust. At last I felt the wheels lift off the ground. Logsdon timed the moment we became airborne at 6:28.46.

Swiftly the jet climbed through the overcast that had blanketed Buenos Aires. Soon the plane was in fine spring sunshine. The flight plan called for a climb to 35,000 feet to start the cruise, and then for picking up additional altitude as the fuel load lightened. Four hours after takeoff the

(Continued on page 75)



Long way down, short way home of General LeMay's flight is traced on map above.

American Ambassador Willard L. Beaulac; Brig. Gen. Alfredo Juan Vedoya, Argentine Air Force Commander in Chief; and USAF Gen. Curtis E. LeMay troop the line as General LeMay arrives in Buenos Aires after setting record.

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The Magazine of American Airpower

KC-135 would attain and remain at its best cruising altitude of 40,000 feet.

Half an hour or so after takeoff LeMay turned the command over to the senior of the three regular pilots aboard—Capt. Charles L. Gandy, Jr.—and came back for a chat. "How about that takeoff?" he was asked. "Bet you used every inch of that runway."

LeMay acknowledged there hadn't been much room to spare. "There must have been a sudden lull in the wind down at the far end of the runway, because we took longer to get off than I had expected," he said. "It's amazing how you can figure out the runway length you have to have, almost to the last pound of fuel."

The General unrolled a series of charts and pointed out the course he had penciled there, straight as an arrow, 5,204 miles from Buenos Aires to Washington, D.C. "We're going in to National Airport, not Andrews AFB," he said. This would be the first time that the Civil Aeronautics Administration, fearful of noise complaints and general safety hazards and airline interruptions, had permitted a heavy jet plane to land at Washington National.

Marking the hours in terms of Eastern Standard time, LeMay noted that at 5:30 a.m., about an hour after takeoff, the plane would be 230 miles southwest of Asunción, Paraguay; at 6:30, 480 miles east of Antofagasta, Chile; 7:30, 285 miles east of LaPaz, Bolivia; 8:30, 175 northeast of Rio Branco, Brazil; 9:30, sixty miles west of Santa Fe, Brazil, and about 145 miles south of the equator; 10:30, twenty west of Pauchi, Venezuela; 11:30, eighty-five southwest of Curaçao; 12:30, crossing the Dominican Republic.

The General also announced that he had taken aboard a supply of the morning's Buenos Aires newspapers. "I'm going to have them delivered this afternoon in Washington—to the White House, the Pentagon, the Argentine Embassy, and the National Press Club," he said. "I'm surprised some of you writers didn't think of that one."

As on any good airline, there was coffee on board. Later A/1C Wayne K. Worden, the crew steward, served a hot steak-and-potatoes meal. After the meal, a frontal area, with some turbulence, rocked the plane even at its high altitude. LeMay fretted that he was ten minutes behind the flight plan. The speed ranged from 483 to 520 miles an hour. There was tropical jungle far below, but up there outside the plane the temperatures were fifty to sixty-seven degrees below zero. The KC-135 was comfortably heated, and so quiet it was easy to talk. Some of the persons aboard read, others slept.

LeMay took the controls for another spell and then returned to the cabin. He sat down at the radio operators' bench. Static was so bad that little of the news copy and message material had been sent.

At 9:15 a.m. we crossed the Amazon, a winding ribbon of brownish-gray cutting through the solid dark growth. The vast tropic wastes of northern Brazil rolled out for 150 to 200 miles, green and gray splotches, dotted thickly with small white clouds reaching out to the horizon.

At 9:30 Capt. Howard T. Dries, navigator, reported the equator below. About 10:00, over the Colombia-Venezuela border, the static cleared away and Captain McElroy and M/Sgt. Harvey H. Arnold started moving the stacked-up news copy, dictating first to one and then another Air Force station.

At 11:15 LeMay, at the radio bench, was informed that there would be a welcoming ceremony at Washington, and that Gen. Thomas D. White, Chief of Staff, would award him the Distinguished Flying Cross and would also decorate the other members of the crew. By that time the plane had left South America and flown out over the Caribbean. We were in the home stretch.

Because of the high altitude of the flight, there had been little sensation of speed. Now, at the start of a long and gradual approach to National Airport, the KC-135 rolled from side to side a few times. For the first time there was a sense of greatly rushing forward movement.

The descent was so gradual, so unlike that of most jet approaches, that in the windowless interior of the plane there developed an uncanny feeling of suspended animation. The engine throb was so steady and low, and the plane itself so free of vibration, that it seemed as if the craft had already landed and come to a stop. I unfastened my seat belt and went to the porthole, and was amazed to see clouds drifting by. We were still in the approach pattern. I sheepishly returned to my seat, but I noticed that others too had left their seats to glance out, thoughtfully. I was not alone in my confusion.

At last there was the slightest touch of movement underneath, and then the throbbing sound of turning wheels. We were home.

Logsdon quickly gave us the official data, before anyone had left the plane. We crossed the finish line at 3:33.17.8 p.m., EST. The average speed had been 469½ miles an hour, and the elapsed time from Buenos Aires, eleven hours, five minutes, and 4/5 seconds.

A jet speed record between the two major capitals had been established. —END

Wide World Photo, Inc.

Home again at Washington National Airport and being greeted by Air Force Secretary James H. Douglas and Chief of Staff Thomas D. White prior to DFC award.

ABOUT THE AUTHOR

His ride on the KC-135 wasn't the first flight for veteran Associated Press reporter Haugland, who covered the air war in the Pacific in World War II, and had a Silver Star pinned on his pajamas by General MacArthur after bailing out of a B-26 in 1942. A native of Minnesota, he's covered aviation for the Associated Press since 1952.

Getting in close is just part of the hazardous job as Air Force firefighters quench B-36 blaze at Ellsworth AFB, S. D.

AIR FORCE CAREERS

NO. 13 OF A SERIES

AIR FORCE FIREFIGHTERS

By Flint O. DuPre

ON AUGUST 12, 1957, Maj. Aloysius Xavier Hiltgen, taking his fifteen days of annual active-duty training at Phelps-Collins ANG Base at Alpena, Mich., took off shortly before noon in an F-84F on a gunnery-training mission. At fifty feet altitude, his engine failed and his plane smashed into a marsh near the base, hit a stump—shearing off the plane's nose section—and nosed over in four feet of muddy water (*see cuts below*).

Trapped in the cockpit, stunned and injured, Major Hiltgen righted himself and fought for breath in the fumes that leaked into the cockpit.

Within seconds, base firefighters were alerted, and were on the scene in a few minutes, despite the hip-deep swamp. Using foamite, they prevented a blaze, then faced the touch-and-go problem of cutting a hole through the bottom of the belly-

1 Rescuers were only minutes away as crashed F-84 lay belly-up in swamp with unconscious Major Hiltgen inside.

2 Quickly alerted aid arrived at crash scene and charted the difficult job of extricating pilot trapped in plane.

3 Firefighters hacked away at wreckage, after taking important precaution of preventing blaze by use of foamite.

up fuselage to extricate the pilot. They ruled against using oxygen because of the ever-present fire hazard from sparks as they chopped through fuel cells and airframe with fire axes. To pass rescue equipment and other items back and forth, they formed a human chain.

After forty-five excruciating minutes, Major Hiltgen was pulled out, in a coma, but alive. He was back on duty a few weeks later.

• • •

The men who performed this heroic teamwork were Air Force firefighters, members of a little-publicized but vital team working in a career field devoted to the preservation of life and the protection of the expensive hardware of defense.

Not every day are they involved in dramatic exploits like the rescue of Major Hiltgen, but, like their civilian counterparts, they must be ready to handle any emergency at any time. And they must stand ready to fight fire in the sub-freezing cold of Greenland or the smothering heat of the tropics.

Their tradition is a proud one, summarized well in the words of one Air Force fire chief, O. L. Hacket, a smoke-eater for most of his mature years, who told a questioner who was watching a blaze at Ramey AFB, Puerto Rico, that "it takes fire to make a fireman."

The observer had asked Chief Hacket how you got men to walk into a raging blaze. And Chief Hacket explained that only genuine training with actual fires could produce full-fledged firemen. It's one job that can't be taught by the book, which is the reason the Air Force firefighter training approach uses actual blaze conditions in the training of its firemen.

Much of the firefighter's work is routine, but anything can happen any time.

On a southern base, not long ago, as a jet fighter squadron was landing after a long training flight, one of the planes exploded. Firemen were on the job within seconds, and the pilot's life was saved. This story is repeated over and over in the Air Force. Crewmembers in all types of planes—bombers, fighters, transports, trainers, tankers—say the most welcome sight on any flight line is the fire department with its equipment clearly visible and always on alert. This is especially true for pilots bringing in crippled planes. The fire trucks provide a welcoming committee and have often "killed" fires before they began in earnest.

The number of men and trucks assigned depends on the size of a base. A base that maintains two fire stations —a crash rescue station on the flight line and a structural fire station in a central location—has about 100 men, four vehicles for regular firefighting, two for water supply, and one for rescue equipment. The men generally work twenty-four hours on and twenty-four off, with five to seven crews on duty at all times.

Airmen assigned to firefighting duties are in the 57000 career field. They include superintendents, supervisors, firefighters, and firefighting helpers. Their grade spread includes master sergeant. In addition to the duties already described, they must learn the chemistry of fire and understand the equipment they use. They must be able to administer resuscitation to those overcome by smoke or water, and know how to give first aid on the spot.

Firefighting is one Air Force career field that leans heavily on civilians for its backbone of experienced chiefs and supervisors. One major command, Air Materiel Command, uses civilians entirely, both in the ZI and overseas. Strategic Air Command leans to civilians for chief and assistant chief responsibilities, while Tactical Air Command has forty percent civilians in varied assignments. Other commands have mixtures.

At overseas bases indigenous personnel are used widely, in Japan, the Philippines, Africa, and Turkey, all under American supervision. The same will soon be true in Germany, France, and Spain.

For basic and supervisory airmen and civilians the Air Force operates a firefighting school at Lowry AFB, Colo. But most of the training is on the job. Obsolete aircraft used for firefighting instruction are familiar sights at most bases. Firefighters keep proficient by hacking their way into burning fuselages to get the feel of the fires. This training can be danger-

(Continued on following page)

4 A human life was saved as Major Hiltgen, alive and soon to recover, was rescued, after forty-five hard minutes.

ous, but it is vital in preparation for the real thing. The men learn to use power tools to reach dummies in burning planes. They gain confidence in themselves and in their equipment for the real tests to come. They learn how to protect themselves from the heat and how to control fire. They learn teamwork—for quick action by fellow firemen can often mean the difference between life and death.

The missile age is imposing new problems on Air Force firefighters, and they're preparing for them. They face potential fires of increasing severity because of the greater fuel capacity of the newer air weapons and the use of "unconventional" fuels such as acids and liquid oxygen. New firefighting agents will have to be developed with more potential volume, and work is already under way on new chemicals to join the present inventory of extinguishers.

Even some of the Air Force Reserve units specialize in firefighting. One such proud organization is the 106th Bombardment Wing's Installations Squadron in the New York Air National Guard, which performs weekend drills at Floyd Bennett NAS, Brooklyn, N. Y., and active-duty tours during the summer at Hancock Field, Syracuse, N. Y. These civilians man the flight line and attend training lectures. Like those in other Reserve units, they are making themselves ready for any eventuality in the future.

Like practically everything else in the Air Force, firefighting is a big business and through good management can mean the difference in millions of dollars saved each year. Consequently, the Air Force is ever on the alert for techniques that will lessen the loss of life and property. Competition among firefighting units is a tradition.

Air Force units participate in the annual fire-prevention contests, sponsored by the National Fire Protection Association. Each major command picks its outstanding bases, and competition is spirited. The Air Force grand award in this competition last year was earned by Pepperell AFB in Newfoundland, with fire losses of less than $500 in a single year.

Air Force experience in fire-prevention measures is under constant study by civilian airports. The Air Force pioneered what is now accepted as a standard fire report form. The National Fire Protection Association at Boston has adopted the four-page Air Force form as its standard and regularly invites Air Force firefighters to sit in on board meetings on fire prevention.

The fire report form covers such items as the aircraft or missile involved, fuel on board, pre-accident status of aircraft operation, airfield type and condition, type of accident, dead or injured, methods used in rescue, terrain, alarm method time, weather, monetary loss, extinguishing agents used, diagram of accident, and recommendations to prevent similar fires—a veritable catalog of Air Force experience in the life-and-death business of firefighting.—END

ABOUT THE AUTHOR

Flint DuPre, a civilian employee of the USAF, in the Office of Information Services at headquarters in the Pentagon, has written this series on AF careers for us for more than a year now. Mr. DuPre has been connected with AF information programs, both in and out of service, since 1942. A veteran newsman, he was formerly the sports editor of the Dallas Journal.

Make Your Reservations Now for AFA's 1958 Convention in Dallas

Seven air-conditioned hotels have set aside 2,500 rooms and suites for the Air Force Association's 1958 Convention and Airpower Panorama in Dallas, Texas, September 25-28.

There will be three Headquarters Hotels, as follows:

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Reserve & Guard ..... Baker
Industry ..... Statler Hilton

The major Convention events will be held in the new Memorial Auditorium, location of the Airpower Panorama. AFA business sessions will be held at the Adolphus Hotel; the Reserve Forces Seminar at the Baker; and the VIP Host Suite will be at the Statler Hilton.

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SOUTHLAND	4.50— 7.50	5.50— 8.50	6.50—10.50	16.50—17.50 No 2-bedroom
STATLER HILTON	7.00—13.00	10.00—15.00	12.50—18.00	20.00—38.00 41.00—56.00
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_____ (Type Room) ( ) Low ( ) Average ( ) High (Desired Rate)

OTHERS IN ROOM_____

ARRIVAL DATE & HOUR_____

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With Data Link Systems, messages that have been translated into on-off pulses can be transmitted by any of the common modulation schemes with a suitable carrier. The transmitter can be air-borne, ship-borne, or land-based. Received messages are amplified, decoded, and transformed into a form suitable for display, or stored for some future time, or used for direct control through auto pilots, for example.

One of the Data Link Systems designed at Motorola utilizes an all-transistor converter-coupler, packaged in modular form. The total system consists of eight modules, each approximately 4" x 8" x 1½". The fully transistorized circuitry is of the highly reliable diode-matrix type logical circuitry used in many digital computers. The switch type transistors employed are a product of the Motorola Semi-Conductor Division. Indicative of the stringent testing program to which the transistors are subjected is a 1000-hour life test at 85° C.

For another Data Link program, Motorola has designed a system featuring resolver-type outputs. A single time-shared servo amplifier positions anyone of the five resolvers in accordance with commands from the ground transmitter.

These two Motorola Data Link Systems aimed at solving one of the important communication problems of the missile age are examples of the complex programs conducted by Motorola for varied military needs.

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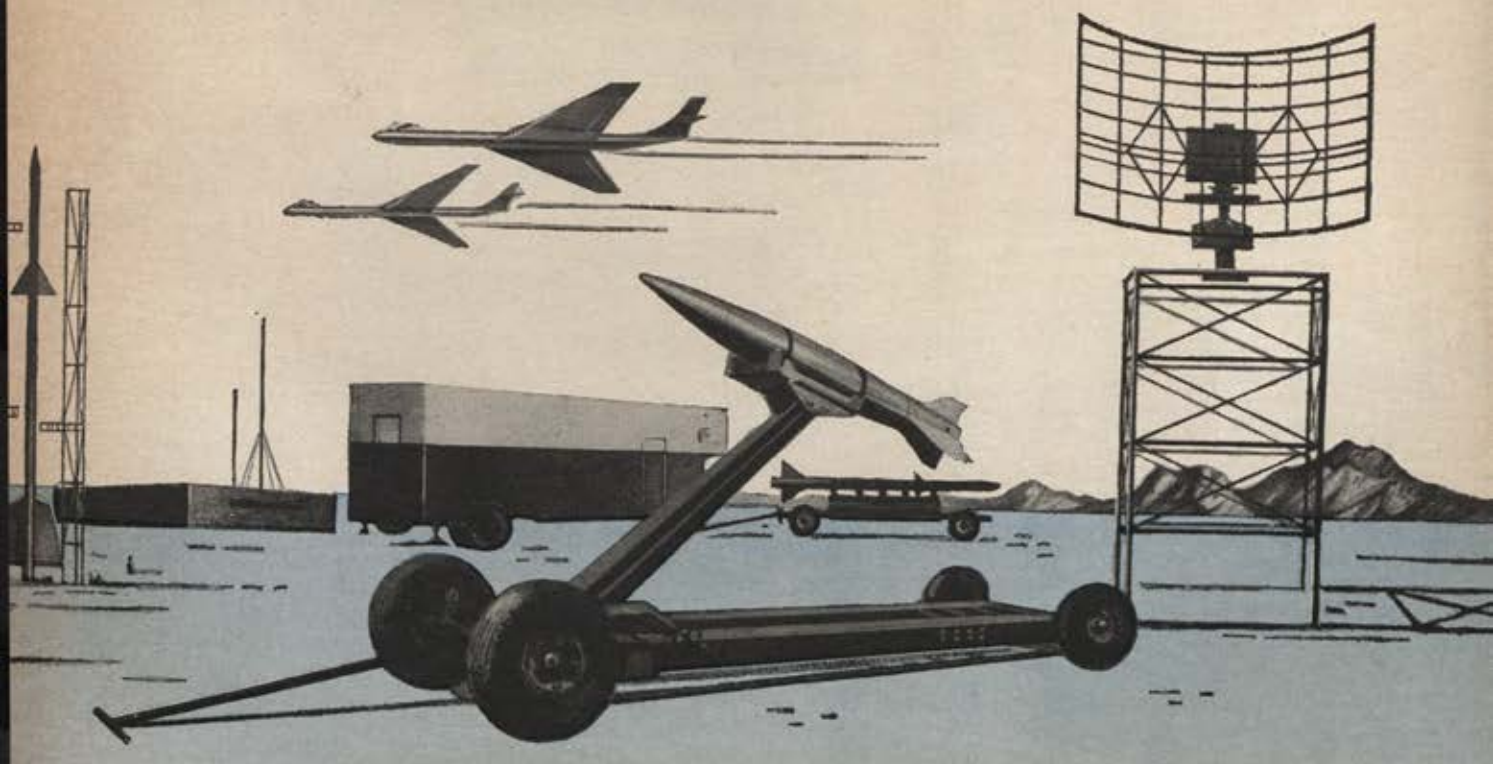

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Tech Talk

By Bob Strobell

North American Aviation's F-107A fighter-bomber (*see cut*) has been delivered to the **National Advisory Committee for Aeronautics** for **supersonic testing** and compilation of research data at NACA's High-Speed Flight Station, Edwards AFB, Calif. NACA studies will include investigation of control characteristics of an airplane with an **all-movable vertical tail,** in-flight evaluation of the **overhead air inlets for the engine,** and a general analysis of flying qualities of the F-107A.

General performance data of the needle-nose, sweptwing craft reveal that it flies **Mach 2** in both level and climbing flight and **exceeds Mach 1 in a vertical climb.** Air speed of the F-107 is in excess of **1,300 mph.** The design of the overhead duct was to give maximum efficiency to the **Pratt & Whitney J-75** jet engine which is rated in the 20,000-pound-thrust class.

A spoiler system of **hinged doors** on both upper and lower wing skins operates to control aerodynamically **air passage over and under the wings** during high-speed maneuvering. These spoilers are used for **lateral control** instead of conventional ailerons.

North American's F-107A single-engine jet fighter-bomber can exceed Mach 1 in a vertical climb. Spoilers on upper and lower wing surfaces rather than ailerons are used for lateral control. Overhead inlets above canopy admit air for the Pratt & Whitney J-75 engine. NACA is flight-testing the fighter at Edwards AFB, Calif.

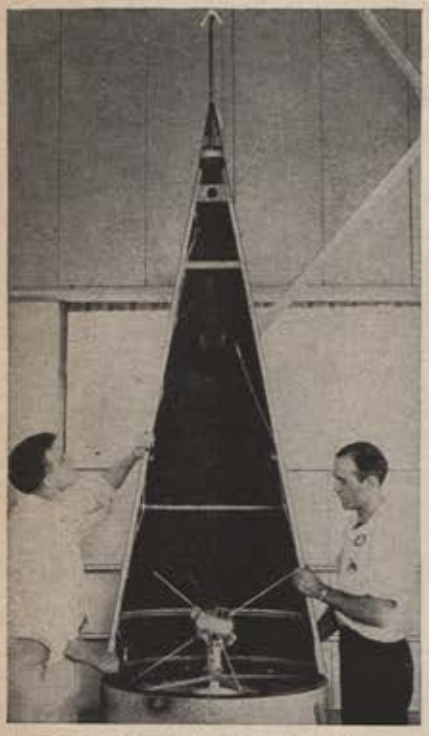
Cornell Aeronautical Laboratory reports it is testing the world's **first supersonic basic trainer** in its **1,000-mph wind tunnel.** Extensive stability tests have already been performed in the tunnel on a model (*see cut*) of **Northrop's T-38** and additional tests are now under way. The T-38 is scheduled for actual flight testing in 1958. Tests under way in the Cornell wind tunnel will substantiate the type of performance the designers can expect from the high-speed trainer.

Test model of Northrop's T-38 supersonic basic trainer is shown preparatory to testing in the 1,000-mph wind tunnel at the Cornell Aeronautical Laboratory.

Lockheed rolled its **new propjet Electra** (*see cut*) out early in November, one month ahead of schedule. Especially designed for **fast, economical operation** over **short-to-medium routes,** the Electra cruises in excess of **400 mph** carrying from **sixty-six to ninety-one passengers.** It is slated for service on five continents. Wingspan is ninety-nine feet, length is 105 feet, and the vertical fin stands thirty-three feet above the ground. Four 3,750-hp **Allison Model 501 propjet engines** swing thirteen and one-half foot **Aeroproducts four-bladed propellers.** The low propeller tip speeds, plus forty-inch clearance between inboard propellers and the fuselage, provide an

(Continued on following page)

Lockheed Electra, the propjet airliner, will cruise in excess of 400 mph, carrying up to ninety-one passengers over short-to-medium range commercial air routes.



Martin workers examine phenolic nose cone for the Vanguard test satellite.

almost vibrationless ride. Single-point pressure fueling reduces on-the-ground time to a minimum.

Raybestos-Manhattan, Inc., has supplied a unique material for the **nose cone of the Vanguard** rocket of the US satellite. The cone, which is approximately six and one-half feet long and thirty inches in diameter at the base, is made of a new **plastic phenolic** developed by its **Reinforced Plastic Department**, Manheim, Pa. The function of the nose cone is to **streamline the rocket** and **insulate the enclosed satellite** from friction-generated heat encountered in the high-speed upward flight which will reach an altitude of **300 miles** and a speed around **18,000 mph.** The nose cone will also protect the seventy-two-foot-long rocket from ram effect due to **aerodynamic loading**, the forces acting on the rocket while it accelerates to altitude. The cone material is an asbestos-reinforced plastic identified as Pyrotex felt. It is molded by the **Martin Company** in two parts so it can **split apart** (*see cut*) and drop off when the rocket is above the densest part of the atmosphere. The material was selected for this leading role because of its **light weight** and ability to **retain strength** at temperatures above 1,000 degrees Fahrenheit.

A huge **centrifuge** that can exert a force equal to a **hundred times the pull of gravity** on test components of the Atlas ICBM has been installed at the new **Convair-Astronautics** plant. One of the most powerful machines of its type in this country, the equipment was designed and built by the **Rucker Company of Oakland, Calif.**, to specifications established by Convair Division of General Dynamics Corp. The centrifuge is one of many devices used to test ICBM components by subjecting them to extremes of stress, vibration, and temperature.

The machine is designed to whirl objects weighing up to **2,000 pounds** at **121 revolutions a minute** at the end of a twenty-foot boom. At full speed, the items under test are traveling about **170 mph.** The machine also is designed to subject test components to **extremes of temperature and acceleration simultaneously.** Temperatures ranging from **100 degrees below zero** to **350 degrees Fahrenheit** can be created in the missile-shaped test compartment (*see cut*) at the end of the boom. Components are bolted into the sharp-nosed steel test capsule.

Now being produced for SAC is Boeing's new model of the B-52, designated the B-52E. Although it has the same general appearance as its predecessors, the B-52E operates with improved bombing, navigation, and electronics systems. Equipped with eight jets, it has a range of approximately 6,000 miles, a speed of 650 mph, and an operational altitude of 50,000 feet. The new model measures 156 feet in length, and has a wingspan of 185 feet. Its tail is forty-eight feet high.

Westinghouse says it is investigating **new "wonder" metals** by heating them thousands of degrees above white heat, while they float, freely suspended in space. Called **levitation melting**, this unique and versatile technique was invented by Westinghouse research scientists and brought to its present state of development by the combined efforts of **Westinghouse Research Laboratories** and the **University of British Columbia.** Levitation melting is used to prepare highly-purified laboratory-scale ingots of **niobium, zirconium, titanium, molybdenum,** and dozens of alloys for research purposes.

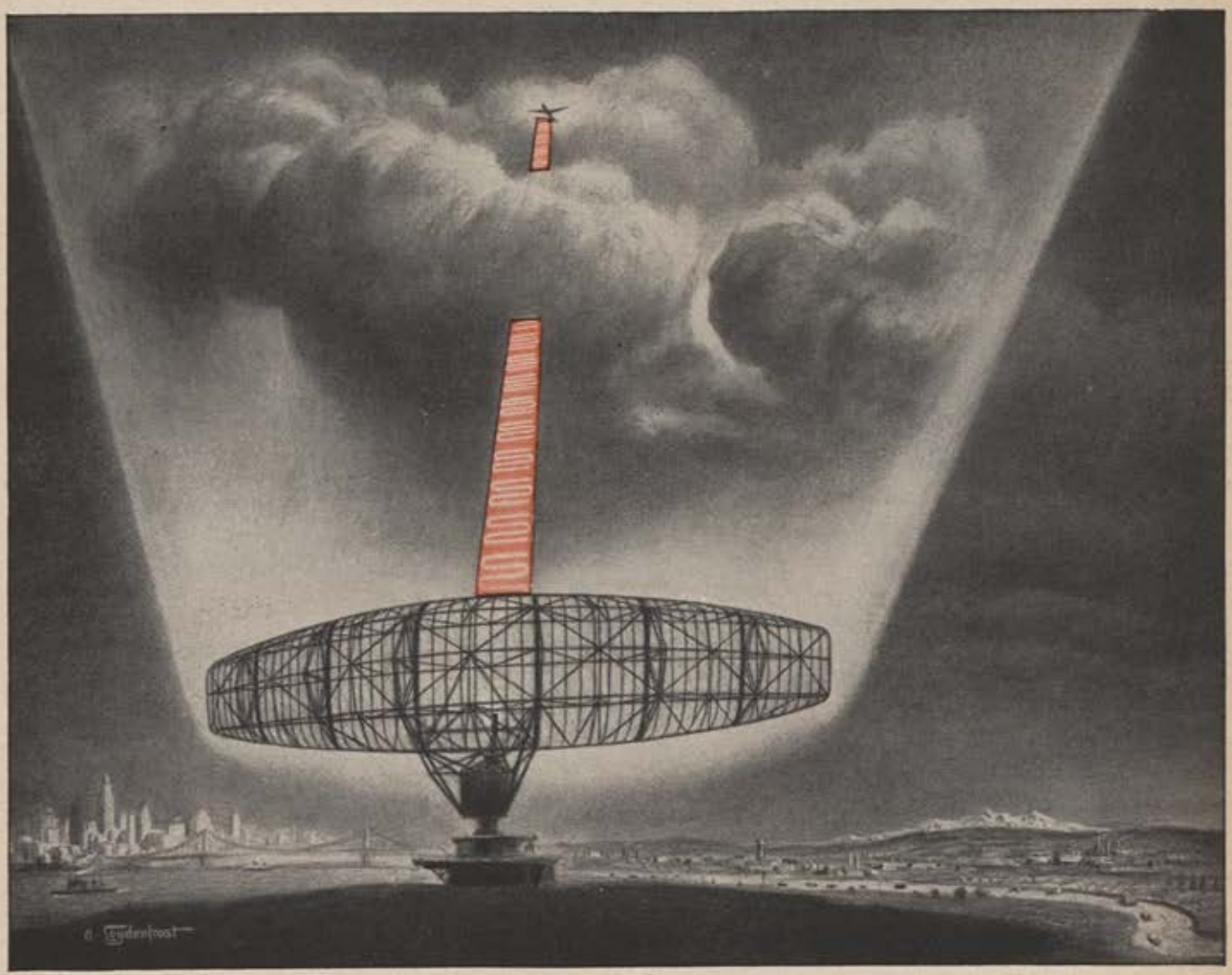
In levitation melting, compressed metal powder is placed **inside a copper coil** which carries a high-frequency current of electricity. Reversing its direction nearly **a million times a second**, the electric current generates a **field of force** which floats the metal charge inside the coil. At the same time, it converts the metal into a white-hot molten mass in a matter of seconds. Temperatures of **4,500 to 5,000 degrees** Fahrenheit are achieved in half a minute or less, melting all but the most stubborn of metals.

At white heat, metals such as nio-

(Continued on page 85)

Huge centrifuge to be used at Convair's Astronautics Division for testing of ICBM components was made by Rucker.

White hot metals float free in coils in Westinghouse's process of levitation melting used for metal testing.



C.A.A. buys 23 new Raytheon "Flight-Tracker" Radars

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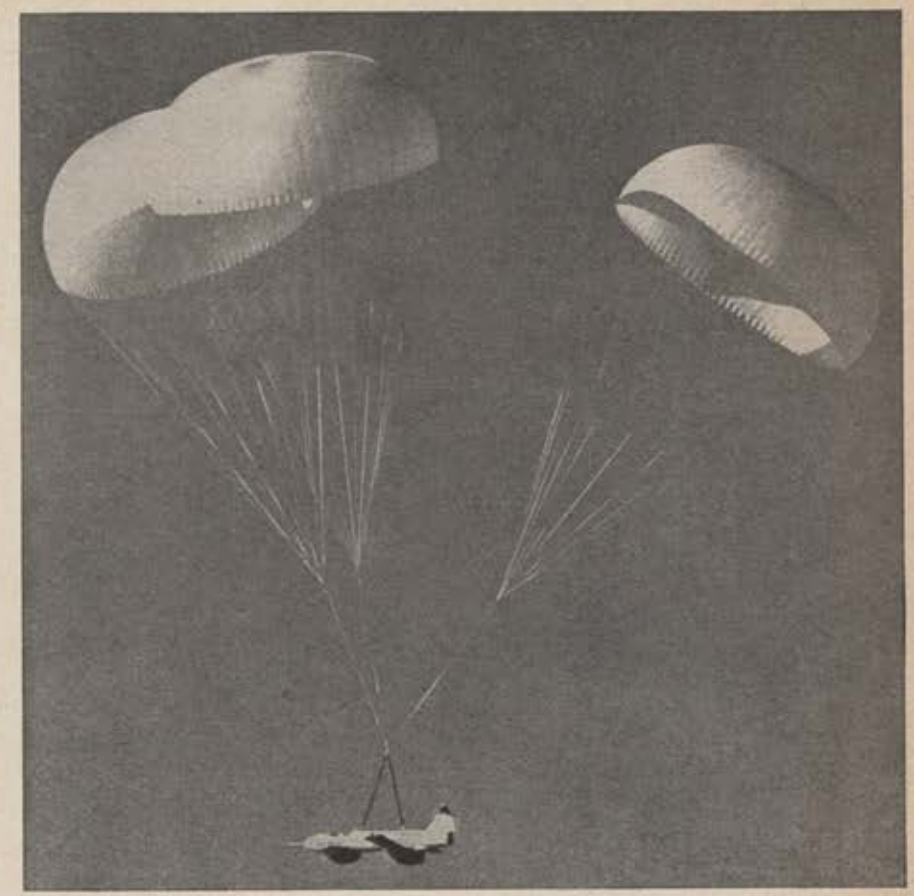
bium and titanium react chemically with any known vessel in which they are melted. The traces of impurities they pick up cannot be tolerated in research on the pure metal. Levitation process eliminates this problem.

The **Air Materiel Command** and **Hamilton Standard** report that a new and advanced **Hydromatic propeller** has been selected for an advanced "B" version of the **Lockheed C-130 Hercules** propeller-turbine transport. The new propeller is tailored to the C-130's requirements, incorporating new safety and performance features. Thirteen and one-half feet in diameter, it is equipped with four **solid aluminum alloy blades** and has an **independent source of oil** with its own pumping system to provide hydraulic power for pitch changing.

Some of the difficult aerodynamic problems associated with **reentry speeds of missiles or hypersonic planes** are being investigated in **"Tunnel Hotshot"** at ARDC's **Arnold Engineering Development Center,** Tenn. The tunnel has special rapid-response instrumentation which permits **measurement of pressure and heat transfer distributions** during the test runs which have lasted up to a twenty-fifth of a second. Temperatures over **15,000 degrees Fahrenheit,** and speeds from **Mach 10** to approximately **Mach 20** have been generated in the electric-arc-driven intermittent tunnel, providing realistic simulation of actual flight conditions (*see cut*). Tunnel Hotshot is operated for use by various companies of the aviation industry in accelerating development of weapon systems projects.



Until recently, the USAF Martin TM-76 Matador jet-powered guided missile had been a one-shot weapon, plunging to destruction at the end of its flight, but with a new kit developed by Martin, the Matador can now be recovered after use by means of controlled drag chutes, operated by an MSQ radar command system. The new system is a boon to post-flight examination, will aid training.

Ready for test, Hamilton Standard's Hydromatic prop for Lockheed's C-130B.

Force of air in ARDC's "Hotshot" tunnel provided light for this photo.

Bell's XV-3 convertiplane in NACA's Ames Laboratory during tunnel test.

Bell Helicopter Corporation's XV-3 convertiplane has successfully completed **full-scale wind tunnel tests** (*see cut*) and will resume test flying. The convertiplane has been returned to the Bell plant following extensive testing through **ninety-degree conversions** and all speed ranges in both airplane and helicopter configurations in the forty-by-eighty-foot full-scale wind tunnel at **NACA's Ames Laboratory.**

The six-week wind tunnel test program, during which 120 hours of powered tests were conducted, was established to check out the stability, control, and vibration characteristics of the aircraft, equipped with the new two-bladed semirigid rotor system. Test speeds reached more than 170 miles per hour. The XV-3 is a tilting rotor type convertiplane with rotor-propellers at each wingtip. For landings and takeoffs, its rotor-propellers are perpendicular to the wing. It is being developed for the Army.—END

JET BLASTS

LET'S HAVE YOUR JET BLAST

In "Jet Blasts" you can sound off on any subject you want. We'll pay a minimum of $10 for each "Jet Blast" used. All letters must be signed but we'll withhold names on request. Keep letters under 500 words. "Jet Blasts" from service personnel do not necessarily report official policy.

RIF-Shmif! So What Did You Expect?

Several ships could be sunk by the copious tears being shed by riffed reservists. Other dreaded RIFs to come are making many other active-duty reservists tremble worse than teenage girls listening to Elvis the Pelvis.

The sale of aspirins and stationery, as a result, is now reaching a new high. The riffed reservists are writing letters, these days, to the following (not necessarily in this sequence):

1. Protestations to Congress;
2. Assertions to the Department of Defense;
3. Denunciations of the Defense Department to news media;
4. Accusations of unfair play to their commanders;
5. The French Foreign Legion.

From the plaints and complaints ricocheting around, you might imagine that the RIF program is a hellish happening deliberately created by the Air Force to undermine military careers. There's nothing new about the RIF. Like Adam, we've had 'em. And we'll continue to have 'em.

The anguished howls from its victims, however, is nothing new. And those howls bewilder me. For this basic reason: the active-duty reservist, a supposedly mature character, should realize that he never did receive a contract, a promise, IOU, or wink that he would complete his twenty years on active duty—and *that he*, therefore, was vulnerable to the infamous RIF program, as his brothers-in-arms were in previous years.

Why, then, the literary lung lamentations?

I grant you it's unfortunate. The riffed reservists rate sympathy and I'm the most sympathetic guy I know of. But mouthing murderous maledictions and angry accusations on the bloody but unbowed pate of the Air Force is another matter. You get a blitzed budget you never wanted, you bleed the budget, and then you're anemic.

Sure, it's rough on the guy who's given ten years or more of his life to the military. He's a retread and he has to start from scratch again. It ain't easy and his future is clouded. The kids need new shoes and where in hell's the two bucks coming from to lay on that nag in the second at Pimlico? Further, pride takes a woeful whopping. But, honestly, is it fair to point the accusing finger at the Air Force?

I won't come out with the corny cliché that it's survival of the fittest. Many of our riffed reservists are top men and you've got to be the world's biggest optimist to believe that kept men, you should excuse the expression, are indispensable. But that's the way the pizza plops.

Obviously, each active-duty reservist has his own particular problem. Listening to each one would fill a year's issues of *The Congressional Record*. For instance, some reservists never desired integration, and for concrete conclusions. Take me, for example:

I have seventeen active duty years as a reservist racked up. I'm a permanent light colonel, under ROPA. I wasn't a youngster when I enlisted. None of your business as to my age—suffice to say that my paunch is getting bigger all the time and I pant frighteningly when I tie my shoelaces.

If I had shot in papers for integration (and the chances for it with my rank are exceedingly dubious), I would have to take a bust to major in my permanent rank and have to start sweating all over again. Then, I'm rock-and-rolling into my last three years, and, being an "old buck," I'm looking forward to and longing for permanent residency in some hospitable hamlet. There are other personal reasons, but that, too, is my business.

I'm a singular case? In a pig's patootie! Okay, I'm vulnerable under the RIF program until I reach eighteen active-duty years—or seventeen and a half, as amended. Sure, I've given a lot to the Air Force, but the Air Force has given a lot to me. Years back, when I thought of getting out of service, I made a survey of my chosen career—the news-writing profession. I discovered that the competition was as keen as ever and that editors and publishers weren't shoving contracts under my nose.

The frau and I did a quick mental inventory. I had a position of responsibility, rank, and respect with the Air Force, which seemed satisfied with my output. I realized there was a calculated risk in making it a career as a reservist, but the opportunities, along with the pay, prestige, overseas duty, et al, were worth it. We never regretted the decision, despite the RIF sword of Damocles hanging overhead.

Could I honestly bellyache if that sword punctured my proud posterior?

I suppose it seems smug of me to sit back and relay my convictions, now that I almost have it "made." But I've been in the precarious position of thousands of active-duty reservists now sweating it out with less than seventeen years.

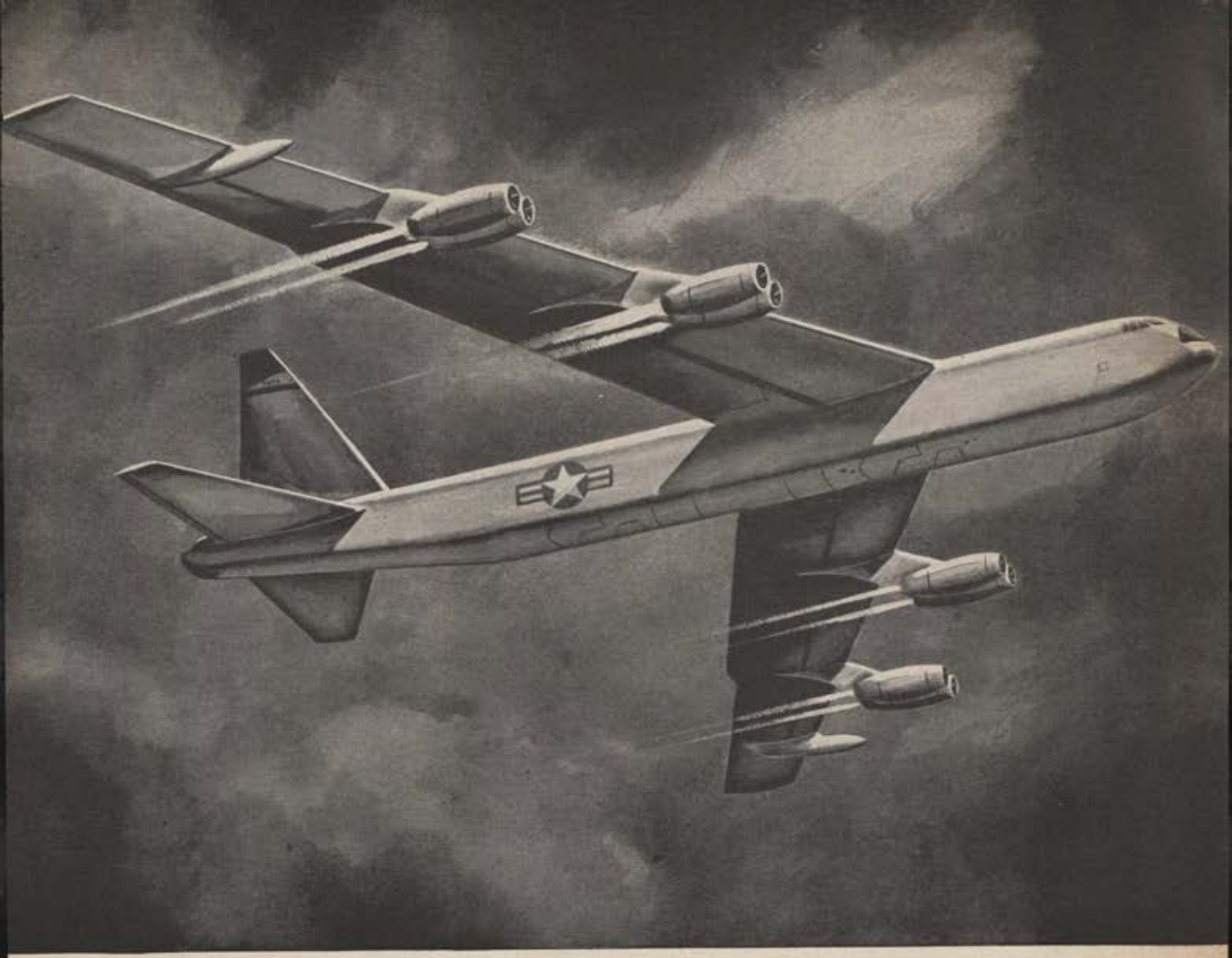
A feeling of bitterness is a natural reaction to being riffed, I admit wholeheartedly. But getting on a platform and pulverizing the air at being crucified, or pouring verbal venom into correspondence, is unhealthy and unjust. I'll go so far as to say that I'd probably emit every four-letter word in captivity, if I were bounced, but I'd do it in my inner sanctum.

I am cognizant of the fact that my not-so-deathless prose may very well make me as popular as a potted porcupine . . . with the riffed reservists. I'll even probably alienate friends and lose people. I'll risk that.

All I do want to get across is that the riffed reservist is something less than mature if he has imagined himself immune to the chopping block and then screams imprecations at the Air Force.

—Lt. Col. Franklin Hibel

Lt. Col. Franklin Hibel enlisted in the Army Air Corps in 1940. During World War II he served as public relations officer of the 7th Fighter Command and later as officer in charge of the Armed Forces Press Service. Colonel Hibel is now editor of The Air Reservist *magazine in Washington, D. C.*



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AFA NEWS

SQUADRON OF THE MONTH

Cleveland, Ohio, Squadron, Cited for

its community services in producing and sponsoring airpower programs for other organizations. This responsibility, accepted when the Charter is granted, has been discharged well in Cleveland.

For special honors this month we chose the **Cleveland Squadron,** which has come back to life with a rush in the past year, under the leadership of **Willard Dougherty,** present Commander, and Erwin Cooper, Past Wing Commander.

The Squadron has sponsored several fine programs, including an Outer Space Symposium, and one recent event—an airpower program for the Kiwanis—was especially productive. The luncheon attracted such a large crowd, that for the first time, the Club had to meet in a larger room.

At the crowded meeting, **Col. Harley C. Vaughn,** Commander, 79th Fighter-Interceptor Group, ADC, spoke on the air defense of the city and the role of the F-102. All Cleveland newspapers and radio and television stations covered the event. As a direct result of this program, the Squadron is cooperating with the Kiwanis Club in sponsoring Kid's Day tours of Ohio SAC and ADC bases next spring.

Inspecting one of the Air Force exhibits at the Cleveland program *(see text)* are, left to right, Robert Skidmore, president of the Downtown Kiwanis Club; Willard L. Dougherty; Reserve Center's Lt. Col. Fred Harshfield; Col. Harley C. Vaughn, 79th Fighter-Interceptor Group Commander; Fred Faile, retiring Kiwanis president; and Erwin Cooper, AFA Program Chairman and Past Ohio Commander.

Maj. Gen. Roger J. Browne, Commander, First Air Force until his retirement on November 1, was honored with a round of farewell fetes sponsored by several AFA units in his area, including salutes at the New York Executive Committee dinner and at the anniversary banquet of the Queens Squadron at Idlewild, attended by N. Y. Wing Commander **Bud West** and some 100 others. Honored with General Browne were **Alan G. Binnie,** Kollsman Instrument Co., who received the Industrial Award; **Robert L. Cummings,** New York Airways, who received the Civil Aviation Award; and **Arthur Desmond,** Boy Scouts of America, who was awarded the Youth Education Award. **David Levison** was toastmaster.

Manhattan Squadron also sponsored a testimonial dinner to General Browne at the Hotel Biltmore on October 24, at which 275 leaders of the area turned out to pay their respects. **Jackson Matthews,** a Past Commander, was dinner committee chairman, and **Robert F. Wagner,** Mayor of New York, served as honorary chairman and presented the Squadron's annual award to General Browne, citing his contributions to public relations.

Manhattan Squadron Citation is given to Maj. Gen. Roger Browne by the Mayor of New York, Robert F. Wagner.

Walter Cronkite listens as his citation from AFA New Jersey Wing is read by Lloyd Nelson, Wing Vice Commander.

Maxwell A. Kriendler, President of 21 Brands, and a member of AFA's Finance Committee, was toastmaster. Principal address was delivered by **Gill Robb Wilson,** who spoke on "Roger Browne—The Officer and the Man." The Arnold Air Society National Commander, **Brig. Gen. John E. Boehm,** presented the **AAS Scroll** to General Browne.

Site of the ninth annual **New Jersey Wing Convention** was Asbury Park's Berkeley-Carteret Hotel. **John Currie,** former Wing Commander and National Director, served as convention chairman.

The Wing's **Airpower Trophy** went to the **Prudential Insurance Company** for its sponsorship of the CBS-TV series "Airpower." **Walter Cronkite** was on hand to accept the trophy.

Other awards went to **Reaction Motors** for research and development, **Electronic Associates** for education,

(Continued on following page)

Smiling New Jersey award winners are Fred Martinson, Electronic Associates; W. S. Morgan, Federal Electric Corp.; S. W. Toole, Prudential Insurance Co.; Alanson W. Parkes, Jr., Aircraft Radio Corp.; and R. W. Young, Reaction Motors.

AIA's Orval Cook, left, delivers airmail packet to George Heaney as special feature of Arnold Squadron program.

Federal Electric Corp. for electronic development, and **Aircraft Radio Corp.** for air safety. **Maj. Gen. Robert L. Copsey,** USAF (Ret.), Chief of New Jersey's Bureau of Aeronautics; and **Brig. Gen. Donald J. Strait,** Chief of Staff for Air of the New Jersey Air Guard, made the presentations. Strait also served as toastmaster.

Kenneth Hamler, Wing Commander, was reelected as were all the other Wing officers, including **Lloyd Nelson,** Vice Commander; **Mary Herr,** Secretary; and **Enrico Carnicelli,** Treasurer. **Martin Buckler,** Commander of the Capital Squadron, District of Columbia, was a guest.

H. H. Arnold Squadron rang the school bell on October 11, and more than 100 Long Island teachers answered the call to participate in "Classroom in the Sky," fourth in the series of programs designed by the Squadron to reach all segments of the community with the airpower story. For its unique and well-planned series, the Squadron was named "Squadron of the Year" for 1957, and received the President's Trophy at the AFA Convention in Washington.

The morning was spent in airlifting the educators in planes furnished by USAF, Grumman Aircraft, and Sikorsky Division of United Aircraft to give them an air view of Long Island. At the same time, a helicopter carrying community leaders was flown from MacArthur Field to LaGuardia Airport, with several stops en route, to demonstrate the feasibility of Island airmail service, and the value of an improved postal service to the development of the economy.

Orval Cook, President of Aircraft Industries Association, addressed the luncheon, which was followed by a panel discussion on career opportunities in the air age.

Lou Davis, Arnold Squadron Commander, headed the committee which originated the "Classroom."

Maj. Gen. Jacob E. Smart, USAF Assistant Chief of Staff, accepts portrait of Gen. H. H. Arnold from District of Columbia's Charles DeF. Chandler Squadron, for presentation to Air Force Academy, where it will be placed in Arnold Hall. Seated at the table are Warren Smith, Maj. Gen. Lucas V. Beau, USAF (Ret.), Squadron Commander, and Stephen F. Leo, a member of AFA's Board of Directors. All are members of the Squadron's Executive Council. The portrait is the work of the world-renowned portrait photographer, Karsh of Ottawa. It has since been accepted on behalf of the Academy by Maj. Gen. James E. Briggs, Commandant.

The annual **Colorado Wing Convention** was held on November 3 at the Broadmoor Hotel in Colorado Springs, and featured, for the second straight year, the presence of **AFA's Board of Directors,** plus several national committees. Sixty-five Board members attended the Wing banquet, and heard **Col. Barney Oldfield,** NORAD ISO, speak on community relations problems and solutions.

Decorations in the banquet room included a golden model of the original **Wright brothers'** plane. The eight-foot model was built by **James J. Reilly,** Colorado Springs Squadron Commander.

Ted Stell, Commander of the Denver Squadron, served as toastmaster, and at the business meeting was elected Wing Commander for 1957-58. He succeeds **Paul Canonica.**

Canonica presented the annual Wing awards, and introduced the Wing's Miss Airpower, **Diana Ross,** of Littleton, Colo. **Gwynn Robinson,** former Regional Vice President, and now an AFA Director, received the top Wing citation for his work in developing the Association in Colorado.

The most ambitious program ever

(Continued on page 93)

The General Motors Matched Power Team of Allison Prop-Jet Engines and Aeroproducts Turbo-Propellers Begins a New Flight Program to Further Demonstrate its Versatile Performance for the Military and Commercial Jet Age

SUPER CONSTELLATION DUPLICATES ELECTRA AIRLINE SCHEDULES – Four Allison 501 Prop-Jet Engines and Aeroproducts 606 Turbo-Propellers power this modernized Super Constellation from Lockheed's Flight Test Facility. Thus begins the Lockheed phase of a round-the-clock flight endurance program unsurpassed in the field of modern prop-jet power. While Allison is rapidly accumulating 1000 hours in "Operation Hourglass," Lockheed will log an additional 650 hours, ranging from routine airline schedules to extreme weather conditions. Power plant performance data accumulated in these programs not only provide practical operating background for the new Lockheed Prop-Jet Electra, but also significantly contribute to Navy and Air Force development programs.

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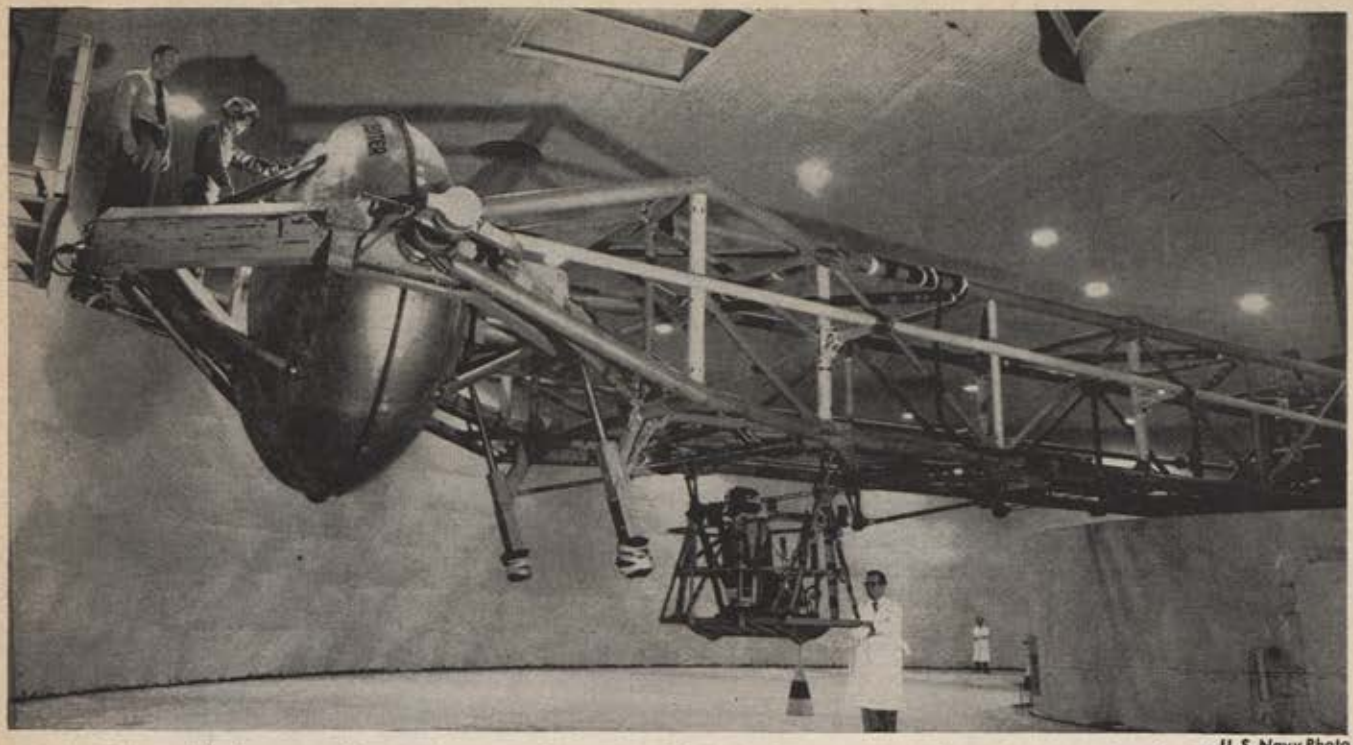

U. S. Navy Photo

The world's largest centrifuge for humans, at Johnsville NADC, is capable of producing 40 times the force of gravity. Flight surgeons and engineers can ride within the "cockpit" at the end of a 50 foot arm.

JOHNSVILLE NAVAL AIR DEVELOPMENT CENTER STREAMLINES RESEARCH VITAL TO DEFENSE

Located in historic Bucks County, just north of Philadelphia, the Johnsville NADC is carrying out a multitude of scientific tasks designed to keep our Navy's air arm second to none. Johnsville, the Navy's largest aeronautical research and developmental activity, developed the radar early-warning systems for planes now cruising above the oceans bordering the United States. Tremendous studies have been made at this center in airborne anti-submarine detection systems, and Johnsville scientists developed the first mock-up of a vertical take-off fighter.

The NADC Aeronautical Instruments Laboratory at Johnsville is engaged in development and evaluation for the Army-Navy Instrumentation Program, and was first to develop the automatic artificial stability control for rotary wing aircraft. Other NADC projects include high-speed low-level cameras . . . techniques for underwater launching of guided missiles . . . and radio controlled drone planes carrying bombs, used so effectively against the enemy in Korea.

This defense center covers over 750 acres, including a Naval Air Station which provides aircraft for scientists carrying out their experimental missions. There are eight laboratory groups at Johnsville, specializing in computation; aircraft armament; systems for drones, missiles and other special aircraft; aviation medicine; air warfare research; aeronautical instrumentation; aero electronics; and experimental photography, a field unto itself.

Many unusual facilities are available to Johnsville's scientific staff of over 2,200 people. In addition to equipment such as the giant centrifuge illustrated, the center has one of the world's largest analog computers — the TYPHOON — which can handle an infinite variety of engineering and aerodynamic problems. Johnsville has a fabrication shop capable of manufacturing anything from a delicate instrument to a complete aircraft. Huge cold chambers are available to test equipment for use under conditions such as those encountered in Operation Deepfreeze, currently underway in the Antarctic. Johnsville is cooperating closely in the Geophysical Year — as well as turning out a wide variety of scientific developments for BuAer, the fleet, and Navy contractors.

Engineer at Ford Instrument tests jet engine exhaust temperature indicator developed for the Navy's Bureau of Aeronautics.

Marilyn Van Derbur, Miss America for 1957, is a member of Arnold Air Society's Angel Flight at the University of Colorado, and here she's shown during Colorado's annual Homecoming Day ceremonies, flanked by Maj. Douglas Jensen (left), Capt. Chester Gilbert, and Capt. Raymond Armour, who are all officers of the AFROTC Detachment. Background, members of the AAS Robert L. Stearns Squadron.

sponsored by an AFA unit outside the limits of the US was held in **Honolulu** on November 22-24, when the **Oahu Squadron** and the **Hawaii Wing** joined in sponsorship of the Pacific Ocean Region's first Jet Age Conference. **Roy Leffingwell,** Regional Vice President, served as chairman of the event.

The entire first day was devoted to a discussion of **community relations problems, noise, and the future of jet aviation in Hawaii.** The second day saw the participation of more than 200 Island educators who stressed the need for **aviation education** in the schools, a recommendation enthusiastically endorsed by the teachers and school administrators present.

Highlight was an air show staged at Hickam Air Force Base, featuring the planes of the **Hawaii Air National Guard** in the air and jets from three nations on the ground, including the **British Comet** jet transport, which will soon begin regular service to Hawaii from Pacific bases.

Maj. Gen. Archie J. Old, Jr., 15th AF Commander, flew his B-47 to Hickam for the program, and was a featured speaker. **Maj. Gen. Winston P. Wilson,** Chief of the Air Guard, also appeared, as did **Col. Francis J. Pope,** representing Hq. USAF; **John B. Cooke,** Pan American Airways; **John F. Davidson,** of Boeing Aircraft; **Rear Adm. A. P. Storrs,** USN (Ret.), Director of Hawaii Aeronautics Commission; **John B. Sorenson,** California aviation education specialist; **Clyde Doran,** Chamber of Commerce Aeronautics Committee Chairman; **Malcolm McNaughton,** President of the Chamber of Commerce; **T. A. Vierra,** architect of the planned Honolulu Air Terminal; **Maj. Salvatore Pelle,** Pacific Air Forces Base Command Information Services Officer; and **George Anderl,** AFA Director.

—Gus Duda

The artist's drawing shows Aeronutronic Systems' four-stage rocket leaving its launching station, a General Mills balloon. With much of the atmospheric drag behind it, the rocket can soar to far greater heights than those launched from usual earth stations.

We build rocket stations in the sky to speed man's conquest of space

This Project Farside polyethylene balloon is identical to the one used in the actual rocket flights. Here it is being readied for a test ascent. Its load is an exact replica (size and weight) of the platform and rockets which were carried to 100,000 feet at Eniwetok Atoll.

In Project Farside, General Mills' polyethylene balloons like this, the largest ever flown, lifted a series of rockets 100,000 feet above the earth. (The nearly 4,000-pound loads were the greatest ever carried to that height.) With 98.7 percent of the drag-producing atmosphere already behind them, the rockets could then be sent farther out into the unknown to gather scientific data essential to man's mastery of space.

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SLOWLY, in a small skiff, kicked along by an outboard motor, we pushed under Gandy Bridge in Tampa Bay, headed out toward Piney Point and a day's fishing in the summer sun.

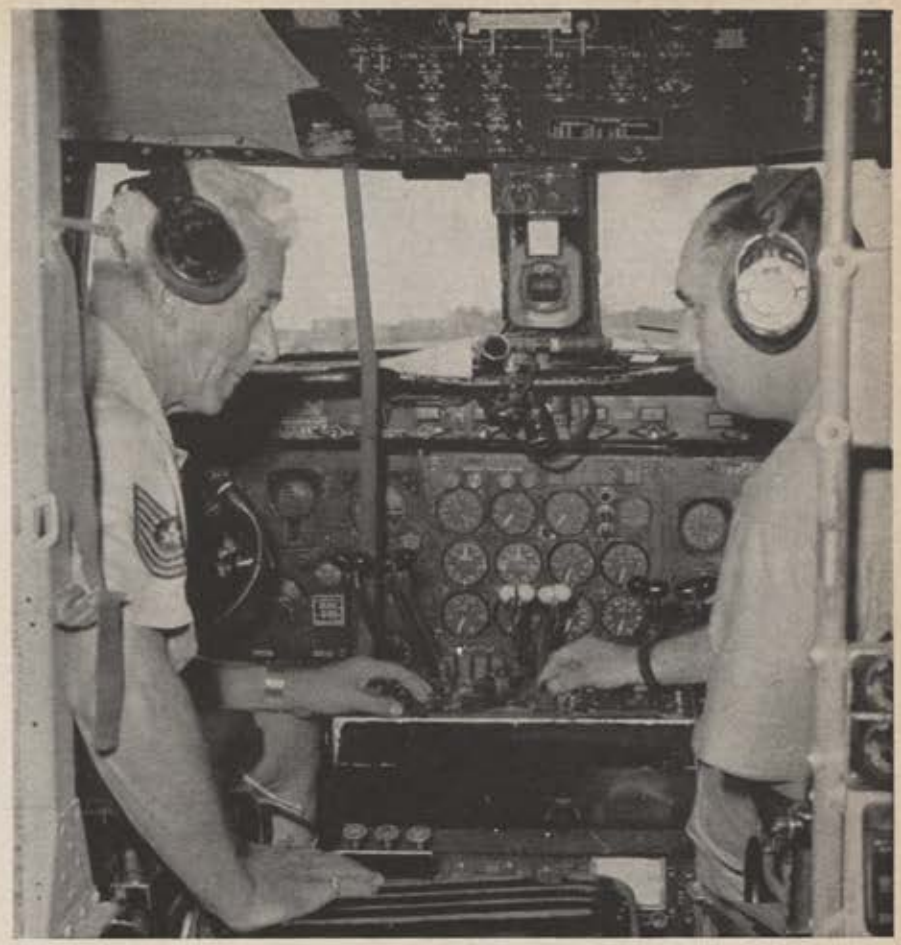
Close overhead, a flight of transient B-66Bs climbed for altitude off the runways at neighboring MacDill AFB. From the stern of the skiff, where he lounged lazily, fifty-nine-year-old, white-haired ex-M/Sgt. George Holmes watched the thundering Destroyers with a professional eye.

"Some difference from the ones we had when I first enlisted," the old six-striper mused.

He could say that again.

Just a week before, in the blazing sun, I'd watched a review at Brookley AFB, just outside Mobile, Ala., as Sergeant Holmes, with thirty-nine years of service for pay purposes behind him and 9,100 hours of flying time in everything from JN-6Hs—the venerable old Jennys of World War I—to four-engined bombers and transports, was ceremoniously retired with honors as the last of the "flying sergeants" in the United States Air Force.

His retirement, leaving only officers now as USAF pilots, closed a colorful chapter of Air Force history, dating back to 1914 when, out in the Philippines, Army Cpl. Vernon L. Burge became the first enlisted flyer.



For Sergeant Holmes, a last, fond look at the plane he loved so well—the C-54.

LAST OF THE FLYING SERGEANTS

By Jim Winchester

Holmes, too, was a corporal when he won his wings.

"That was back in 1921," he told me as we putt-putted across Tampa Bay, "a couple of years after I'd enlisted as a private in the infantry. It was called the Army Air Service at that time.

"I'd been in the Navy in the First World War, in the aviation section, as a landsman-machinist mate. We had a polyglot lot of planes in those early days—the old Curtiss R-6 biplane, the Curtiss R-9, fitted out with pontoons, the old HS-1L and the HS-2L, which were pusher biplanes with laminated wood fuselages. But I learned something from every one of them. I even learned to fly—halfway sort-of, anyway—as a copilot on test hops. And I was thoroughly indoctrinated into flying.

"At the end of the war, though, I got out of the Navy and went to work as a mechanic for the old Franklin Auto Works in Syracuse, N. Y. But flying was in my blood and a few months later, in the middle of 1919, I guess it was, I decided to get back into the service."

Commercial aviation, in 1919, was getting off the ground . . . but just barely. The first municipal airport in the US was opened at Atlantic City, N. J., and the first plane built for actual transport purposes—the eight-passenger Curtiss Eagle—rolled off the line that year, followed quickly by the twelve-passenger Martin.

But to a young man looking toward aviation as a career, the services—even though it was a period of serious postwar struggle for them—offered the best opportunities.

"I tried to get back into the Navy first," Holmes recalled. "But they wanted to ship me to a destroyer down in Charleston. I told them no soap and went across the street and signed up as a private in the infantry, asking for duty in the Air Service.

"My first assignment was out at Hazelhurst Field on Long Island, near Hempstead, working on test blocks where we were running some old water-cooled, six-cylinder German engines. From there I went down to San Antonio. There were two Kelly Fields there then—Kelly One and Kelly Two. Kelly One, where the depot is now, was a mechanic's school. The 1st Pursuit Group was at Kelly Two, and that's where I was assigned, in charge of the radio communication school."

(Continued on following page)

Several things happened in 1920 that Holmes well remembers. He made corporal, and, in June, Congress passed the Army Reorganization Act, which created a new Air Service.

"We had an authorized strength of about 1,500 officers and 16,000 enlisted men," he recalled. "Ninety percent of the officers had to be pilots or observers, and all the flying units had to be commanded by flying officers."

For aviation in general, this era had many highlights. The first passenger airline was established, in 1927, between Key West, Fla., and Havana, Cuba. The Atlantic was spanned nonstop by two former Royal Flying Corps officers, Capt. John Alcock and Lt. Arthur Brown, who flew from Newfoundland to Ireland in a Vickers-Vimy bomber. And a US Navy NC-4 flying boat went from Rockaway Beach in New York City to Newfoundland, to the Azores and Lisbon, and on to England. There was even a transcontinental airmail service of sorts. Dr. Sanford Moss invented the supercharger and, at McCook Field, engineers dreamed up the idea of variable and reverse-pitch propellers. The altitude record went up to 30,000 feet, and work progressed on the development of a practical radial air-cooled engine.

In August of 1920 the Army Air Service asked for volunteers for pilot training, and Holmes stepped forward.

"They only had two primary training fields then," he recalled. "One at March Field, out in California; the other at Carlstrom Field, here in Florida. I went out to March. Capt. Barton K. Yount—he later became a lieutenant general—was in charge. I took my primary on an old JN-6H, a Curtiss Jenny biplane, with a 150-horsepower Hispano-Suiza water-cooled engine.

"For my advanced, I went back to Kelly Two. As flying cadets there we wore white arm bands and a white band around our campaign hats. For some reason or other—I can't recall just why now—we were known as 'twelve-and-a-halfs.'"

One of Holmes's closest buddies during both his primary and advanced training days was another enlisted trainee by the name of Irvine.

"He's a lieutenant general now," Holmes told me with a smile. "You might know him from around the Pentagon—C. S. Irvine."

As advanced students, Holmes and Irvine flew a variety of planes—the old SE-5A, which was a single-seater biplane with a 180-horsepower Hispano-Suiza engine; the Thomas-Morse Scout biplane, with a Le Rhone rotary engine; and even French-built Spads and German Fokkers.

As he completed his final tour, he could look back to pioneering days of aviation and ahead to days of ease.

In August 1921, when he received his wings, Holmes remembers he had the choice of going back to his old rank of corporal or being discharged.

"I was getting married," Holmes said, "and I needed more than a corporal's pay so I took my papers, walked across the street and took a job as an aeronautical draftsman at the San Antonio Air Depot."

Two years later he signed up in the Army Reserve as a private, and, in 1924, a young Air Force officer by the name of Weyland—later to become Gen. O. P. Weyland—gave him his written examination for a commission. He took his test for flight and pilot rating in a Jenny—they were still around—and, when the paper work got cleared away, he had a commission as a second lieutenant in the Reserve.

Still a civilian, he watched both commercial and military aviation mature. Experiments were started in midair refueling—the forerunner of the "long-reach" of our present SAC bombers. Four Army flyers made the first round-the-world flight. Hundreds upon hundreds of "barnstormers"—most of them war-trained and all of them flying war-surplus planes—toured the country making the nation air-conscious. These aerial swashbucklers were paving the way for today's booming commercial aviation industry.

In 1926, Congress authorized the formation of the Army Air Corps and established the office of the Chief of the Air Corps, with Maj. Gen. Mason M. Patrick as its first chief. They also created a new sub-Cabinet post, that of Assistant Secretary of War for Air, and they loosened the purse strings with new appropriations for planes.

"It was after that, that I began to think seriously again of getting back into uniform," Holmes recalled.

In 1928, the year after Lindbergh spanned the Atlantic in his single-engined Ryan monoplane, which weighed only 5,000 pounds fully loaded, Holmes put in for active duty. Called up, he was assigned to the 12th Observation Squadron at Dodd Field, on the grounds of Fort Sam Houston at San Antonio, as assistant engineering officer and assistant parachute officer.

"We had O-2Hs in the squadron, then," said Holmes. "That was a Douglas job, with a Liberty engine. We also had one old trimotored Fokker C-7A."

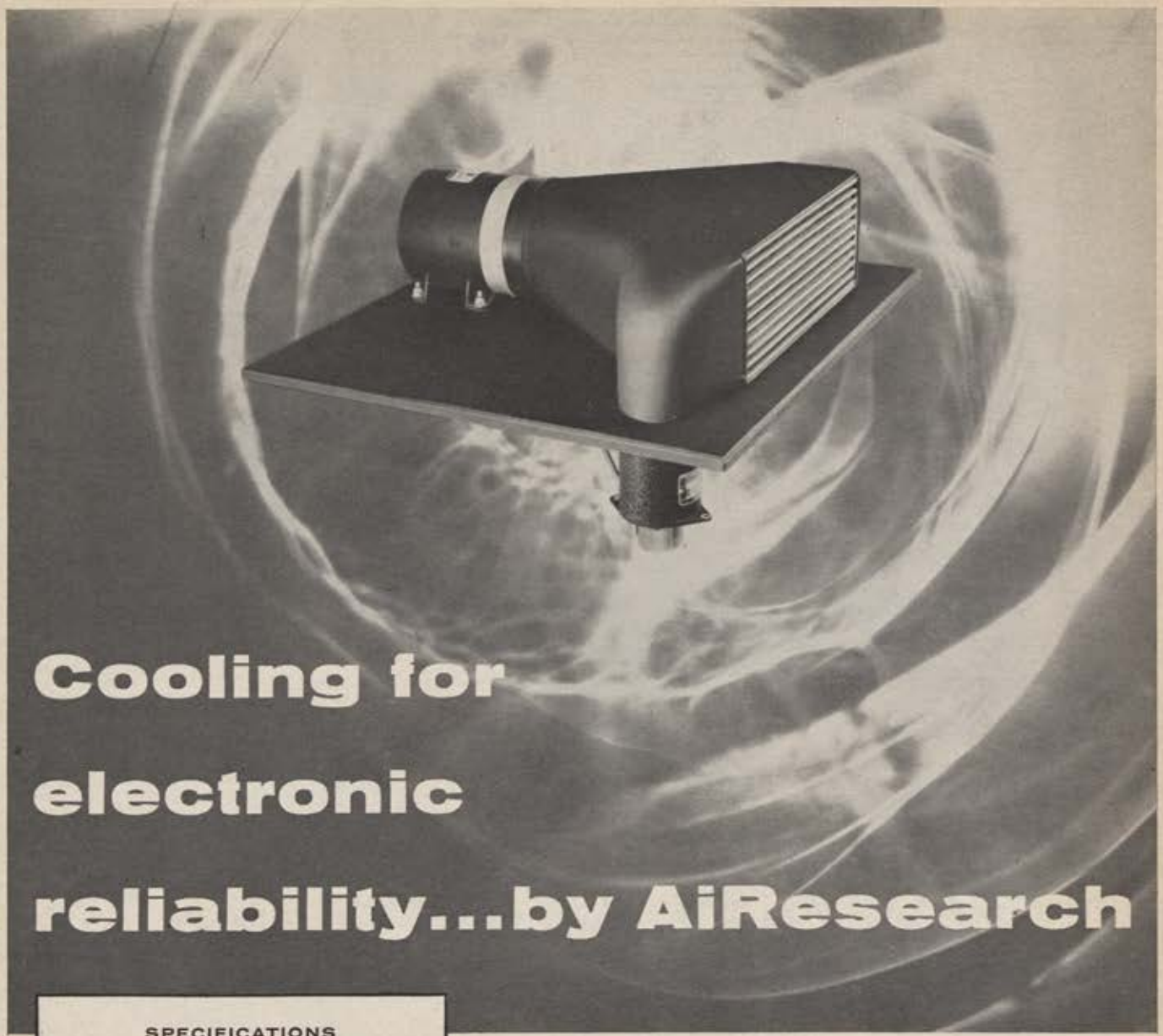
On this hitch, Holmes stayed in uniform for thirteen months. In late 1929 he got out again. Within a year after Lindbergh's flight, commercial aviation was booming.

US airlines doubled their mileage, tripled the amount of mail carried, and hauled four times as many passengers as the year before. That year, too, just before Wall Street fell on its face, the newly formed Transcontinental Air Transport, with Lindbergh as chairman of its technical committee, inaugurated coast-to-coast passenger service, flying Ford Trimotors, which carried ten passengers at 110 mph. The trip—air by day, rail by night—took forty-eight hours and cost $351.94 one-way.

Holmes had no trouble getting a job with Pan American Airways down in Cristobal, Panama, as a crew chief and mechanic, flying on their twin-engined Sikorsky S-31s. Later he went to Guatemala City for PAA as a co-pilot, flying Ford Trimotors over the rugged Central American mountains and jungles to San Salvador and San José. Still later, he flew as a combination mechanic and copilot on PAA's Consolidated Commodores, trimotored Fokkers, and Sikorsky S-43s from Miami throughout the Caribbean.

The Air Corps was still in his sys-

(Continued on page 99)



Cooling for electronic reliability...by AiResearch

SPECIFICATIONS

COOLING CAPACITY	Full 1.5 kw at 50,000 ft. ambient pressure altitude and inlet conditions as follows:
AMBIENT AIR	TEMPERATURE: 10°C. PRESSURE: 1.7 psia FLOW: 3.6 lb/min
CONTAINER GAS	TEMPERATURE: 85°C. PRESSURE: 20 psia FLOW: 9.8 lb/min

The AiResearch unit shown above solves another critical electronic cooling problem in the following manner:

The larger fan, at top left of unit, draws cooling ambient air through the heat exchanger. Simultaneously, the smaller fan, at bottom center of unit, circulates dense, non-toxic sulfur hexafluoride (SF_6) through the heat exchanger and over the electronic equipment. The cooled gas maintains the sealed electronic equipment at the desired temperature.

The 20 by 24 inch honeycomb mounting base for the cooling components is designed by AiResearch to form an integral part of the pressurized electronic equipment container.

This cooling package, incorporating standard, proved components, was developed by AiResearch in minimum time. It and other air or liquid-cooled units for similar purposes are based on almost 20 years of experience in the development of cooling systems for aircraft, missile and nuclear applications.

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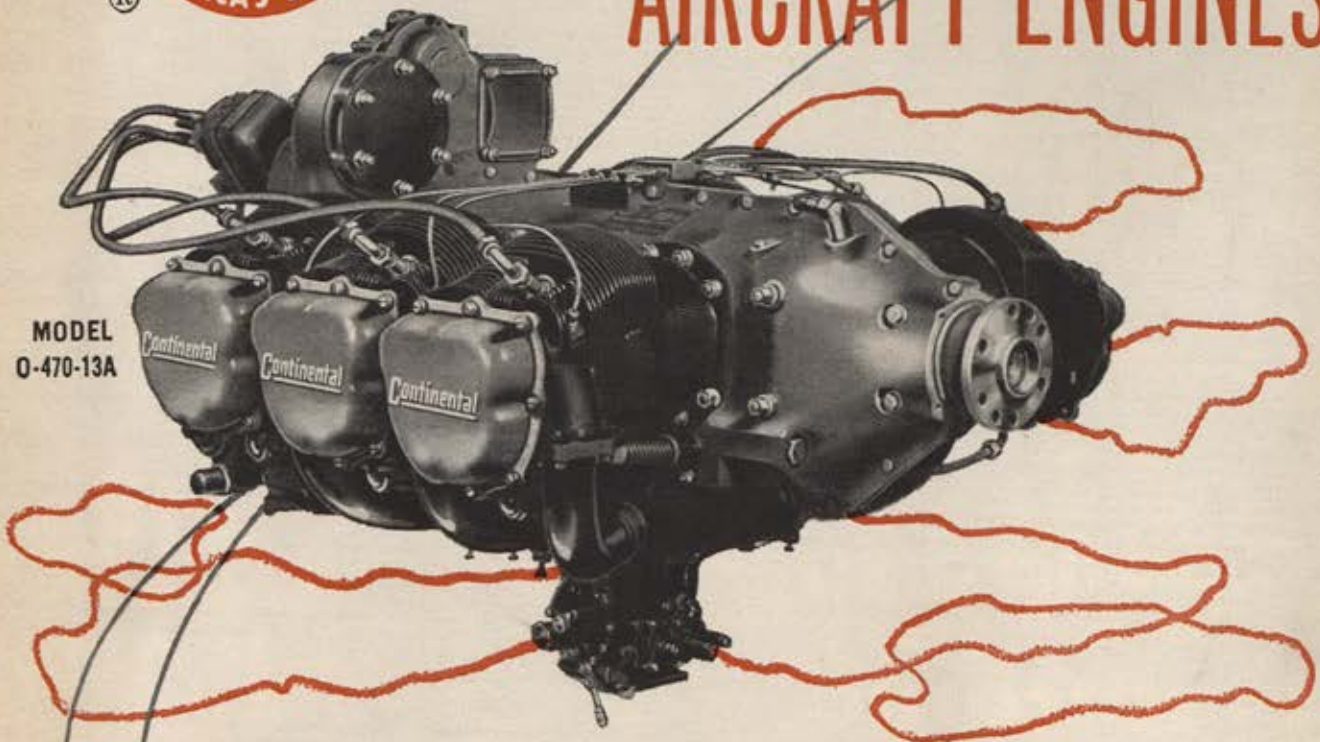

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MUSKEGON • MICHIGAN

tem, however, and in 1931, he reenlisted, this time as a sergeant, at Randolph Field.

"I had to get special authority," Holmes recalled, "to wear my wings and to fly."

While waiting for this authority to come through, he was assigned to the maintenance section.

"I made the first installation of blind flying instruments on an Air Corps plane while working there," Holmes said. "The instrument itself was called a sonic altimeter and we put it on a BT-2."

When his authority to fly as an enlisted man came through, Holmes was assigned as test pilot for the engineering section at Randolph, a job he filled until 1933, when the country's commercial airmail contracts were canceled and the Air Corps was called upon to fly the posts.

Major—later general—Joe Cannon was in charge of flying at Randolph at the time, and he promptly shipped Holmes off to Chicago to fly Ford Trimotors between the Windy City and Omaha, North Platte, Kansas City, St. Louis, and Cleveland.

"I flew them all alone, too," said Holmes, not without a trace of nostalgic pride. "No copilot, no mechanic. I was a sergeant, then, drawing down $84 a month as an air mechanic first class, plus fifty percent extra for flight pay. I was also getting $5 a day while detached to the airmail run. And I earned every cent of it. Aside from having no copilot or mechanic, there was no radio, and no instruments to speak of, beside a turn-and-bank indicator, and an altimeter. Later, they switched me to flying single-engined Fokker C-14s and they weren't any better."

After the airmail fiasco was settled —and the commercial airlines resumed flying the mails—Holmes returned, still a sergeant, to his test piloting at Randolph.

"In my spare time," Holmes recalled, "I did some instructing, teaching seven students their primary in a PT-3."

One of his students in this period was a cadet named Birchard, now a full colonel and deputy commander of the Continental Division of MATS.

"I was eight and a half years a buck sergeant," Holmes told me. "Then, in 1940, I made tech sergeant. I also got my command pilot's wings in January of that year. In March 1941, I made master sergeant."

With the entry of the US into World War II, and the rapid buildup of the Air Corps, Holmes, in 1942, was commissioned a captain. As a flying engineering and maintenance officer and test pilot he served throughout the war years at Luke Field in Arizona, at Randolph, Roslyn, N. M., and Kelly Field, where he was chief inspector for the Air Materiel Command, with thirty-two subdepots under his supervision. Finally, in the closing stages of the Pacific campaign, he was commanding officer of the 301st Air Depot Group, as a major, with eighty-eight officers and 1,800 enlisted men under his command. He wound up the war on Biak with the 4th Air Service Group of the AMC. In 1946, after attending the Air Inspector's School at Orlando, Fla., and the Special Staff School, he got out of uniform once again, this time with the rank of lieutenant colonel. He was back in uniform again, though, six months later, reenlisting as a master sergeant at Kelly Field in Texas.

"I still had my wings," he laughed now, "and they gave me the job of flying the Munitions Board around in a B-17. Sometimes we'd get strange brass on board and you should have seen some of the looks they got on their faces when they learned a sergeant was in command of the plane. I used to have a major flying with me as copilot."

In 1949, Holmes—still with only six stripes—went to Brazil to spend thirty months flying members of the Joint US-Brazil Military Commission around on inspection trips.

Back from Brazil he was assigned for two years to MATS at Great Falls, Mont. From there, in March 1954, he went to Brookley AFB, with the 2850th Air Base Wing, then as test pilot for the base and transient section of the Mobile Air Materiel Area Headquarters. It was from this last post that he was retired to close the era of flying sergeants in the Air Force.

Tampa Bay and the lure of the line await as he readies the boat for a day on the water, busy with his favorite retirement pleasure—fishing.

This recital of nostalgic history had taken a couple of hours. By now we'd eased our way across Tampa Bay. Sergeant Holmes reached behind him to cut off the outboard motor.

"Throw out the anchor, boy," he told me. "Have a beer and drop a line. This is the life for me now. I've got it made. No more airplanes for me."

From across the Bay, out of MacDill, a new flight of bombers—swept-wing B-52s this time—pulled themselves into the clear blue afternoon sky. Holmes, who only a moment before had denied any further interest in anything that flew, let his sharp hazel eyes follow the bombers until their silver sides blended out of sight into the haze of the horizon.

He looked toward where I was sitting in the bow, watching him eye the disappearing jets.

"Yeah," he grinned. "I guess I'm too old to change."—END

ABOUT THE AUTHOR

Jim Winchester is by now well-known to readers as a frequent writer for AIR FORCE *Magazine. His most recent article here was last month's "Unbreakable Jug." He also wrote, for the October issue, "SAC's Saboteurs." A veteran newsman, Mr. Winchester works in New York City, where for some time now he has been connected with King Features as a writer.*

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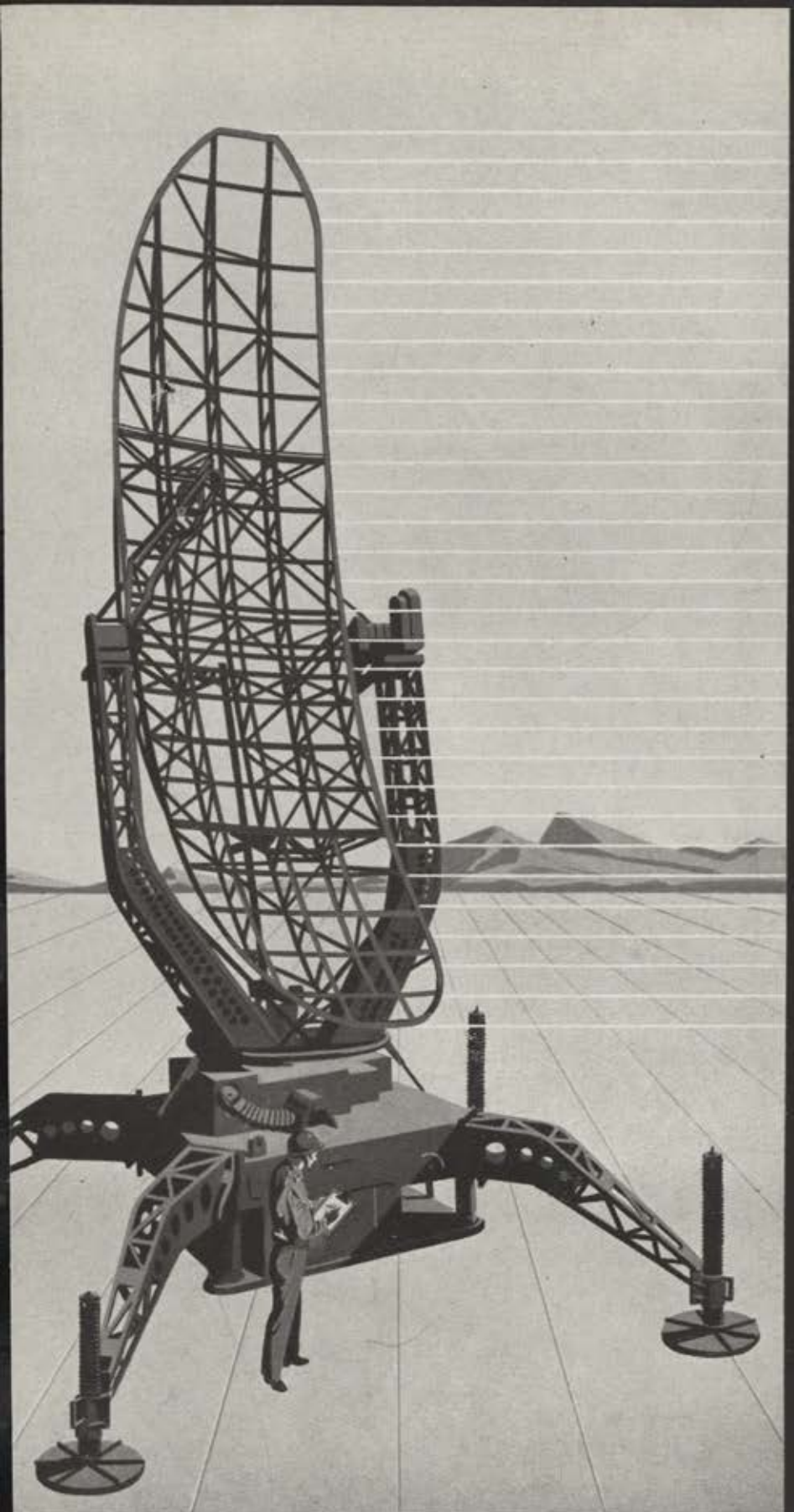

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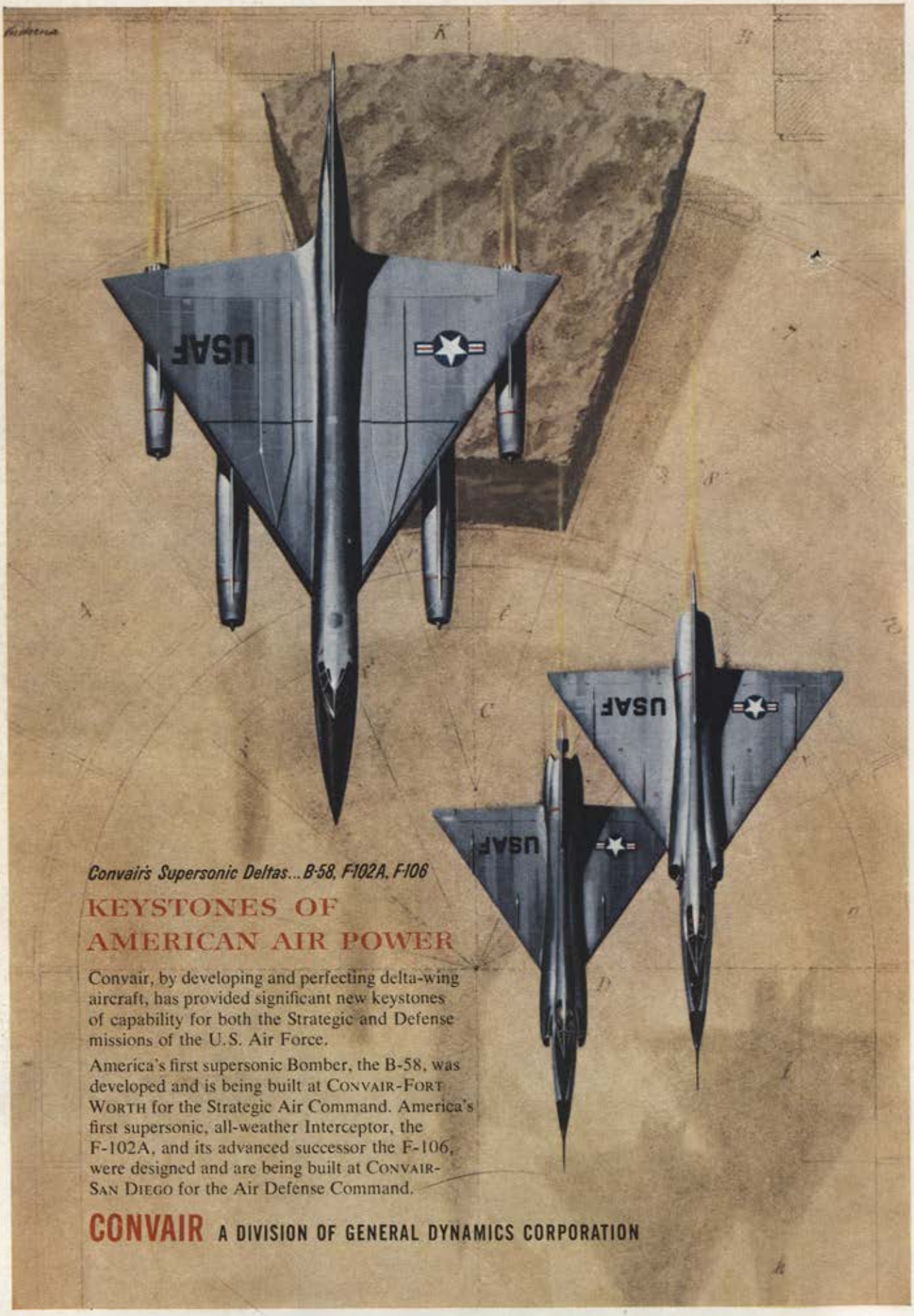

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