

MAY 1968 / 60c

AIR FORCE

and **SPACE DIGEST**

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



FALCON ONE ... UP AND AWAY!

Cessna T-41 over Pikes Peak—
The New Flight Training Program
at the Air Force Academy.

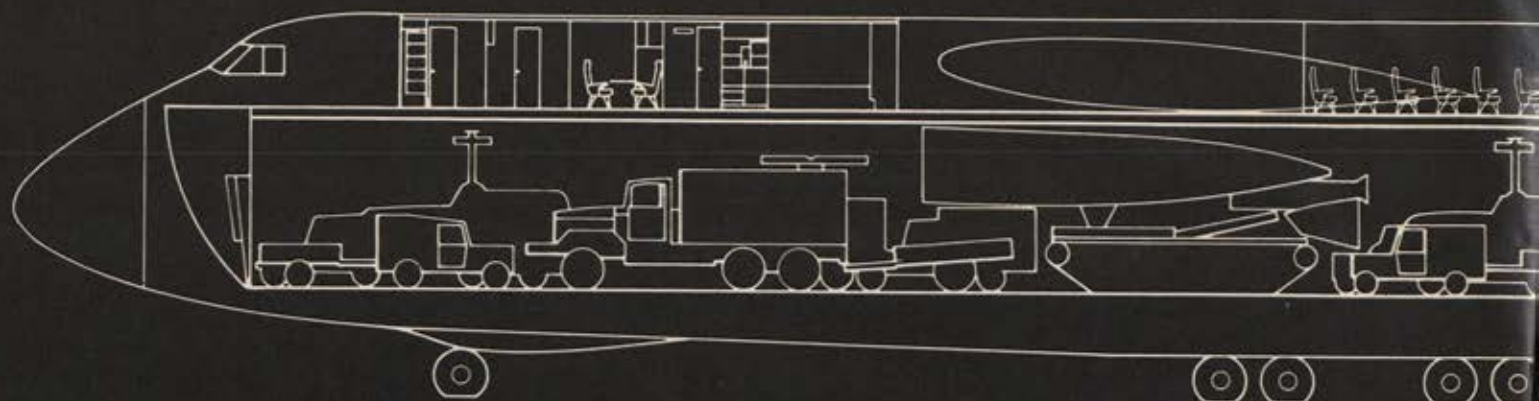


A-7A Corsair II, powered by TF30-P-6

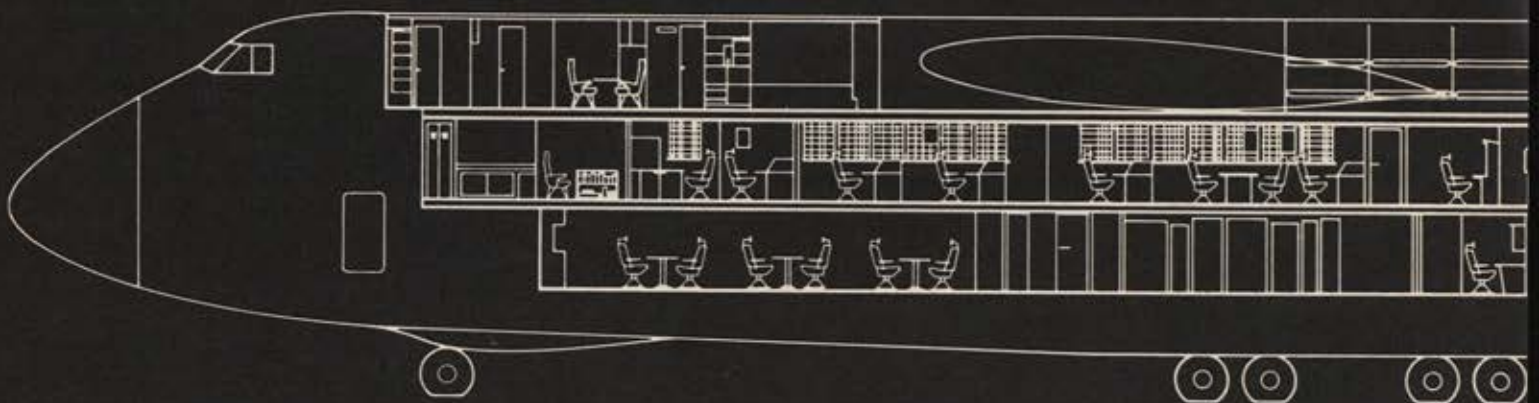
PUNCH by A-7A **POWER** by TF30

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A



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AIR FORCE

and SPACE DIGEST

The Magazine of Aerospace Power

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MAY 1968

VOLUME 51, NUMBER 5

"We Must Stay . . . We Must Prevail"

AFA'S 1968 STATEMENT OF POLICY

The hearts and minds of the American people must be won and their purpose focused on the fact that the Vietnamese War is a confrontation with aggressive communism in which we must prevail.

"Technological Plateau"—There's No Such Thing

BY THE HON. JOHN FOSTER

An assessment of some of the major problems facing the US in the technological race with its potential enemies, culled from recent open testimony to the Congress by the Pentagon's top R&D planner.

Falcon One . . . Up and Away! / BY ED MACK MILLER

A compact and tightly managed flying-training program has been instituted at the US Air Force Academy to give Cadets a taste of the "wild blue yonder."

On the Southeast Asian Confrontation / BY DR. ROBERT STRAUSS-HUPE

We must rid ourselves of the false preconception that the Vietnamese War is solely to protect the people of a small nation, and face the reality that it is a crucial test of American strategic credibility.

Mission: Recce North / BY ALLAN R. SCHOLIN

An on-the-scene report on the reconnaissance missions USAF flies in Southeast Asia—how they are accomplished, the problems involved, and the importance of the pictures taken.

New Home for an Old Dilemma

BY AVM ROBERT A. CAMERON, RCAF (RET.)

The present crisis in NATO offers an opportunity for significant changes that would make the alliance a more realistic deterrent.

SPACE DIGEST

Systems Analysis: Useful, Yes—But Scarcely a Panacea

BY GEN. B. A. SCHRIEVER, USAF (RET.)

The former head of Systems Command, who has had cause and opportunity to evaluate systems analysis in a working situation, comments on its shortcomings.

Bringing 'em Back Alive from Space

BY MELVILLE LEONARD AND LORENA O'CONNOR

Although methods other than preventive safety may still be somewhat in the future, space rescue techniques are being studied.

Thoughts on the "Military Mind" / BY RAYMOND J. BARRETT

As difficult as it may be, ingrained as it is in American mythology, we must discard the negative image we have of the military mind.

Speaking of Earth / BY WILLIAM LEAVITT

Some thoughts on the connection, not at all tenuous, between the space age, of which we are so proud, and civil strife, of which we must all be ashamed.

The US Air Force Flight Safety Program

BY MAJ. GEN. PERRY B. GRIFFITH, USAF (RET.)

The first goal of accident prevention is finding the cause before the crash. With this goal constantly in mind, USAF has developed the most effective flight safety program ever devised.

A Critical Look at "The Last Hero" / REVIEWED BY C. B. ALLEN

A veteran aviation writer and friend of Lindbergh looks at the new "unauthorized" biography of Charles Lindbergh.

Ballooning: The Early American Way / BY S. S. WHITT

American efforts in lighter-than-air vehicles, well before the Wright brothers, make a fascinating chapter in the history of flight.

DEPARTMENTS

Airmail	10	Index to Advertisers	30
Airpower in the News	12	Senior Staff Changes	31
Aerospace World	25	This Is AFA	89
New Books in Brief	26	AFA News	90
There I Was	96		





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'WE MUST STAY...'

Herewith is the full text of the 1968 Statement of Policy of the Air Force Association. In the opening business session of the AFA National Convention in Atlanta, Ga., on April 3, delegates unanimously and enthusiastically approved the Statement. At the same time, special note was taken, as set forth in the opening, of "both the desire and the responsibility of the President to seek peace by every honorable means"—this reference, of course, to the limited bombing pause proposed three days before the Convention opened.

Full Convention coverage, including resolutions passed, other delegate business, and a complete round-up of Convention special events will appear in the June issue of AIR FORCE/SPACE DIGEST. Until that time, suffice it to say that the Convention was an outstanding success by any yardstick, with the Vietnam Air War Symposium standing out as the highlight event, along with the visit to the Lockheed-Georgia plant at Marietta for a close-up look at the huge new C-5 transport.—THE EDITORS

The Air Force Association, in this pivotal year of 1968, continues its support of United States commitment in Southeast Asia, and again declares:

We must stay.

We must prevail.

Nothing has happened in the past twelve months that would lead us to any other conclusions.

We are concerned, however, with the level and the tempo of the war effort. Time is not on the side of freedom. The level of effort must be raised. The tempo must be quickened.

And these things must be accomplished in the face of a growing body of American opinion which holds that we cannot prevail in Southeast Asia and that therefore we should not stay. The pressure to do less is rising at the very moment when the need to do more was never greater.

The struggle, then, is not so much for the hearts and minds of the Vietnamese, as has been said so often, but for the hearts and minds of the Ameri-

can people themselves. Not enough has been asked of them. Not enough has been confided to them. Their purpose has not been focused. Their patience is wearing thin.

We recognize both the desire and the responsibility of the President to seek peace by every honorable means. The bombing pause recently put into effect provides a case in point. Admittedly, it could involve grave military risks. It must produce a prompt and meaningful response from Hanoi or it will have failed. If it fails, there is no alternative, in our judgment, to a heavy increase in America's military effort.

Threefold Need

The need, then, becomes threefold.

First, the war must be won. A military victory will provide the only sound basis for a satisfactory political solution.

Second, the war must be won quickly. The war's burdens will not be borne indefinitely by Americans unless there is an end in sight.

Third, the American economy must be mobilized, both to provide the needed resources and to spread the burden of sacrifice and involvement among all Americans.

Quicken the Pace

The war can be shortened only by a radical change in both the pace and direction of our military effort. Token increases will not suffice. The enemy must be hurt faster than he can recuperate. In our judgment, this will call for:

1. An end to sanctuaries in North Vietnam.
2. The denial of seaborne imports to North Vietnam by appropriate application of air and naval power.
3. Coordination of the above with a sustained air and ground offensive against the forces of North Vietnam and those of the Viet Cong.

To support such an effort, business as usual on the home front must be put aside for the duration.

WE MUST PREVAIL'

Economic sacrifices at home must be required to support the personal sacrifices of our fighting men in Southeast Asia. The entire nation must get involved. Military solutions can be found in Southeast Asia. Political resolution of the war can only be found here at home.

A Meaningful Confrontation

These are admittedly strong measures. We can justify them only if the war is placed in its proper context.

It is more than a matter of political self-determination for the people of South Vietnam.

It is more than a matter of honoring commitments made in the past to a government which no longer exists.

It is more than a matter of guaranteeing the territorial integrity of an ally.

Such aims, however noble, must be measured against our enormous national investment in this war to date and the increased effort called for from here on.

This investment can only be justified if the struggle in Southeast Asia is viewed as a meaningful confrontation with aggressive communism.

It can only be justified if success will lead to a dampening of further aggression, both in Southeast Asia and elsewhere in the world.

It can only be justified if a victory in Southeast Asia will lead us *away* from World War III, and not toward it.

Only in such a context can we justify the loss of blood and treasure being suffered by America and by the Vietnamese people South and North. The result must be important enough to warrant such a fearful cost.

We believe sincerely that it is.

Soviet Involvement

A measure of proof can be found in the rising level of material support which the Soviet Union is providing to North Vietnam.

The Soviets are providing the sophisticated air defense system which has made North Vietnam the most heavily defended piece of real estate in the history of air warfare.

The Soviet Union provides the trucks which ply the Ho Chi Minh trail and the gasoline and oil which run them.

The Soviet Union provides the artillery, the ammunition, the rockets and launchers which are killing Americans daily.

The Soviet Union provides the aircraft and the ground-control system which challenge our pilots over North Vietnam targets.

Without Soviet support, North Vietnam simply could not stay in the war. Someone in Moscow must think that Southeast Asia is important.

Meanwhile, the Soviet Union takes advantage of US involvement in Vietnam to make its presence felt in the Mediterranean, in the Middle East, in Korea, and in Western Europe, where the NATO alliance is still a main Soviet target. Soviet Russia moves ahead on the technological front in a drive for strategic superiority over the United States. It looks with satisfaction on the prospect of an America divided at home and bogged down indefinitely in Southeast Asia.

No Neutral Solution

An American loss in Vietnam would put enormous pressure on the other countries in Southeast Asia which already are experiencing Communist insurrections.

More important, an American retreat would affect the way that men in Moscow, and in Peking, and in many other places, shape their plans for the future.

This is why there can be no neutral solution in Vietnam. One side must win and the other must lose, and the impact will reverberate far beyond the boundaries of two tiny countries.

All this provides compelling reasons, not only for winning in Vietnam, but for winning quickly and decisively.—END



Pilot Shortage

Gentlemen: Having read Mr. Loosbrock's editorial in the March '68 issue ("Living at the Bottom of the Barrel"), I would agree with his obvious conclusion that the key to the present pilot shortage is the prolonged war in Vietnam. However, it is not merely the length of the war but the way our government has chosen to wage it which accounts for the high rate of attrition among our pilots—and, I would add, for the shortage of young men willing to pursue flying in any branch of the service.

Any college graduate who has been fortunate enough to postpone military service long enough to be able to evaluate the various ways of fulfilling military duty is likely to exclude pilot training as a possibility. Why? Because the present policies of air warfare in Vietnam are suicidal for our fighter pilots. . . .

Few men are willing to enter a career when they realize that, due to a course of action diametrically opposed to the sound conduct of war, they may not return alive.

Being faced with this same decision, I can assure you that the opportunity to become a pilot is not an attractive one.

R. E. LANDRETH
Midland, Tex.

Gentlemen: A gray overcast matches the gloomy mood of the well-wishers. The champagne tastes flat and seems to match the false heartiness of the good-byes. . . . A few hours later and a few thousand miles away an extremely competent and highly respected fighter pilot will separate from the service. . . .

Ingratitude? Deserting his country in its hour of need? Squandering the thousands of dollars spent for his valuable training? All too true, but aim your indignation at the proper target.

This man has been drummed from the service by a ponderous selection process that recognizes only the expected potential of paper credentials and pays little heed to actual performance and capabilities. Twice inexplicably passed over for major, this talented individual must accept a meager door prize, his readjustment pay, for his years of dedicated service and now contribute his considerable

abilities to the civilian world. To expect him to accept "continuation" is to spit in the face of his pride and says not a little about the caliber of a person who does, in fact, "stay on."

But my objection goes deeper than mere principle. I object as a taxpayer who supplies the capital to train a replacement. And how many of these new "replacements" will desert for the airlines before the load is actually shouldered?

Gentlemen, this is inefficient business and poor personnel management at its worst. All ethics aside, are we so saturated with such brilliant prospective talent that we can afford the loss of the proved professionals who are the guts of today's Air Force?

CAPTAIN
APO, N. Y.

• *All this reflects the problems involved in fighting a war on a "business-as-usual" basis. Career development programs, promotion policies, forced attrition, and the like may be necessary in times of stable peace, but they can work 180 degrees in opposition to the requirements of fighting a war. We must point out, in addition, that grade limitations are a matter of legislation and, failing new legislation, the Air Force's hands are tied in certain promotion areas.*—THE EDITORS

Strategically Unimportant

Gentlemen: Col. C. V. Glines has, as always, written a most interesting tale in his "The Forgotten War in the Aleutians" in the March issue. But one is left with a sense of frustration by such statements as "Japan's master plan for the Pacific did not at that time include an actual invasion of the Alaskan mainland" (emphasis mine); "men like Generals Bennie Foulois, Billy Mitchell, and Mason Patrick of the Army Air Corps had been calling attention to the strategic importance of Alaska"; and "the threat to Alaska was gone. . . ."

Within the generally accepted meaning of the term "strategic," I fail to see how the possession of Alaska by the United States or Japan in WW II could "increase the possibilities and consequences of victory and . . . lessen the chances of defeat."

As Colonel Glines correctly observes, Japanese operations in the Alaska the-

ater were to "attack shipping, planes, and shore installations at Dutch Harbor . . . to create a diversion for the planned Japanese invasion of Midway Island."

No documentation appears to exist to support the contention that the Japanese had any plans to assault Alaska proper. It does not appear to have been of strategic importance to them. Was there strategic importance in Alaska for the United States? According to the US Strategic Bombing Survey:

"Early experience in the Aleutian campaign also developed clearly the disadvantages of the northern short route to Japan. The prevalence of fog in the summer and great storms in the winter was known, but the effect on air operations was not fully appreciated. Significant was the ratio of total theater loss to combat loss in aircraft of the Eleventh Air Force. This ratio was 6.5 to one, as against three to one for an average of all Pacific theaters. Reflected in it were unusual hazards due to weather—visibility at base, icing, storm damage, poor maintenance, conditions of runways—and the hazard of operating from a sparse number of airfields strung along a single line of islands which paralleled the direction of the target. Significant also was the number of days upon which successful bombing missions could be flown: for a period of nineteen days, June 11-30, 1942, during the early attempt to bomb the Japanese out of Kiska, only six successful heavy bombing missions were completed. Likewise, in the critical period of the Attu occupation, weather permitted air bombardment and support on only nine out of twenty days."

These limitations, plus those of transporting troops, equipment, fuel, and munitions into Alaska and the Aleutians, plus the scarcity of enemy targets within range, tend to negate any strategic value of the area.

After the "forgotten war" described by Colonel Glines, the Americans used bases in the Aleutians for raids against the Japanese Kuril Islands. Also, the Japanese did put some effort into preparing the Kurils against a possible attack by US forces staged through Alaska and the Aleutians. But these activities could not be considered of strategic importance. What then was

the strategic importance of Alaska which was so clearly recognized by Generals Foulois, Mitchell, and Patrick?

In 1935, Billy Mitchell declared: "He who holds Alaska will hold the world." It had appeal; did it have meaning?

MICHAEL BENJAMIN
Lanham, Md.

Future Professionals

Gentlemen: Murray Green's article, "A Military Career—Is That a Job for an American Boy?", in your March issue is one of the finest I have ever read. Dr. Green does an outstanding job of expressing the idea of dedication and need for the military professional which I have attempted to portray to my Air Force Reserve Officers Training Corps cadets here at Montana State University.

With your permission, I would like to reprint this article and provide a copy for each of my cadets.

CAPT. HAROLD L. WOMACK
Asst. Professor of Aerospace Studies
Det. 450, AFOTC (AU)
Montana State University
Bozeman, Mont.

• *Permission gladly granted.*—THE EDITORS

UNIT REUNIONS

2d Air Division Association

The 21st Annual Reunion of the 2d Air Division Association, Eighth Air Force (ETO, WW II), will be held in Chicago, Ill., at the Sheraton-Chicago Hotel, June 14-16, 1968. Contact Robert L. Pellican, 20 S. George St., Mt. Prospect, Ill. 60057

63d Station Complement Sqdn. (Sp)

The 25th Anniversary Reunion of the 63d Station Complement Squadron (Sp), Ninth Air Force, of WW II, will be held Saturday, June 29, at Bixler Lake, Kendallville, Ind. For reservations and further information contact Lt. Col. John T. Gilmore, USAF (Ret.), 2564 South Adams St., Denver, Colo. 80210

88th Troop Carrier Squadron—438th Troop Carrier Group

The reunion of the 88th Troop Carrier Squadron will be held in St. Louis, Mo., June 14 and 15, 1968. Members of the 438th Troop Carrier Group and Components are invited to attend. For further details contact Lt. Col. C. L. Hash, USAF (Ret.), 4754 Parc Orleans, Bridgeton, Mo. 63042

415th Bomb Sqdn., 98th Bomb Group

A B-24 outfit, 1942-45, the 415th Bomb Squadron, 98th Bomb Group, will have its first reunion in Denver, Colo., July 11, 12, 13, and 14, 1968. The 343d, 344th, and 345th Bomb Squadrons are invited to make this a group affair. Please contact

Rudolph Schmeichel
11829 Broadmoor Dr.
Dallas, Tex. 75218

collage 32

JOIN THE WAR ON CLUTTER



It has been reported that the Maharishi told Mia, "If the clutter power is greater than the power reflected by the target, discrimination is extremely difficult." Actually, one of our engineers said that, but it sounds more like something the swinging Maharishi might have during one of his lucid moments. Rather than ponder the sociological implications of all this, we would like to tell you that we're doing some interesting things in signal processing to suppress clutter on missile guidance

systems, of all things. This should come as good news to those of you concerned with air-to-air, surface-to-air or surface-to-surface missiles. No longer will you have to depend on old-fashioned, not very reliable matched filter techniques when trying to track targets in a clutter environment. In fact, now you missile makers can design types to home in accurately on low altitude or surface targets that are normally impossible to hit because of clutter problems. Isn't that nice? So send a missive of your very own to our Aerospace Center and they'll clutter your desk with literature.



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MOTOROLA
Government Electronics Division



By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

General Schlesinger Speaks Out

WASHINGTON, D. C., APRIL 2

Arthur Schlesinger, Jr., Harvard historian-turned-military expert, is one of America's most outspoken critics of airpower. He says he can find little more astonishing, "after the trial of airpower thus far in Vietnam, than persistence in the faith that bombing will succeed in doing next week what it has conspicuously failed to do in the last three years."

Mr. Schlesinger, provoked by the daily spate of news stories and television reports from the embattled garrison at Khe Sanh, has concluded that the base has no military significance, that it is highly vulnerable, and that airpower cannot save it.

In a Letter to the Editor of the *Washington Post* on March 22, the Cambridge scholar and mainstay of the

Kennedy entourage accused President Johnson of having "deliberately and unnecessarily committed American honor to holding Khe Sanh," forcing the Joint Chiefs of Staff to "sign on in blood."

Historian Schlesinger resorts, of course, to the labored charge that bombing "did not prevent the infiltration of men and arms into South Vietnam," despite the fact that nobody ever said it would.

The bombings, Secretary of State Dean Rusk has declared, have been intended "to limit and render more difficult the infiltration of men and supplies from North Vietnam to South Vietnam. It was perfectly clear from the start, as it is clear today, that airpower would not be able to stop infiltration." Mr. Rusk did assert that the air campaign in the North has slowed down infiltration and raised its price to the enemy.

Schlesinger, the strategist, holds that Khe Sanh should

The Khe Sanh stronghold lies directly across the easiest infiltration route into South Vietnam.

It is dug out of red clay on a plateau and ringed by high hills, fifteen miles south of the Demilitarized Zone and only ten miles east of the Laotian border. The airstrip runs east-southeast (bottom of photo) to west-northwest. US Marines and South Vietnamese troops, with the help of airpower, held off two divisions of North Vietnamese regulars there despite unfavorable terrain. The accompanying article was written before the situation at Khe Sanh eased.



—United Press International Photo

be evacuated. He may be right, but he does not give the right reasons. He maintains our Marines are trapped, awaiting an inevitable attack, while the airpower advocates say they can save the battle. He scoffs at the concept that Dien Bien Phu was different because the French lacked adequate airpower.

The other side of the coin was displayed in the New York Times of March 28. A staff reporter of that paper wrote from the scene that both Army and Marine officers at Khe Sanh say airpower is providing the only disaster they anticipate and it is the enemy that is suffering, not the Americans.

"Each day the enemy moves closer to Khe Sanh with his intricate network of zigzag trenches," the Times said, "but each day fresh waves of American bombers and fighter-bombers fly in and send American optimism soaring anew."

"The senior officers are now so convinced that the aerial bombardment is a major success," the Times went on, "that they have no plans for pulling the Marines out no matter how much the enemy might increase his shelling at Khe Sanh."

Further disagreeing with Mr. Schlesinger's analysis, an intelligence officer is quoted as saying the 6,000 Marines in the besieged garrison are tying up two enemy divisions.

"If we pulled out," this man said, "then those divisions would go some place else—say to Hué—and cause more problems. This way we've got them where we can hit them with our bombs."

Both the Times report and other correspondence to this office attest to the effect of the blanket of ordnance laid around Khe Sanh by USAF, Navy, and Marine pilots. An area of ten square miles around the encampment, formerly lush and heavy jungle, has been turned into a wasteland. The destruction is described as "almost unbelievable."

Hundreds and hundreds of secondary explosions prove that the bombs have hit fuel and ammunition dumps. There never will be a count of the thousands of enemy troops buried alive in tunnels and trenches.

Mr. Schlesinger's contention that airpower cannot help Khe Sanh any more than it could help Dien Bien Phu also is refuted by the facts. The French in 1954 lacked adequate airpower, as all military men know. Bernard Fall has written that only 3,700 combat missions were sent against the enemy during the 167-day siege of Dien Bien Phu. Their combat mission is our sortie, and the comparable figures are reported by the Times:

"In contrast, United States fighter-bombers flew 17,731 sorties against enemy positions near Khe Sanh in the sixty-three days between January 22 and March 24. In addition, B-52 bombers flew 334 missions, a mission including a minimum of three and a maximum of twelve planes."

"What is more, the officers add, the average American fighter-bomber carries 2,000 to 2,700 pounds of ordnance, while the B-52s carry twenty-seven tons. France's largest fighter-bombers carried only 500 pounds."

"Compared with what we are doing to the enemy, the French planes conducted only harassment raids," one USAF officer said.

The Times concluded that Khe Sanh will produce a major test of the ability of bombers to stop a major ground assault.

The newspaper quoted a military official:

"We believe that, while we have not stopped all enemy activity around Khe Sanh, we have reduced [the enemy's] strength enough to prevent him from being able to wage a successful attack."

In all of this, it is of top interest that a US officer in Vietnam, and not Mr. Schlesinger, brought up the subject of the Communist assault on Hué. The military man was concerned about the possibility that pressure relieved at

Khe Sanh would be applied in Hué. Mr. Schlesinger expressed no interest in Hué, or apprehension about what is happening there.

Still another newspaper, *The Times* of London, has a reporter in Hué who has found wide evidence that the Communists have wantonly executed many South Vietnamese and some Americans in that city. Men who have seen the bodies are convinced that some of these victims were tortured before death or mutilated afterward.

Here is a quotation from a British correspondent, first interviewing an American named Bob Kelly, senior provincial adviser in Thua Thein:

"I have heard of no confirmed instances of torture. Men were simply condemned by drumhead courts and executed as enemies of the people. These were the leaders, often quite small men. Others were executed when their usefulness ceased, or when they didn't cooperate they were shot for their trouble."

"Some of my staff were badly mutilated, but I am inclined to believe this was done after they were killed. Their hands were tied, and they were shot behind the head. I helped dig one body out, but I have been told by Vietnamese whom I respect that some people were buried alive."

"Lt. Gregory Sharp, an American adviser with the South Vietnamese 21st Ranger Battalion, said that his men came across about twenty-five new graves in a cemetery five miles east of Hué on March 14. From half a dozen of the graves, the heads were sticking up out of the sandy soil."

"They had been buried alive, I think," Lieutenant Sharp said. "There were sort of scratches in the sand in one place, as if someone had clawed his way out, but then he may have been playing possum. I don't really know."

"At Quan Ta Ngan, three Australian warrant officers saw seven men in one of three graves they had found. The seven, they said, had been shot one after the other, through the back of the head, hands tied."

In the light of this report, Mr. Schlesinger still finds the situation at Khe Sanh "astounding." Somehow, it fits; Secretary Rusk already has pointed out how his critics never put the label of "escalation" on a Communist act of aggression. This would include whatever atrocities take place in Hué, even if two more divisions were freed to perpetrate them.

USAF's Long Look Ahead

With the pinch that the war in Vietnam has put on expenditures, nobody was surprised to learn that the USAF program for Research, Development, Test, and Evaluation in Fiscal 1969 is, with a single exception, financially un-

(Continued on following page)



Lt. Gen. Joseph R. Holzapple, USAF Deputy Chief of Staff for Research and Development, recently presented the Fiscal Year 1969 USAF program for Research, Development, Test, and Evaluation to the Senate Armed Services Committee.



To match the Russian tactical fighters expected to replace the MIG-17 and MIG-21, USAF proposes, in its FY 1969 budget, an advanced tactical fighter, the FX, shown in artist's concept at left, with variable-sweep wings and improved maneuver capability.

changed. The Manned Orbiting Laboratory (MOL) will take a big step next year, offset to some extent by the approaching end of development for the F-111 and C-5 programs.

Herewith are the figures for the USAF 1969 RDT&E budget estimates, as presented on Capitol Hill by Lt. Gen. Joseph R. Holzapple, Deputy Chief of Staff for Research and Development:

	FY '68	FY '69
Military Sciences	\$143,200,000	\$162,500,000
Aircraft and Related Equipment	822,600,000	572,100,000
Missiles and Related Equipment	938,400,000	939,300,000
Military Astronautics and Related Equipment	1,037,400,000	1,261,900,000
Other Equipment	270,300,000	392,800,000
Programwide Management and Support	250,500,000	266,700,000
Total	\$3,462,300,000	\$3,595,300,000

MOL, General Holzapple says, will enter its peak year of development in Fiscal 1969. All major components are in the development stage. These include the Titan-III launch vehicle, the laboratory and space modules, the Gemini-B spacecraft. Construction of the launch complex at Vandenberg AFB, Calif., will be completed this year.

In addition, fourteen pilots are undergoing training for the MOL mission at the Aerospace Research Pilot School, Edwards AFB, Calif., and at contractor facilities. The \$600 million requested in the budget will continue work on the program to get two men in orbit in 1971.

Other highlights from General Holzapple's presentation to the Senate Armed Services Committee:

- Funds are requested to start development of an advanced communications satellite with superior capacity and life than the initial system possesses. USAF also is prepared to build, launch, and test a Tactical Communications Satellite for use by Army, Navy, and Air Force.

- The Russians are expected to come up with new tactical fighters more advanced than the MIG-17 and MIG-21. To face this, USAF proposes its own advanced tactical fighter, the FX, and a new aircraft, the AX, for close air support. The FX will have maneuver capability better than that of the F-4E, and will use the variable-wing technology now on the F-111. The AX system will put the emphasis on survivability, flexible payload and loiter time, STOL characteristics, and low cost.

- \$15 million is requested for contract definition on a new Light Intratheater Transport (LIT). The requirement has been demonstrated in Vietnam, where C-130s, C-123s, and C-7s have been performing the mission. The new aircraft will be a V/STOL or STOL design. Tilt wings are being considered, as well as stowable rotors, lift fans, and jets.

- The budget includes a \$30 million program for advanced development of propulsion and avionics for the Advanced Manned Strategic Aircraft (AMSA). Only \$5 million is sought in new obligational authority, the rest having been provided in the Fiscal 1968 budget. The time to get from contract definition to initial operational capability remains at about eight years, which means that the system must be tailored to the environment of the mid-1970s.

Other advanced defense systems were discussed before congressional committees by Dr. John Foster, representing the Department of Defense. Some of his projections are reported beginning on page 16.—END



To replace the C-130s, C-123s, and C-7s that have been performing the mission, USAF has asked \$15 billion for contract definition of a Light Intratheater Transport such as stowed-rotor proposal shown in artist's concept above.



Another proposal being studied for the LIT is the tilt-wing V/STOL technique shown in the artist's concept above. This approach was tested extensively with the LTV XC-142 and is available in the Canadair CL-84 transport.

ARE ADEQUATE DEFENSE PROFITS "UN-AMERICAN"?

A special "Airpower in the News" report by Senior Editor Claude Witze on James Forrestal Memorial Award-winner William M. Allen's address at the Forrestal Dinner of the National Security Industrial Association, where he warned that the attitude that there is something basically wrong with the defense industry's making a profit could drive industry away from government business, threatening national security.

A warning that national security may be endangered if adequate profits are not assured for defense industry has been put on the record by William M. Allen, President of the Boeing Company and this year's recipient of the James Forrestal Memorial Award.

Mr. Allen said there is a requirement for a change of attitude toward defense industry by both the program administrators and Congress. He said that too many of these people have the misconception "that the defense industry is a 'kept' industry, eating at the public trough; that there is something basically un-American about profits on government business; that defense contractors should be regarded with suspicion."

In an address to nearly 2,000 civilian, military, and industry officials at the annual Forrestal Dinner of the National Security Industrial Association, Mr. Allen expressed alarm over the possibility that private investors will find defense industry unattractive. If they do, he said, it will increase the requirement for government financing.

Citing the recent report on defense profits by the Logistics Management Institute, he said the low level may cause "some companies to conclude that defense work is not worth the risk involved when compared with the potential rewards."

Then, he posed a key question:

"What may be the consequences?"

"It is hard to state with certainty. Possibly the number of competitors will be thinned down and the relative opportunity be thereby increased. Possibly enough companies as a matter of policy will seek to carry on an adequate amount of defense work. . . .

"Looking across industry as a whole, I am more concerned about the long-term impact of the trend we have been discussing. If there is not the opportunity for reward, the innova-

tive process that has been so vital to our security could atrophy."

Later, Mr. Allen gave a more precise definition of the requirement:

"There must be a continuing recognition by all branches of government that the fundamentals of private industry's success must be taken into consideration if the desired results are to be obtained. Industry can only function if its earnings are sufficient to pay its owners a reasonable return on their investment and in addition permit a plowback of necessary funds into research and development and into the building of organizational strength and know-how. These essential elements of the creative and producing mechanism must be fostered and stimulated."

Mr. Allen said that the persons who look upon defense as a "kept" industry are "ignorance steering the ship—ignorance of the mechanism that propels it." And:

"We need, to a greater extent, to bring the public in on the vital nature of this [government-industry] cooperation. Of course, industry must bear its full share of responsibility. It must recognize the objective of providing a vigorous, capable, efficient source of the equipment and systems that will meet our national defense needs, and it must strive to achieve this objective."

"Further, there certainly can be no condoning of malfeasance of any sort. We all desire and welcome such safeguards as are necessary in the public interest, but we should seek to remove the misconceptions that are invisibly undermining the public interest."

"The attitudes of many people involved in administering the defense programs, as well as many members of Congress, are influenced by these misconceptions. If these prevailing attitudes are not revised by a better understanding of what makes industry effective, the result will be a less



William M. Allen, President of the Boeing Co., receives James Forrestal Award from N. B. McLean in Washington.

effective industry. The laws of economics have a way of working out their own ends."

Mr. Allen listed four major problem areas that harass the government-industry relationship. They are:

- The vast technological advances in weaponry that make it essential for the industry to have the best talent in the nation at its disposal. This technical complexity, he said, has complicated the process of selecting contractors and administering the contracts. This has encumbered the buyer-seller relationship.

- Industry, highly competitive, often accepts highly questionable contracts. This may weaken the industry.

- The Defense Department, by edict and regulation, recognizes the need for adequate profits. But the way the system is administered produces the opposite result.

- There is wide public belief "that the defense industry reaps undue profits at government expense, and that there may even be some sort of unholy collusion. . . . The opposite is distinctly the case. . . . In view of the presumed public attitude, officials are apprehensive that they may be subject to criticism for laxity, and are inclined to lean over backward to avoid this."

The LMI report on defense profits that provided a text for Mr. Allen's NSIA speech was covered in last month's issue of AF/SD. (See "Declining Defense Profits—Government Economy, or a National Security Risk?" by Claude Witze, page 129.)

The study found that the profit on defense sales has declined, from 1958 to 1966, to just under half that earned on commercial business. Barry J. Shilito, president of LMI and principal architect of the profit report, since has been chosen by President Johnson to serve as Assistant Secretary of the Navy for Installations and Logistics.

Culled from recent open testimony to the Congress by the Pentagon's top military R&D planner, here is an assessment of some of the major problems facing the United States vis-a-vis potential enemies. "There are some indications," he says, "that the [R&D] program is eroding, and we must act forcefully to reverse the recent funding trend" . . .

'Technological Plateau'— There's No Such Thing

By Dr. John Foster

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
DEPARTMENT OF DEFENSE



Early this year the Congress was told that the advanced technology effort in the United States is unsatisfactory, and that improvements must be made immediately or our defenses could become second-rate in the 1970s. The authority for this estimate was none other than Dr. John S. Foster, Jr., Director of Defense Research and Engineering.

Dr. Foster's warnings reversed, on many points, his own testimony of previous years and the testimony of other high DoD officials since 1960.

The substance of his predictions for the future are presented below in the form of quotations from his reports to congressional committees. Quotes also are included on major weapon systems and technical management problems. Over-all, Dr. Foster's testimony set new standards for lucidness and candor.

—J. S. BUTZ, JR.

Technical Urgency

Our research and technology base—the research, exploratory development, and advanced development programs—must be protected carefully and must not be permitted to erode. There is no "technological plateau" now, nor is one about to be created. . . . We are convinced that our research and exploratory development requires increased support during the next few years to ensure many options—a margin of safety—against any technological challenge. . . .

Operational experience [in Vietnam] helps us plan future R&D; it also means we lose a margin of technological surprise. Assessed along with the highly significant estimated ten percent growth in Soviet spending during the past year for military and space sciences, this "disclosure" places new urgency on our entire R&D program. . . .

There are some indications that the [research and exploratory development] program is eroding, and we must act forcefully to reverse the recent funding trend. . . . The Exploratory Development program reached a high point of almost \$1.2 billion in FY '64. If we apply the estimated five percent per year increase in the

cost of doing this work, then our actual FY '68 effort will amount to only about \$735 million in terms of FY '64 dollars. This means that we are doing little over half of what we did four years ago. . . .

Technical Management Objective

A major new system response by the United States takes about six years, unless we make preliminary preparation. This situation leads to the following rationale for R&D. We perform operational development and deployment of forces that will be sufficient to give us high confidence in our second-strike capability. We augment and improve these deployed forces (e.g., better penetration, better warning) on a time scale that matches our intelligence regarding actual Soviet development and deployment activities. . . . To avoid technological surprise, we carry out a vigorous advanced technology program to anticipate the worst that our potential adversaries could bring against us, and to exploit these advances to our own advantage. . . .

New Communist Weapons

The Fractional Orbit Bombardment System (FOBS) can be explained as an attempt at a "cheap shot" at our bomber bases, attempting to avoid our existing ICBM warning. As you know, we already are countering their effort by installing new over-the-horizon radars to provide adequate warning for our alert bombers. . . .

Should Soviet missiles achieve greater accuracy or be MIRVed, they would become a threat to the land-based missile component of our strategic retaliatory force.

An engineering development program has been started for a prototype hardened silo to maintain present Minuteman survivability against the higher accuracy threat, and large enough to hold a new large-payload missile if, in the future, we decide to deploy one. . . .

(Continued on page 23)

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A verified statement has been filed with the Department of State of the State of New York. The filing does not constitute approval of the sale or lease or offer for sale or lease by the Department of State or any officer thereof, or that the Department of State has in any way passed upon the merits of such an offering. A copy of this offering is available upon request from the subdivider.

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The American Way



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305-52

We put our hardware to the test.*

AIRCRAFT ENGINE GROUP

GENERAL  ELECTRIC

Communist China has not yet fired an ICBM-range test missile. Last year we anticipated that event might occur as early as the summer of 1967. Now we estimate it will not happen before the summer of this year and could precede an IOC [initial operating capability] by about three to four years. . . .

The Chinese bomber threat is small and the Soviet bomber threat appears to be decreasing somewhat. Our bomber defense objectives are to deny damage from the Chinese and prevent the Soviets from having an alternate threat cheaper than missiles. However, current air defense systems permit intercept only a few hundred miles from the North American defense perimeter. . . .

Reselection of F-106

Many of our problems are so complex the "intuitive answer" may not be correct. The conclusions from many studies are not at all obvious. Thus, studies are a necessary check of our experienced judgments. For example, I think most people would agree that the new Mach 3 F-12 is a far superior air defense interceptor to the F-111, F-106, or F-4. The F-12 is superior in speed, altitude, and range capability to any of the other candidates for the mission. In spite of this, a careful look at the system revealed that the controlling elements for combat were AWACS (Airborne Warning and Control System), OTH (Over the Horizon) Radar, and the fire-control system used in the interceptor. Extremely high speed for the interceptor was found to be useful but relatively unimportant. All the candidate interceptors could use the same fire-control equipment. The F-106 was chosen—it gave the best capability for investment, largely because the airframe makes little difference given AWACS, OTH, and good fire control. It already is in the inventory, and the cost of modification and ten-year operation is almost tenfold less than an F-12 system. . . .

Unexploited Fighter Potential

To assure our capability for air superiority against improved Soviet aircraft in any environment during the 1975-85 period, we should replace our F-4s, the first-line Air Force and Navy fighters. The advancing technology in engines and airframes, along with more flexible and reliable avionics and weapons, make possible a substantial improvement in fighter capability. A competitive program to demonstrate the total avionics-weapons capability before deciding on a particular design should give us the advantages of the "fly-before-buy" prototype approach. . . .

Improved Communist Air Defenses

Increased effectiveness of NVN (North Vietnamese) anti-air systems (which involve improvements in combined SAM-MIG tactics) indicates greater potential air attrition in the future. This is a very serious trend. We will have to work harder to maintain our presently low loss rate. . . .

Titan III Success

The Titan IIIC boosters successfully placed nineteen payloads into high orbits [during FY '67 and early FY '68]. . . . Use of these boosters, incidentally, saved \$50 to \$100 million, compared to using other boosters for this purpose. . . .

New Computers for Command and Reconnaissance

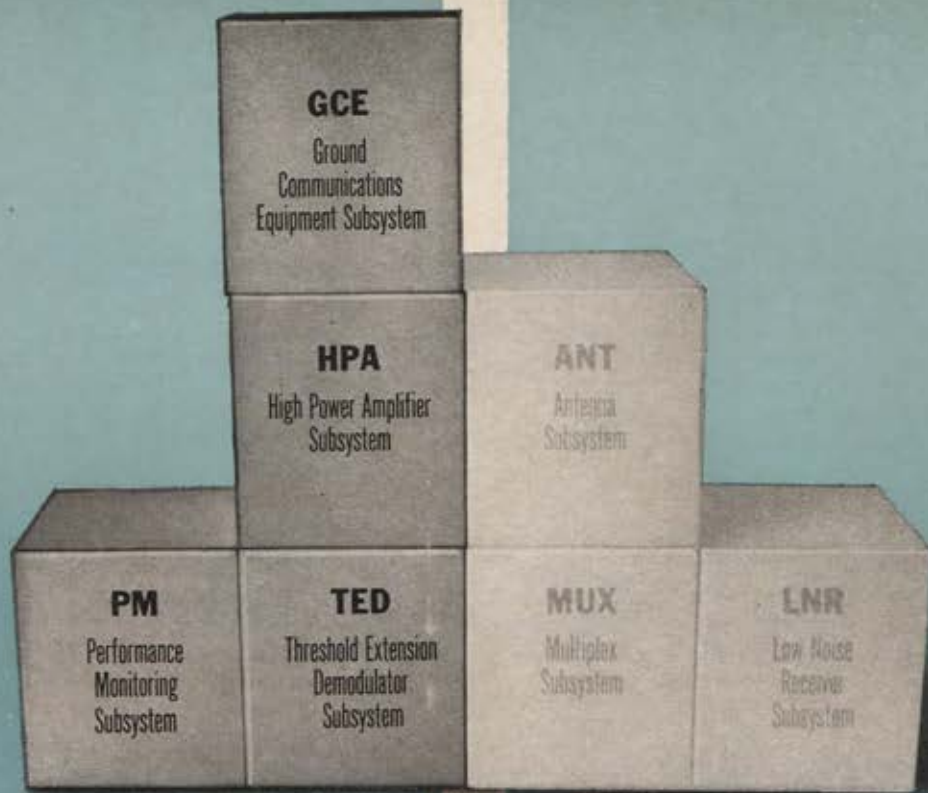
ARPA's Information Processing Techniques project has done the essential research for a digital data-processing system which gives various elements of a command organization simultaneous direct access to a vast store of computerized information. This system should be tested and evaluated in the National Military Command System beginning in May of this year. ARPA is supporting research on a parallel-processor computer, which is expected to be 500 times faster and 150 times cheaper (per "unit of computation") than present machines. The prototype should be completed in 1970, and DoD applications to ballistic missile defense, weather prediction, and nuclear burst phenomenology are expected. There is a promising computer technique for enhancing photographic detail, with obvious applications to photo-interpretation. . . .

B-52s Operational in 1982?

In the late 1940s we needed a replacement for the B-36, so we studied various alternative aircraft. . . . After several rounds of studies, it was decided to build prototypes of two different aircraft. After both prototypes had been flown, the decision was made to produce the B-52. I would like to note that today we probably would do more thorough studies to try to reduce the uncertainty.

There were continuing studies on how best to use this new weapon, the B-52. As the Russian defenses changed, our plans changed. In the mid-1950s, a radical change took place. The Russian development of air defense radar and missiles made it necessary to modify the system to allow low-altitude penetration of defended areas. There were many implications [in] this; flight profiles and routes were changed, and many weapons utilization plans had to be modified. Also, the B-52 was designed as a high-altitude bomber, and the flight loads encountered at low altitude made it necessary to accomplish extensive structural modifications.

Another major change occurred when the B-52s were refitted to carry conventional bombs in Vietnam. Again, extensive modifications were required. Studies are still going on, because there are certain metal fatigue problems with aircraft in service as long as some of the B-52s. We will continue to study the B-52 as long as it is in our inventory, which may be as long as another ten to fifteen years. The point of this example is the clear need for study from concept development through to decommissioning.—END



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WASHINGTON, D. C., APRIL 11
Clark M. Clifford, the new Secretary of Defense, used his first Pentagon press conference today to put 24,500 more men into uniform.

He disclosed that President Johnson had signed an executive order calling up eighty-eight units from the Army, Navy, and Air Force National Guard and Reserve. The men will serve up to twenty-four months.

The announcement was not unexpected; it is a step that was anticipated with some signs of impatience from those who wanted America to get on with the job in Southeast Asia. There are many who still feel that not enough has been done to mobilize the nation's real strength. Reporters at Mr. Clifford's press conference expressed some surprise at the modest size of the call-up and asked: Is it big enough?

The Secretary's reply was that President Johnson, currently deep in a new effort to negotiate with the North Vietnamese, has indicated he does not contemplate mustering any more manpower in the reasonable future. The Pentagon, of course, will keep up its running studies of the requirement and remain ready for any shift in the outlook.

Possibly the real news in today's conference was the disclosure that our policy is being revised. Mr. Johnson has set, for the time being, a ceiling of 549,500 for the total American strength in Vietnam. Out of the new call, about 10,000 will be sent to Southeast Asia, the rest used to bolster our strategic forces at home.

The South Vietnamese themselves are being prepared to carry more of the burden.

USAF's share in the call-up will be about 3,500 men in ten units (*see box*), of whom about a third will go to the theater of war. The Navy has the smallest call—1,000 men in two Reserve units—and the Army will provide the largest share, about 20,000 men in seventy-six units. Their active duty will begin May 13.

Secretary Clifford indicated that earlier press reports that Gen. William C. Westmoreland has requested a huge new force of 206,000 men were not accurate. He suggested that that figure came from studies out of Saigon, which speculated on what would be needed in the future under certain conditions that could develop over a long period of time.

But, the Secretary emphasized, the General is satisfied with the man-



Combined Vietnamese-US forces await softening up of enemy-held tree line by USAF jet before moving in, fifteen miles west of Saigon, during Operation Quyet Thang ("Resolved to Win").

power President Johnson has provided since the Tet offensive early this year. That has included 11,000 fighting men sent to Vietnam as an emergency force and 13,500 more to go to provide additional support. Of the latter figure, it is clear that 10,000 will come from the Reserve Forces called up today.

Mr. Clifford said that our new policy, or course of action, contemplates a planned deescalation, step by step, as events and the reaction of Hanoi justify such action. He said the program is in only its early stages, but at least messages from the White House now appear to be effective and there is some response from the other side.

There was some discussion of the newest "bombing pause," announced by the President in his television address of March 31, the night he also said he is not a candidate for reelection.

Mr. Clifford said there have been no bombings north of the twentieth parallel in North Vietnam since March 31. Questioned about the pace at which North Vietnam is pouring men and equipment into South Vietnam, he said the rate of shipment had been increased prior to March 31 and that

(Continued on following page)

HOW THE NEW CALL-UP AFFECTS THE AIR FORCE

Ten units of Air National Guard and Air Reserve forces have been called up, as listed below. The strength figures are current actual strengths. Not all these men will report for duty, since those with less than six months remaining service on the date of their unit's reporting to active duty will be excused from the call. The units will be brought to full strength with volunteers and fillers from the active forces.

US Air National Guard

Unit Designation	Home State	Mobilization Station	Assigned Strength
174th Tactical Fighter Group	New York	Cannon AFB, N. M.	723
175th Tactical Fighter Group	Maryland	Cannon AFB, N. M.	718
171st Aeromed Airlift Group	Pennsylvania	Pittsburgh, Pa.	760

US Air Reserve

Unit Designation	Home State	Mobilization Station	Assigned Strength
34th Aeromed Evac Squadron	Texas	Kelly AFB, Tex.	80
52d Medical Service Squadron	Illinois	Scott AFB, Ill.	130
22d Medical Service Squadron	Maryland	Andrews AFB, Md.	130
82d Aerial Port Squadron	California	Travis AFB, Calif.	93
88th Aerial Port Squadron	New Jersey	McGuire AFB, N. J.	94
86th Aerial Port Squadron	Washington	McChord AFB, Wash.	95
930th Tactical Airlift Group	Indiana	Lockbourne AFB, Ohio	665



Abrams



Westmoreland



Goodpaster



Sharp



McCain

he was not aware of any change in the traffic since the bombing pause was declared.

There is a report in today's New York Times that troops and war materiel are crossing into South Vietnam in a "maximum effort" and, if this is permitted to continue, the enemy will return to his fighting peak by early June.

While this continues, Mr. Clifford still said the enemy started his withdrawal from the Khe Sanh area about March 12 and the reason was that the area had become "untenable." The enemy was being destroyed. The Secretary did not say it was airpower that was inflicting the casualties, but that is the fact.



The change of command in Vietnam has been made official by the White House. The Army's Gen. Creighton W. Abrams, fifty-three years old, has been named, as expected, to replace Gen. William Westmoreland

as chief of the Military Assistance Command, Vietnam (MACV).

A veteran tank commander of World War II, General Abrams has been at General Westmoreland's elbow for several months, taking charge of the training and performance of the South Vietnamese Army (ARVN). Secretary Clifford indicated at today's press conference that the Abrams effort in this area has been successful; the ARVN is preparing to grow—by 135,000 men—and take over more of the fighting.

The United States is going to improve their equipment, providing them with M-16 rifles, new and better mortars, communications equipment, and helicopter support. Presumably, this work will be continued by General Abrams' deputy in his new job, who will be Lt. Gen. Andrew J. Goodpaster, a former aide to President Eisenhower and a man with extensive experience in the office of the Joint Chiefs of Staff.

President Johnson had announced

earlier that he intends to nominate General Westmoreland to be Army Chief of Staff, replacing Gen. Harold K. Johnson.

The Navy also figured in the new command changes, with Adm. John S. McCain, himself the son of an admiral, named to succeed Adm. U. S. Grant Sharp as Commander in Chief of all Pacific Forces (CINCPAC), with headquarters in Honolulu.

Admiral McCain will be the top boss of all Army, Navy, and Air Force units in Vietnam. He has a son, John S. McCain, III, a lieutenant commander and pilot, who was shot down last October and remains a prisoner of the North Vietnamese.



It will sound incredible to veteran airmen, but USAF is experimenting with the idea of having helicopters towed by fixed-wing aircraft. The purpose, of course, is to extend the helicopter's range, which can be a limiting factor on some air rescue missions.

NEW BOOKS IN BRIEF

The Costs of Economic Growth, by Ezra J. Mishan. Another humanist warning that our economic abundance may not be worth its price in social tolls. There are points to be considered here, despite the temptation to discount prophets of doom. Praeger, N. Y. 190 pages. \$6.50.

Crisis Now, by James M. Gavin. It is not easy to reason that a scientific revolution has left the American public with a knowledge gap responsible for the dual crises of the Vietnamese War and urban disintegration. But General Gavin has deduced just that. His suggestions are provocative, but he need not have gone through so many philosophical maneuverings to connect the subjects. One of them would have sufficed. Random House, N. Y. 184 pages. \$4.95.

The Gooney Bird, by William C. Anderson. An unlikely crew of characters in a resurrected DC-3 keeps the pace lively in this humorous novel in a Vietnamese War setting. Crown Publishers, N. Y. 306 pages. \$5.95.

Hitler's Secret Weapon: The "Managed" Press and Propaganda Machine of Nazi Germany, by Alexander G. Hardy. A study of the philosophy and decrees which operated that machine, and of its devastating effects. Vantage Press, N. Y. 350 pages. \$5.95.

The Nuclear Revolution in Soviet Military Affairs, edited by William R. Kintner and Harriet Fast Scott. A collection of articles translated from the Russian, too revealing for the West to overlook, that describes strategic goals for the nuclear hardware improvements of the last five years. Could be regarded as a "primary source" in gauging and explaining Soviet plans. University of Oklahoma Press, Norman, Okla. 420 pages. \$6.95.

The Remnant, by Stephen C. Shadegg. This is the story of a Washington politician so zealous, so idealistic, and so honest that his colleagues as well as his enemies decide he must be eliminated. Of course, it's only a novel. Arlington House, New Rochelle, N. Y. 336 pages. \$5.95.

Republican Politics: The 1964 Campaign and Its Aftermath for the Party, edited by Bernard Cosman and Robert J. Huckshorn. The contributors to this book, scholars and Republican activists, are not too optimistic for the future—especially the immediate future—of the party. After examining its organization on paper and in operation, its power squabbles, propaganda, finances, and leadership, the editors suggest some survival tactics. Praeger, N. Y. \$6.95.

—MARIA T. ESTEVEZ

Out at Edwards AFB, in California, pilots are conducting what are called "close-proximity tests" with a Lockheed CL 286 helicopter and a Lockheed C-130 transport aircraft. The Flight Test Center is aiming at smooth and practical flight of the two aircraft, while the helicopter remains about fifty feet beneath the transport.

Once this is achieved, the next step will be to stage a midair hookup. The C-130 will be equipped with a stowable boom. During hookup, the boom would be fastened to a nonrotating mast above the hub of the helicopter's blades.

In flight, the weight of the helicopter would be carried by the transport and the two aircraft would move much faster than the helicopter can fly alone. The operating range of the rotary-wing aircraft would be extended by as much as 600 miles.

Lockheed Aircraft Corp. is contractor for the tests, under direction of USAF's Flight Dynamics Laboratory, part of the Systems Command with its headquarters at Wright-Patterson AFB, Ohio.

—C. W.



Brig. Gen. Robert F. McDermott, since 1956 Dean of the Faculty at the United States Air Force Academy, Colorado Springs, Colo., is completing twenty-six years of military service and will enter the business world as executive vice president of the United Service Automobile Association at San Antonio, Tex.

In so few lines, it is hard to put down with any degree of adequacy the contribution of General McDermott to the Academy. Perhaps more than any other faculty member, this soft-spoken and often stubborn, but always dedicated, officer has been the heart and soul of the Academy since (Continued on page 30)

Allan Scholin, who usually writes this column, returned from his trip to Southeast Asia late in March. His article on air reconnaissance begins on page 42 of this issue. His next assignment was to the AFA Convention in Atlanta. On his return to Washington on April 6, he was immediately called to active duty in his capacity as a lieutenant colonel in the Air National Guard, during the rioting in Washington, and as this issue closed was still on active duty. This month's "Aerospace World" has been written by Senior Editors Claude Witze and William Leavitt and Associate Editor Edgar Ulsamer.

Gary W. in our electronics group is one engineer who believes in communicating with the layman. He feels that in discussing a technical problem with someone outside the engineering world, one frequently gains perspective.

The only layman within holler distance of Gary is Iris Rimkopf, file clerk. Iris is the flighty but practical type. Also, she is stacked.

Some time back, we overheard Gary talking to Iris.

HOW TO TAKE A BRAKE'S TEMPERATURE

"Uh...yes..."

"Well, couldn't you just wet one finger — like so — and just sort of whisk it by the brake and then if you get a 'sssst' noise and it burns you a little, why..."

The perplexed look from Gary proved once again that he who involves the feminine mind ends up with middle part of Lifesaver.

That was some time back. Last week we listened to Gary's presentation of the new Hydro-Aire Brake Temperature Monitoring System. We were impressed.

A thermocouple on each brake pressure plate generates a signal as a function of temperature. Said signal is transmitted to the pilot via a unique amplifier/compensator. Overheat in any brake illuminates an indicator. The pilot then operates a switch to find out which brake is the guilty one.

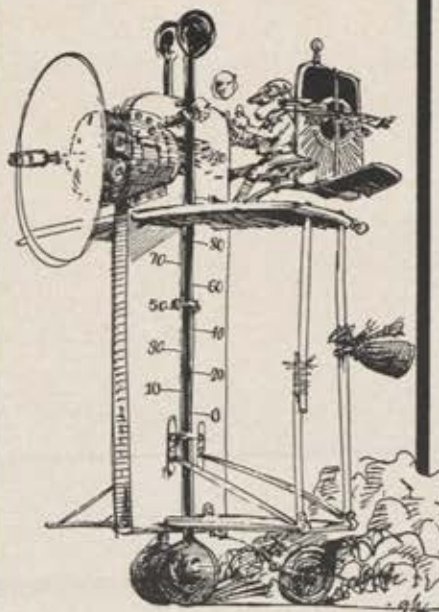
Effects of variation in reference junction temperature of the thermocouples are compensated by a unique Hydro-Aire technique. Because of this technique there are advantages in weight, size, cost and ease of maintenance.

Result: a rugged and reliable system to fill an important need. And, Gary pointed out, it's already installed and operating with a major airline.

One of the marketing people wanted to know if Engineering had considered any simpler alternate approaches to the problem.

Pause. Then a gleam in Gary's eye. He moistened one finger...

If you want the thermocouple solution, we'll be glad to send you an abstract of Gary's presentation. For the alternate solution, see Iris. In Engineering. The one with the bandaged index finger.



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1967

Technical Editor J. S. Butz, Jr., for "Taking the Night Away From the Viet Cong."

****1963**

Senior Editor Claude Witze for "Private Enterprise and the Public Interest."

1966

Senior Editor Claude Witze for "Let's Get Operational in Space."

Technical Editor J. S. Butz, Jr., for "Rx for Spaceborne Deterrence." (Ball Award)

***1964**

Senior Editor William Leavitt for "Space Technology: Today's Tool for Controlled Peace."

1961

Senior Editor Claude Witze for "The Challenge to Aviation in the Cold War."

* Article also won Robert S. Ball Memorial Award for best space writing in any media.

** Article also won James J. Strebig Trophy for best aviation writing in any media.

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its establishment. He has been there from the start, first as professor of economics, later as first permanent professor at the Academy, and finally as permanent Dean of the Faculty. At the time of his appointment as permanent dean and consequent elevation to one-star rank, he was the youngest general officer on active duty.

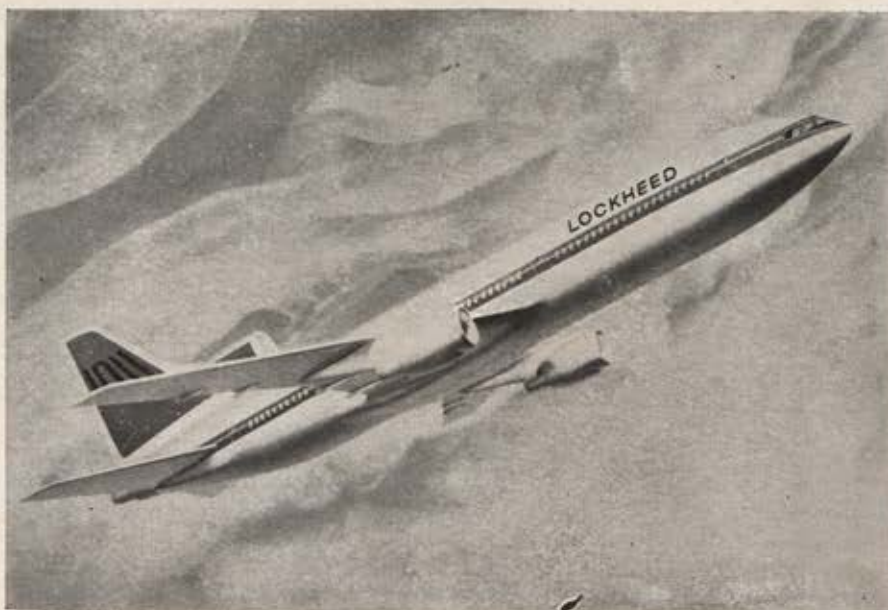
His contributions to the Academy range from the development of the "whole-man" concept and the enrichment curriculum to the insistence on measures of moral and leadership qualities as well as mental and physical attributes as selection criteria for Cadets.

When disaster struck, during the cheating scandals at the Academy some years ago, it was this determined Irishman who helped weather a storm that might have swamped the Academy for all time. He will be missed.

—W. L.



Brig. Gen. Robert F. McDermott, AF Academy Dean of the Faculty since 1956, is retiring to become executive vice president of the United Service Automobile Association in Texas.



Front runner in the airbus competition is the Lockheed 1011. To date the airlines have ordered 172 aircraft. It has a cruising speed of 600 mph and will carry from 256 to 345 passengers in luxurious comfort, according to Lockheed. The Boeing and McDonnell Douglas airbus entries are still contenders in the race.

During late March and early April four US airlines and a British aviation holding company placed firm orders for 172 Lockheed L-1011 advanced technology trijets, that company's version of the "airbus," powered by Rolls-Royce RB.211-22 engines. The L-1011, an aircraft capable of transporting up to 345 passengers and their baggage over a distance of more than 3,300 miles, thus became the first airbus to enter production. Priced at about \$14.7 million and powered by advanced technology engines rated at 40,600 pounds of thrust, the L-1011 is substantially heavier and larger than originally conceived to meet the increasing range requirements of the airlines.

No production decision has yet been reached in the case of the competing Boeing 747-300 and the McDonnell Douglas DC-10. American Airlines, subject to actual production go-ahead

by McDonnell Douglas, earlier this year placed orders for twenty-five DC-10s and retained options for an additional twenty-five aircraft. (See "The Airbus Race: Still Neck and Neck," April '68 AF/SD, p. 172.) If McDonnell Douglas cannot win a sufficient number of orders for its DC-10 from other airlines to warrant production go-ahead by May 1968, American Airlines will be free to place its airbus order with one of the competing manufacturers. Boeing, which did not enter the airbus competition until March 22, has not yet sought any firm orders.

All three designs, the L-1011, the DC-10, and the 747-300, are competing currently for the airbus orders by United Air Lines and Northwest Airlines. McDonnell Douglas is reported to have offered to transfer United Air Lines's deposit for forty

INDEX TO ADVERTISERS

American Airlines, Inc.	20 and 21
Armed Forces Communications & Electronics Association	95
Autonetics Div., North American Rockwell	32 and 33
CEIR, Inc.	91
Delco Radio Div., General Motors Corp.	47
Electro-Optical Systems, Inc.	80
Garrett Corp., The, Air Cruisers Div.	31
General Development Corp.	17, 18, and 19
General Electric Co., Aircraft Engine Group	22
Honeywell, Inc., Aerospace & Defense Group	6 and 7
Hydro-Aire Div., Crane Co.	27
Kollsman Instrument Corp.	54

Lockheed Aircraft Corp.	2 and 3
LTV ElectroSystems, Inc.	4
McDonnell Douglas Corp.	Cover 4
Motorola, Inc., Government Electronics Div.	11 and Cover 3
Pratt & Whitney Aircraft Div., United Aircraft Corp.	Cover 2 and page 1
Radio Engineering Laboratories Div., Dynamics Corp. of America	24
Singer, HRB, Inc.	53
TRW Systems	61
United States Air Force	73
Vertol Div., The Boeing Co.	74
Vitro Corp. of America	56

DC-8-61 and DC-8-62 "stretched" jets to an order for the DC-10. —E.U.



After his nomination by President Johnson in March and Senate confirmation on April 8, J. William Doolittle has assumed the position of Assistant Secretary of the Air Force for Manpower and Reserve Affairs. His oath of office was administered by Secretary of the Air Force Harold Brown on April 10. Mr. Doolittle is the first person to serve in this post, which was created by the Reserve Forces Bill of Rights and Vitalization Act of 1967.

The new position was designed to strengthen the management structure of the Reserve Forces in order to make them more effective. Mr. Doolittle had served as General Counsel of the Air Force since November 1966. John M. Steadman, who has been the Special Assistant to the Secretary and Deputy Secretary of Defense, has been selected for appointment as Mr. Doolittle's successor as General Counsel of the Air Force.

SENIOR STAFF CHANGES

M/G William B. Campbell, from Dep. Inspector General for Inspection and Safety, Office, TIG, Norton AFB, Calif., to Director of Manpower and Organization, DCS/Programs and Resources, Hq. USAF, replacing M/G Bertram C. Harrison . . . M/G Bertram C. Harrison, from Director of Manpower and Organization, DCS/Programs and Resources, Hq. USAF, to Cmdr., Sixth Allied Tactical AF, SHAPE, Izmir, Turkey . . . M/G Richard O. Hunziker, from DCS/Materiel, Hq. SAC, Offutt AFB, Neb., to Dep. Inspector General for Inspection and Safety, Office, TIG, Norton AFB, Calif., replacing M/G William B. Campbell.

M/G John D. Lavelle, from Dep. Dir. for Forces, to Director, Defense Communications Planning Group, Washington, D. C. . . . B/G Leo C. Lewis, from Dir., Command and Control, DCS/Ops, to Inspector General, Hq. SAC, Offutt AFB, Neb., replacing B/G Edward M. Nichols, Jr. . . . B/G Edward M. Nichols, Jr., from Inspector General, Hq. SAC, Offutt AFB, Neb., to Vice Cmdr., 15th AF, SAC, March AFB, Calif. . . . B/G Anthony T. Shtogren, from Cmdr., Pacific Comm. Area, AFCS, with add'l duty as DCS/C&E, PACAF, Wheeler AFB, Hawaii, to Dep. Dir., J-6, JCS, Hq. USAF . . . B/G John M. Talbot, Asst. Surgeon General for Staffing and Education, Military Personnel Center, from duty station Randolph AFB, Tex., to Hq. USAF.—END

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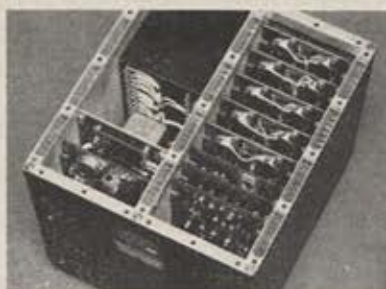
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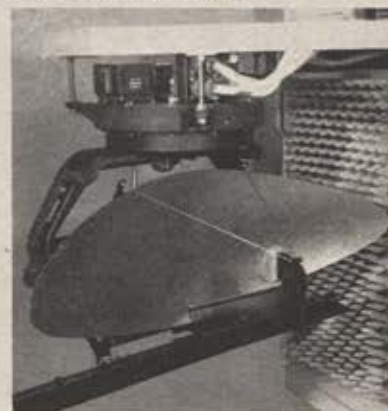


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We invite your inquiries, your questions. We want to show you that AMARS are just what we say they are: the most advanced, cost-effective, radar systems available today. Write AMARS, Dept. 080, Autonetics, 3370 Miraloma Ave., Anaheim, Calif. 92803.



North American Rockwell Autonetics Division

In the shadow of Pikes Peak, they've finally welded the short blue line to the wild blue yonder as the US Air Force Academy this year instituted its first Cadet flight-training program. The program, compact and tightly managed, gives Cadets a chance to get a taste of flying before they start their active Air Force careers, and saves the taxpayer money by weeding out those unsuited for flying before they are sent to regular pilot training. Cadets no longer are embarrassed when asked how they like flying with the Air Force, and the sky over Colorado is filled with the words . . .

AIR FORCE

MAY, 1968

Falcon One . . . Up and Away!

By Ed Mack Miller

IT USED to be "Guy in the sky by and by" at the US Air Force Academy.

But, at about the same time the hottest MIG-shooter of the Vietnam War hit the Academy this year, they finally got a military sky program going at Wild Blue U.

Col. Robin Olds, the new Commandant of Cadets, was at least as enthusiastic as the Cadets:

"The mission of the Air Force is to fly and fight, and don't you ever forget it! So state signs and plaques in offices and briefing rooms from the Pentagon to jungle strips in Southeast Asia. The statement is unofficial, but in the hearts of the men in blue it states the matter with direct simplicity and human appeal.

. . . The newly installed T-41 program at Peterson Field has been met with tremendous enthusiasm by the entire Wing. They are in the 'blue' and directly related to the basic mission of the service. The impact has been deeply significant. It will broaden and deepen as the program expands. From here into the future, no Air Force Academy graduate is likely to 'ever forget it,'" Colonel Olds says.

Actually, the word "flying" had been something of an embarrassment at the Academy from the beginning. For years the Cadets have had to blush and look at their shoes when people asked how they liked it "up there."

"We don't do any actual flying at the Air Force Academy," they'd say. "That comes later," they'd explain. "You see, we're academically oriented. This is a college. . . ." Lamely now, "We do get navigation, but. . ."

Ten years ago, in an article on the Academy, I wrote the following:

"The mission of the Air Force Academy is dedicated military leadership. Every Cadet who enters the Academy learns this almost as soon as he gets his first crewcut. . . . The Academy aims no more at making its Cadets pilots than the US Naval Academy was established to produce oarsmen. It doesn't take four years to make a man a pilot . . . but it does take



From left: instructor pilot 1st Lt. Richard Lee, son of retired Gen. Robert M. Lee, former ADC Commander; Charles Holland, Class of '68, Elkins, W. Va., a student; and the author, Ed Mack Miller. Lee is a 1966 Academy graduate.

The author, Ed Mack Miller, an aviator-writer who has contributed frequently to these pages, has been a pilot with the Air Force, the Air National Guard, and United Air Lines. He has published three books and more than 1,200 articles and stories. His latest contribution to AIR FORCE was last month's "An Interview with Snoopy."

four years and a \$33,000 education to produce the kind of officers the Air Force wants."

In that ten years, the US Air Force Academy has built an enviable record for academics—while all but ignoring the Colorado sky beckoning above.

Then, finally, approval was gained for a pregraduation military-type pilot-training program, providing First Class (Senior) Cadets with approximately thirty-six hours of flight instruction, plus associated ground-school study.

Previously, there had been attempts to get flying programs going during summer vacations for Cadets, but these had always died aborning.

The Academy Board of Visitors each year had asked for some kind of comprehensive pilot-training program, but it was not until December 8, 1966, that the Secretary of Defense was able to see his way clear to approving the program, which got off the ground on January 8, 1968, when Cadet Frederick E. Bassett, twenty-two, and his instructor, Lt. Col. Joe Price, launched at dawn in a trim new Cessna T-41, the 210-horsepower "big brother" of the civilian Cessna 172. The program uses forty-five of the great little performers.

"It's a big day for us," Lt. Gen. Thomas S. Moorman, Academy Superintendent, told newsmen. "We've been looking forward to this for a long time." Cadets, of course, are and were sent to Air Force pilot training after graduation, and those who were found to lack flying aptitude were funneled into other Air Force career fields—a policy resulting in lost effort, lost time, and additional travel expense. "This new program makes sense," said Lt. Bill Riley, Squadron Information Officer and himself an Academy graduate. "It identifies nonfliers at low cost, and catches them early enough to permit them to train for other Air Force career fields before graduation."

Flight training is centered at Peterson Field, named in World War II to honor an Englewood, Colo., pilot, 1st Lt. Edward J. Peterson, who was killed at the joint military-civilian Colorado Springs field when his P-38 crashed on takeoff in August of '42. Auxiliary fields used in the operation are the strip at the Academy and the Army field (Butts AAF) at nearby Fort Carson.

The training differs from civilian lightplane training in a number of ways. One big difference is the "tight control" facet of the training, which closely duplicates the operational launch-and-recovery techniques used in Vietnam, conditioning the Cadet for the precision that will be required in operational flying—and also, through almost absolute efficiency, resulting in large dollar savings. The average mission is 1.3 hours, with four sorties scheduled on each plane each day. For Period I, twenty Cadets arrive by bus at 6:15 a.m. After a time-hack, they are briefed on weather, the day's syllabus, safety, and operational facilities. Precision "slot" taxi times are assigned, and the students and instructors get to their silver-and-black Cessnas in time to make a thorough walkaround.

Then they are in the cockpit and ready to taxi at the appointed minute (the times are carefully planned, as are the runways and "canned departures" and patterns used so as to exert as little impact as possible on the other traffic at busy Peterson Field). All twenty of

the tiny trainers are airborne and on their way via corridors to individual "grid" training areas (thirty-nine of these are plotted within thirty-five nautical miles of "Pete" Field). These are carefully selected to keep the Academy training segregated from airways and civilian flying training areas. Traffic information is passed on from area control and individual planes on 123.5 ("Caution, red-and-white Bonanza heading 120 degrees, transiting area 26 at 9500").

Period I ends when the last of the twenty trainers touches down at its appointed time. After tying down and debriefing, the Cadet is on the bus back to the Academy (about twenty miles) at 9:05 a.m. Five minutes later, another bus arrives; the process is repeated through all four of the daily periods five days a week (normally no flying is set up for weekends, when civilian flying training near Colorado Springs reaches its peak). Periods I and IV each day have twenty Cadets; the two midperiods, thirty-five. When the program is fully activated, each period will be used to train approximately thirty-five Cadets.

In the landing-and-pattern phase of training, the Cadets are given standard departure routes to one or the other of the auxiliary fields. If only part of the period is to be spent at the airport, the Cadet is assigned a route and training area by radio on departure from the satellite field.

The twenty-seven-sortie syllabus takes thirty-four training days and allows the newly commissioned graduate to enter regular Air Force training with the same flying background as an ROTC pilot trainee.

Flight instruction at the Academy is provided by
(Continued on following page)



With the Rampart Range looming in the background, student pilot C1C James A. Johnson, Fairmont, W. Va., accompanied by Lt. Col. Edward McSorley, commander of the 3253d Training Squadron, flies his T-41 over Academy site.



CIC Stephen C. Mish, left, and his instructor, 1st Lt. Philip McClain of ATC, head for a debriefing session after tying down their Cessna T-41. Cadets get 36½ hours of flying time and 30 hours of ground school in the pilot program.

the 3253d Pilot Training Squadron, an organization of the Air Training Command, commanded by Lt. Col. Edward C. McSorley, Jr., a combat veteran of World War II and Korea and well experienced in flight training programs. The 3253d has thirty-two officer instructors (many Academy graduates themselves), four civilians, and twenty-three rated pilots from the Academy faculty and staff (who instruct on a part-time basis), and three noncommissioned officers.

It is the responsibility of the Air Training Command, the "free world's largest school system," with headquarters at Randolph AFB, Tex., to train the pilots for the US Air Force team. The command's Undergraduate Pilot Training (UPT) Program also operates at Laredo, Laughlin, Randolph, Reese, and Webb AFBs, Tex.; Craig AFB, Ala.; Moody AFB, Ga.; Vance AFB, Okla.; and Williams AFB, Ariz.

The Academy graduate who goes on to formal USAF flight training will get eighteen more hours in the T-41 and ninety hours in his first jet, "the sports car of the Air Force"—the Cessna T-37. He will get his silver wings after 120 hours in the supersonic Northrop T-38.

Formerly, about eighty-five percent of the physically qualified Cadets requested and received pilot training after graduation. The new pre-graduation program is expected to motivate an even higher percentage of Cadets toward flying careers. The first class contains 221 Cadets, but, by 1972, more than 700 will be taking the course. Flight training includes dual instruction, solo flight, cross-country instruction, and solo navigation. The syllabus differs from civilian flight training

in a number of respects, although provisions are made for the Cadet to take his FAA written and flight examinations for a civilian private license if he desires. Maneuvers that differ from civilian training include "steeper" steep turns (sixty-degree banks instead of forty-five), lazy eights, and perhaps a greater accent on ground-track maneuvers. Out of 36½ hours, all but eleven are dual.

Ground school totals thirty hours and includes flight procedures, weather, navigation, flight planning, and Federal Aviation Administration regulations. On his own time, the Cadet can get simulator training in the T-33 ground trainers.

Ground school instruction is provided by Academy personnel under the direction of Lt. Col. Robert K. McCutchen (a former member of the Thunderbirds jet precision demonstration team), who is now Chief of the Airmanship Division at the Academy.

Also included under Colonel McCutchen's Airmanship Program are soaring, a lightplane flying club, and a sky-diving program.

Soaring is centered on the Academy airstrip, the old Pine Valley Airport, located in the southeast corner of Academy property. The program has a fleet of four sailplanes, all Schweizers, some of them oxygen-equipped for high-altitude flight.

As a part of the Airmanship Program, a year before they enter the T-41 program, Cadets can, in their spare time, work on FAA ratings in the club's four Cessna 172s and go on for advanced work in T-34s, a Mooney 21, or a Piper Comanche. Dues and aircraft expenses bring the average cost for a private pilot certificate to about \$375, almost a fifty percent savings over learning "on the outside." This program is, of course, voluntary and is completely separate—in the sense that it is a club activity—from the official T-41 program.

The Airmanship Division received certification for a complete FAA-approved flying school in November of 1966, and now Cadets can go on to get their FAA Com-



Lt. Bill Riley, himself an Academy graduate and now information officer for the training squadron, here talks over the program's effectiveness with Lt. Col. Edward C. McSorley, who heads the Training Command unit at the Academy.



1st Lt. Jack Gingerich, left, an ATC pilot-instructor, goes over checklist with C1C Richard E. Coe, Arlington, Va., during preflight inspection of a T-41 at Peterson Field. The 210-horsepower Cessna is modified version of the 172.



Lt. Col. Robert K. McCutchen, Chief of the Academy's Airmanship Division, supervises ground-school instruction for the Cadets. Colonel McCutchen is a former member of the famed Thunderbirds jet precision demonstration team.

mercial, Instrument, and Instructor ratings through the Aero Club. It is also a military representative organization of the Academy and represents the Academy at intercollegiate flying contests.

So far, more than fifty Cadets have earned private ratings, six their commercial, four their instrument, and three their instructor ratings. The club, although offering training similar to the T-41 program, is civilian rather than military oriented.

Academy Cadets, under the Airmanship Program, have also participated in parachuting for several years. Airborne Infantry Training has been made available to Cadets on a voluntary basis for some years, but, until 1966, Cadets were required to give up summer leave in order to participate.

In 1966 more than 400 Cadets received their airborne wings as part of the scheduled summer training program. Cadet activity for parachuting as a sport was organized in 1964. In the spring of '66 the newly designated Cadet Parachute Team was made a military representative activity and became eligible for appropriated-fund support. At the same time, Air Staff approval was gained for military parachute training to be taught at the Academy. Aircraft support is through civilian contract.

A twelve-man competition team represents the Academy at the annual military meet at West Point (with other service academies and active-duty military units represented), and in regional, college, and national competitions.

But, the big new thing at the Academy is the "Guy

in the Sky" program, the official Pre-Graduation Pilot Training Program.

"Our instructors also have to be good managers," Colonel McSorley says. "Time is critically important in this program. We feel that learning to fly is more an athletic, rather than an intellectual, achievement. Anyone can learn to fly—but to learn to fly to the standards we set in the time frame we have—that's an achievement."

"This program makes sense," says Colonel McCutchen. "You've got to walk before you can run. And so it's wise to start these young men out in Cessnas. The plane is comfortable. It's friendly and intimate—and you teach the Cadet the basics of flying in an easy, effective way, sitting beside him where he can see you demonstrate, can ask questions easily."

"I'm convinced it's a lot better than slapping a G-suit and a parachute on him, putting his head in a 'fishbowl' hard hat, slapping an awkward oxygen mask on his sweating face, and scaring him to death right off the bat with six Gs in a jet trainer."

"We're sold on the T-41 program here," Colonel McSorley says. "We think it'll save the taxpayers a lot of dollars in a lot of ways—and do a better job."

Ranks of grinning Cadets agree. They're looking up now, instead of at their shoes.

And, behind them, Col. Robin Olds (recently nominated for his brigadier's star) looks on approvingly.

And the Cadets like *that*. In fact, you can almost see all those young guys sprouting handlebar mustaches when they think he isn't watching.—END

The Vietnamese War, suggests a noted political-military analyst, must be seen in its true light as a crucial contest in the protracted conflict between the United States and the Soviet Union. Only through an acceptance of this grim fact can we rid ourselves of the erroneous preconceptions that have hampered US strategy in Southeast Asia and utterly confused American public opinion . . .

On the Southeast Asian Confrontation

By Dr. Robert Strausz-Hupé

DIRECTOR, FOREIGN POLICY RESEARCH INSTITUTE

PRESUMABLY, the purpose of US intervention in Vietnam has been to safeguard the people of South Vietnam against a takeover by the Communist regime of North Vietnam. Presumably, too, this purpose lies in the US national interest. With this purpose most Americans have agreed and, probably, still agree.

In the process of accomplishing this stated purpose, the United States has launched a full-scale ground war in Asia, supported by selective bombing of North Vietnamese and adjacent territories. It is possible to agree fully with the stated US purpose and to disagree completely with the strategy chosen to achieve it.

The military history of US involvement in Southeast Asia has been one of slow and halting escalation. The principal rational purpose of escalation is to forestall counterescalation. To accomplish this, escalation must be so massive and rapid as to inhibit the enemy's attempt to repair the damage wreaked upon his forces and system of supplies. Since war signifies violence, and since a civilized nation abhors violence as disruptive of the civic and moral order, the rulers of a civilized nation must seek to fight war so that objectives will be attained *speedily* and with the greatest economy of means. This is the one and only rational and moral justification of escalation.

Specifically, the weight of punishment must fall upon the concentrations of the enemy's power—upon his military forces, stores of materiel, and routes of access to supplies from abroad. For reasons of economy, if not of moral scruple, this strategy aims to destroy only vital military targets. Although it cannot avoid harming civilians, it will seek to reduce civilian casualties to a minimum and, more important still, attain the desired results with the greatest dispatch so that the target society can return with the least possible delay to its peaceful pursuits.

This principle applies, as a matter of course, to military operations in an allied country. They must be conducted in such a way that the ally's civilian population is spared the horrors of war and can resume as quickly as possible the works of peace. All successful wars—wars that attained desired political objectives and, at the same time, ensured the restoration of a peaceful order—have been waged this way. Wars that have not been waged this way created more issues than they were supposed to have settled and engendered international instability, harmful to both the victors and the defeated.

The conduct of the United States in Vietnam has not cleaved to these principles of rational warfare. US escalation ascended by low steps. The enemy had time to realign his forces, repair damage, and draw upon supplies imported from abroad. He also could anticipate successive escalatory steps. Thus, the United States deprived its military initiatives of that element of surprise which is at the heart of successful warfare.

The United States' reiterated willingness to negotiate a settlement that would explicitly guarantee the integrity of the Vietnamese state and implicitly accord the North Vietnamese rulers a role in the domestic affairs of South Vietnam relieves the enemy of whatever doubts he may have entertained concerning his own safety. He knows himself immune against invasion. He need not fear appropriate punishment for his aggression against a neighboring state which did not attack him.

The United States has sedulously refrained from blocking North Vietnam's principal routes of access to foreign supplies. Nearly all Communist states, led by the Soviet Union, have for years supplied, and are now supplying, North Vietnam with war materiel and other vital imports. For this information we can thank not so much the candor of our government as the proud

As this is being written, the siege of Khe Sanh has apparently been lifted. This was the scene in late March when supplies had to be dropped by parachute to the besieged allied garrison. Khe Sanh had become major symbol of US determination by the time the base was relieved. But it was also a focus of recrimination and confusion among Americans on the home front.

—Wide World Photos



boasts of the Soviet rulers and their satellites in Eastern Europe. For a long time the US government has fostered the notion that it has been Red China rather than the Soviet Union that has fueled the North Vietnamese war machine.

In his statement to the Senate Armed Services Committee, prepared on January 22, 1968, then Secretary of Defense Robert McNamara cryptically conceded that "North Vietnam is becoming ever more dependent on the Soviet Union for all kinds of support, military and economic. . . ." The sophisticated weaponry which has enabled North Vietnam to exact an exorbitant price in US planes for the bombing of North Vietnamese installations and which is inflicting increasingly heavy losses upon US ground forces is almost exclusively of Soviet and East European make. The activities in North Vietnamese ports of thousands of Soviet "advisers" and the presence of Soviet, Polish, Romanian, and Bulgarian ships carrying arms are among the least publicized facts of this, the most publicized of all wars. Since no other rational explanation beckons, we must presume that the US government either doubts the good sense of the American public or seeks to smother the rise of that popular skepticism which might interfere with the "building of bridges" to the East.

Strategic logic would seem to dictate a tight maritime blockade of North Vietnam, a task that US naval forces in Southeast Asian waters could be relied upon to accomplish. Soviet diplomatic protests at the alleged US interference with Soviet shipping in the Bay of Tonkin, orchestrated with menacing statements in the Communist press, suggest that such a US blockade would be fraught with the risk of another US-Soviet crisis. More likely than not, the realities of the US-Soviet confrontation in Southeast Asia would then be projected in sharp relief onto the screen of international politics. Harrowing as is this prospect, these realities, since they are the root of the US dilemma in Vietnam, cannot be made to vanish by manipulating American public opinion.

As viewed by American public opinion, the war in Vietnam appears as an isolated conflict between a third-rate Communist power, North Vietnam, and a third-rate free world power, South Vietnam, into which the United States, mindful of previous commitments and its stake in national self-determination under demo-

cratic freedom, elected to intervene. It is this narrow concept of the Vietnamese War, accepted by the bulk of the American press, which lies at the heart of public and professional disagreements about how the Vietnamese War should be fought or whether it should be fought at all. If the war in Vietnam is simply an internal war over whether or not the nationalist Communists of the North shall prevail over the nationalist democrats of the South, then one might legitimately question the inconclusive expenditure by the US of \$90 billion on behalf of its hapless Southern clients. If the US freely chose to intervene in this conflict and could freely withdraw from it, then one might reasonably argue that the United States should neatly disengage itself from the messy fracas. Of course, the Vietnamese War is *not* an internal war, and the alternatives available to the United States in Southeast Asia—and elsewhere—are determined by global strategic equation. If this were not so, then the Vietnamese War would be a "tale told by an idiot, full of sound and fury. . . ."

The Vietnamese War is a crucial contest in the global protracted conflict between the United States and the Soviet Union. It is with the acknowledgment of this fact that a reappraisal of US policy must begin. Only by explicitly abandoning its quest for a bilateral understanding with the Soviet Union—the grand partnership of the two great nuclear powers—can the United States rid itself of the pernicious preconceptions which have hampered US strategy in Southeast Asia and thrown American public opinion into utter confusion.

No two strategic situations are ever exactly alike. This does not mean, however, that two strategic situations might not have a great deal in common and cannot be organically linked with an encompassing system of conflict. The crisis over Cuba was a contest between the strategic power of the United States and that of the Soviet Union over the dominance of a strategic area. The issue of that crisis lacked that finality which, so we can infer, the Soviet Union sought to achieve. As now can be seen, the returns for the United States, too, were not as conclusive as they are made out to be in our national mythology. The Vietnamese War is in part a contest between the strategic power of the United States and the Soviet Union over the

(Continued on following page)

ON THE SOUTHEAST ASIAN CONFRONTATION

dominance of a strategic area, *i.e.*, Southeast Asia. More than that, it is one front in the global confrontation. Just as in Cuba, at issue is not only local dominance but also the global credibility of the strategic power of the United States vis-à-vis the Soviet Union. Three things mask the dual issue: the magnitude and violence of the local conflict, fought with massive conventional forces; the part which the Chinese People's Republic, allegedly at odds with the Soviet Union, is supposed to play in the counsels of Hanoi; and the presence of huge American army, air, and naval forces unmatched by the deployment of equivalent Soviet combat forces.

No doubt, the limitation of Soviet military intervention has been favored by geographical factors and the high quality of the proxy forces, *i.e.*, the army of North Vietnam. The situation—the security of the Communist base of operations (North Vietnam) and the insecurity of the target state (South Vietnam)—conforms in every respect to the pattern of protracted conflict: The Communist territory is the “peace zone,” while the non-Communist territory is the “war zone.” Within the “war zone” the Communists are free to apply whatever conflict techniques they deem suitable—*without having to fear a proportionate response against their own base.* Within the “war zone,” the Soviets can operate behind the screen of proxies, such as the Cubans and the North Vietnamese; avoid direct confrontation with the United States; and time a direct challenge to the combination of local, tactical advantage with global strategic superiority. This is the classic strategy of the indirect approach. This has been the way the Communists have always waged the cold war—and are now waging the war in Vietnam.

Against this strategy the United States has found, over the last twenty years, no answer except a strategy of containment. The effectiveness of containment—an essentially defensive strategy—has hinged upon a complex of superior military technology and geopolitical advantages—for example, secure bases and supportive alliances—which we may call, for a want of a better expression, over-all strategic superiority. This combination of factors, none of which can be measured with absolute accuracy, proved effective in the containment of the Soviet Union and its proxies in the crises of Berlin, Lebanon, and Cuba, as well as of Communist China in the Taiwan Straits. How great a factor, in each of these crises, was US strategic superiority might be a matter of conjecture. For all practical purposes it sufficed that the Soviets and their allies *perceived* the existence of US strategic superiority. Indeed, the resolution of each of these crises favored the United States: The United States accomplished its purpose, and the Communist challenge was contained.

Now, the question is whether the United States still possesses that credible strategic superiority which alone can contain the Soviet challenge in Southeast Asia. If the answer is yes, then a blockade of North Vietnam poses no greater risks than did US responses to the Berlin, Lebanese, and Cuban crises.

To have raised this question only a few years ago would have bordered on impertinence. Even now, it



—Wide World Photos

President Johnson conferring on April 1 with Gen. William W. Momyer, Commander of the Seventh Air Force. The US military has fought the Vietnamese War within policy guidelines set by the civilian leadership and should not be faulted, the author believes, for strategies and tactics that have necessarily flowed from these political policies.

can be put only with trepidation. Yet, of late, odd pieces of evidence have floated into public view, casting a shadow of doubt upon the credibility of the US strategic deterrent. Former Secretary of Defense McNamara, though he noted a subsidence of Soviet aggressiveness, conceded that the Soviet ICBM establishment was approaching parity, missile for missile, with that of the United States. The Soviets launched a number of fractional orbital bombardment vehicles, capable of releasing nuclear bombs, and managed to abide by the letter—if not the spirit—of the treaty banning orbital weapons from space. The United States neither protested nor duplicated this demonstration of Soviet military technology. The Soviets, unmindful of US pleas to desist, deployed a nuclear antimissile defense around their major cities. The US “thin” ABM system is still an unspecified lead time behind the Soviets’ deployed and operational missile defense. All these might be only frail straws in the wind; former Secretary McNamara’s categorical assurances as to the imperviousness of US national security to Soviet technological breakthroughs and quantitative increases in weaponry might well be based on that privileged information which was meant to smother critics in Congress and outside the government.

Yet some plain facts, available to everyone, permit an interpretation less sanguine and even more categorical than that vouchsafed us by the Administration. Over the last years, the research and development budget of the US Defense Department has remained relatively static. The Soviet budget for military-technological innovation has increased annually. The \$90 billion cost to the US of the Vietnamese War has not benefited to any great extent—and perhaps not at all—the state of the art in strategic weaponry. The Soviets are not saddled with such a diversion of funds from the research, development, and deployment of advanced weapon systems. The Soviets are fully aware of the

Vietnamese War's fiscal implications for the US defense budget—and would be unwontedly dense to overlook the reciprocal advantage to themselves. The Soviets have built up their navy, complete with nuclear-powered and nuclear-missile-carrying submarines and highly effective rocket ships. The Soviet Navy is active in the Mediterranean and Red Seas, heretofore the private preserve of Western navies. The Soviet Navy prowls the North Sea flank of NATO Europe. Soviet electronic spy trawlers constantly patrol our coasts. It happens that this remarkable expansion of Soviet power coincides with developments which, for twenty years, have been the primary concern of Soviet policy, namely, the disintegration of the Western alliance.

The withdrawal of France from NATO not only bears upon the security of the Mediterranean and the North African coastal regions but also upon the defense of Northern Europe against a Soviet attack or even against Soviet political pressure. In Europe, the policy of "bridge building" and bilateral negotiations with the Soviet Union has borne fruit, though not the sort expected. The states of Western Europe have turned their backs to the cold war. Each and all have cut their defense budgets. And those who can, seek to negotiate bilateral deals with the Soviets. The British abdication of power leaves the United States alone to mount the defense of Western interests between the Straits of Gibraltar and Singapore.

Although the above list is not complete, it seems proper to ask whether, within the last six years, the power of the United States has not so diminished as to inhibit an adequate response to a Cuba-type challenge? Does the sluggish and unsure conduct of the Vietnamese War not reflect uncertainty about the effectiveness and credibility of the US deterrent? If the Administration sees no need to candidly answer these questions and the attention of expert critics and the general public remains riveted on the narrow focus of the Vietnamese War, the inwardness of that contest will remain hidden from the American people, and the responsibility for failure might be shifted to convenient scapegoats.

Mr. Arthur Schlesinger, adviser and historian to President Kennedy, told a public meeting: "The inescapable conclusion is that our military leadership has grossly misjudged and misconceived the character of the [Vietnamese] War." Leaving aside the question of who initiated the US military commitment to South Vietnam, it should be clear that if ever civilian leadership kept a firm rein on its military establishment it has been President Johnson and Mr. McNamara. Certainly, the Joint Chiefs of Staff did not appoint themselves. It is unthinkable that the US military leaders were not commanded to plan for and fight the Vietnamese War *within the context of US foreign and security policies*. The only justifiable criticism one might make of these military leaders is that, if they objected to the guidelines, they should have resigned. But this is not tantamount to assigning them the responsibility for policies which they did not shape and could not modify.

Although, late in 1967, Mr. McNamara expressed doubts that "any bombing campaign, short of one which had population as its target, would by itself force Ho Chi Minh's regime into submission," he stands on record as having approved the bombing of North Vietnam. Not only did Mr. McNamara find no fault with the performance of his military subordinates, but he also declared, in July 1967, that "we have made more progress in the last few months than during the last six years." In a business as uncertain as warfare, all those remote from the posts of responsibility should comport themselves with becoming tolerance toward error. But those in posts of responsibility must bear the burden of error—just as they would rightfully wear the crown of success.

If there is any rational justification of war, it is that it attains a vital political objective which cannot be attained by other means. If we agree that, by all odds, the one vital objective of American foreign policy is the preservation of the world order under freedom and justice, and if, furthermore, we agree that, in order to secure this vital objective, the United States must maintain the strategic power needed for the containment of Communist aggression, then the Vietnamese War, as it is now being fought, serves neither to ensure international stability nor enhance the credibility of US strategic power.

At stake in Southeast Asia is not only the security and welfare of the local population and the fortunes of American arms, but also the credibility of American strategic power. The latter stake is synonymous with the security of the United States itself. In this sense, the Southeast Asian confrontation poses for the United States nothing less than the issue of survival. The American people, when they finally grasp this fact, will stand up to the challenge, reorder national priorities, and make whatever sacrifices the defense of their security requires. Then they will brush aside the pretense of the alternative choices between domestic well-being and military power. Adequate military power shields domestic well-being. Without it, the United States cannot safeguard its cities, obsolete or renewed, and the trust of its people in a better, a peaceful, future, the wellspring of domestic improvement. Nothing stands between international order and chaos, freedom and tyranny, but American resolution and power. If the Vietnamese War, terrible as has been its cost, brings home this truth, it will not have been fought in vain. The critical factor is time. The accelerated pace of global crisis cannot be halted by clinging to policies that have failed. It is not easy for the statesman to reverse course and to concede that he has been looking in the wrong direction. Yet the mounting dangers to national survival bid our leadership to do exactly that.—END

Dr. Strausz-Hupé is Director of the Foreign Policy Research Institute, University of Pennsylvania. The author of numerous books, Dr. Strausz-Hupé has also contributed to many national magazines. His most recent article on these pages was "A Look at National Defense as a System," which appeared in the March '68 issue of AIR FORCE.

The Air War in Vietnam

With aerial reconnaissance accounting for eighty-five percent of all immediate intelligence data in Southeast Asia, the dangerous missions of the men who fly unarmed RF-4Cs, RF-101s, and RB-57s are more than justified by the information they bring back. Here is an on-the-spot report on how these missions are planned and carried out, the problems involved, and what is done with the pictures they bring back . . .

Mission: Recce North

By Allan R. Scholin

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

UDORN, THAILAND
IN THE windowless, fluorescent-lighted mission-planning room of the 14th Tactical Reconnaissance Squadron here, two men pore over a detailed map of the Hanoi area. Alone in the room, they converse in low tones and brief phrases.

"I. P. here," one says, pointing to a feature on the map where they will turn to roll in on the target. "Take up 105-degree heading. Crawl over this hill, drop to the deck, maintain 550." The other nods.

"We pick up this"—pointing on the map—"slip her a bit to catch these . . ."

"With a bit of luck, we'll be through the barrel before they open up on us."

"... and then," indicating with a flick of his pencil, "we hightail it out, through here."

"Damn right. All the coal she'll burn."

"Feet wet about here, climb out over the water, and home by . . ." he checks some notations on a card attached to his clipboard, "... 0340."

"Looks good to me," says the other. He glances at his watch. "We've got a couple of hours before time to start engines. How about some chow?"

This is a two-man crew—pilot and navigator—flying the McDonnell RF-4C Phantom II of the Udorn-based 432d Tactical Reconnaissance Wing. They've been "fragged" by Seventh Air Force to acquire infrared photographs of a railroad marshaling yard, a nearby bridge, and an adjoining power plant. After studying the targets and expected enemy defenses, they have worked out their route to and from the objective and the tactics they'll use.

Commander of the 432d Wing is Col. Victor N. Cabas, one of the Air Force's top reconnaissance experts. Except for two periods of military schooling, he has served continuously in reconnaissance assignments

for the past nineteen years. Before taking over the 432d, he commanded the 363d Tac Reconnaissance Wing at Shaw AFB, S. C., which trained many of the crews now at Udorn.

The 432d is one of two USAF recce wings in Southeast Asia, the other being the 460th at Tan Son Nhut, commanded by Col. Robert J. Holbury. The 432d operates mainly over North Vietnam. It's made up of the 11th and 14th Reconnaissance Squadrons and the F-4D-equipped 13th "Panther Pack" Tactical Fighter Squadron, which flies both strike and interceptor missions. The 460th Wing, providing coverage for targets in South Vietnam, includes two RF-4C squadrons—



—Staff Photo

A1C James Ashley, from Napa, Calif., loads film aboard an RF-4C's Hycon KS-72 cameras prior to its taking off on a recon mission over the North. Airman Ashley is part of the 432d Tactical Reconnaissance Wing stationed at Udorn, Thailand. The 432d Wing flies mainly over the North and is composed of the 11th and 14th Recon Squadrons.



Maj. Charles A. Flanagan, right, who was part of the first operational RF-4C squadron when it trained at Shaw AFB, S. C., and went to Vietnam with it, was also a pilot on the first RF-4C mission over North Vietnam. Here he checks camera at Mountain Home AFB, Idaho, where he instructs.



This photo, taken by Lt. Col. Morgan R. Beamer, Commander of the 16th Tac Recon Squadron, from an RF-4C Phantom II, shows the intense ground fire faced by US pilots over the North. This night photo, lighted by a flare, shows lines of tracers cutting across Beamer's flight path.

the 12th and 16th—and the 45th, with RF-101 Voodoos. Also attached to the 460th is a unit of RB-57s.

No Halt in Recon

President Johnson's order of March 31 halted the bombing of targets in the heavily populated areas of North Vietnam, but the order does not affect reconnaissance flights. These are continuing, both to determine whether there is any indication that Hanoi may reduce the flow of men and supplies to the South, and to maintain current data on potential targets in case Hanoi continues to ignore US peace overtures and bombing should be resumed.

For the next few weeks, however, much of the 432d's reconnaissance effort is expected to be concentrated in North Vietnam's panhandle, the section below the twentieth parallel and just above the Demilitarized Zone (DMZ), which President Johnson specifically excluded from the bombing pause.

For operational planning purposes, the Military Assistance Command, Vietnam (MACV), has divided North Vietnam into seven segments, called Route Packages. No. 1, also known as Tally Ho, is in the southernmost part of the North Vietnam panhandle. USAF has primary responsibility for targets in this Pack. Packs 2, 3, and 4, going northward, are assigned to the Navy carrier-based fighter and attack aircraft on Yankee Station in the Tonkin Gulf, and to Marine fighters from Da Nang and Chu Lai in South Vietnam. Pack 5, in the bulge of North Vietnam west of Hanoi,

is allocated to the Air Force. Pack 6, the highest threat area, is divided into two parts, the larger, known as 6A and including Hanoi, being assigned to the Air Force, and 6B, along the coast from Haiphong to the Red China border, assigned to the Navy and Marines.

Udorn's RF-4Cs range all over North Vietnam, throughout all six route packs.

Hazardous Task

Reconnaissance missions in Pack 6 may well be the most hazardous of any air tasks in Southeast Asia, which is to say the most hazardous in the history of air warfare, since North Vietnam's defenses are more concentrated and far more sophisticated than those encountered by any air forces in World War II or in Korea.

In a fighter-bomber mission over Hanoi, the strike force may include sixteen to twenty F-105 Thunderchiefs, of which four are assigned primarily to flak and SAM suppression, plus eight F-4D Phantoms to defend the Thuds against enemy MIGs. The force is also supported by EB-66 radar-jamming aircraft, augmenting the protection afforded by the combined effect of their own electronic countermeasures (ECM) pods, and by EC-121 "College Eye" warning planes, carrying radar observers who report SAM site activity and track enemy aircraft from the moment they take off.

In contrast, reconnaissance crews go out alone. Sometime back, recce crews were escorted by Phan-

(Continued on following page)



Gia Lam airfield, across the Red River from Hanoi, is one of the largest North Vietnamese airfields. Photo shows Russian-built AN-2 utility aircraft at lower left, MIG-21 in the center, and a MIG-17 at upper right. This photo of the three North Vietnamese aircraft was taken by a USAF recon jet.

tom interceptors. But the Air Force discovered it was losing more interceptors than reconnaissance planes on those missions, so the escort was withdrawn.

But the recce crews have some compensations, as Lt. Col. Steve Neely, operations officer for the 14th Squadron, pointed out to me.

"The Thuds give the North Vietnamese all kinds of warning when they're coming in," he noted. "They're being tracked by enemy radar from the time they make their first tanker rendezvous. There's a lot of radio chatter between the elements. SAM and anti-aircraft gun crews are alerted all along the route, and the MIGs know exactly where the force is all the time.

"When we go in, we keep quiet about it. We may be on the deck or very high. In either case, it isn't easy for enemy radar to 'paint' us as long as we keep our ECM pods shut off. And we maintain radio silence, too. Flying alone, or in a two-ship formation, we're a lot more freewheeling than the big Thud circus.

"The main advantage we have is speed. We aren't loaded down with bombs and guns. We seldom fly less than 500 knots indicated airspeed, and on leaving the target we may get up as high as 900. At that speed, if we stay low, no MIG can catch us."

Most Vulnerable

Recce crews are most vulnerable in the moments when they are photographing their targets. While fighter-bomber crews can take evasive action for all

but a few seconds on their bomb run, the recce crew, particularly in photographing a stretch of highway or railroad, must fly in a straight line, often for minutes at a time. But though they may have to fly straight, they don't have to fly level. They can, and do, climb and dive in erratic high-G maneuvers to make it difficult for enemy gun crews to draw a bead on them.

"There's nothing constant about our tactics," Colonel Neely continued. "The guy who sticks to the same pattern day after day is asking for trouble. We're always adding new wrinkles to keep the enemy off balance. But sooner or later on each mission there comes the time when we have to line up on our target. If we haven't got the enemy thoroughly confused by that time, he can make us mighty uncomfortable."

Over the three years that USAF has been conducting combat operations against North Vietnam, reconnaissance units have sustained a higher percentage of losses than have the fighter-bombers or interceptors. Within the reconnaissance element, the loss rate was higher for RF-101 Voodoos than for RF-4Cs—so much so that the Seventh Air Force last year withdrew all Voodoos from operations in Route Packs 5 and 6. In recent months the odds have improved, to the extent that six out of seven new recce crews can now expect to complete their 100 missions.

"The toughest missions, of course, are those in Pack 6," said Colonel Neely. "Our crews will draw about thirty of their 100 missions in that area. But though they're the toughest, they're not the longest.

"When we go up there, we're usually assigned only one target, or maybe two or three very close together so that we can pick them all up on one run. It may take only thirty seconds to a minute. The reason is that these are all high-priority targets. Saigon needs the pictures or we wouldn't be going up there. If we tried to reach two or three different targets in the same mission, it could cut down on our chances of getting back at all.

"But in some of the other route packs we may be



This is the type of photo taken by cameras of the RF-4C reconnaissance aircraft in Vietnam. Machine gunners in photo are training their weapons on the recon jet. The concrete structures on the site are part of a fort from the long-ago days when Indochina was a French colony.

Quality of pictures taken by Air Force pilots flying in Vietnam, using a new recon camera developed by AFSC's Aeronautical Systems Division at Wright-Patterson AFB, Ohio, is suggested by this picture, which shows highway vanishing in distance with trucks in foreground bypassing cut in the road.



assigned half a dozen targets or more in widely separated locations. That's when our navigator really earns his pay."

Two RF-4Cs are regularly employed on daylight missions, but they operate singly at night.

"We use two planes in daytime to improve our coverage," explained Col. George Hammond, 432d Wing Director of Operations. "Then, too, if one should be hit and the crew has to abandon the plane, the other can call for help and direct the rescue operation. But at night there's too much danger of a midair collision if two planes were to operate at high speed in the close formation necessary to get target coverage."

Flying alone has some advantages, but it also has one serious drawback that recon crews don't like to talk about. Too many of their buddies have gone out on a night mission only to disappear without a trace. Were they shot down over the target? Did they plow into a mountainside, or dive into the sea? On rare occasions, word may filter back that a crew that disappeared in that way is now interned at the Hanoi Hilton, but many are still "missing in action."

Three Types of Sensors

Three types of sensors are carried in the RF-4C—photo cameras, infrared cameras, and side-looking radar. For photography it carries three cameras—a Hycon KS-72 forward oblique, usually employed at low altitude; a Fairchild KS-56 with three-inch focal length for low-altitude coverage; and a Hycon KS-55 high-altitude panoramic camera with twelve-inch focal length. The latter two point straight down. Camera shutters of all three are synchronized with the speed and altitude of the plane, shooting frames automati-

cally as often as necessary to provide continuous strip coverage. Thus, at low altitude, with each exposure covering a relatively small range, the shutter is clicking rapidly, while at high altitude, covering a much broader area, it may be triggered only at intervals of thirty seconds or more.

The RF-4C carries flash cartridges for night photography. These are seldom used in Pack 6 because, besides illuminating the target, they silhouette the plane for enemy gunners.

(Continued on following page)



Near the Thai Nguyen iron and steel complex, thirty-five miles north of Hanoi, a USAF recon jet catches ten barges waiting to be loaded with supplies. The huge steel plant provides North Vietnam with a major portion of its iron and steel to keep their war machine in the South running.



This is the kind of firepower recon jets, as well as attacking fighter-bombers, must face over North Vietnam. Shown is an anti-aircraft site near an important bridge some fifty miles south of Hanoi. It has 57-mm-cannon emplacements, generator van, command post, and radar unit.

For night missions in Pack 6, crews use the infrared camera which produces pictures not unlike those taken by a conventional camera except that there are no shadows. The side-looking radar (SLAR), manufactured by Goodyear Aerospace, records its readings on tape. It's used primarily in searching for traffic on roads and railroads, but is also helpful in gathering data when the crew finds it impossible to fly directly over its assigned target.

All sensors are controlled by the navigator in the rear cockpit. Navigators have occupied the back seat in the RF-4C since October 1966, a measure the Air Force is now extending to the fighter version of the Phantom as well, to alleviate pilot shortage.

Together, the 11th and 14th Squadrons of the 432d Wing average close to a mission a day per assigned Phantom. With a crew ratio of 1.25—or five crews for four aircraft—the average aircrew flies about five missions a week. Not all of these are “counters,” that is, missions over North Vietnam. Occasionally, crews will be assigned targets in South Vietnam and frequently in Laos, assisting the Royal Laotian government to keep track of Pathet Lao and North Vietnamese armies which have now overrun almost all the eastern two-thirds of that nation.

What Happens to Film?

I asked Colonel Hammond what happens to the film after the crews have risked their necks to get it.

“As soon as the plane lands, airmen unload the cameras and rush them to our recce tech squadron for processing,” he said. “Our photo interpreters take a good look at the negatives to pick up really hot information. Maybe there’s a shot of a truck convoy that should be hit before it can disperse. We notify Hillsboro, the Airborne Command and Control Center, and they’ll call in a FAC and a flight of fighters to take care of it.

“Or maybe the PIs find that a vital bridge up North has been repaired sooner than we expected. If it’s something Saigon is very interested in, we’ll call them with the information so that they can frag another strike against it right away.

“Then each frame is titled to identify the exact location, the date, and the mission. As soon as the prints are dry, we put them on a courier plane for delivery to Seventh Air Force headquarters.”

Occasionally, Seventh AF may call for immediate coverage of a high-priority target. In that event, the crew may be instructed to fly the film direct to Tan Son Nhut Air Base in Saigon for processing by the 460th Recce Tech Squadron.

“Lots of people want to see our pictures,” Colonel Hammond added. “Intelligence, first of all, to decide what targets need attention, and to see results of strikes. After all, aerial reconnaissance is the source of about eighty-five percent of all immediate intelligence data in Southeast Asia. Commanders of strike squadrons go over them to evaluate the performance of their crews. Copies go into target folders for use in planning future missions.

“And months or years from now, some government agency in Washington will probably hunt them up to study North Vietnam’s geography or farming techniques.”—END



Recon photos as above are often used for damage assessment. Here massive damage done to Thai Nguyen thermal powerplant, located thirty-eight miles north of Hanoi, is shown. The plant supplied seventeen percent of North Vietnam’s electrical power before the F-105s clobbered it.



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MARK OF EXCELLENCE

It seems to take a crisis to shake up the NATO alliance enough to cause improvements, according to this author, a retired RCAF Air Vice Marshal with extensive NATO experience. The latest crisis, the withdrawal of France, for all the negative effects it may have on NATO, has caused some tightening of management and, contends the author, this favorable trend can and should be extended to encompass further improvements, such as the "Europeanization" of NATO by concentrating even more power in the military and civilian committees and relieving SACEUR of some of his responsibility, and taking a more realistic look at the doctrine of "flexible response" . . .

New Home for an Old Dilemma

By Air Vice Marshal Robert A. Cameron, RCAF (Ret.)

IT TOOK a Communist coup in Czechoslovakia to give us NATO in 1948, a war in the Far East to add military teeth in the early 1950s, and a bludgeoning by the President of France to shake it out of the doldrums in 1967. The lesson is clear: It may be possible to organize an alliance and keep it moving forward by friendly cooperation, but a clap of thunder does it slicker and quicker.

The question is whether NATO still makes good sense in 1968 and beyond. It's surprising how many people say, "Sure, I realize why NATO was necessary back in the 1950s when the Russian threat was real and menacing. But why do we need it now?"

Using this logic, we should perhaps do away with vaccination now that smallpox is under control! But a better answer is to look at France.

France has withdrawn from the military organization and has adopted her own defense policy. It can best be described by a slight variation of the NATO credo to read: "One for one and all for one." This may, of course, turn out all right for France so long as there are friends around—as there were in 1940. But what if everyone decided to run his own defense organization with the same independence? In this jet/misile age? Costly, chaotic, and crazy is about the best you could say for it.

Therefore, no need to get involved in lengthy debates about whether or not the Russians have changed their spots. Let us simply recognize this one practical fact: so long as individual allies consider it necessary to keep any men at all in uniform, we'll get more bang for our buck if the worst comes to the worst, and

sleep better in the meantime, by paying our dues to NATO.

Committee Rule

Two major developments have come with the last crisis precipitated by France. First, it is quite obvious that committee rule in NATO will soon be more solidly entrenched than ever before. Up to now the top committee of civilians, the NATO Council, has been located in Paris, whereas the Military Committee was rooted in Washington. This 3,500-mile separation naturally compounded the difficulties of committee management to an enormous degree. In consequence, the major military chiefs had to do much freewheeling to get on with the job.

Now that the two top committees are located in the same building in Brussels, this situation seems about to change. It would be wrong to say that the politicians and soldiers have already organized themselves into a smoothly functioning management team. There is, for instance, some jockeying for position because of a fear that the Council will now be better able to suppress any military advice that doesn't suit them. But the other side of the coin is that henceforth there will be this powerful group of military personnel, working right next to their political counterparts, and thus in the best possible position to keep NATO's attention focused on the military realities of Europe.

The next change worth comment is increased effectiveness of the Military Committee that seems to have come with the disappearance of its executive agency, known as the Standing Group (SGN). Membership of the SGN consisted of a four-star officer each from France, UK, and the USA. In theory, it was supposed to provide the kind of quick-reaction capability that didn't seem possible with a committee of fifteen. But practically, what it did was delay any innovation that one or the other of the SGN powers didn't like. It was via the SGN, for instance, that France brought the important business of the Military Committee to a near standstill during the last few years.

The author, Air Vice Marshal Cameron, spent thirty-five years in the RCAF. For eight years he was assigned in Eastern and Western Europe, including a tour in NATO. Much of his career was in the management area, and his last assignment, before his retirement in early 1966, was as RCAF Director of Organization and Management. He has written twice before for AF/SD, on Canadian military unification and nuclear credibility.

By contrast, here is what some authorities have to say about the present situation: "In the past, SGN nations could keep controversial problems in the ice-box for 'further consideration.' But now we can get them on a daily basis if necessary. In Washington it was hard to get the members of the committee together in a hurry since they were scattered all over town at their national embassies. But here we are all in one building with no other purpose than to provide effective military direction to the alliance. We can get together on fifteen minutes' notice. It works magnificently. We're ten times as effective as before."

SACEUR—No Longer a Viceroy

A most conspicuous fallout from the tighter management, now taking shape in Brussels, is that the Supreme Allied Commander for Europe (SACEUR) is no longer the sort of viceroy he was in the days of Eisenhower, Gruenther, and Norstad. Those three enjoyed great prestige and independence in a period when credibility of the nuclear deterrent for Europe was at an all-time high. This change in status is no reflection on the present incumbent. He has plenty of charisma of his own. What has happened is simply that the newly colocated civilian-military management hierarchies have taken a good deal of the power and the spotlight away from the Supreme Commander, US Army Gen. Lyman L. Lemnitzer.

This switch to firmer committee rule is clearly a new way of life that we have to adjust to. On the other hand, I believe it is unsound to leave SACEUR with the same great span of responsibility but without his former authority. Such an arrangement makes for effective bottlenecks, not effective commanders. Therefore, the time may be right to consider a major change in the control of our military forces.

Two further factors support the need for change. First, there is the withdrawal of France from the military organization. Geographically this has split SACEUR's command in two and makes mutual reinforcement between the north and south even less feasible than it was before. Up to now France hasn't prohibited overflights and may never do so. However, she could at any moment. So SACEUR must plan for such an eventuality.

The logical thing for SACEUR to do is to make the southern flank as independent as possible. Indeed, many officials frankly admit that, in time of war, it would be most impractical trying to control CinC South, in Naples, through SACEUR's headquarters in Belgium. The question this therefore raises is: Why wait for a crisis to correct a weakness in the military organization that is evident right now?

The second factor which suggests an up-dating of our military control system is the greatly increased importance that the Mediterranean has assumed in the past year. When NATO was organized, it was the threat in Western Europe that demanded most attention. And, of course, it still can't be neglected. But clearly it is in the south that many of NATO's most difficult decisions may have to be taken in the future. So again the thought suggests itself, why not run the chain of command direct from the Military Committee in Brussels to Naples?

A Third Supreme Commander

If we were to split the European frontier into two parts, we would end up with three major operational commanders: SACNorth, SACSOUTH, and SACLANT—each having about the same span of responsibility.

This organizational change may sound a little startling at first, but it grows on one. Politically the idea of having their own Supreme Commander, and with him a more direct line to Brussels, ought to please NATO's southern tier of nations. It would also introduce a new element of flexibility for military operations. For instance, if something serious developed in the Mediterranean, NATO could probably lead with a much stronger right than is possible at the moment. True, such nations as Norway and Denmark could still argue for restraint in the Council. But in practice they are more likely to defer to the wishes of allies directly involved and whose forces were organizationally separate.

A further modification to the command structure that was suggested by many sources, and which makes eminently good sense, would be to have SACLANT assume responsibility for Norway. As things stand at the moment, while being integrated into SACEUR's command, Norway is almost entirely dependent on SACLANT for reinforcement and support in time of war. So this change would merely recognize a current reality. It would also have the effect of bringing SACLANT more firmly into the family circle and help get him the attention he regularly needs but which is not always forthcoming under existing arrangements.

Europeanize Military Hqs?

Time is running out on the idea that Europe can, or even should, lean as heavily on the US as it has done in the past. Moreover, time has long since run out on the abject fear that the US will pick up and go home simply because they aren't running the whole show and Europeans offer to do more for themselves. The US is not in Europe simply to please and comfort its allies. It is there for well-established strategic interests of its own that happily coincide with those of the Europeans themselves.

Having said this, one must recognize that the US is now forced to spread its resources throughout the world to an extent few would have thought possible when NATO was formed. And the process is liable to accelerate in the future. The recent announcement of Britain to cut bait in the Far East has made this abundantly clear. Therefore, even though the US repeatedly avows its intent to support NATO to the hilt, we must expect its contribution both in manpower and management talent to diminish as times goes on.

The Beaufre Idea

General Beaufre, a distinguished French soldier who has put much thought into the future development of NATO, feels that the time is ripe to start aiming at a military command structure that would be supported, but not dominated, by the Americans. He considers that such a development is a desirable addition to the
(Continued on following page)

various European communities now in existence (Coal-Steel, Euratom, etc.). Otherwise expressed, we could get double mileage out of the costly security system; as well as defending Europe, a reorganized military command structure could simultaneously help achieve the important political goal of a united Europe.

The General also sees his thinking as consistent with the Kennedy-inspired "dumbbell" concept for NATO—a strong North America plus a strong Europe, working together as approximate halves of the alliance rather than the way it is now, one giant dominating the fourteen lesser powers.

What General Beaufre suggests may seem quite radical if you take the trouble to read the details. But in practice we would end up with nothing more complicated than the arrangement we have right now between France and the rest of the alliance. However, the US and not France would be odd man out—with its appropriate liaison officers and a staff organization to control US nuclear weapons.

Compromise

It seems to me that France, by her recent actions, has made the move that Beaufre recommends much less feasible in the foreseeable future—even with a fair-sized crisis to set things in motion. Therefore, a simple reallocation of some key posts in the existing integrated structure would be a more realistic plan to work on in the meantime.

A start might well be made with the top post, *i.e.*, that of SACEUR. This single change would do wonders to set a desirable pattern. And it should help stimulate what NATO needs as much as anything right now—a greater interest by Europeans in their own defense.

A proposal for this change should best come from the US. With any luck it might be accomplished without waiting for a crisis. To make it more acceptable to all concerned, it could perhaps be timed with a division of SACEUR's responsibilities as previously recommended, *i.e.*, the creation of a SACNorth and a SACSOUTH (and which similarly shouldn't need a crisis to accomplish since it could almost be done with the issuance of a new organizational chart). An appropriate, but not the only, occasion to make the move would be when General Lemnitzer completes his tour of duty.

With the Europeanizing of NATO's military structure as the general aim, and the three posts of SACNorth, SACSOUTH, and SACLANT, plus their three deputies, to allot among the allies, one can visualize several national combinations that would be effective without excluding or affronting the US. Moreover this innovation should allow enough flexibility to get away from the current undesirable habit of giving nations a more or less permanent lock on specific jobs.

Disagree with the particulars I have suggested for a start on Europeanizing the military hierarchy, if you will. But one would have to be completely blind to political realities not to admit the principle. A US Army general as SACEUR, a UK Army general as his

Deputy, another US Army general as the Chief of Staff, a US Air Force general as the Air Adviser, and a Canadian Army major general as the Chief Planner—can this conceivably be right for NATO's top command, in Europe, in 1968?

Flexible Response

The US recently achieved a long-standing aim and had NATO's strategy officially proclaimed as being one of "flexible response." Success didn't come easily. The French provided stiff opposition for a long time. However, in withdrawing from the military organization, they finally eliminated themselves from the debate. From then on it was plain sailing for Mr. McNamara.

After all the years of indecision, military personnel ought to be elated now that their strategy is cut and dried. But I've yet to find any who are. On the contrary, the vast majority are outspokenly pessimistic about some glaring flaws in the theory of flexible response, and the way we are implementing it.

An increase of conventional armaments in Europe probably would make us more prompt and bolder in responding to aggression. But any enemy with even half a wit would certainly interpret such a buildup as evidence of increasing reluctance to face the use of nuclear weapons. And to confirm his suspicions, there's the object lesson in Vietnam. If the US hasn't escalated the challenge in Southeast Asia after three years, even with conventional weapons, who can really be persuaded that they would meet a situation with any more resolution in Western Europe—an area where the results of escalation could be much more awesome both for the US and its allies?

Reality

So what will flexible response really do for us? The realists say that the main thing it will do is to once more raise the horrible specter of conventional war in Europe. It will do so by drastically reducing the deterrent to local aggression. For, in effect, we give the enemy a guarantee that if he makes trouble it won't necessarily lead to nuclear war. We therefore invite aggression, with its potential escalation, that our defense system is supposed to avoid.

The realists furthermore say that even with all the urging in the world, the best conventional cushion NATO is liable to provide "will turn out to be too little or too much: too little to prevent some loss of allied territory and too much for our nuclear-backed strategy to remain credible."

One has only to look at what we are doing to see the truth in this estimate. It's no secret that we have recently reduced our conventional strength along the Iron Curtain; that further cuts are imminent; and that more of the same is to be expected in the future. True, we are expanding our conventional capability with the airpower that remains. We're giving most aircraft a dual capability.

But this dual capability involves mastery of one

more highly complicated task by the same crews and, therefore, lowers the efficiency of the force. Since most of the aircraft were designed to carry atomic weapons, it is economic madness to think of employing them in this way. The supply of conventional arms costs more just when we are trying to save our money for added manpower and capital equipment. And finally, there's not the slightest sign of reserves, in aircraft or weapons, to accompany them, that our policy requires.

I recently had an opportunity to talk with one of the high priests of flexible response. Here's the way he describes our effort to increase the size of our conventional cushion. "We've made a lot of progress since you were at NATO, Bob. We've gotten away from our unrealistic force goals and we're now basing our plans on what we can actually expect to get. Some people, of course, accuse us of ignoring the threat and resorting to capability planning. But this isn't so. We are constantly trying to push up the national goals—maybe fifteen percent or so."

Despite what my friend thinks, this *is* capability planning in its purest form. We are trying to build a defense with what nations offer, and not insisting on what is needed. We all know that doing the best with what you have is the normal way of life for commanders in the front line. But it isn't what military planners should be paid for back at defense headquarters.

It's a "responsibility gap" that causes this head-in-the-sand planning. Those earnest, well-intentioned people who have settled for a new strategy with no prospect of the forces to sustain it are in the NATO business today with authority to unthink the threat. But they may not be there tomorrow. And they will never have the responsibility of battling the potential enemy who has a vastly superior military machine in Western Europe to back his point of view should he suddenly turn sour.

I do appreciate people's fear of nuclear war. I sympathize with the desire to do all we can to avoid it. I believe we must have some alternatives to "all or nothing." And I understand as well as anyone the difficulty of getting nations to contribute more defense in times of seeming détente.

Self-Deception

But all this is no excuse for self-deception of the order practiced in NATO. It is because of this that I part company with our present policies. NATO is rapidly economizing itself into a position of greater reliance on nuclear weapons, yet we claim just the opposite. We boast of better defenses with flexible response, but it clearly invites what we seek to avoid. We point to greater credibility—but this is our interpretation, certainly not that of the enemy. And while we subscribe to deterrence, we plan for conventional war.

In the final analysis, I can't forget Cuba. The US response to Khrushchev's threat in 1962 has been heralded as a great triumph. It is used to assure us that if there is ever any real crisis in Europe, the US

will come through with flying colors, no matter what the critics say.

But first and foremost, the cause of the Cuban crunch was a frightening failure—a failure of flexible response. US efforts to sell this strategy in Europe had completely destroyed the credibility of US military power. Russia was encouraged to take a wild and dangerous risk. And because of this failure to deter, all the world needlessly trembled on the brink of disaster.

Mobility

The anomalous situation of having announced a new strategy of doubtful value to begin with, then not providing the forces to sustain it, is not liable to be resolved overnight. Meanwhile, we can do much better with what we have. This is particularly true in the realm of mobility.

Mobility is a great thing. But it doesn't come free. And sometimes it covers a multitude of sins. For instance, take the mobile force recently organized for Allied Command Europe (ACE). This force was designed to give quick support to a threat on either the northern or southern flanks of NATO. The brigade of fighting troops, plus air support that it offers, may make some quantitative sense in the north but certainly none in the south. Therefore, its only real justification must be to make the unity of the alliance more credible both to ourselves and to the enemy.

But couldn't we accomplish the same purpose at considerably less expense? Not only dollars and cents but undesirable side effects as well.

For example, Canada has committed a battalion of army personnel for use in Norway and another for use in the eastern Mediterranean. But surely Canada has long since priced herself out of the market in military units where manpower is the principal ingredient. Why shouldn't her contribution to solidarity be made with scarce resources where she's competitive, and where the cost of airlift might have some economic justification? Is this an example of the interdependence that NATO boasts about? Or is it simply a horrible case of sending coal to Newcastle—and adding to the waste by flying it the whole 5,000 miles?

Costly Side Effects

Apart from direct cost, the idea of keeping one's troops at home and airlifting them to threatened areas is very catching. In Canada's case, it is hard to disassociate her enthusiasm to join the ACE mobile force from ultimate disengagement in Western Europe. The US has already tried some large-scale experiments in reinforcement from North America. In addition, they have made some token withdrawals. The UK has done the same. If this sort of thing spreads, our defenses soon might consist of an integrated command with the forward protection manned predominantly by Germans. This would be in no one's best interests. Thus, what started out as a simple exercise in solidarity has

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within it the seed of serious political trouble as well as greatly increased costs.

Another side effect of the ACE mobile force is the attention it diverts from an important part of the frontier where more flexibility has long been urgently needed. Everyone knows that NATO is relatively strong in the mountainous terrain on the central front to the east of Frankfurt. But this is the most unlikely area for an enemy thrust. On the north German plain, however, which is the logical axis for attack, we are very much weaker.

This situation has existed from the early days of NATO. It results from the occupational area and good accommodations assigned to US forces at the end of World War II. Common sense dictates that the imbalance should have been corrected long since in one way or another. But thus far we have swept the problem under the rug.

New Look at Flexibility

At this point, the best solution to the somewhat haphazard distribution of landpower in Germany may not be just a simple switch of forces. It might be worth trying something more imaginative, something that not only corrects the force imbalance, but which attempts to counter the steady rundown of troops in the forward area.

Greater flexibility, in the form of a force organized to support the whole of the European frontier and not just the flanks, might accomplish this dual purpose. To be successful, it would have to be coupled with a new look by SACEUR on the policy of troop withdrawals to meet national emergencies.

The heart of such a flexible support force would be units pulled out of the central front. This would make that part of the frontier relatively weak, but it would add enormous strength to the defenses as a whole. Then by seeking additional units from the allies on the clear understanding they would be quickly released for any national requirement, SACEUR might build the force into a really effective reserve.

This would run counter to his present policy of insisting that forces allocated to NATO should be available at all times. It hasn't prevented troop withdrawals when needed elsewhere. But it has probably discouraged many countries from assigning units for which there was only a very slight possibility of use elsewhere. The net result is that nations have gotten no mileage out of many reserves who sit on their fannies back home waiting for trouble that may never develop. And SACEUR loses the deterrent potential of troops he might reasonably have on a full-time basis.

Credits

If SACEUR were to modify his attitude, many benefits would follow. First of all, it should lead to a reasonable reserve for NATO—not in the US, UK, or Canada, but in Europe where the problem is. National units assigned to the force should achieve greater efficiency and maintain it by training in a bigger organi-

zation rather than on their own. SACEUR would have greater flexibility in supporting the flanks than he now has. Movement costs would be less for a crisis in NATO, and probably for a national emergency as well. Nations would save the expense of a separate infrastructure to keep their mobile reserves at operational pitch. And finally, it would add enormously to the credibility of our defense.

The nonavailability of French territory certainly complicates the geographical problem. But this is no excuse for doing nothing and letting an awkward situation stay that way. So long as we are committed to a flexible response, NATO desperately needs something that at least looks like a conventional reserve. And so long as the conventional cushion is going to get smaller rather than larger, this reserve should be available not just on the flanks, but for the whole frontier as well.

Recapitulation

The most exciting thing that has happened to NATO with the move to a new home is the prospect for better management. After all, it's hard to pass judgment on any organization until you pull the bits and pieces together with an effective team at the top. This is what we've never had in NATO. Up to now our managers have been scattered over two continents with confusion, misunderstandings, and sterile competition for power as the consequence.

With the principal elements of management now together in Belgium, we have the essentials for progress in the future. Which direction should we head? To this I would only say that my experience, research, personal contacts, and common sense all suggest the wisdom of placing the Europeanizing of military management high on the list of priorities.

Turning to the other side of the coin, the most disturbing aspect of NATO is without doubt the steady loss of its nuclear credibility. And for this, our recently proclaimed strategy of flexible response must accept a major share of the blame. No one in his right mind would ever suggest using nuclear weapons where bullets would suffice. But if you have only a limited supply of bullets, and become fearful that the use of even small nuclear land mines on your own territory (to stop an enemy who attacks you) will escalate to atomic holocaust, then you're in trouble. And this, I regret to say, seems to be the state and mentality of our defense at the moment.

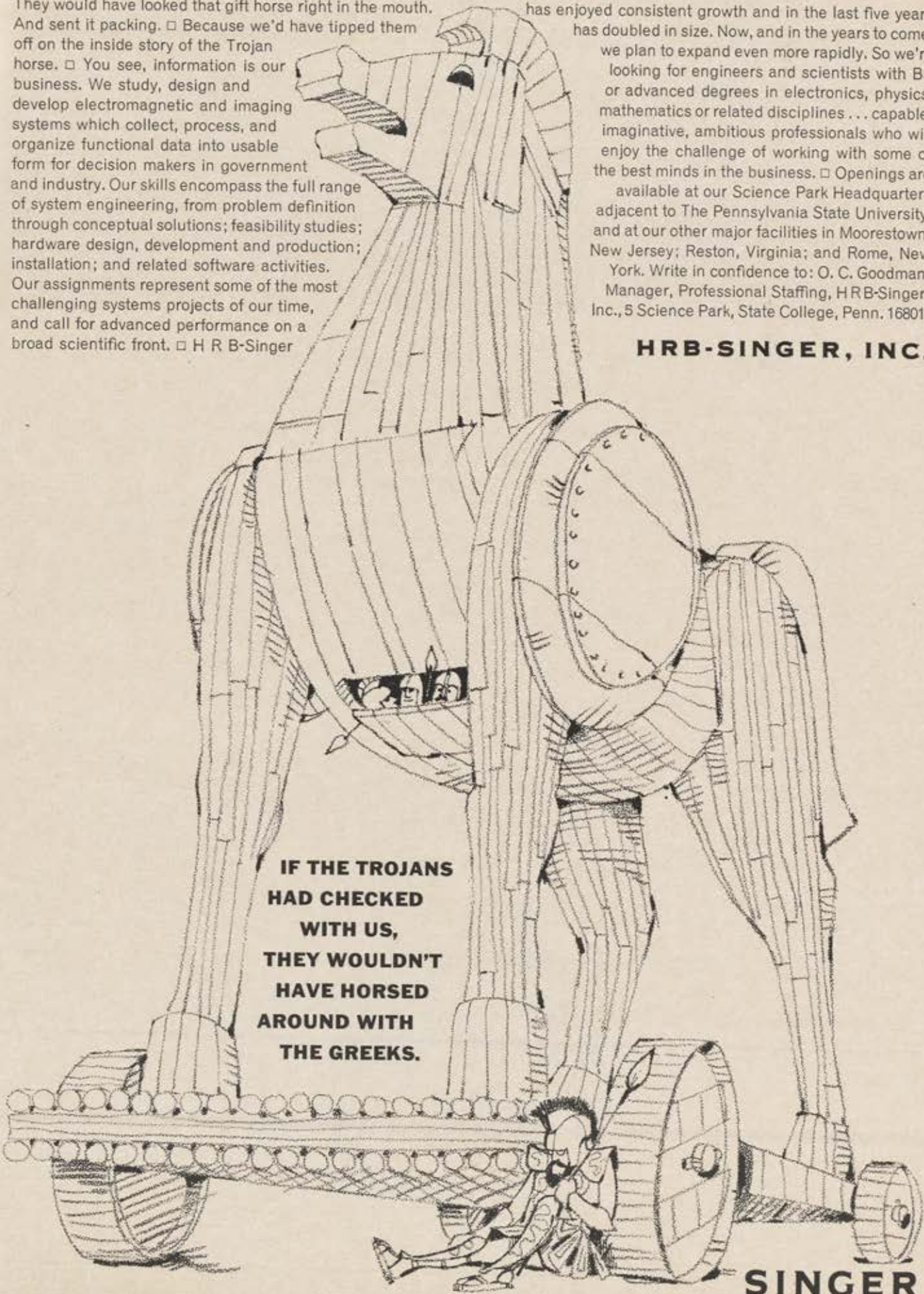
The danger of our defense is not only that it lacks credibility. It is frightening also because we just might arrive at the right end (a permanent détente) by the wrong means only to have our blind spots catch up with us in a bloody fashion elsewhere—as, indeed, seems to be happening to the US right now.

The irony of our defense is that while the credibility of our US nuclear support is steadily drifting over to North America, the much-maligned *force de frappe*, with the independent finger of a much-maligned French general on the trigger, may in the final analysis keep it where it belongs, i.e., in Western Europe!—
END

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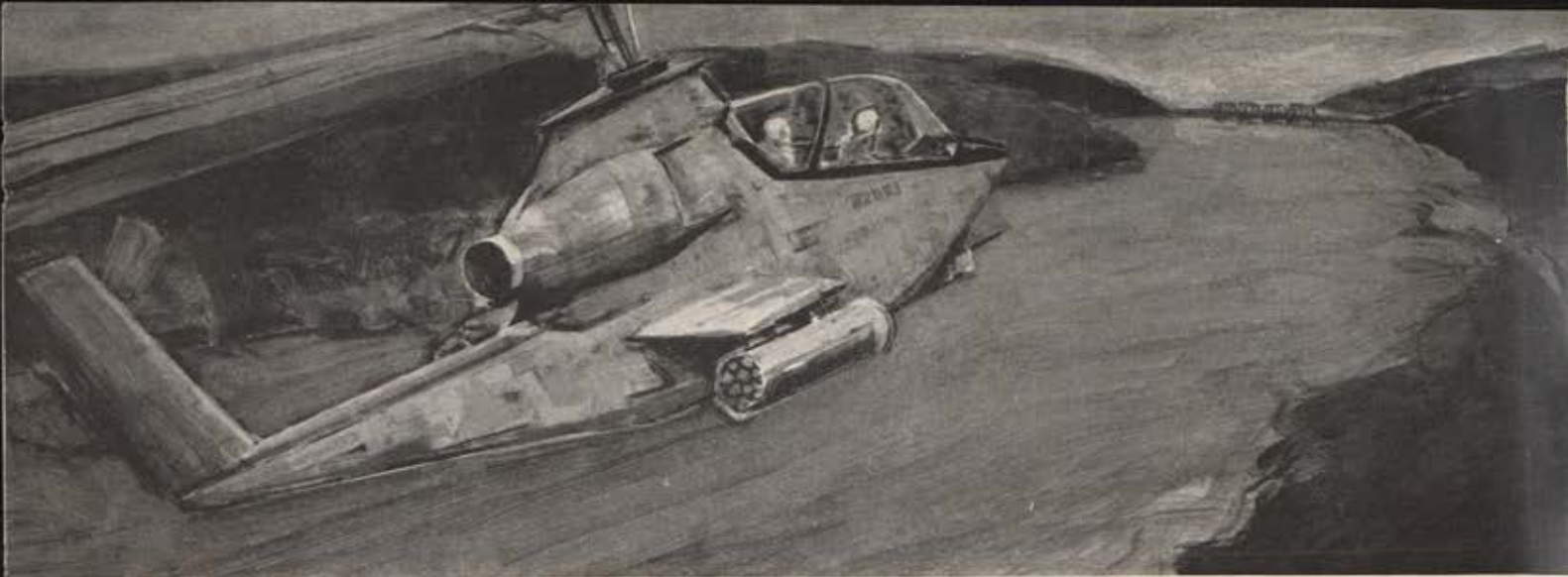
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VOLUME 11, NUMBER 5 • MAY 1968

- Systems Analysis: Useful, Yes—But Scarcely a Panacea
By Gen. B. A. Schriever, USAF (Ret.)57
Himself no stranger to the highly touted technique known as systems analysis, the former head of Systems Command comments incisively on its shortcomings when *all* the variables are not fed into the equations.
- Bringing 'em Back Alive from Space
By Melville Leonard and Lorena O'Connor62
In the view of many experts, preventive safety is not enough to ensure the survival of astronauts who might get "spacewrecked." Here is a report on some proposed techniques for rescue in space.
- Thoughts on the "Military Mind"
By Raymond J. Barrett66
Americans everywhere must discard the myth of the so-called military mind as rigid and cruel and stupid. We simply can no longer afford mindless prejudice against those who defend us.
- Speaking of Earth
By William Leavitt68
Some thoughts on the connection, not at all tenuous, between the space age, of which we can be so proud, and the civil strife, of which we must be ashamed.

Terrier/Talos/Tartar

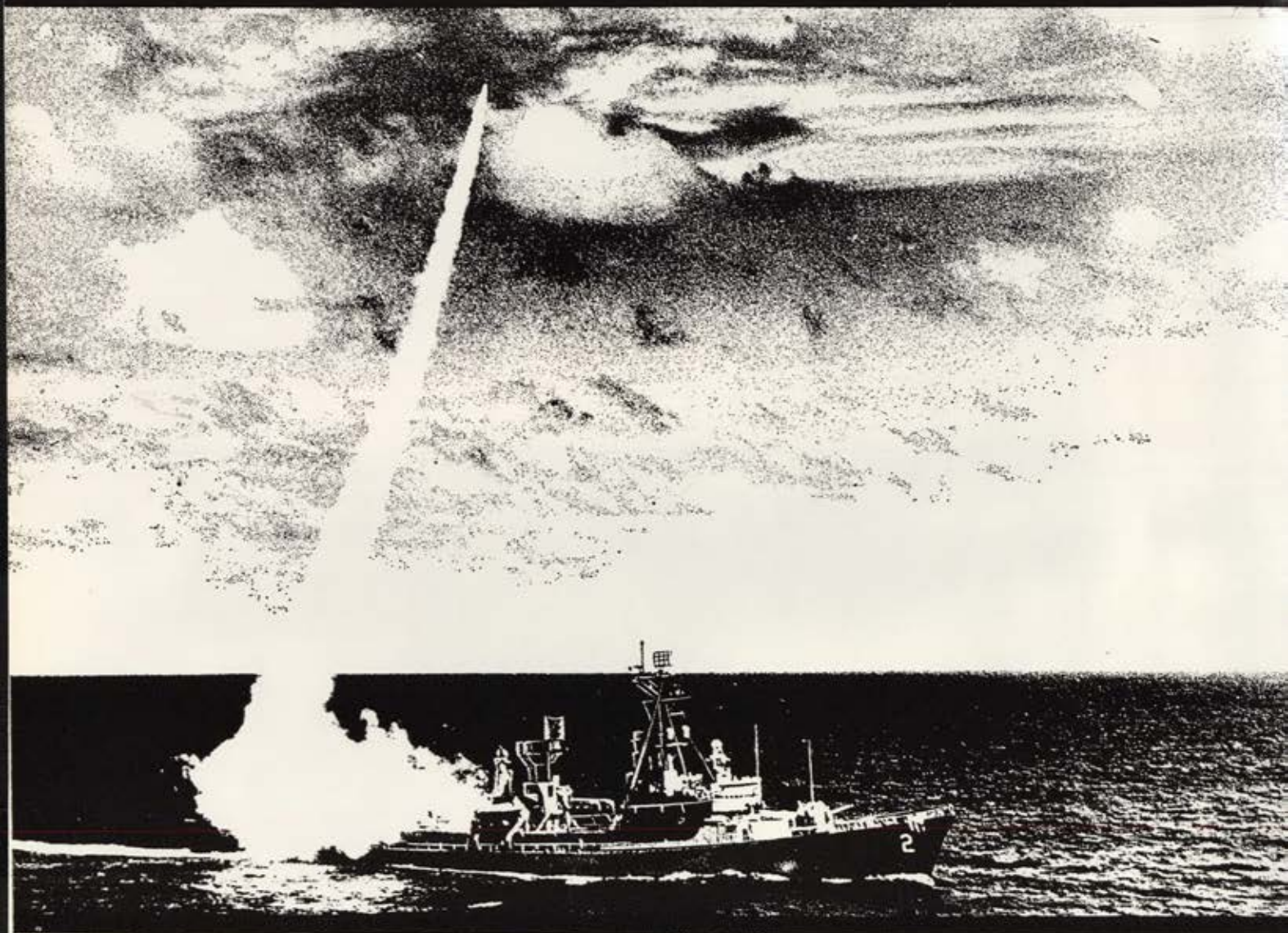
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The former chief of the Air Force Systems Command, himself no stranger to systems analysis, here comments incisively on the shortcomings of that well-known technique when all the variables are not fed into the equations . . .

Systems Analysis: Useful, Yes —But Scarcely a Panacea

BY GEN. B. A. SCHRIEVER, USAF (RET.)

W

HEN I was the Commander of the Air Force Systems Command, I used to receive a report periodically on the number of briefings our people were giving to press and civic groups about our new Air Force weapon systems.

In a typical briefing, the speakers usually discussed the new capabilities of the system, the technological

advances that made the system possible, and the tactics the system would employ.

Naturally, the briefings also had to deal with costs—always an important item. And, then, they usually closed with a comment on the impact of the new system on our training and logistics programs.

Whenever possible, the audiences were provided the opportunity to ask some of those “good questions.” In all the many briefings that I listened to or participated in, I never once heard anyone ask the question, “What kinds of systems were rejected in favor of the one that is being produced?”

Today, science and technology are not only offering us new and better systems. They are also making possible a variety of fundamentally different systems, all able to carry out a specific mission, and all able to exceed several operational specifications. Most new systems these days do not represent merely incremental improvements in a given line or succession of weapon systems. Almost all of them are so advanced in whole or in part that they amount to radical innovations.

The selection process by which the best weapon system is chosen from among its competitors or alternates is, therefore, of vital importance. It is no exaggeration to say that the manner in which weapon systems are selected can determine the security of our country. It is that selection process—and the role a special form of systems analysis plays in that process—that we are concerned with.

Fortunately, the advances in science and technology which are making possible optional systems for accomplishing military tasks are also giving us an effective means for making reliable and disciplined comparisons between alternatives. This new means is, of course, systems analysis. It is based on the many advances that have been made during the postwar years in mathematics and data processing. . . .

Those defense officials who must approve or disapprove military research projects and weapon system proposals also bear a very heavy weight of responsi-



“ . . . there is no such thing as an analysis . . . on the basis of just cost and effectiveness. Time is part of the equation.”
—Former Systems Command chief General Schriever.

bility. They . . . need and deserve every possible assistance from modern technology.

Since the first days of recorded history, military commanders and their staffs have had to make comparative analyses of large quantities of interacting data—and to bear the responsibility for their decisions. Despite their having unreliable intelligence sources and primitive briefing methods, many of those early-day field generals were amazingly adept at evaluating the multiple elements of warfare, even in the confusion of battle.

Historians seem to suggest that some battle commanders possessed a sixth sense—a masculine, military intuition—and that their victories should, on occasions at least, be credited to that intuition. It is difficult to argue the point. . . . We know that there was no Control Data #6000 in Napoleon's tent. Successful military commanders, however, have always firmly denied any reliance on intuition, and have credited their victories to their experience and to their sensitive appreciation of both the concrete and the subjective elements that play a part in violent conflict. Defeated generals have usually blamed their fate on such causes as the want of a nail. Modern historians, who have so few victories to write about—victories no longer seem to have their old importance—will probably find themselves forced to credit the defeats of today's and tomorrow's unfortunate generals to the lack of an effective systems-analysis capability.

During World War II, Air Force bomber commanders and their intelligence staffs were faced with the most complicated comparative analysis task ever to confront military men. Their problem was to determine which industrial targets meant the most to the enemy's war effort, and in what order and at what rate they should be attacked. Some of the brightest economists and mathematicians in the country were assembled to help with the problem. The contribution of these men who conducted what was then called Operations Analysis has been duly recognized and recorded.

Operations Analysis for the first time brought the scientific approach and the modern techniques of mathematics to bear on a military analysis problem. The recommendations of the operations analysts were based on objective data, treated and analyzed in the most rigorous manner.

The ICBM Story

In more recent years a completely different type of military problem was subjected to a similar form of modern systems analysis. This was the problem of the ICBM. In early 1954, when it began to appear technically feasible to design and build ICBMs, the late Dr. John von Neumann demanded a year-long analysis of the technical options. The goal was to determine the surest and swiftest course to the development of an effective ICBM. The systems-analysis study directed by Dr. von Neumann served as a guide to our ICBM programs during those trying years in the mid-1950s. Several years later we performed a similar study in the Air Force to help us determine the best approach to the design of the solid-fueled Minuteman.

Those early systems-analysis studies in regard to missiles have sometimes been maligned. The General Accounting Office was ordered to investigate some cost

estimates. The investigation confirmed, however, that our estimates on those early missile programs were within ten percent plus or minus—and this, despite the fact that we were trying to make estimates to cover five-year periods, and despite the unprecedented, high-risk research and development associated with these programs.

I do not mind adding that in regard to the technical features of the Minuteman, we hit the estimates on the external dimensions to the inch and the total weight within a few hundred pounds.

Cost-effectiveness studies were introduced into the Department of Defense in 1961 on an experimental basis and on a full-time basis in 1962. Cost-effectiveness is now part of a larger management control system called the Planning, Programming, Budgeting System, PPBS. According to Department of Defense officials, PPBS is "an effort to tie forward planning to budgeting via programming."

The public first heard about cost-effectiveness in the Department of Defense when the much-heralded Skybolt missile was suddenly canceled after something over \$700 million had been invested in the program. A few months later the B-70 program was canceled, also on the basis of cost-effectiveness. It was apparent then, in my opinion, and beyond question now—in the light of the abortive Multilateral Force program and our other nuclear weapons excursions—that the Skybolt was canceled on the basis of political considerations and *not* on the basis of cost-effectiveness. The cancellations of the Skybolt, the B-70, and many other programs—*theoretically* on the basis of cost-effectiveness—have increasingly disturbed the leaders in the armed services, and in the defense industries it has become more and more apparent that some unidentified defense policies have, in fact, been the reason for the cancellations. But to the public, the press, and Congress, the justification has been the possibility for economy, as indicated by cost-effectiveness studies.

Today, systems analyses are often used at several points in the life of major weapon systems programs. There is a study at the Program Definition Phase, when a system concept is being formed. There is a running or continuing study by DoD from program definition until the system is approved or disapproved for production. And still later, there is a study to determine the value of modifying or modernizing the system.

In recent years, the Department of Defense has placed increasing importance on cost-effectiveness as a means to economy. Many factors have contributed to this emphasis. The first has been the rising cost of the weapon systems themselves. The second has been that each of the costlier weapon systems has involved a larger percentage of the total Defense budget. The third factor has been that the commitment of money and resources to a weapon system program has had to cover longer periods of time.

The war in Vietnam has been the other factor—and a most demanding one—leading to the growing emphasis on cost-effectiveness. Vietnam has, in effect, put a ceiling on those funds available for R&D and for the procurement of new systems.

Despite the obvious logic of using cost-effectiveness as a basic criterion for systems analysis studies, these studies at the Department of Defense level have come in

for increasing criticism. In the last few months there have been a number of articles in the leading military journals about cost-effectiveness. And I would guess that most of the people in this audience have also read Dr. Alain Enthoven's statement before Senator Jackson's Subcommittee on National Security and International Operations (see *AF/SD, January '68, p. 33*) and the subsequent dialogue between the Assistant Secretary and members of the subcommittee. Very nearly every essential argument, pro and con, about the technique of cost-effectiveness, was aired during those hearings. . . .

I do want . . . to make clear that I am not opposed to cost-effectiveness studies as such, nor am I opposed in general to other forms of systems analysis. I have been party to many systems-analysis studies, and I have ordered the conduct of several such studies myself.

I am also convinced that the experience gained in systems analysis throughout the Defense structure will benefit all segments of the civilian economy. We face many problems in this country, especially in urban redevelopment, which will require systems analyses as the first step in their solution.

I am deeply concerned, however, with the way they are being used as an aid to decision-making, and I will focus my comments on that aspect of the subject.

How best to select the weapons our nation needs for its military forces is admittedly one of the most complex problems faced by our government. The ramifications are endless. For example, some systems are potentially so powerful and so effective that it seems almost criminal, from a purely military point of view, for the nation to be without them. On the other hand, there is such a thing as bankrupting the country in the name of national security. There is also such a thing as a system so vital to our national security that we should have it whether it is cost-effective or not.

Incomplete Triangle

In the face of the complexities associated with the selection of weapon systems, the basic requirement is for standards or criteria by which the weapon system proposals can be judged. It would appear that the sole standard in DoD today is cost-effectiveness. Even in those instances in which it is the logical standard, I am convinced it is not always being applied properly.

I am of the opinion that in many instances cost-effectiveness is being applied in the Department of Defense to two and a half sides of a triangle. The triangle I am referring to is the classic management triangle: cost, performance, and time. Students of management have long struggled to grasp the interrelationships of these three factors. As a rule, we find that one or two factors must be sacrificed in the interest of the third. For example, if management wants to keep the per-unit cost of some new product down to a low preset figure, it must be willing to accept something less than maximum quality or performance in the product. But the proper control of the time factor can result in advantages in both cost and performance—especially in military weapon system programs.

In short, there is no such thing as an analysis of a weapon system on the basis of just cost and effectiveness. Time is part of the equation, and, from a management standpoint, it is the key factor.

Let's take a careful look at the "time" side of the management triangle in relation to a weapon system program. The "time" line itself has three sections or phases: The first covers the period of research and development; the second, the period of production; and the third, the period of usefulness of the system in the operational inventory. There are important interactions between these three phases. For example, if we can compress the first two phases, R&D and production, we can improve the cost-effectiveness of the system. If we can also extend Phase III, the period of operational usefulness of the system, we can improve still further the cost-effectiveness of the system.

There is a way to compress the first two phases—R&D and production—and that is to have them overlap as much as possible. In the missile programs, we used to call it "concurrency."

What is often overlooked is that the compression of Phases I and II through concurrency will almost always extend Phase III. This is more than simply doing two things at once. The important point is that the continuation of the most promising R&D into the production period will result in a more modern system, a more effective system, and a system that will remain useful in the operational inventory over a longer period of time. Obviously there are tradeoffs here. The degree of improvement in the system effectiveness from continued R&D must be sufficient to justify the higher cost that may result. I want to note, however, that in many cases continued R&D can actually lower the cost of the system, shorten the production schedule, and increase the performance of the system. It is all a matter of management judgment. If the right research and development projects are continued, the results are favorable. If the wrong R&D projects are continued, the results can be increased costs.

Let us take a short look now at the "time" factor, as it applies to the period in which a weapon system is in the operational inventory. To begin with, one must amortize the cost of a weapon system over its years in the operational inventory to determine its cost-effectiveness. Therefore, the longer a system remains useful, the better is its cost-effectiveness.

Take the B-52, for example. It is now programmed to remain in the inventory well into the 1970s—twenty years from the time it was introduced. To get this many years of usefulness out of the B-52, we have had to make several major modifications. Each was justified on the basis of cost-effectiveness. Each has been proved to be a wise investment. For several reasons, however, the aircraft has reached the end of the line as far as cost-effective modifications go. The prime reason is that the air defense system in the Soviet Union will be too advanced during the late 1970s for B-52 operations. The length of time, therefore, that a weapon system may remain in the operational inventory is relative to the rate of technological progress in the Communist countries.

The difficulty here is that we are dealing with closed societies. On occasions we get an early hint about a military research project in the Soviet Union or Red China because their scholars must write for their learned journals. But once a Communist research effort has been accepted as having military potential, we have no way of finding out the status of the develop-

ment programs until a prototype of the new weapon appears—many months, sometimes many years, later. And at that moment, it may very well be too late for us to institute a “catch-up” program. We simply may not be granted the time. Therefore, we have no alternative but to adopt defense policies which assure technological superiority for our weapons.

Bearing in mind the significance of the “time” side of the management triangle, what conclusions can we come to about cost-effectiveness? The first is that cost-effectiveness studies of weapon systems are limited in their value to the manner in which the “time” factor is treated. The “time” factor must be fully appreciated as a composite of several interacting variables coupled to a basic uncertainty. And that uncertainty is the pace of technological progress in those countries having aggressive ambitions. . . .

Beating the Competition

The second conclusion we can come to about cost-effectiveness and the management triangle is that if this nation is to have the most technically advanced systems—and this means that we must have them *before* competitor nations have them—then defense management must do everything possible to save time and to increase effectiveness. The laws of the management triangle tell us clearly that we cannot increase effectiveness and reduce costs without compressing time. It is meaningless to carry out cost-effectiveness studies of weapon systems proposals unless all Department of Defense policies governing research, development, and production are aimed at the saving of time. Military systems which are not time-effective cannot be cost-effective.

The laws of the management triangle make equally clear that one cannot have weapon system effectiveness, relative to either time or cost, without the urgent advancement of technology. Unless all Department of Defense policies are aimed at the goal of technological superiority for our weapons, it is meaningless to make studies that relate time or cost to effectiveness.

When I look at the Planning, Programming, Budgeting System in the Department of Defense, I see a management triangle which has been oriented toward cost—and at the expense of time and effectiveness. Even a quick look at PPBS procedures will show this. First, there is the long and tedious Program Definition Phase, with its exhaustive cost-effectiveness studies—despite the fact that much technical data is not available and cost calculations are based heavily on assumptions. Next, there is the rule that the final system proposal must be based upon completed research and development. As the phrase goes, the technology must be on the shelf. The system design is frozen at that moment, which is to say, the effectiveness of the system is frozen at the level of technology at that point in time.

Finally, industry is asked to bid on the program, on the basis of a fixed-price contract, with the assurance from DoD that the technical specifications of the system will not be changed.

Nowhere in that procedure is there any effort to compress time. Nowhere is there concurrency. Nowhere is there time urgency.

The procedure offers no challenge, no stimulation, to research and development. R&D is allotted so much

time in the sequence of events and that is all. Continuing R&D falls under the Building-Block program, so-called, a title which has never been known to arouse the enthusiasm of any scientists. There is no effectiveness urgency in PPBS, anymore than there is time urgency.

When I think of the Planning, Programming, Budgeting System, I find it especially ironic that cost-effectiveness is being used to give PPBS scientific status. Defense decisions are constantly being justified to the public and to the Congress on the basis of cost-effectiveness, when in fact, PPBS is defeating the possibility of our having maximum cost-effectiveness in our weapon systems.

I am happy to point out that PPBS has brought to the defense picture a more orderly system of budgeting. And that is to be applauded. There is a difference, however, between orderly budgeting and fiscal responsibility. I do not believe that discipline in defense budgeting must be achieved at the expense of the effectiveness of our weapons. And I believe that is, in fact, the price we are now paying.

What is needed is the aligning of all defense policies with the goal of technological superiority for the weapons of this nation. If this is accomplished, then the full potential of cost-effectiveness will be realized as an aid to defense management.

I have long felt that most Americans do not fully appreciate the benefits this nation has received over the years from military research and development and from the innovations in military management. Looking to the future, I am certain R&D and progressive management must play extremely important roles in improving the welfare of mankind, both at home and abroad. There is no question that the suffering of human beings can be alleviated through well-managed national and international cooperative programs, designed to capitalize on the potentials of technology.

Certainly, the first step in the solution of major problems, such as regional famine, inadequate transportation, or polluted air, is a systematic and reliable method for defining and analyzing the problem. The experience the Defense establishment has had with systems analysis can be invaluable in many governmental programs, domestic and foreign, in dealing with such problems.

The challenge to systems analysts, in and out of the Defense establishment, is to improve their methodology, to increase the reliability of their studies, and to find new areas of application, so that systems analysis can make the contributions it is potentially capable of in our nation's effort to strengthen our national defense and to improve the welfare of mankind.—END



Now a private management consultant and a special adviser to the Secretary of Housing and Urban Development on the enlistment of American business in the solution of urban problems, General Schriever, before his retirement in 1966, was a principal architect of the USAF missile program. The above article was delivered originally as a speech to a joint meeting of the Operations Research Society of America and the American Institute of Aeronautics and Astronautics, held in Washington, D. C., March 18, 1968, and is condensed here with permission of the AIAA.

A man wearing a dark hard hat and a dark jacket is shown in profile, looking upwards and to the right. He is holding a tool, possibly a wrench or screwdriver, and appears to be working on a large, textured, metallic surface that resembles a spacecraft component or a large industrial structure. The background is dark and industrial, with some horizontal lines visible. The overall lighting is dramatic, with strong highlights and deep shadows.

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As manned spaceflight becomes routine and as traffic in the void increases, there will be times when operational systems to enable crew survival after "spacewrecks" will be required. Preventive safety, as important as it is, is not enough, in the view of many experts who are working on ways of . . .

Bringing 'em Back Alive from Space

BY MELVILLE LEONARD AND LORENA O'CONNOR

IF YOU have ever watched a steel worker high up on the skeleton of a skyscraper, calmly walking the length of a steel girder hundreds of feet above the city streets, looking like a man on a tightrope, you have perhaps shivered, suddenly afraid, and thought—just one slip, just one misstep. . . . Suppose while you watched, the girder began to pitch violently, going into a mad gyration with the riveter hanging on as best he could. That's about what happened to Gemini-8.

On March 16, 1966, an unmanned Agena was launched into space from Cape Kennedy, and 101 minutes later Gemini-8, carrying Astronauts Neil Armstrong and David Scott, lifted off the launch pad. For seven hours everything went exactly as planned. Gemini closed in on and docked with the Agena target vehicle, the first time such a feat had been accomplished in space. Then without warning the combination went into a roll, like a giant roulette wheel.

The astronauts worked feverishly to discover the cause and some way of correcting it. As he pulled switches and worked hand controls, Armstrong reported: "We are toppling end over end. We can't turn anything off. We consider this problem serious."

Serious it was. The space duo's heartbeats increased to 150 beats a minute. The roll of the ship was close to one revolution per second, and beyond one rps lies dreaded "redout," the disabling rush of blood to the head.

Armstrong reduced the roll rate by using the Gemini thrusters. He undocked and backed away from the Agena, but still the roll continued. As a last resort he switched on the reentry system in the nose of the craft. That did it. Fortunately, enough fuel remained to orient Gemini for its subsequent reentry. Otherwise the entire

craft would have burned up instead of safely splashing down in the Pacific.

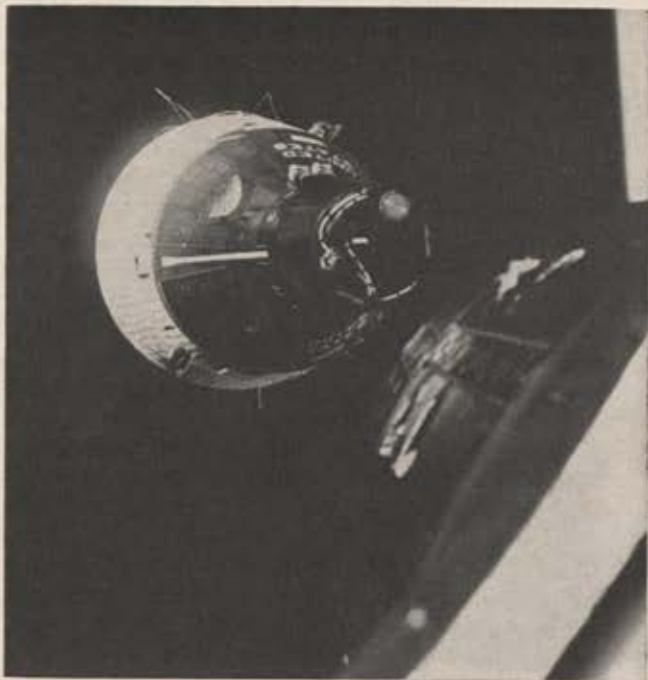
What is being done, what can be done, to prevent a recurrence of what happened to Gemini-8, or the occurrence of the space scientists' nightmare—the malfunctioning of an orbiting spacecraft and the inability to return its occupants to earth? How can we be sure of bringing them back alive?

American astronauts have benefited from the high standards of mission planning, equipment design, and manufacturing precision. The men themselves have



For Gemini Astronauts David Scott (right) and Neil Armstrong, their Gemini-8 flight in 1966 turned out to be a near-disaster. They are shown after postflight splashdown at sea.

Miss O'Connor and Mr. Leonard are freelance writers in the Washington area who specialize in science reporting.



When everything goes well in space, the vista is beautiful. This was the scene as Gemini-6, occupied by Astronauts Walter Schirra and Thomas Stafford, and Gemini-7, with Frank Borman and James Lovell, rendezvoused in 1965.

been superbly qualified and thoroughly trained for their missions. But the near-disaster of Gemini-8, and the horrifying deaths of the three Apollo astronauts in January 1967 have convinced space experts that concentration on safety is not enough. The *prevention* of disaster is feasible only up to a point. Many experts believe that a space rescue system is needed to supplement the existing contingency measures—and that such a system is needed *now*.

What has been done to date about space rescue? Dr. Eugene B. Konecci, formerly of the National Aeronautics and Space Council, suggests one answer.

"It is true that the Gemini program did not have a ground-to-orbit manned space rescue system capable of bringing back stranded astronauts. Likewise, in the Apollo program, we do not have a standby manned rescue system. It is inaccurate, however, to say that we

have done nothing about space rescue. NASA and the Air Force have been examining various approaches for some time. Industry has made significant contributions."

Before looking into these "approaches" and "contributions," it might be well to examine what our current capabilities are. Col. Francis X. Kane of the Air Force Systems Command describes some of them this way:

"Mercury had an escape tower with a solid-rocket motor. In an on-pad emergency, the motor would have fired and taken the capsule away from the booster. A parachute would have lowered the entire capsule to the ground. In Gemini, we have a system similar to that of the fighter aircraft ejection seat. In an emergency, the hatch is blown off and the astronaut is ejected, separated from the seat after ejection, and comes down by parachute. Apollo, our current manned program, has approximately the same system as Mercury. But as you can see, these measures are good only for an on-pad or early-booster-phase emergency."

But suppose Gemini got into trouble after early booster phase? Did we have the capability of space rescue?

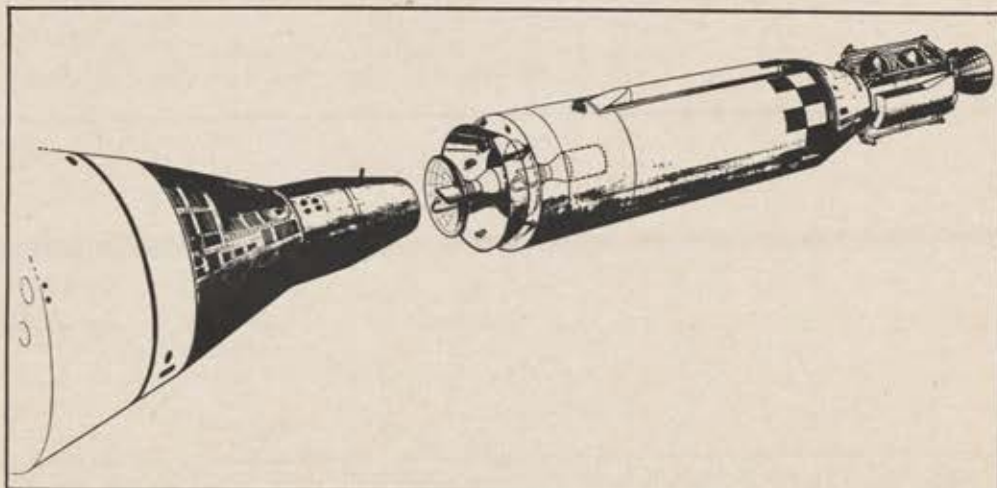
"No," says Colonel Kane. "The reason for this is easily described. These missions [were] planned in minute detail and [were] executed under the most favorable conditions possible. They [required] precision calculation and exacting performance of launch areas, launch vehicles, and both the target (manned or unmanned) vehicle and the manned spacecraft performing the active portions of the rendezvous. As you can imagine, this precise planning and these favorable conditions [would] *not* be prevalent during a space rescue or escape attempt since fast reaction under *non-optimum* conditions is important."

It is clear that the term "space rescue" is being used to describe a wide variety of concepts. Just what are some of the hazards astronauts may encounter? They include malfunction of the on-pad booster, failure of retro rockets, control system malfunction, meteor damage to the spacecraft, collisions with space debris or other craft, accidental firing of rockets (this is what caused the roll in Gemini-8, triggered by a short circuit), accidental decompressions, life-support malfunctions, exhaustion of expendables, etc.

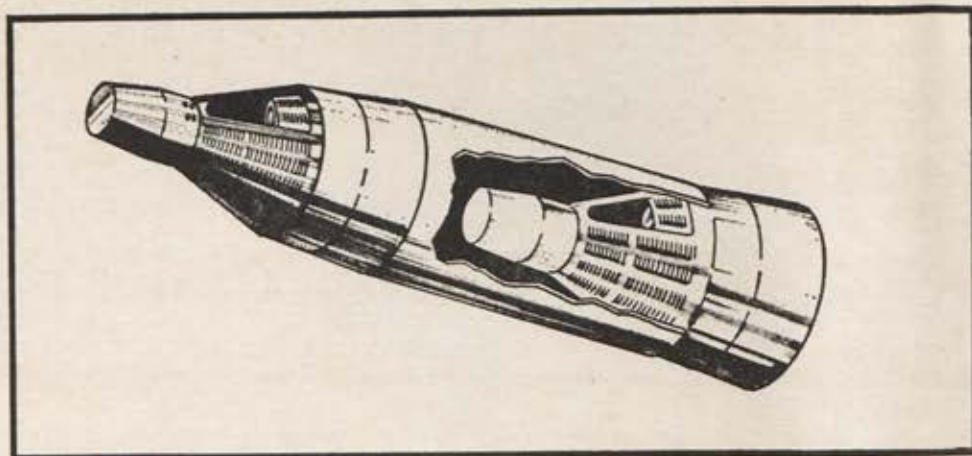
Basically there are two categories of rescue missions:

1. Base-Launched Rescue.
2. Self-Rescue.

Lockheed has proposed a Base-Launched space-rescue concept which would involve launching an unmanned Agena rocket to carry life-support and fuel to a disabled ship. The Agena might dock with the spacecraft and the astronauts might use Agena's controls and propulsion system to return to earth.



To rescue a three-man space-crew, Martin has proposed a tandem Gemini with seating capacity sufficient to carry back to earth five men, including two-man rescue crew and three stranded astronauts, after rendezvous with disabled spacecraft.



The Base-Launched category of rescue mission is founded on the use of vehicles (manned or unmanned) launched from a base, either earth or space base, to the astronaut in trouble. After pickup of the astronaut, the vehicle would return to its base.

The Base-Launched Rescue mission is analogous to the case of rescue from a boat or submarine, in which the crew "stays with the ship" if at all possible, or stays near the ship's location in life rafts or lifeboats, until rescued by other ships or air rescue units.

For this mission, the spacecraft crew requires means for protecting and sustaining themselves while awaiting rescue, whether in a secure compartment on the spacecraft or in space "life rafts" near the spacecraft.

When it is not feasible or possible to wait for rescue, the spacecraft crew must be provided with means to accomplish their own rescue. This Self-Rescue mission, thus, requires systems that not only protect them from the space environment, but also provide controlled de-orbit capability and reentry capability.

"In the Base-Launched category, the simplest concept is that of an unmanned assistance vehicle [such as the one] proposed by Lockheed," says Colonel Kane. "This proposal consists of launching an unmanned Agena rocket to carry fuel and life-support equipment, escape kits, tools, and parts for repair. Or the Agena could dock with the disabled spacecraft, thus enabling the astronauts to use the Agena's control and propulsion system to return to earth."

A space rescue system involving a single Gemini vehicle with three seats has been proposed by Martin Co. The third-seat capability would be obtained by removing the Gemini experiments and one of the two ejection seats. One man would go up with the rescue vehicle, riding in the single ejection seat. After rendezvous, two crew members from the distressed vehicle would be brought down in the two other seats.

To rescue a three-man crew, Martin has proposed a tandem Gemini. It would consist of a standard Gemini with rendezvous radar in the front and a three-seat Gemini with no ejection seats in the rear. Thus, two men would go up to accomplish the rescue and five men would then return to earth in the two separate Gemini vehicles.

But how acute will orbital emergencies be? Can a distressed crew wait twelve or fourteen hours while a ground-based vehicle is made ready and launched. Possibly, but it would be foolhardy to count on it. This is

one serious limitation to the present utility of any ground-based rescue system.

Also it is possible that a spacecraft accident or failure might render both the spacecraft and its vicinity uninhabitable, or orbit/launch pad relative positions might be such that base-launched rescue missions would require more time than is acceptable. Under these conditions the spacecraft crew must have available a method for leaving the vicinity of the spacecraft, orienting themselves for deorbit, accurately deorbiting themselves, re-entering the atmosphere, signaling their emergency return, landing on land or water, signaling their location, and surviving until ground crews could reach them.

"A number of self-rescue systems have been reviewed," says Colonel Kane. "There is the satellite life raft proposed by General Electric. It is mounted on the wall of the spacecraft and either blows out through a hatch or acts as a hatch itself. The astronaut simply gets into it and ejects as in the case of an aircraft ejection capsule. Then he must align the capsule at the proper angle for retrofire and deorbit."

A deploying device designed to achieve low reentry area loading is the Douglas "Space Parachute." The drag shape unfolds from an ejection seat after retrofire. Attitude control jets would be used to orient the vehicle prior to reentry. A crushable nose is provided for landing without a parachute.

North American has proposed a family of separate shelters, which are lightweight and expandable. They are capable of maneuvering away from the troubled vehicle and into other orbits which might be more favorable for later rescue.

An erectable, one-man reentry vehicle known as MOOSE (Manned Orbital Operations Safety Equipment) for emergency return to earth has been developed by General Electric. An endangered astronaut would first don a maximum-protection spacesuit. The MOOSE unit would be attached to the back of the suit, to which also would be attached oxygen tanks and a chest-type parachute.

After removing the MOOSE unit from its container, the astronaut would unfold a six-foot Mylar plastic bag to which a quarter-inch heat shield would be bonded. After stepping into the bag and slipping into a harness, the astronaut would zip the bag closed.

"At this point," says Alan Johnson of General Electric, "the astronaut's body occupies a kind of pocket built into the front side of the bag. As he pushes him-

self away from his disabled craft, he activates two cylinders hung from the Mylar bag containing foam. This expanding plastic foam fills the plastic bag so that it forms a solid wall around the astronaut's back and sides, separating his body from the heat shield. The foaming process takes only a few minutes and, when completed, causes the Mylar bag to assume the correct reentry shape. The front of the spacefarer's body is protected by the aluminized plastic sheet."

Next, using the portable rocket motor contained in MOOSE, the astronaut would fire the rocket motor to achieve the correct deorbit trajectory and attitude, getting his bearings by sighting on the earth's horizon.

No further effort is required by the astronaut, who would see himself surrounded by a ball of fire as the earth's friction boiled away the outer layer of the heat shield. Since the astronaut would face away from his reentry path, the plastic sheet would provide ample shielding across the front of his body.

During and after reentry, MOOSE would be aerodynamically stable. Radio and radar signals would be automatically initiated at selected points to provide location data for recovery forces.

The parachute would be deployed at approximately 30,000 feet, and the astronaut would float to earth at twenty and thirty feet per second. A survival kit would be included in the vehicle equipped to maintain the astronaut in any earth environment.

If touchdown occurred in water, the foam vehicle would float the astronaut like a raft, deploying bombs and dye markers and actuating a radio beacon to attract rescuers.

No rescue system can deal with all emergencies that may arise in space. A meteoroid, for example, might collide with a spacecraft, and the resulting decompression might kill all occupants before they had time to put their spacesuits on. There is always a calculated risk.

What are the attitudes of the astronauts themselves on the subject? Astronaut Donald Slayton takes a realistic view. He says, "A separate rescue system may be feasible in the future, but not while our space program is in the research and development phase."

There is, however, a difference. The modern space pioneer does not trudge off alone and unnoticed. Elaborate and costly machines and instruments are devised to send them on their pioneering. And elaborate and intricate methods must be devised to see that they return safely.

Officials of the space program are aware of this, as evidenced by Colonel Kane's view: "The Air Force and NASA are cooperating closely, and we are at this time taking all necessary steps to solve the problems of space rescue."

We can thus hope that it won't be long before we'll be certain of bringing 'em back alive from space.—END



Left, MOOSE (Manned Orbital Operations Safety Equipment) is the acronym for General Electric rescue proposal by which endangered astronaut would ride a foam-filled Mylar plastic bag earthward with propulsion supplied by special propulsion unit. Below, an artist's conception of the sequence of astronaut operations from ejection to parachute-braked landing.



It is time for Americans everywhere to discard the myth of the so-called military mind as rigid and cruel and stupid. Nothing could be further from the truth, nor can we afford such prejudice against those who defend us . . .

Thoughts on the 'Military Mind'

BY RAYMOND J. BARRETT

HOW THE concept of the military mind came to have disparaging connotations is clear from our history and heritage. In the dead past, civilians very often saw the military as second-rate men spending second-rate lives in what was at best a scarcely honored profession beyond the pale of respectability. Frequently that picture was accurate. Also in the back of the public mind there lurked the fear of the "man on horseback" who might attempt to seize power. Obviously, these two perceptions were contradictory—yet together they have pervaded public attitudes toward the professional military.

It should be clear that the situation in today's complex world is vastly different and that we can no longer afford the luxury of these misconceptions if we value our survival as a society. Military power is no longer an occasional element in our national life.

The threat of force from the outside is constant and pervasive and must be dealt with by power of our own. We must even deal with the possibility of virtual national obliteration in a matter of minutes. Nor is force the relatively straightforward phenomenon it once was, or was thought to be; it is intertwined with such phenomena as economic and social discontent, cultural perceptions, multiplying nationalistic aspirations, and cleverly contrived subversion. The application of force has become incredibly sophisticated and costly. Equally sophisticated talents are needed to develop, provide, and direct the means for employing and countering such force.

These considerations have meant an entirely new role for the military in American society. Whatever may have been the dimensions of the military mind in the past, the present realities are vastly different from the conceptions that still persist in the American myth.

The first reality is that there is, and must be, expertise in the use of force. It is easy to forget this when there are signs of thaw in the cold war or amidst genuine American concern regarding the welfare of oppressed peoples such as those of Vietnam. But the stark fact is that there does exist a tremendous

military threat to the United States, which has not appreciably declined. Whatever improvement has occurred in the international atmosphere stems in the first instance from the awareness by those who mount threats against us that the United States has in readiness a force that could literally destroy an enemy's homeland. In the same way, and without in any way minimizing the problems involved, I believe that the basic issue in Vietnam is the United States's demonstration that we also have the force to make sure that the enemy does not have any hope of successful conquest at lower levels of violence either.

Simple prudence requires that the United States have an expert military profession. If there is not a military view of things then we taxpayers are being cheated. I like the SAC motto, "PEACE IS OUR PROFESSION," but I also liked the sign on the desk of a SAC officer friend of mine which added, "BUT FIGHTING IS OUR BUSINESS—AND DON'T YOU FORGET IT!" The truth is that the effectiveness of the US armed forces in deterring or defending against attacks—and thus as an instrument of peace—depends on their ability to destroy more efficiently than any potential enemy.

To state the matter so baldly is not meant in any sense to argue for a cold-blooded, aggressive approach to the problem. But it does suggest that a toughness of mind and spirit is necessary to be sure that our guard is always up and that the dangerous, unpleasant business of meeting force with force is unhesitatingly taken in hand when the nation's elected leaders so direct. A distinct set of attitudes is essential. Courage, loyalty, integrity, and self-discipline are essential in this world of turmoil and uncertainty. While the military professional should be closely integrated with the civilian elements of our society, he cannot and should not be some mirror image of his fellow citizens in civilian life.

Another reality is the humane tradition in which the American military has operated. Although the military man is not a mirror image of his fellow Americans, he does share with them the fundamental values and aspirations of the American way of life. No longer are the military a handful living largely apart from civilian life. They represent a cross section from all areas of the United States and from many walks of life. Their talents and tasks put them in close contact with many currents of thought. Contrary to radical myths, the overwhelming majority of military men prefer peace to violence every bit as much as do their civilian fellow citizens. It is worth recalling that

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it was an American general (not a civilian, and not a foreigner) who made it emphatically clear that "war is hell."

In any profession governed by relatively fixed standards of conduct there is, of course, a danger of producing stereotypes, but more noteworthy are the diversity and compassion which characterize the American military. Confronted with the enormous human challenges of insurgencies and other lower-level violence, they have shown a rapidly growing awareness of cultural, sociological, economic, and political complexities. And at more places and in more ways than can be tabulated they have reacted to problems of human misery with medical care, school supplies, and other practical help, and with the kind of spontaneous compassion that springs from the heart. The toughness of mind and spirit that is essential to the American military mind also obviously includes a reverence for humanity that gives meaning to courage and discipline. It is essential both that we maintain the military mind and that it be a balanced one in the profoundest sense. That both of these conditions are true of the modern American military mind is, despite the present wave of emotional dissent, a deep tribute to the essential soundness and values of our way of life.

The richness and sophistication of the modern military mind constitute another reality that contradicts the stereotype about the narrowness of military thought. A moment's reflection reveals the great variety of roles that military men now fill. The US Air Force alone has more than 1,000 occupational specialties. The military forces today operate at the boundaries of knowledge in many fields. Military men today are experts in a host of scientific fields—rocketry, electronics, engineering, computer technology, oceanography, and communications, among many others. They are also active in such sophisticated fields as systems analysis and its many ramifications, the development and application of advanced management skills, and highly complicated financial, economic, and legal questions.

To cope with the many problems that deal primarily with the minds of men, members of the American military have also become proficient psychologists, public relations experts, civic-action specialists, sociologists, politico-military analysts, and diplomats. The level of training and education in the American military services is rising steadily. The range of training, talents, and accomplishment in the American military establishment compares more than favorably with that of virtually any broad professional grouping in our society. No matter how you approach the question, any fair assessment of the American military mind shows a remarkable variety and richness of talents that utterly belie any stereotype regarding narrowness or inflexibility.

A dispassionate look at the realities thus shows the military mind of today to be vital to the survival of the American way of life, balanced and compassionate in its dimensions, and remarkable for the sweep and sophistication of its talents. This being so, it does seem high time for a more realistic and positive public understanding of the military mind in the United States. The present misconceptions are

unlikely to disappear or even decline appreciably in the face of protestations or earnest exhortations. Greater efforts, such as data on the growing number of advanced degrees held by military men or articles for learned journals, directed at academic circles and other opinion molders, might help somewhat. So would a more vigorous and widespread effort to get military men of varied talents out speaking to groups of civilian activists such as PTAs and fraternal organizations.

Basically, however, taken in its present context, the unfavorable image of the military mind probably cannot be substantially altered. It is too deeply enmeshed in what is considered to be the American heritage. Consciously or unconsciously, the disdainful attitude toward the military mind is considered part and parcel of the doctrine of civilian control of the military.

An honest appreciation of the present role and capabilities of the military mind probably requires a more realistic assessment of the relationship between the civilian and military elements of our government. Rather than thinking of these two elements as separate, with the civil power "controlling" the military forces, it would be more accurate to use the concept of partnership. In the modern world, we have not been able to ignore the intimate interrelation of military and civil elements in our policies. To do so would court disaster. We no longer have a foreign policy, a military policy, an economic policy, or a social policy. All are parts of, and essentially inseparable from, the ability of the United States to protect our freedom. We are now engaged in national security policy-making.

Viewed in this light, military expertise is no longer a thing apart. It is too much a part of the whole of national policy-making. Military men now have many facets to their talents. They have been brought into the inner sanctum of official policy planning, formulation, and execution. The other side of the coin is the increasing participation of civilians with the military in decision-making. The net result is a political direction that is far more in tune with military realities and much more intimate. In an age of instant communication media, the national security policy-making process is carried on under considerable public scrutiny. Political responsibility, which was the goal of the doctrine subordinating the military man to civil authority, is thus actually increased under the new arrangement.

The concept of partnership in policy-making has at least a twofold value. It clarifies the realities of the arrangements we have developed to meet the security problems of our exceedingly complex and dangerous world. It also provides a framework that highlights clearly both the essential role of the military mind and the background of human values that condition it.

The concept of a multifaceted partnership also illustrates the variety and scope of military talents and how they are thoroughly intermixed with and comparable to sophisticated civilian skills. On the record of its recent and present accomplishments in effectively preserving our freedom, the American military mind has been responsive and responsible. It deserves the esteem of the American people whom it serves so well.—END

Speaking of Earth

There is no lack of connection between the glamor of the space age and the turmoil in our cities. Those who riot—as inexcusable but explainable as their actions are—are trying to tell the rest of us something: that they want to share in the fruits of the technology that has made life more comfortable, if also more complex, for the affluent majority . . .

Letter from the Inner City

BY WILLIAM LEAVITT

Senior Editor/Science and Education

WASHINGTON, D. C., APRIL 11
AS IT happens, this writer, who has spent most of his working time the past several years covering and commenting on the space age, lives in a downtown Washington neighborhood that was affected by the disorders that followed the assassination of Dr. Martin Luther King.

It was a harrowing experience, holed up in one's house with a wife and two young children on a residential street one block west of the high-water mark of the violence. Indeed, as this is being written, there is an unbelievable atmosphere in Washington, with federal troops patrolling not only the relatively small areas of destruction but also sectors of the city where nothing at all happened.

What follows are personal views and observations, based not only on the events Washington has passed through and which it has survived but also on the experience of living for nearly a decade in the inner city.

What happened in Washington the past weekend and in other major cities across the land has, in this writer's view, everything to do with the space age and all its works of which we are so proud.

But first, let it be said that it does no good, indeed much harm, for affluent white Americans to cluck about law and order or to mutter, correctly but irrelevantly, that the looting and vandalism were a desecration of the memory of a man who stood for nonviolence, or to suggest, also correctly, that the disorders embarrassed the vast majority of black Americans who took no part in the violence and indeed, in many cases, were its principal victims. For as Eric Sevareid pointed out at

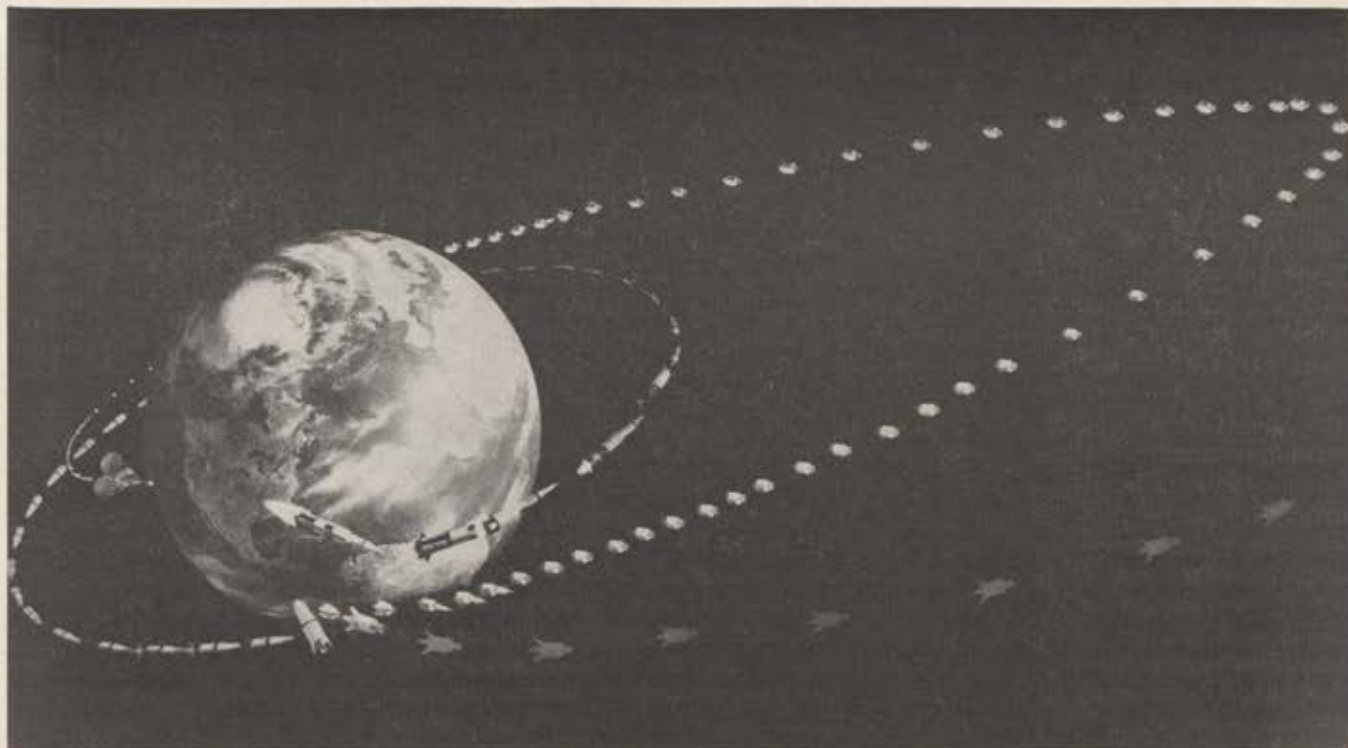
the height of the disorders, noting the contrast between the city in torment and the horrified and virtually untouched surrounding white suburbs, the people who were looting and burning were behaving like fourth-class citizens for the simple and not surprising reason that for too long in the history of this nation that is what they have been made to feel they are.

To say all this is not to excuse the violations of law that occurred. No one can excuse them. But inexcusability is not the same as inexplicability.

Our age of technology, with its spaceships, computers, color televisions, superhighways, and jumbo-jets, and above all instantaneous communication, has, if anything, hastened—in this writer's view—the day of reckoning that has been so long put off. In that realization lies either hope or despair for our society, and the choice is very much with affluent America, which for the most part means white America.

For it is a striking fact that, although our society has divided itself virtually into two nations—the affluent and the poor—there has been one continuing link between the two separated communities. Not a social link but an electronic link. The communications media, the products of our technology, particularly television, have served as a one-way window on the acceptance, affluence, status, and respectability that appeared so truly unattainable to those who looked in from the outside.

Now there has been crackling communication in the other direction, from the disaffected and the disadvantaged, and, to use an overworked but useful word, the alienated, to the affluent. These people are trying to tell us something: that beyond the long-overdue laws that now on paper guarantee them the civil rights they had



Disappointment for planners marked the April 4 attempt by NASA to test ability of Apollo modules to reenter the atmosphere safely at speeds expected during return from actual moon mission, as shown in artist's sketch. Propulsion troubles kept the vehicle from attaining proper orbit and buildup of lunar-return reentry velocity. But modules came safely down at sea.

been denied for a very long time, they also want to participate in the technologically based society from which so many of them have been isolated.

It is not an unreasonable request. Yet a dangerously large number of Americans seem to find it unreasonable and fall back on all manner of specious arguments about how any American can make it to affluence and respectability, if only he puts his mind and back to it.

It is amazing how myopic we all are. After the disaster in Washington, as we watched troops—black and white, it may be noted—patrolling our block, we were struck by the idea that so many white Americans think of Negroes as “them”—as some species of alien in our land. How very ironic. The Negro soldiers are the descendants of people who have been in this country for hundreds of years. Here they were, protecting this writer, who is himself a first-generation American whose father came from a small town in Lithuania in search of freedom from Czarist Russian oppression.

As one of the editors of this magazine remarked a few days after the disorders here: “Nobody seems to realize that these were not Negroes rioting—these were Americans. It wasn’t them. It was us. That’s the point we mustn’t miss. And that’s the point at which we have to start our thinking for the future.”

Assuming, with all the hope that we can muster, that the majority of white Americans, no matter where they live or what they do, are intelligent and humane enough to view the matter in that light, we can ask what needs to be done.

At least some of what needs to be done is obvious and even simple, if there is the will, among people, in government, and throughout the free-enterprise system

of which we have boasted so often. A massive dose of “instant justice,” it seems to us, must be infused into our society. That is more than a phrase. It involves not only true two-way communication between the separated segments of our society. It involves a willingness to invest decent amounts of money in the inner-city educational systems. This opportunity and the social benefits that could flow from it are so vast that they can only be compared with, say, the post-World War II GI Bill, in terms of potential return. How many Americans, who were born in depression and weaned on war, today consider what their lives might have been like in 1968 had the commitment to educate at public expense the veterans who came home from that war not been made? Where would our vaunted technology be today without the contributions of those who benefited from that unprecedented act of faith that was *also* a kind of social insurance, at the time, against our sinking back into the sort of postwar desperations that eventually followed the First World War?

As to business and government, there are roles here that must be played and played vigorously. There are intensive work-and-study programs, involving government, business, and public education, that must be begun in earnest. And the sooner the better, so that those who have been alienated and separated can see some decent future for themselves as participating members of our technologically oriented economy, and so that these same people can have the money to make the choices as to where to live and where to send their children to school that the law on paper now guarantees them. Business particularly has a responsibility, in this writer’s view, responsibility to devise programs, out of



One-hundredth Athena missile, part of advanced ballistic reentry study, was launched from Atlantic Research Green River, Utah, site on March 29. Missile's 470-mile flight duplicates 6,000-mile ICBM path, but can be fired overland.

its own funds, for work training that does lead to employment at the maximum level of trainees' abilities. This is not to denigrate the many worthwhile programs already under way which use federal funds to help industry's efforts. The best of those should be continued. But there is a danger if all the emphasis is put on federal financing of the training, a danger that too much of industry will think of what it is doing as some species of public relations, some kind of halfhearted favor to a concerned and frightened public authority. The commitment by industry of its own resources to this vast but soluble problem would, to a great degree, breathe reality into the effort, and would also overcome the never-ending problem of bureaucratization. It would mean that industry, free enterprise, in a country where this phrase must be more than a slogan, would be expressing its understanding that if the two nations into which we have been divided cannot be reunited, then industry's own safety and future prosperity are seriously threatened. To at least some sectors of industry, this realization has already come. We pray that the understanding will spread and spread fast.

AIR FORCE/SPACE DIGEST is a publication devoted to the advancement of national security in a troubled world. On these pages we have through the years championed the technological advancement of this country as an indispensable instrument of national security. We have—we believe properly—taken the broadest possible view of the definition of national security. And in

taking that view, we have reported and commented not only on military weapon systems, aviation and space technology, and the host of doctrinal arguments about the proper military postures this country has and continues to need. We have also talked about *people* as the most important national resource of all. Toward that end, we have advocated the upgrading of our nation's educational systems through the use of intelligently conceived programs that would put to work the best techniques, many of them developed in the military, available today. This approach, as imperfect as it may be, seems to us at least a beginning. It is at least part of the solution.

A few issues ago, this writer wrote on Project 100,000, the current effort to use the armed services' educational and training resources to help bring pride and a sense of achievement and participation to thousands of disadvantaged American kids—blacks, whites, Mexican-Americans, Puerto Ricans, and American Indians. In the course of the trips to military bases that we visited for the preparation of that article, many thoughts flooded our mind. But our chief rumination was over the fact that everyday American respectable society had, to such a degree, failed so many of these youngsters.

We recall chatting with some of these kids—black, white, and all the rest. They were wearing the uniform of their country. At last, at least some of them would be getting a chance. They had aspirations, these American boys, the same as everyone else's.

And it occurred to us that, in this era of technological miracles, our Spaceship Earth will not fly unless they, too, are aboard.

The Academic Responsibility?

Do university-based scientists have a duty as citizens with special abilities to serve the federal government in



Mars will be the target of a pair of Mariner spacecraft expected to be launched by NASA in 1969. Above, technicians make final checks on a test engine at TRW, Inc. The hydrazine engine will perform midcourse corrections.

the field of military research? Not only "hard scientists"—physicists and their confreres in the laboratories—but also the social scientists who give policy-advisory advice to government agencies on subjects ranging from counter guerrilla warfare to Kremlinology.

This question has begun to plague individual academicians and institutions in the face of the growing resistance across the country to the Vietnamese War. It has visibly shaken the once-strong partnership between the academic community and the Defense Department, a partnership that started in earnest during World War II and led to such monumental achievements as the atomic bomb and later the American missile arsenal. It has already led to such divorces between academe and the defense community as the recent abandonment by Princeton University and the University of Chicago of their sponsorship of the Institute for Defense Analyses in Virginia—the Defense Department's "think-tank" which provides expertise to military and civilian officials on weaponry and military postures, among many other subjects.

The latest ripple in the widening sea of academic discontent with US foreign policy is the recent quiet severance of his advisory connections with the Defense Department by Dr. George B. Kistiakowsky of Harvard University. Dr. Kistiakowsky was science adviser to President Eisenhower and is a noted physical chemist and explosives expert who played a key role in the World War II Manhattan Project. Dr. Kistiakowsky's motive in cutting his connections with Defense, where he had reportedly been advising on the so-called McNamara Line electronic barrier for Vietnam, is said to be quite specifically his opposition to the Vietnamese War. His action preceded the April negotiations on negotiations that were set in motion by President Johnson.

Vietnam has doubtless been the catalyst for such actions as Dr. Kistiakowsky's and the general grumbling



Astronauts Neil Armstrong and Edwin "Buzz" Aldrin, both space veterans, check out crew compatibility with equipment of Apollo Lunar Module test vehicle at the Long Island, N. Y., complex of Grumman, LEM's builder.



Onetime scientific adviser to President Eisenhower, and a long-time major figure in defense R&D, Dr. George Kistiakowsky severed some connections, apparently as Vietnam protest. Academic resistance is growing problem for DoD.

on campuses over academic-community support for defense research and development. But there are other factors, too. Beyond the coterie of guilt-ridden nuclear scientists who left the weapon business after World War II, there has been for a number of years a vocal minority on campuses that has opposed classified research at universities on the ground that the traditional academic role as spreader of knowledge openly for the public good is compromised by the secret stamp. Others have argued that not only classified research ought to be barred from campuses but also that universities should take on far less, and perhaps no contract research of any kind, from the federal government. Their claim is that universities and individual academics cannot help but be corrupted and their missions distorted by large inflows of government money.

There are distinct divisions of viewpoint on this issue within the academic community. If Dr. Kistiakowsky, as *Science Magazine* suggests, is the major figure now in opposition to academic service to the government, then Dr. Frederick Seitz, outgoing president of the National Academy of Sciences and newly designated president of Rockefeller University in New York, is the leader of the opposition to the opposition. A physicist who also worked on the atomic bomb project, Dr. Seitz recently told the *New York Times* that although the question of academic work on government military research projects "continues to be a divisive issue," he continues to believe that scientists should assist the

government and that indeed "in the long run, the quality of [our] military strength will depend on their work." Indeed, under Dr. Seitz's leadership, the National Academy has sharply increased its advisory role to Congress and the government on public policy.

In any case, as noted above, the academic resistance to government work transcends the Vietnam issue, and because it does, the movement presents a potentially serious problem not only to the Defense Department but to the federal government generally. The federal government needs the research, whether in the military field or for the vast range of nonmilitary public problems that are crying for solutions. If the academic community's resistance to its large role as purveyor of expertise reaches tidal wave proportions, then who is to do the research job? It is true that the men in white coats in federally owned and federally operated laboratories can do some of the job, but scarcely all of it. In the same way, much of the work can be done, but not all of it, in the world of the nonprofit, government-funded "think-tanks" like RAND and others that have been described on these pages in earlier issues.

Adding to the federal government's headaches is the fact that for all sorts of political reasons, even including, ironically, some apparent university pressures against them, the "think-tanks" have been plagued with congressionally applied ceilings on funding, which, of course, limit their growth.

As to industry, where a good deal of developmental research goes on for the Defense Department, again all of the job can't be done there either. Industry is not basic-research-oriented in general and cannot be expected to absorb the work an increasing number of campus academicians are refusing.

A Space-Age President

Probably the very last thing on President Johnson's mind as he made his dramatic renunciation of a second elective term as President was the United States space program. The war, the divisions within his own political party, the specter of strife in the cities—all these have for many months smothered public and presidential interest in what a few short years ago was the most exciting and dramatic of American enterprises—the leap into space.

Yet it is true, despite all the accusations by critics that Lyndon Johnson had lost touch with his time, with youth, and all the rest, that, as Senator, as Vice President, and as President, this tall man from Texas did understand the overwhelming importance of technology and the need to keep its fires burning so that his country could retain the technological leadership crucial to safety and advance in a threatening world.

To a dramatic degree, it was then-Senator Lyndon B. Johnson, as Chairman of the Senate Preparedness Subcommittee, who rallied the country and the Congress after the shock of Sputnik. It was a delicate task at the time, back in 1958, to balance the need for action against the political temptations to attack a Republican Administration which had failed to see the implications of a Soviet triumph in the void. To his credit, Lyndon Johnson, certainly ambitious for the presidency he was later to assume in the midst of tragedy, rose to the challenge and acted as a statesman.



—Wide World Photos

As Senator, VP, and now President, Lyndon Johnson has played major space roles. Above, he honors outgoing NASA Deputy Administrator Robert Seamans (center). On hand, House space committee chairman, Rep. George Miller.

As Vice President, Mr. Johnson, a vigorous man who must have felt stultified in the ceremonial box of that high office, contributed heavily to the advancement of the then-burgeoning space effort. As Chairman of the National Aeronautics and Space Council, he worked hard to spur public support for the national space program, and, by all accounts, played an important role in the formulation of the decision to mount an American manned expedition to the moon before the end of this decade.

As President, Lyndon Johnson had the courage to approve the exploration of the utility of military man in space by giving the go-ahead to the Air Force Manned Orbiting Laboratory project, over the objections of those who were naïvely convinced that space should not be sullied by the military, even if such rigidity could someday leave us at the mercy of opponents who had no such compunctions.

In this startling election year, nothing can be taken for certain. It is unlikely, but conceivable, that President Johnson might reemerge as a draft candidate for his party's nomination. But the chances are against it. There was a distinct air of irrevocability about his decision. Thus, it will be another man who will greet the astronauts who carry the American pennant to the moon. But as he enjoys what will undoubtedly be an active retirement, Lyndon Johnson will be able to savor some of the praise, deserved, for himself, as he watches the event on TV at the ranch.

There is an interesting irony to all this. For while an ex-President Johnson will be able to take credit for much of what will have happened in space by the end of this decade, it is also true that the brother of John F. Kennedy (who as President in 1961 committed the country to the moon-landing expedition) is now, as a candidate for President in his own right, calling for cut-backs in the space program.

All of which could happen, in that marvelous phrase of Harry Golden, editor of the *Carolina Israelite* and a man who manages to keep his cool even in the space age, "only in America."—END

Anything but.

A young man can climb into this incredible piece of hardware and break the sound barrier.

And the awe-inspiring probes into space are not figments of his wild imagination. He read the fantasy of Buck Rogers as a boy. Now in a Buck Rogers' space suit he explores the outer reaches of the beyond. It all started with imagination and dreams. If anything, a young man's fancy is exactly what we need.

Without it we'd all still be on the ground.

U.S. Air Force—great career, great life

This is not just a young man's fancy.





New Chinook lifts 12 tons.

**Boeing's latest helicopter—
the new CH-47C—
carries two tons more than
the "B" model Chinook.**

**Payloads can be carried
internally, externally or both.**

**Size, power, maneuverability
and reliability make the new
Chinook the most versatile
helicopter available for
heavy-lift missions.**

**Boeing's Vertol Division
backs its products with the
V/STOL industry's largest and
most advanced R&D facilities.**

At Boeing, something new is always up.

BOEING HELICOPTERS

Since the beginning of military aviation the battle to lower and, if possible, to eliminate aircraft accidents has been a continuing concern of top aerospace leaders. Attacking the problem at all levels and all facets of flight, the US Air Force Flight Safety Program sees that safety is designed into aircraft and missiles, infuses safety consciousness into Air Force people, and investigates accidents so that the same mistake will not be made again. Here a former USAF Director of Safety tells how the program works and why it is so effective . . .

The Goal of Accident Prevention: Find the Cause Before the Crash

By Maj. Gen. Perry B. Griffith, USAF (Ret.)

THE flight had been long. The aircraft rolled to a stop, and I looked down on the ground where the commander of our US Azores base stood with a message in his hand. I heaved my bone-tired frame out of the seat and greeted the commander. He silently handed me the message.

"Proceed to Le Bourget Airdrome for purpose of investigation of crash of B-58 that occurred this date during flyby at Paris Air Show," said the message from the Chief of Staff of the Air Force.

Twenty-six hours earlier we had taken off from Norton AFB, Calif., stopped for an hour on the East Coast to refuel, then flown most of the Atlantic. A rest would have been welcome.

But now, here we were, back in the business the taxpayer paid us for—*safeguarding the combat potential of the Air Force.*

This all happened about five years ago, but a similar situation could happen within the next hour, and only circumstances and the players change.

How USAF Views Safety

Military power is rooted in two elements—men and things. The smooth, efficient working of both elements, geared for total performance, is an absolute. USAF does not hesitate in sending its Director of Safety thousands of miles to help keep the combat machine working at its peak. Events happen fast today, and damage must be fixed fast. Losses due to accidents are as costly as losses in combat, so a safety program to preserve the capability to wage a modern nuclear war, as well as a conventional war, is a necessity, if we are to realize our full potential.

To meet this need, programmed air safety was pioneered worldwide by USAF.

Even so, during 1967 the Air Force suffered 332 fatalities as a result of aircraft accidents among crew members and passengers or incidental to crashes. The figures do not reflect battle casualties but accidents after or before combat are counted. During the same period, an original cost of over \$300 million for aircraft, including repairs, had to be crossed off.

(Continued on following page)



A typical "human-error" accident that is one of the prime targets of the USAF flight safety program. During one change of shift, personnel left without relaying adequate instructions to new shift, resulting in B-52 oxygen fire.

Brig. Gen. Frank K. Everest, Jr., Director of Aerospace Safety, USAF, is a fighter pilot who became an ace in World War II and still flies an F-4 Phantom as often as possible.



Military aviation does possess certain built-in hazards not peculiar to other kinds of flying. *But any loss is too much, and any accident except an act of God can be prevented.* The Air Force has developed its program of flying safety and accident prevention upon these convictions.

The Early Days

Back in 1918, the Aviation Section of the Signal Corps was a stepchild of the ground-oriented Army. The service was warmly regarded by the public as a group of hard-living, irresponsible glamour boys. Yet these same "irresponsible" airmen were farsighted enough to organize the first safety bureau in the military. From then on a measure of official attention was paid to safety.

In 1940, pilot training and mission responsibility were increased enormously. The accident rate began to curve upward at the same angle as that of the increased activity until the Chief of the Air Corps, Gen. H. H.

Arnold, took corrective action by creating a safety program guided by a staff section invested with authority and responsibility. From this official step the Air Force safety effort has developed the methods it uses today.

Accident Rate as a Yardstick

In great measure, the arch of the accident-prevention and safety program has as its keystone two interrelated axioms.

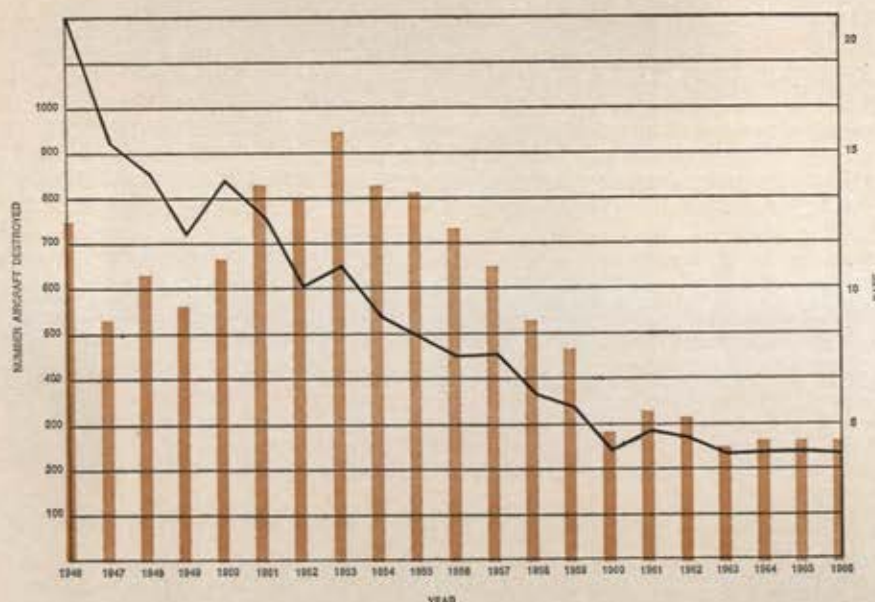
- The common root of almost all accidents is human error—a failure, somewhere, by someone who did his job incorrectly.
- Behind each potential accident is a cause or series of events to be identified and eliminated.

And so, the purpose of any flight safety program is to act before the fact.

Yearly statistics are fairly constant: Personnel error accounts for about half of all Air Force accidents, materiel failure the remainder. Even in accidents attributed to materiel defects, the villain is frequently man. When we speak of materiel failure we refer to out and out inability of equipment to function, or breakage of machinery. An example is the disintegration of a jet engine. And if, as has happened, a wrench was left in the machinery, the generic cause is the inexcusable act of a careless workman.

If man *can* gum things up, he *will*. The Air Force categorizes his mistakes, feeds the computer with the figures, and the results come out of the hopper in terms of major and minor accidents and incidents, accident rates, fatality rates, etc. A major accident occurs when the aircraft is destroyed or there is substantial damage—replacement of a major component or a substantial amount of repair man-hours. A minor accident or incident occurs when the damage is minimal. *Every accident and incident* must be immediately reported and investigated.

The Air Force uses the accident rate as a yardstick; and rates are related to accidents, using as a basis the number of accidents involved per 100,000 hours of



As this chart indicates, the US Air Force safety program works. The accident rate in terms of number of aircraft lost and rate of aircraft losses per 100,000 flying hours has been generally going down over the years since 1946. The color bar graph illustrates the number of aircraft lost as shown on the scale at the left of the chart. The solid line indicates the rate of accidents per 100,000 flying hours as shown on the right-hand side of the chart.



The late Sydney D. Berman was a renowned though controversial safety expert. Many military airmen have owed their lives to him and will continue to for some time to come.

flying. Consequently, the fatality rate for a Military Airlift Command organization can jump tremendously as a result of one disastrous troop-carrying transport accident. On the other hand, considering the accident rate alone, as opposed to the fatality rate, a fighter unit suffering a plethora of bad luck puts its unit commander in deep trouble because of sheer number of aircraft involved.

Living with the accident rate is an occupational hazard tactical commanders endure. Some leaders with a great future have been cast into limbo—at least for a period—because of an unaccountably high accident rate, and because no forthright action was taken.

In the sixteen-year period since 1951, USAF flight accidents have resulted in 7,979 aircraft destroyed. Accident rates, aircraft destruction rates, and fatalities have all declined with time. Between the years 1946 and 1966, inclusive, Air Force losses in aircraft destroyed are shown in the accompanying chart.

The US Air Force over-all aircraft major accident rate for 1967 was 4.5. This includes accidents in Viet-

nam and the whole of Southeast Asia (but, as stated earlier, does not include battle damage).

USAF's Aerospace Safety Plan

The Air Force aerospace safety program (which includes not only flight, but also ground, missile, and nuclear safety) is run by a general officer on the Air Staff. Historically, this man has most frequently been drawn from the "operator" category, rather than from predominantly staff types. The reasons are pretty obvious.

Flying accident problems are rooted in operational chores. The present Director of Safety, a fighter pilot not given to wasted words, keeps his shop at Norton AFB, Calif., geared to the pace that a few years ago earned him the title of "the fastest man alive," when, indeed, he was just that. His name is Brig. Gen. Frank K. Everest, Jr. Like some others of his predecessors, he was an ace in World War II; and, rather than mush through the air in a coffee grinder, he still flies an F-4 Phantom as often as he can.

The part of General Everest's shop related to flight safety is headed by another man who has spent most of his military life flying for a living—Col. James G. Fussell.

This whole structure comes under Maj. Gen. William B. Campbell, the Deputy Inspector General for Inspection and Safety.

Colonel Fussell's division is composed of experts in the field they represent. At one time, eight aces from World War II and/or Korea, at least two former division commanders from TAC and SAC, plus several former wing commanders were on the staff. In addition to the military, a backbone of technical experts are on the job, furnishing continuity to the program.

A bank of computers, set to forewarn a commander of any dangerous trends, is in the charge of Mr. William Russler, who keeps tabs on everything flying in the Air Force. In local archives repose the investiga-

(Continued on following page)

CAT (clear air turbulence) caused the loss of the vertical stabilizer and rudder on this B-52. The pilot, with help from the F-100 chase plane, was able to fly the aircraft safely back to base. Clear air turbulence is one of the most difficult problems facing safety officers since so little is known about the phenomenon and it gives so little warning when it occurs. A great deal is being done to learn more about it.



tive papers of all accidents that have ever been reported—from that of Lt. Thomas E. Selfridge, back in 1908, to the present.

Accident investigation is plodding, theoretical piece-work, the kind that was involved in the solution of a recent fire in an F-101 interceptor. Two Air Force civilian engineers, Robert Nagel, an electronics expert, and Richard Pennoni, a structures specialist, were able to trace a flame path throughout the fuselage and the airframe to its source. The accident had baffled previous investigators, but, working together, these men solved the problem. A fix went out to using agents, and corrective, preventive action was immediately taken.

It was also Nagel who discovered why a missile was launched from a fighter during a practice intercept, with disastrous results to the unwitting crew of a multiengine bomber.

I watched Mr. Nagel in that bit of scientific detection: the almost surgical procedure involved as he reconstructed the flight path of the target and interceptor, their course through a supersaturated cloud bank, the tally-ho, breakaway, and sudden, inadvertent missile launch—and its impact. He isolated the fighter and went over it inch by inch until he eventually discovered the part that allowed the unplanned firing—completely out of the pilot's hands.

SOAP

SOAP stands for Spectrometric Oil Analysis Program. A small sample of oil is collected from each turbojet engine on an aircraft. This is subjected to laboratory test in which the oil is ignited between two electrodes. Its coloration at time of flash is recorded through a prism, and further tests determine any change in engine condition by a buildup of aluminum, steel, or other metal fragmentation.

Recently, an aircraft returning from a mission in Vietnam suffered engine malfunction. Just about the same time as the landing, the squadron received word from the rear area, advising that the most recent sample of oil collected from the faltering engine showed an alarming jump in metal fouling. Bearing failure had occurred. The laboratory has now been moved forward, up with the troops, so the report can be filed before the engine fails.

The late Sidney Berman was one of the most highly regarded metallurgic engineers in the US. I have been down in a hole, dug in a European barley field by a crashed American aircraft, and watched Berman do his work. I've had him tug the lapels of my tunic as he explained passionately how, inch by inch, cable by cable, longeron by longeron, an aircraft disintegrated; why it happened, and how it could have been avoided. Mr. Berman was a man of single purpose—the saving of American lives and dollars. Bruised feelings, politics, the echelon involved concerned him not at all where accident solution and prevention were concerned.

Consider, for example, the interrelationship of a large transport airline and the working carriers in the Air Force fleet. When you fly in a comfortable 707 or DC-8 from Los Angeles to New York your reading

may be affected shortly after the pilot announces a bit of turbulence is in store. So you buckle up and for a few minutes while—with throttles retarded and radar in full operation—the pilot steers the customers around a little stuff that may cause a slight spillage of your drink or, at most, a few green-faced neophytes off on their first ride. The airframe and the passengers have suffered only small discomfort.

By contrast, look at a SAC crew, seven men in a B-52, similar to a 707, flying a low-level mission in a straight line a few hundred feet above the ground, over mountains, subjecting the airframe to intolerable forces sometimes beyond what the designer ever calculated. The flight shakes the living insides out of both crew and aircraft—and this goes on for hours, not minutes.

Then, too, there is the fighter pilot who bores in to the target over Vietnam, through wall-to-wall flak. He launches his ordnance, and with throttles to the fire-wall, with every bump hammering his aircraft, hoping his machine will hold together, he fights his way out.

Things *can* come unglued. A few years ago an aircraft in the fleet lost its vertical fin in CAT (clear air turbulence). Berman recovered some parts and began his insistent, often aggravating, detective work. Three other authoritative agencies got into the act, but there was no consensus. Berman insisted on reworking certain parts of the airframe, a move that could ground the whole fleet. The evidence was not conclusive enough at that point to justify large sums dumped down the drain because one man abrasively insisted he was correct. Then, too, had not all agencies run exhaustive tests on the problem?

A few months passed when, in rapid succession, two aircraft suffered identical accidents. No question remained. Berman got his fix, and undoubtedly many lives and some airplanes have been saved as a result.

How Accident Prevention Works

If a successful safety program is composed of prevention and a purgative, how does the Air Force conduct its program?

Starting at the Air Staff level, safety personnel are not the types one usually associates with the word "inspector."

In flying safety, a philosophy of helpfulness has grown over the years. And much good has come from this philosophy. The survey-team members are all specialists in their fields and, as such, readily pick up deficiencies found down the line—deficiencies that the commander can correct.

At the level below the Air Staff, the major air commands have a section devoted to flight safety, and are also manned by experts and specialists. There is one thing each squadron commander may be sure of: He will be surveyed some time during the year.

Investigating an Accident

In most commands, if a unit has a major or minor accident the sequence runs like this:

A phone call is made at once from the unit to the

next higher headquarters. Within three hours a message goes to Hq. USAF, and a preliminary report follows containing as much factual data as is known. Progress reports follow, and within thirty days the formal report must be on its way.

If the accident is charged with public interest, the degree of handling and the level involved become pretty flexible and can easily get to exalted heights. High professional interest is not only expected but politic and necessary, and the expertise existing in General Everest's shop is always available, on call.

The responsibility to investigate an accident rests with the commander from whose organization the aircraft comes, unless he calls for higher help. Simple guidelines exist for a board's composition. It must have (1) an expert pilot who is actively up to date on the type of aircraft wrecked; (2) a maintenance officer familiar with the plane; (3) a flight surgeon; (4) a safety specialist, who is the investigating officer (his function is much the same as that of a law member on a court-martial). He must be a flying officer whose primary duty is in flying safety and, preferably, a graduate of the Flying Safety Officers' Course at the University of Southern California.

The board may number additional officers—depending on the complexity of the accident. For instance, a legal officer should be a member if the crash might involve legal action against the government. The board must work thoroughly but fast. The Air Force likes to bring things back to normal without delay, especially if the accident is off military territory. Work goes on around the clock, until the board's president is satisfied that the wreckage can no longer contribute anything. The accident scene is policed up and the board retires to a more orderly setting.

At an accident investigation the witness is warned of his rights and asked to describe, in his own words, the action he is there to relate. *No punitive moves will accrue from anything said at that time.* One lowers the accident rate by capitalizing on experience. This should be remembered. One does not lower it by punishment or by threats.

If there is evidence that a court-martial may result from the accident, a collateral board must be formed—quite apart from the accident board. Some witnesses may testify before both boards, but testimony given at one cannot be used by the other. If the accident is of sufficient gravity, the unit's numbered air force may move in a board, or the USAF Director of Safety may personally come in or bring a team. Things have to be pretty critical for this to happen, for no one likes to tell a subordinate how to do his job.

So, after the accident and a little dust has cleared, what goes on back in the unit?

The commander has his hands full. If the accident is fatal, there are family problems. He must, if possible, get out to the wreck. A parade of operational, maintenance, ordnance, and intelligence personnel trek into his office with background material, operational orders, and the like.

The phone rings often, and on the other end most likely is one of his seniors, his wing or division or

numbered air force commander, possibly even the Pentagon. Most of his questioners are sympathetic. They simply ask a question or two, just in case. They have been in his shoes, and while they want quick results to save other aircraft, they feel for the squadron commander, his officers and men, and the families of the victims.

About three days after an accident, the squadron commander must have briefed his wing or division commander well enough for the latter to hustle off to see the numbered air force commander. The two commanders try to get at the nub of the problem. The senior is surrounded by his backup men—his staff. The wing or division commander is usually solo. It is a good test of his homework.

After this ordeal, the numbered air force commander appears before the major commander. There is no attempt to find a goat. Prevention of future accidents is the issue. But the Air Force takes a dim view of a commander with a high rate. I can think of no other similar position in any military service except one involving the captain of a naval vessel who has a collision or runs on a reef. One thing the Air Force has steadfastly refused to do, over the years, is arbitrarily court-martial the pilot of a crashed aircraft, except in cases of willful violation of instructions.

A flying officer is constantly reminded of safety. He must spend hours in a flight simulator on the ground. He must pass an annual instrument check. He attends scheduled lectures on safety. *Aerospace Safety*, a magazine published for Air Force units by the Directorate of Aerospace Safety, is a thirty-two-page monthly magazine that is available to all flying officers and airmen in the US armed forces, a majority of pilots in the RAF, and other foreign air forces lucky enough to acquire copies. I have seen issues of it in tatters being soaked up by crew members all over the world.

The Flying Safety Officer

The lowest tactical and administrative unit to which a flying safety officer (FSO) is assigned full time is the separate squadron based away from its headquarters. A job in safety is not eagerly sought for nor especially appealing to other than an introspective type. When notified I had been tapped for two stars and would take over duties as Director of Safety, USAF, I was far from pleased. The wrong attitude, of course. It comes from ignorance. I learned fast that the FSO is one of the most important men in the USAF.

Few people can really define safety. I have yet to get a totally adequate definition. Airmen can't define it, but they have a pretty lucid idea of what it is—depending on the depth of their submergence in the problem.

The FSO himself knows what safety is. He is required (or highly desired) to be a graduate of the FSO Course at the Institute of Aerospace Safety at the University of Southern California, a course started at the request of the Air Force in 1951.

Since 1951 the course has, indeed, sprouted wings.

(Continued on page 81)



**"As for fixing the time
of a surprise attack,
it is best to
carry it out at night."**

—Mao Tse-tung on Guerrilla Warfare

It's a war the United States had to learn to fight. Furtive and against the nature of a nation cast historically in the heroic role. A war of ambush and darkness. Electro-Optical Systems, a Xerox Company, is proud to be a member of the industry/military team which gives our men the eyes to see at night. Light amplification scopes provide night vision without danger of detection. A hand-

held searchlight is battery-operated and puts out 3 million peak beam candlepower over a 1000 yard range. A vehicle-mounted searchlight system fits into a 15-inch cube and produces 70 million peak beam candlepower, has a beam deforming capability which puts the light where you need it. Applying technology to national and human needs is the reason for EOS. To give you more

explicit knowledge of available night vision devices, get complete information from EOS. And to give you further insight into the basic tactics of insurgency, get your copy of the book, *Mao Tse-tung on Guerrilla Warfare*, free of charge merely by writing Electro-Optical Systems, Inc., a Xerox Company, 300 North Halstead Street, Pasadena, California 91107.



A key to accident prevention is the careful investigation of aircraft accidents, as at left, to keep the same thing from happening again.

In addition to the twelve-week FSO class, the university teaches a class for the Army, is preparing a course in the new System Safety Engineering concept, and conducts a separate class for officers in the Air Forces of the fifty countries in the Military Aid Program.

The course consists of 336 hours of instruction and practical field training to "provide an officer with a working knowledge of aircraft accident prevention techniques and the motivation and abilities required to conduct an effective accident-prevention program." After USC began its courses, the USAF aircraft accident rate took a downward trend, continuing to this day.

System Safety Engineering

A relatively new concept of system safety has been developed by the Air Force since 1960. That year a low-order explosion wiped out a missile-launch test site to the tune of \$45 million. The cause: failure of a very small component—a component that had been questioned, but a hurried schedule and pressure had forced plowing ahead with a calculated risk. Since then several missiles have failed because of malfunction by small parts and personnel error.

Out of these mishaps has come a new system of safety checks involving safety engineering, management, and scientific principles and techniques. The men with these skills live with the item from the drawing board, through manufacture, test, acceptance programs, and out into the tactical units—from start to finish. This is a marriage of civilians and the military, where mistakes will be recognized and corrected before they become fixtures in the product.

In the past, the contractor was left pretty much to himself to guarantee that built-in hazards were absent from his product. No more. In System Safety Engineering a cross-checking discipline starts at the drawing board and continues.

The first true flying test of this principle, although it is a fact with missiles, will be with the C-5. When the contract was signed for this aircraft, a requirement was established that seventy-five percent or better of the aircraft in a unit must be flying or ready to be flown at any one time. If an aircraft lands with cargo, it must be configured so that the load can be discharged and the aircraft refueled and reloaded, all in fifty-three minutes. And finally, specifications call for no more than nineteen man-hours of maintenance per flying-hour.

Thus, safety is part of the joint Lockheed/USAF effort all the way with the C-5A. Convenience, sim-

plicity, and reliability have been stressed to keep failures simple and simple to fix, thereby obviating causal chains of events accident people are so familiar with. Nor will there be an indeterminate waiting period before it goes into civilian use either. The FAA has been in on the system safety program from the start.

Safety Problems Ahead

In the next ten years the biggest problem will be saturation of the airspace. By 1975, military flying is estimated to be reduced, but civilian aviation will no doubt be increased by something on the order of eighty percent. The competition for jet altitudes will be fierce and can only be solved by computers. For many years now, the Air Force Systems Command has been identified with problems in this area.

The astronautical units being developed now by the command are providing the stepping-stones to truly manned space systems as surely as our present aircraft emerged from the Wright brothers' bicycle shop. On the design board, safety can brook no compromise with performance. It is through the system safety concept that we will be able to monitor progress of a vehicle with emphasis shifted to safety first and performance second.

Upon emerging into the truly aerospace age, the pilot will become a monitor, like a ship's captain. Electronic machines will perform the physical work, the pilot will make the decisions. Materiel and design reliability will play the predominant roles in flight safety, for the human hasn't changed much. Materiel errors occur and are corrected, but the basic human failures consistently repeat themselves.

Achievement of the greatest gains in accident prevention will have to depend on emphasis on finding the causes of human failures. This approach is preventing accidents today and will prevent future accidents if prosecuted vigorously.

The Air Force's fundamental thesis is that no flying accident except an act of God is inevitable; that any one accident can be prevented; and, if any one can be prevented, theoretically, all can be prevented.

This is not an unrealistic approach. The efforts of a few dedicated people in a small segment of the Air Staff and scattered throughout the service, are devoting full time to making it realistic. They have saved lives and much money. Your Air Force enjoys the most effectively guided and prosecuted aircraft accident-prevention program in the world—inside or outside the military. I expect it will continue to be that way.

—END

The author, General Griffith, retired from the US Air Force in 1965 after thirty-one years of service. As commanding officer of Kirtland AFB, N. M., he played a key role in the first atomic tests performed in Nevada. He became Deputy Assistant for Atomic Energy in the Pentagon in 1955, and he served as Air Deputy in the 1956 atomic tests at Eniwetok and as Chief of Staff in the 1958 tests. A command pilot with 8,000 hours and an experienced tactical commander, General Griffith became USAF Director of Safety in 1960, the year USAF achieved its lowest accident rate to date.

Book Review

The new, "unauthorized" biography of Charles Lindbergh, by Walter Ross, here reviewed by a veteran aviation writer and long-time friend of Lindbergh, has some shortcomings and serves at best as little more than a hearsay history . . .

A Critical Look at 'The Last Hero'

Reviewed by C. B. Allen

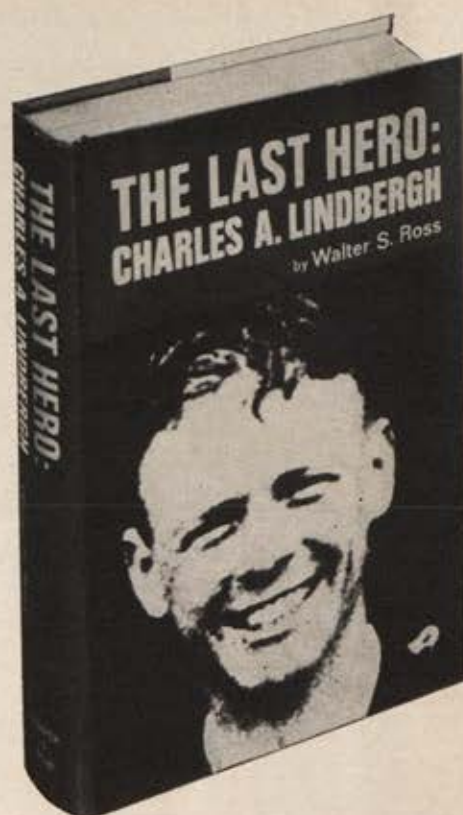
This book* is a sort of hearsay history of the subject's background, family life, and recorded achievements. It is documented to an amazing extent, both by quotation and paraphrase, with page after page of material extracted from books written by Lindbergh and his wife; by writers of other books, diaries, letters, and papers concerning the Lindberghs; and by gossip-column-type information gleaned from the usual unnamed sources.

As a rehash job, the book is well organized, well-enough written, and interest holding. It also is interesting for other reasons.

**The Last Hero: Charles A. Lindbergh*, by Walter S. Ross, Harper & Row, New York, 402 pp., indexed, \$7.95.



This photo of the Lone Eagle and his airplane depicts both Lindbergh's youthfulness and his modesty in 1927. He would have been satisfied, it was reported, if there had been no publicity and no mention of his preparations to fly the Atlantic. Instead, he was hounded by the press.



In the relatively few parts clearly original with the author, he emphasizes that the book "is not an authorized biography" though he tried his best to make it so. He then justifies his production of *The Last Hero* by quoting a Lindbergh friend as saying that "He [Lindbergh] is an historical character, partly by choice, partly by circumstance. Like it or not, he owes a debt to history." This, the reader gathers, inspired Mr. Ross to try to pay off that debt.

Pilots and others familiar with the development of aviation will quickly discover that Mr. Ross got off to a sorry start in his historian role—even in quoting from Lindbergh's *The Spirit of St. Louis*. He writes that when Lindbergh started flight training in 1922, he knew "the vocation was risky" and the lifespan of an aviator "about 900



—Wide World Photos

Wearing a suit of borrowed clothes, Charles A. Lindbergh greets the Parisian crowds after his flight from New York to Paris. He probably did more than any other man to inspire belief in international air transport, but shuns publicity, although continuing his interest in aviation.

flying hours" but felt it was "possible to surmount the risk" and was eager to try.

Lindbergh explains his willingness to accept this hazard, Mr. Ross says, by the assertion in his own book that "I decided if I could fly for ten years before I was killed in a crash, it would be a worthwhile trade for an ordinary lifetime." Then Mr. Ross adds: "Also there was Wilbur Wright, who had flown actively for more than fifteen years and was still very much alive." Actually, Wilbur Wright died of typhoid fever in 1912.

A hundred-odd pages later, Mr. Ross says that Lindbergh, after landing at Ford Airport in Detroit, "persuaded Henry Ford, Sr., to take his first (and only) airplane ride in the *Spirit of St. Louis*." Ford's company, he adds, "had been flying the mail (. . . the first private company to do so in the United States) and . . . was also manufacturing the planes it flew. . . . The Ford plane, originally designed by William B. Stout, was an all-metal monoplane with three Liberty engines (later redesigned to take the Wright Whirlwinds). . . ."

Here again, historian Ross flunks his research. The World War I 400-horsepower Liberty was used in a handful of Ford's early planes, but these were single-engine, open-cockpit craft. Successor enclosed-cabin models were equipped, first with three 200-horsepower Whirlwinds and later with more powerful Pratt & Whitney Wasps. Sizable fleets of both types were used by various airlines until superseded by faster and more economical twin-engine craft.

From the aviation viewpoint, Mr. Ross slips once more in describing Transcontinental-Air Transport's early plane-train service between California and New York. He says it involved an overnight train from New York to Columbus, Ohio, and a daylight flight thence to Wichita, Kan. His book then takes the T.A.T. traveler on a night train ride to New Mexico for a second daytime flight on to Los Angeles. In reality, the first day's flying was from Columbus to Waynoka, Okla., the train trip to Las Vegas, New Mexico, and the second day's flight from Las Vegas to Los Angeles.

Similarly, the author points out that, in more recent years, Lindbergh served "on several key committees for the Air Force. One of these, the von Neuman [sic] Committee," we are told, "made the decision approving the Atlas missile, the motive power for our Mercury manned



In his first speech in ten years, Lindbergh addressed the Alaska legislature in March 1968 on conservation, a subject that has always concerned him, coming second only to aviation and its role in national security.

—Wide World Photos

orbital flights into space. . . ." The "Committee" was probably the Atlas Scientific Advisory Committee, headed in the mid-1950s by the eminent John von Neumann. This committee, an outgrowth of von Neumann's earlier "Teapot Committee," was concerned not only with Atlas but with our entire ICBM program. The use of Atlas, our first operational ICBM, as the booster in the NASA Mercury program was secondary to Atlas' development as a weapon system.

Such errors in easily ascertainable fact inevitably raise doubts as to the authenticity of other statements. For example, Mr. Ross states flatly that Lindbergh—whom he has never met—"unlike his wife," never has been able (with one exception), to discuss with their five living offspring the kidnap-murder of their first child. The exception, he says, concerns "a nameless stranger" who rang the doorbell one day when Lindbergh and his two young daughters were alone in their Connecticut home and told the little girls he was their supposedly dead brother.

The girls called their father, who came at once, Mr. Ross says, "talked quietly to the man and finally got him to go. . . ." After he left, Mr. Ross continues, "Lindbergh spoke to the girls unemotionally . . . about the kidnapping" and, when he was certain they "were no longer upset at the intrusion, he went back to his work." Mr. Ross does not explain how he knows all this; yet he asserts in his book's introduction that the volume "is based on known and verifiable fact" and that "speculation and deduction are labeled as such."

Another introduction-avowal says "part of the purpose of this book is to clarify the record, not violate [Lindbergh's] personal life." Yet the book excoriates both the news-mongering agencies of this country and the American public for their "barbarous" hounding of Lindbergh and his family until they were forced to seek sanctuary in Europe. Then it dishes up, in dubious taste, the highlights of Lindbergh's press-public persecution which Mr. Ross professes to deplore. And if the gossip-based "Family Life" chapter of his book does not "violate [Lindbergh's] personal life"—including his persistent effort to wrest a measure of privacy from the world's Prying Pauls and Pushy Paulines—some readers, at least, will wonder just what Mr. Ross thinks would.—END

The reviewer, C. B. Allen, now semiretired and living on his farm in West Virginia, covered all of America's pioneer aviators as a reporter for the old New York World and New York Herald Tribune. He has been a friend of Charles Lindbergh for more than four decades. Mr. Allen became a pilot in World War I, served as a colonel in the Air Transport Command in World War II, and still acts as a consultant to Martin Marietta's Aerospace Group.



In February 1954, Charles Lindbergh's abiding interest in aviation and national defense was recognized once again when President Eisenhower nominated him for brigadier general in the Reserve. After congressional approval, Lindbergh was sworn in by Air Force Secretary Harold E. Talbott.

The Early, Early Birds

Although we realistically accept the epic flight of the Wright brothers as the true opening of the air age, man's efforts to fly go back to the 1780s, when the Montgolfiers and others were making the world's first lighter-than-air ascensions in France. But it wasn't long before the balloons were ascending in this country as well, and the American efforts make a fascinating chapter in the history of flight. Here's an account of some of the early American efforts and the author's assessment, using contemporary technology, of what might have happened to Aeronaut Thaddeus Lowe if he had taken off as he planned from the US for Europe in 1860 . . .

BALLOONING

The Early American Way

By S. S. Whitt

OUR country was fortunate to have had Benjamin Franklin, a great scientist and superb reporter, present at the first balloon ascensions in France in 1782 and 1783. Franklin, one of the representatives of the new United States then negotiating peace with Great Britain, wrote to the Secretary of the American Philosophical Society in Philadelphia (which he had organized) describing the events and conjecturing that they represented a new turn in human affairs. Franklin later sent the Secretary a book published in Paris that gave a detailed account of the Montgolfier brothers'



The author is a retired US-AFRes colonel who served during World War II in the Far East with the famed 7th Bomb Group, now SAC's 7th Bomb Wing, the oldest bomber outfit in the Air Force. Aviation history has been Colonel Whitt's avocation for a long time, and in his extensive library are a number of books autographed by famous flyers, among them Orville Wright. Colonel

Whitt's earlier article for this magazine was "England's Flying Cowboy," in May '55, dealing with Samuel F. Cody, a rough and ready showman from Texas who opened the British eyes to the coming age of aviation. Colonel Whitt is a private pilot with a license that dates back to the 1930s. He and his wife and four daughters live at Baileys Crossroads, Va. His two sons are serving in the Air Force.

hot-air balloons and the hydrogen balloons of Professor J. A. C. Charles.

Franklin's reports, and others, caused a stir in the new nation. In April 1784 George Washington commented in a letter to a French general: "Newspaper accts of the Air Balloons lead us to expect that our friends in Paris, in a little time, will come flying thro' the air, instead of ploughing the ocean to get to America."

And Thomas Jefferson, with his characteristic genius, wrote a letter to a relative at about the same time detailing a surprisingly farsighted list of uses to which aeronautics could be put.

The first American to ascend in a free balloon was Dr. John Jeffries, a Tory physician from Boston who had found it advisable after the American Revolution to take up residence in London. There Dr. Jeffries made the acquaintance of a diminutive French balloonist, Jean-Pierre Blanchard, and on November 30, 1784, ascended from London with him. So intrigued was the doctor that he immediately offered to underwrite the expense of a balloon flight across the English Channel. Blanchard accepted, but later tried to dissuade Jeffries from accompanying him, saying the hydrogen balloon was not big enough for the two of them. But Jeffries insisted on going, and on January 7, 1785, after a comic-opera flight from Dover to near Calais, during which they had to jettison all their baggage and most of their clothes, the two made it across the Channel by the skin of their teeth, establishing for themselves immortality in the history of aeronautics.

The first ascent from American soil took place on



A huge crowd, including President George Washington, was on hand when the French balloonist, Jean-Pierre Blanchard, who had earlier flown the English Channel, made the first aerial flight in America, on January 9, 1793, from Philadelphia. He traveled fifteen miles during the forty-five-minute voyage.

June 24, 1784, seven months before the Blanchard-Jeffries cross-channel flight, in Blagdensburg (now part of Baltimore) when a man by the name of Peter Carnes let a thirteen-year-old spectator, Edward Warren, go up in a hot-air balloon Carnes had constructed and put on exhibition. Apparently the balloon was tethered.

Young Edward Warren seems also to have been the first American to go up in any balloon, since Dr. Jeffries didn't make his first ascent with Blanchard until November of that same year.

Few noteworthy aeronautical events occurred in this country after that time until the ubiquitous Blanchard showed up in Philadelphia, then the US capital, and on January 9, 1793, made the first aerial voyage in America, a distance of fifteen miles in forty-five minutes. The event was witnessed by an enormous throng, including President George Washington, most of his Cabinet, and many members of Congress.

Blanchard spent the next two years in Philadelphia and other cities along the East Coast, exhibiting his balloon, but made no more ascensions. He failed, after his first aerial voyage, to fire the imagination of Americans, and went back to France disappointed with the results of his tour. Undoubtedly his volcanic temper and inability to speak English contributed to his failure to inspire his audiences.

Things were quiet until 1819, when another Frenchman, Charles Guille, made several ascensions and made the first manned parachute descent in the US on November 20, 1819, at Jersey City. Like Blanchard (who claimed to have invented the parachute in 1785), Guille also failed to promote any lasting enthusiasm for the art and science of aerostation.

Six years later still another Frenchman, Eugene Robertson, made a tour starting in New York City. He attracted tremendous crowds and so inspired an eighteen-year-old man named Charles Ferson Durant that Durant went back to Paris with Robertson as his understudy and became a professional aeronaut—the first American to do so.

Durant returned to New York City in 1830 and was an immediate and spectacular success. For the next four

years he toured the Eastern cities giving ballooning exhibitions, and then turned to instruction of others and the construction of balloons. Between 1834 and 1840 he built a number of balloons, some being ordered from as far away as California.

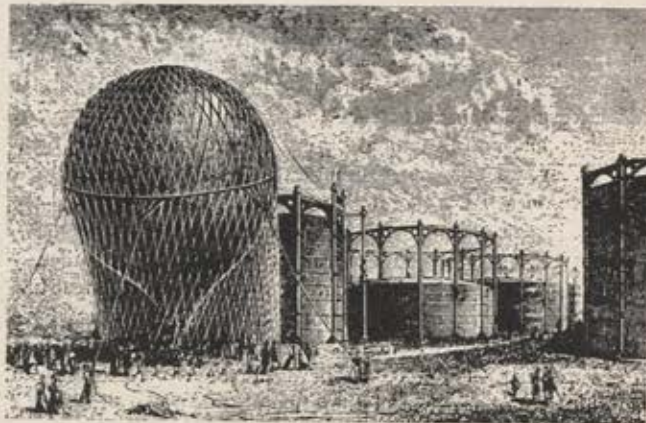
Durant attracted many young men to the profession. It is a safe bet that the great nineteenth-century balloonist John Wise was influenced by Durant to try his hand at the art. Wise made his first ascent in a balloon of his own manufacture from Philadelphia in the spring of 1835.

Indicative of the temper of the times was an incident perpetrated by the famous writer Edgar Allan Poe. Poe's fertile mind produced what was to become one of the great hoaxes of all time. On April 13, 1844, the *New York Sun* published his account of history's first transatlantic balloon crossing. Poe's account, which was fictional, was written as though it were the journal of one Monck Mason. Mason really existed. He was an Irish flutist, one of the earliest aviation writers, and had been up in balloons. The *New York* newspaper printed the account as fact, headlining the story **ASTOUNDING NEWS! ATLANTIC CROSSED IN THREE DAYS!** The story was widely accepted at its face value by a public eager for news of progress in aeronautics.

Only a few years earlier, in 1840, had come the first proposal in this country to use balloons for military purposes. Col. John Sherburne, on active service in Florida during the second Seminole War, which had begun in 1835, proposed that the government purchase balloons from Charles Durant and use them for aerial reconnaissance in the dense Everglades. The proposal was turned down, though there was much logic in Sherburne's arguments that the new technique be tried.

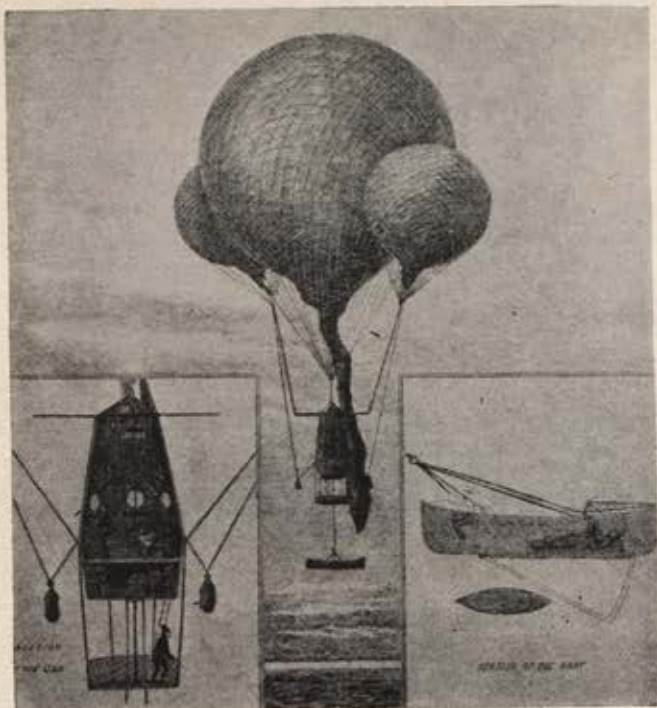
A few years later, during the Mexican War, John Wise offered to build and operate a tethered balloon over the offshore fortress San Juan de Ulúa, which guards Veracruz, Mexico. His balloon would have carried a crew and 18,000 pounds of "percussion bombs and torpedoes" to be dumped on the fort from about a mile up.

The proposal was turned down, and probably deservedly so. Far greater weights of explosives were delivered more efficiently by cannon and mortars during a three-day bombardment in March 1847, during
(Continued on following page)



An early American balloonist was Pennsylvania-born John Wise, from whose 1873 book, *Through the Air*, this print comes, showing the inflation of a large balloon. Wise failed to carry out his dream of a transatlantic flight.

BALLOONING—THE EARLY AMERICAN WAY



John Wise designed this elegant vehicle to carry him across the Atlantic, a flight he never attempted, though in 1859 in a trial run he and three companions flew from St. Louis to New York in an historic overland voyage. Wise died in a ballooning accident over Lake Michigan in 1879.

which Winfield Scott's 12,000-man force landed and seized the city and then went on to take Mexico City in the final campaign of the war.

The early history of ballooning in this country was dominated by John Wise. He devoted forty-four years of his life to the profession and wrote two books that had a profound effect: *A System of Aeronautics* (1850) and *Through the Air* (1873). Incidentally, the latter work was dedicated "as a tribute of respect and admiration, to Professor Joseph Henry, of the Smithsonian Institution."

Wise firmly believed the era of aerial navigation was near, and worked hard to bring it to pass. He was convinced that in the upper atmosphere there were rivers of air, much like those of water on the earth's surface, and that if man could locate and chart them he could use them for aerial transportation of passengers and cargo. He was well aware of the prevailing easterly winds in the upper atmosphere, from practical experience as well as published findings of meteorological research scientists. He was born in Lancaster, Pa., and many of his ascensions took place there and nearby.

From the start, Wise was preoccupied with an ambition to make a transatlantic voyage using the strong easterly wind currents that he knew existed. In July 1859, twenty-four years after his first balloon ascension, he made an overland trial run in his transatlantic balloon that came to be one of the historic flights in America. Accompanied by his friend John La Mountain, who was a veteran aeronaut; a Mr. Hyde, a reporter from the *St. Louis Republican*; and Oscar A. Gager, a wealthy balloon enthusiast who had supplied most of the necessary capital, Wise took off from St.

Louis, Mo., and stood to the east. Nineteen and a half hours and an estimated 1,100 miles later he and his companions landed near a small town named Henderson, in Jefferson County, N. Y., on the eastern tip of Lake Ontario, a straight-line distance of some 800 miles from their point of departure. The airship, optimistically christened *Atlantic*, was sixty feet in diameter, 130 feet high, and had a gas capacity of about 50,000 cubic feet.

Shortly after the *Atlantic* completed her record flight and before the crew had returned home with her, on September 22, John La Mountain agreed to make an ascension with an eminent newspaperman, Mr. J. A. Haddock, from the county seat, Watertown, N. Y. They took off about 5:30 in the afternoon for what was to be a short pleasure jaunt and soon were on top of a solid overcast. Apparently they were fascinated with a panorama of creamy white cloud mountains and valleys, iridescent rainbows, and the like, for they made no attempt to descend until the light began to fail, about 9:00 that evening. On coming down they found themselves over a dense wilderness, they knew not where. Finally they landed and spent four miserable days walking through the cold, wet forest before they came upon human habitation. To their surprise they learned that they were about 150 miles due north of Ottawa, Canada. They had been carried north by air currents ranging up to 100 knots.

Wise died with his boots on: He and a companion—George Burr, a St. Louis bank teller—disappeared in a balloon flight from St. Louis over Lake Michigan on September 29, 1879. He was seventy-one at the time of his death.

The other outstanding aeronaut of the century was Thaddeus Sobieski Constantine Lowe. Wise's junior by twenty-four years, Lowe made his first balloon ascension July 17, 1858. Like Wise, he was fired by an ambition to cross the Atlantic by air and soon set about trying to make his ambition come true.

In 1859 he managed to obtain sufficient financial backing in New York City to construct a monster balloon—diameter 104 feet, height 200 feet, and capacity



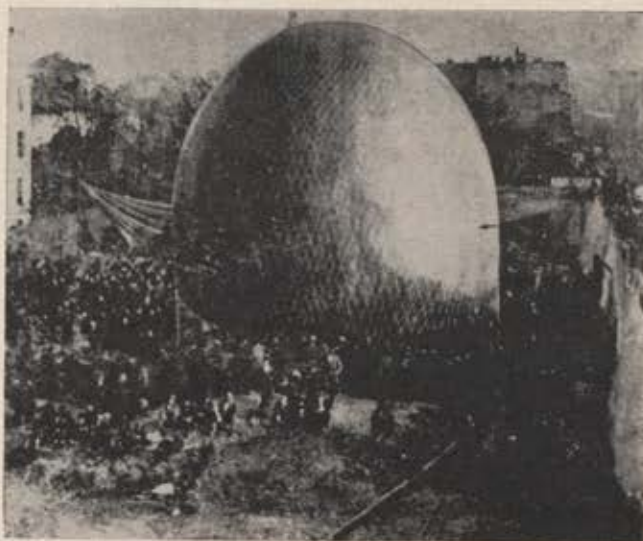
The other titan of 19th-century American ballooning was Thaddeus S. C. Lowe, whose balloon *Eagle* is shown here in a contemporary print being steadied during a storm. Like Wise, Lowe dreamed of one day flying the Atlantic.

about 725,000 cubic feet. His first disappointment came when it was discovered that, despite their assertions to the contrary, the New York Gas Co. was unable to deliver enough gas to inflate the airship. The situation was saved by Dr. John C. Cresson of Philadelphia, who offered to take the balloon to that city and have it inflated at the Point Breeze Gas Works, of which he was president.

Lowe moved his balloon there, and by June 1860 it was ready for a test run. The balloon, now named the *Great Western*, took off on June 28, the same day that the *Great Eastern*, then the world's largest steamship, entered New York harbor. The trial run was a complete success, and preparations were redoubled for a takeoff to Europe in September. On September 7, 1860, a gust of wind caught the *Great Western* as it was being inflated and hurled it against an obstruction, causing a large rip in the fabric. It was repaired, but on September 29, 1860, the balloon burst at the damaged gore as it was again being inflated. Because of lack of funds to make proper repairs, the project had to be temporarily shelved. Lowe set about to increase his scientific and financial backing.

Like John Wise, he enlisted the support of Professor Joseph Henry, of the Smithsonian, who suggested to Lowe, as he had to Wise, that he should first make a long overland flight to prove the feasibility of a transatlantic crossing. Lowe immediately went to Cincinnati with his exhibition balloon *Enterprise* and made preparations to fly to the Atlantic coast. After a long wait for favorable weather, he got off on April 19, 1861, and made a spectacular 900-mile voyage to Virginia, where he encountered an unanticipated flow of southerly winds that took him to a small rural locality named Pea Ridge in Union County, S. C., about ten miles north of Unionville, the county seat (now known as Union).

Fort Sumter, S. C., had just yielded to the Confederates and feeling was running high. Lowe was immediately taken to Unionville and jailed as a Yankee spy, released only after rigid cross-examination and the fortuitous testimony of the local hotelkeeper, a



Here Professor Lowe's balloon *Enterprise* is being readied for its spectacular 900-mile flight in April 1861 from Cincinnati to South Carolina. There the balloonist was seized by suspicious Southerners and jailed as a Yankee spy.

man of some influence and importance, who once had made an ascension with him in a captive balloon.

Lowe made his precarious way through Secession back to Cincinnati, thence to Washington where he offered his services to President Lincoln as a military aeronaut and (much to the disgust of Lt. Gen. Winfield Scott) was accepted.

Of necessity the transatlantic project had to be deferred for the duration. Lincoln made Professor Lowe chief of the Army's Corps of Aeronautics. During the Civil War Lowe built up a fleet of observation balloons that served usefully in a number of engagements. After the war, Lowe had one more go at ballooning. His *City of New York*, with a diameter of 130 feet and able to carry a dozen people, was the largest gas balloon ever built up to that time. Unfortunately, it was destroyed while being inflated, and thereafter Lowe turned his genius to things other than aeronautics—he invented an ice-making machine and, before his death in 1913, established the Lowe Observatory in the Sierra Madre.

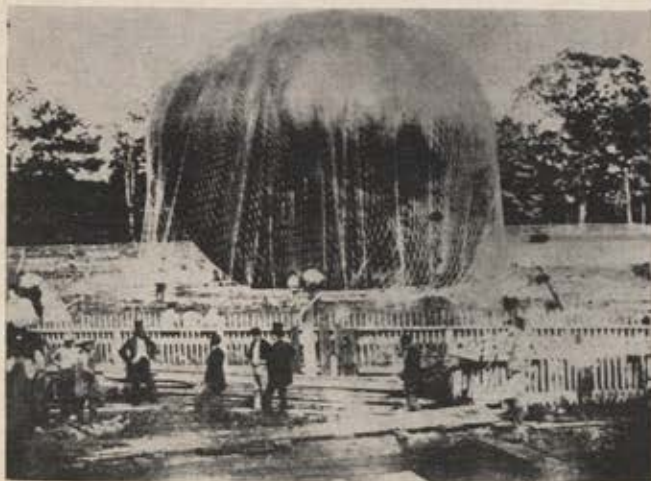
He never again tried to fly the Atlantic in a balloon. But what if he had?

When we consider the dream of Lowe and Wise and many early balloonists of making a transatlantic voyage, the question naturally arises, would it have been possible? Specifically, would Thaddeus Lowe's *Great Western* have made it across the ocean if he had successfully taken off on September 29, 1860?

You will recall that Lowe had the backing of an eminent and highly respected scientist, Professor Joseph Henry, Secretary of the Smithsonian Institution, who had access to the best meteorological data then available. Also, Lowe was a professional balloonist with proven genius for getting the maximum performance from his airship.

Lowe was of the opinion that the crossing would take about three days, cruising at an altitude of two to three miles.

(Continued on following page)



Lowe, shown in foreground, wearing a high silk hat and facing left, here watches as his balloon *Great Western* is inflated at Philadelphia in 1859. During the Civil War, Professor Lowe organized and headed the first US air arm.

I decided the question should be put to experts, and therefore contacted the Weather Officer at Andrews Air Force Base, Lt. Col. E. B. Jack, suggesting we should run a hypothetical flight starting September 29, 1966, 106 years to the day after Lowe's abortive attempt.

Colonel Jack kindly gave me access to the weather charts over the Atlantic, and asked one of his staff to assist me in plotting the hypothetical voyage.

We started with the assumption that Lowe would have cruised at 10,000 feet—the temperature at that height averaged only a little above freezing but probably would have been endurable. Then we examined the weather and wind-flow charts that are prepared every six hours.

Here is how we "recreated" Professor Lowe's flight:

- Lowe completed inflation of his 725,000-cubic-foot giant the night of September 28-29, 1966, and took off at 8:00 a.m. EDT. Weather at takeoff was nasty due to an occluded front lying along the entire northeastern seaboard. The balloon ascended in light rain and soon disappeared into an overcast at 3,000 feet. When last seen from the ground it was traveling not east, but west, at about five knots.
- When it reached 10,000 feet, however, it picked up a forty-knot easterly wind and headed out to sea. Six hours later it was just south of Boston, cruising through layered cloud decks with occasional light rain.
- By 8:00 p.m. EDT, night had fallen, and the *Great Western* was sailing through broken clouds illuminated by a full moon.
- By dawn the next morning the balloon was in scattered thunderstorms, about sixty nautical miles south of Nova Scotia. There were considerable clouds on all sides and above and below.
- Six hours later at 8:00 a.m. EDT September 30, 1966, the balloon entered clear weather, cruising at somewhat better than forty knots under a 16,000-foot overcast.
- By late afternoon the weather had turned bad again, with thunderstorms and broken clouds extending down to 1,000 feet above the ocean.
- By nightfall the balloon was traveling through towering cumulus clouds with light to moderate icing.



This balloonist's-eye view of rebel encampments at Yorktown, Va., based on sketches from Professor Lowe's balloon at an altitude of 1,000 feet, is an example of Union use of balloons for aerial reconnaissance in the Civil War.



Here, surrounded by Union forces, Lowe prepares his balloon *Intrepid* for a "reconnoitering expedition" to Vienna, Va., during the Civil War. After the war Lowe moved to California, gave up ballooning, and died there in 1913.

Above the balloon remained a solid overcast at about 16,000 feet.

- Dawn found the weather clear but with threatening line squalls to the north. The *Great Western* was approaching the Azores, and Lowe could see floating seaweed and green-brown splotches in the ocean.
 - By mid-morning the *Great Western* was back in clouds again with broken layers up to 23,000 feet and huge cumulus chimneys extending up through them.
 - Six hours later the balloon was cruising at the base of a six- to eight-tenths cloud deck in mild icing conditions.
 - Shortly after nightfall the *Great Western* entered clear weather with a brilliant full moon turning night into day. The balloon continued at about forty knots, sailing just south of a front that paralleled its course.
 - Dawn brought more threatening weather with the most extensive thunderstorm activity encountered throughout the whole voyage. There was a broken, angry overcast at 12,000 feet.
 - By mid-morning the balloon had emerged from the front and was cruising above a broken undercast. Frontal activity could be seen far to the north. By noon the weather at 10,000 feet was again bright and clear, and the changing colors in the ocean told Lowe he was approaching land.
 - By mid-afternoon Lowe could perceive in dim outline the coast of Portugal, with a bank of clouds following the land. His speed had dropped to about twenty knots.
 - He made landfall late in the afternoon (1:00 p.m. EDT October 2, 1966) and established his position just west of the university city of Coimbra, 108 miles north-northeast of Lisbon.
 - He began his descent and entered broken clouds with rain at 7,000 feet and again at 4,000 feet. Below 4,000 feet, visibility was about five miles with occasional light rain. The wind was only five knots at the surface when he gently set the basket down in a vineyard and, with a strong tug on the rip panel, deflated his aerostat.
- He had traveled 3,030 nautical miles, and the voyage had taken him seventy-seven hours—just five hours longer than his own prediction!—END

THIS IS AFA



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ILLINOIS: Ludwig Fahrenwald, III, 108 North Ardmore, Villa Park, phone 832-6566. **CHAMPAIGN, CHICAGO, ELMHURST, LA GRANGE, PARK FOREST, PEORIA.**

INDIANA: George L. Hufford, 419 Highland Avenue, New Albany. **INDIANAPOLIS.**

IOWA: Donald Koontz, Simpson College, Indianola, phone 261-2835. **CEDAR RAPIDS, DES MOINES.**

KANSAS: Don C. Ross, 10 Linwood, Eastborough, Wichita, phone MU. 6-6409. **WICHITA.**

KENTUCKY: Ronald M. Peters, 8604 Holston Road, Louisville. **LOUISVILLE.**

LOUISIANA: John E. Miller, 469 Sandefur Street, Shreveport, phone 868-6616. **ALEXANDRIA, BATON ROUGE, BOSSIER CITY, MONROE, NEW ORLEANS, RUSTON, SHREVEPORT.**

MASSACHUSETTS: Hugh P. Simms, Brooks Road, RFD 2, Lincoln. **BOSTON, FLORENCE, LEXINGTON, NORTHAMPTON, PLYMOUTH, RANDOLPH, SAUGUS, TAUNTON, WESTFIELD, WORCESTER.**

MICHIGAN: W. M. Whitney, Jr., 708 Francis Palms Bldg., 2111 Woodward Avenue, Detroit, phone 567-5600. **BATTLE CREEK, DETROIT, FARMINGTON, GRAND RAPIDS, HUNTINGTON WOODS, KALAMAZOO, LANSING, MOUNT CLEMENS, OAK PARK.**

MINNESOTA: Victor Vacanti, 8941 10th Avenue South, Minneapolis, phone TU. 8-4240. **DULUTH, MINNEAPOLIS, ST. PAUL.**

MISSISSIPPI: M. E. Castleman, 5207 Washington Avenue, Gulfport, phone 863-6526. **BILOXI.**

MISSOURI: O. Earl Wilson, 10651 Roanna Court, St. Louis, phone VI. 3-1277. **KANSAS CITY, ST. ANN, ST. LOUIS.**

NEBRASKA: Stanley Mayper, P. O. Box 14252, W. Omaha Station, Omaha, phone 333-8537. **HASTINGS, LINCOLN, OMAHA.**

NEVADA: Barney Rawlings, 2617 Mason Avenue, Las Vegas, phone 735-5111. **LAS VEGAS.**

NEW HAMPSHIRE: Stuart N. Shaines, Northfield—Beech Road, Dover. **PEASE AFB.**

NEW JERSEY: Salvatore Capriglione, 83 Vesey Street, Newark, phone MA. 2-6653. **ATLANTIC CITY, BELLEVILLE, BURLINGTON, CHATHAM, FORT MONMOUTH, JERSEY CITY, MCGUIRE AFB, NEWARK, PATERSON, TRENTON, WALLINGTON.**

NEW MEXICO: William C. Bacon, Rt. 2, Box 162A, Roswell, phone 623-5488. **ALAMAGORDO, ALBUQUERQUE, CLOVIS, ROSWELL.**

NEW YORK: Charles Alexander, 104-07 Union Turnpike, Forest Hills, phone 594-9074. **BINGHAMTON, BUFFALO, ELMIRA, FOREST HILLS, FREEPORT, ITHACA, KEW GARDENS, LAKEWOOD, NEWBURGH, NEW YORK CITY, PATCHOGUE, PLATTSBURGH, ROCHESTER, ROME, STATEN ISLAND, SUNNYSIDE, SYRACUSE, WHITE PLAINS.**

NORTH CAROLINA: Eldon P. Allen, Rt. 1, Box 277, Knightdale, phone 829-3834. **RALEIGH.**

OHIO: George A. Gardner, 620 Rockhill Avenue, Dayton, phone AX. 9-3956. **AKRON, CANTON, CINCINNATI, CLEVELAND, COLUMBUS, DAYTON.**

OKLAHOMA: Lawrence E. Leffler, 2208 N. Key Blvd., Midwest City, phone 732-9843. **ALTUS, ENID, OKLAHOMA CITY, TULSA.**

OREGON: Clayton Gross, 804 Portland Medical Center, Portland, phone 233-0875. **CORVALLIS, PORTLAND.**

PENNSYLVANIA: George W. Crosby, 1905 West 34th Street, Erie, phone 866-3955. **ALLENTOWN, AMBRIDGE, ERIE, HARRISBURG, LEWISTOWN, PHILADELPHIA, PITTSBURGH, WAYNE, YORK.**

RHODE ISLAND: William V. Dube, T. F. Green Airport, Warwick, phone 781-8254. **WARWICK.**

SOUTH CAROLINA: Franklin S. Henley, Rt. 2, Box 83, Charleston Heights, phone 552-2845. **CHARLESTON.**

SOUTH DAKOTA: John S. Davies, 392 S. Lake Drive, Watertown. **BROOKINGS, RAPID CITY, SIOUX FALLS, WATERTOWN.**

TENNESSEE: Howard F. Butler, 6224 Hillsboro Road, Nashville, phone 292-7381. **MEMPHIS, NASHVILLE.**

TEXAS: Sam E. Keith, Jr., P. O. Box 5068, Fort Worth, phone PErshing 8-0321. **ABILENE, AMARILLO, AUSTIN, BIG SPRING, CORPUS CHRISTI, DALLAS, DEL RIO, EL PASO, FORT WORTH, HOUSTON, LUBBOCK, SAN ANGELO, SAN ANTONIO, SHERMAN, WACO, WICHITA FALLS.**

UTAH: Nolan Manfull, P. O. Box 774, Hill AFB, phone 487-0731. **BOUNTIFUL, BRIGHAM CITY, CLEARFIELD, HILL AFB, OGDEN, SALT LAKE CITY, SPRINGVILLE.**

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VIRGINIA: A. A. West, P. O. Box 1038, Newport News, phone 596-6333. **ARLINGTON, DANVILLE, HAMPTON, LYNCHBURG, NORFOLK, ROANOKE, STAUNTON.**

WASHINGTON: Marvin O. Christman, P. O. Box 6100, Seattle, phone CH. 4-8650. **SEATTLE, SPOKANE, TACOMA.**

WISCONSIN: Kenneth E. Kuenn, 3239 North 81st Street, Wauwatosa, phone 871-3766. **MADISON, MILWAUKEE.**

WYOMING: Merle W. Allen, Veterans Administration Center, Cheyenne, phone 634-1581, Ext. 232. **CHEYENNE.**



THE IRON GATE CHAPTER

for consistent and extremely effective programming in support of the AFA mission, most recently exemplified in the fifth national "Air Force Salute."

On Wednesday evening, February 21, AFA's Iron Gate Chapter conducted its fifth national fund-raising "Air Force Salute" in the Grand Ballroom of the New York Hilton Hotel. More than 1,000 leading Air Force, New York City, government, and industrial dignitaries attended the banquet and ball, which has become one of the top social events of New York.

Music was furnished by two well-known society dance orchestras, Meyer Davis and Lester Lanin, who provided continuous dancing from the serving of the first course for the banquet until 1:00 a.m.

General chairman for the Salute was James W. Austin, an Iron Gate Chapter member and Chairman of the Board of Northeast Airlines. Honorary cochairmen were C. R. Smith, an AFA permanent national director and new Secretary of Commerce; and James Stewart of Hollywood, one of AFA's founders and a former national director.

Master of ceremonies for the evening's formal program was news columnist Bob Considine. George Jessel, unofficial "Toastmaster General of the United States," provided entertainment.

Pan American World Airways contributed an around-the-world trip for two, while Eastern Airlines and Braniff International contributed trips to Mexico.

Following remarks by Air Force Secretary Harold Brown, Iron Gate Chapter President Ray Bell presented the Chapter's Bronze Eagle Trophy to the men and women of the Air Force serving in Southeast Asia. The trophy was accepted by the Air Force Chief of Staff, Gen. John P. McConnell, and by CMSgt. Raymond Milam, Jr., representing Seventh Air Force Commander Gen. William W. Momyer and all the Air Force men and women in Southeast Asia.

Net proceeds from the Salute will go to the Air Force Aid Society, the Air Force Village Foundation, the Air Force Enlisted Men's Foundation, and AFA's Aerospace Education Foundation.

• • •

The Utah State Organization, "AFA Unit of the Year" and recipient of the AFA President's Trophy at the National Convention in Atlanta, recently conducted its thirteenth annual Aerospace Symposium and Educational Seminar.

The program, cosponsored by AFA's Utah State Organization, Utah Small Business Administration, and the Utah State Board of Education, was held in cooperation with the Aerospace Education Foundation, aerospace industries, US Air Force, US Air Force Academy, Air University, Ogden Air Materiel Area, Defense Contract Administration Service, and the Utah Department of Employment Security.

Held in Salt Lake City's Hotel Utah, the three-day program, entitled "Design for the Future," devoted one day to industry, one day to education, and one day to the Air Force Academy.

Utah Governor Calvin L. Rampton delivered the keynote address at the opening of the Industrial Symposium. AFA's Rocky Mountain Regional Vice President Nathan Mazer moderated the session that included presentations by Lyle Stoner, General Purchasing Agent, Thiokol Chemical Corp.; William M. Pierce, Manager, Purchasing Division, Hercules, Inc.; and William Bruhn, Regional Director, Small Business Administration. The afternoon session was devoted to a very effective Management Workshop on bidding, financing, cost ac-



Air Force Chief of Staff, Gen. John P. McConnell, right, and SMSgt. Raymond Milam, Jr., left, accept the Iron Gate Chapter's Bronze Eagle Trophy from Chapter President Ray Bell, center, on behalf of the men and women of the Air Force serving in Southeast Asia. The presentation took place at the National Air Force Salute in New York City.



Prior to the opening ceremonies of the Utah State AFA's Annual Aerospace Symposium and Educational Seminar, from left, keynote speaker Governor Calvin L. Rampton, Maj. Gen. T. Alan Bennett, USAF (Ret.), former Commander of the Ogden Air Materiel Area; and Utah State AFA President Nolan Manfull enjoy an exchange of anecdotes.



Col. Robin Olds, famed Vietnam MIG-killer and presently assigned as Commandant of Cadets at the US Air Force Academy, displays a Texas-style hat presented to him following his talk to the Fort Worth, Tex., Chapter at the Ridglea Country Club in Fort Worth. Also shown are, from left, Sam E. Keith, Jr., Texas State AFA President; Malcolm Holloway, Fort Worth Chapter President; and James K. Johnson, who is the Fort Worth Chapter Vice President for Programs.

counting, quality control, and transportation and packaging.

Maj. Gen. Robert H. McCutcheon, Commander, Ogden Air Materiel Area (OOAMA), and the program's military host, was the luncheon speaker. Roy Gibson, news director of KCPX-TV in Salt Lake City, served as master of ceremonies.

The Education Seminar keynote address was delivered by Dr. Jay Campbell, Deputy Superintendent, Utah State Board of Education. Utah State AFA President Nolan Manfull served as moderator for the morning panel that included Dr. Richard Maxfield, Utah State Board of Education, and Daniel G. Lewis, consultant to General Learning Corp.

The afternoon session's keynoter, George Van Leeuwen, Deputy Director of Materiel Management, OOAMA, and chairman of the State AFA's Aerospace Education Council, also served as moderator. Presentations were made by Dr. Richard B. Weed, Director of Public Relations, Utah Department of Employment Security; and Paul Simmons, Management Engineering Division, OOAMA.

Art Kent, KUTV news manager, served as master of ceremonies at the Education Luncheon, which featured an address by Dr. Robert Reid, consultant for AFA's education affiliate, the Aerospace Education Foundation.

That evening, Dr. T. H. Bell, Superintendent of Public Instruction, Utah State Board of Education, conducted a well-attended and very effective Reaction Panel on "Education—Everyone's Responsibility."

The final day's program was devoted to briefing prospective Air Force

Academy candidates and their parents on preparation for the Academy, on the Academy program, and on careers in the Air Force.

The program opened with a presentation by the Air University Aerospace Presentations Team on the US space program. Gen. Thomas S. Moorman, Superintendent of the Air Force Academy, discussed the Cadet Advisory Service and its purpose. Other presentations were made by Air Force Academy Cadets Seth Jensen, Class of '68, and Jeff Robinson, Class of '70; and Maj. Robert Oaks, Air Officer Commanding, 23d Squadron, at the Academy. Also participating in the program were Col. Oliver R. Smith, Air Force Academy Liaison Officer Coordinator for Utah; Air Force Academy Liaison Officers Col. Paul Simmons and Lt. Col. Reece S. Robinson; and Utah State AFA Past President David Whitesides.

The prospective candidates and their parents were guests of the Utah AFA at a luncheon where they were privileged to hear a most inspiring message from General Moorman. Dick Nourse, news manager of KSL-TV in Salt Lake City, served as master of ceremonies. The Brigham Young University AFROTC male vocal group provided entertainment.

During the week, the Air University Aerospace Presentations Team, under the sponsorship of the Utah AFA, made presentations to students at eight high schools and two universities in the Salt Lake City area. Team members are Lt. Col. James Wall, leader; Lt. Col. E. M. Swindle; and Maj. R. P. Bockius.

(Continued on page 94)

Problem:



Solution:

Rather than follow intuition or precedent in designing combat communications systems, the Army requested C-E-I-R to design a computer simulation of combat ground operations. The major objective of the model that C-E-I-R produced was to evaluate various communications systems in a battle environment. The model can simulate engagements of up to two divisions — size forces up to 250 individual units.

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Professionally Administered by AFA!

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Age	Basic Coverage*	Extra Accidental Death Benefit
20-24	\$20,000	
25-29	20,000	
30-34	20,000	
35-39	20,000	
40-44	17,500	
45-49	13,500	
50-54	10,000	
55-59	10,000	
60-64	7,500	

*A flat sum of \$15,000 is paid for all deaths which are caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved. In this case, the accidental death benefit does not apply.

LOW PREMIUM SCHEDULE

\$10 per month gross premium (reduced by dividends each year since 1962) provides COMPLETE coverage.

Policyholders Have Shared in
Dividends for Six Consecutive
Years—Plus Increased Benefits

1961



Policy changed to permit policyholders to keep insurance at the low, group rate when leaving military service.

1962



20% dividend paid to all policyholders.

1963



25% dividend paid to all policyholders.

Coverage extended to include AF Ready Reserve and Air National Guard.

1964



20% dividend paid to all policyholders.

Accidental death benefit increased to \$12,500. Coverage increased for flying personnel at no increase in premium.

1965



9% dividend paid to all policyholders, a decrease reflecting AFA's decision not to limit coverage in combat zones.

1966



10% dividend paid to all policyholders. Coverage continues to insure policyholders in combat zones with no restrictions.

1967



8% dividend paid to all policyholders. Coverage continues to insure policyholders in combat zones with no restrictions.

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WAR
VIETNAM

GROUP LIFE INSURANCE.... ..Everywhere, All The Time

NO WAR CLAUSE! NO HAZARDOUS DUTY RESTRICTION!

There is no war clause, combat-zone waiting period, other hazardous duty restriction or geographical limitation on AFA Military Group Life Insurance coverage. It is AFA's policy to continue to provide the broadest possible protection to all of our member-policyholders, including those in combat zones. We believe we can best fulfill our mission of service to the Air Force and to members in this way.

\$12,500 ACCIDENTAL DEATH BENEFIT

An additional benefit of \$12,500 is paid for accidental deaths—even those caused by aviation accidents—except when the insured is serving as pilot or crew member of the aircraft involved.

EXCLUSIONS—FOR YOUR PROTECTION

In order to provide maximum coverage at minimum cost for all participants, there are a few exclusions which apply to your coverage. They are:

Death benefits for suicide or death from injuries intentionally self-inflicted while sane or insane shall not be effective until your policy has been in force for twelve months.

The Accident Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity or poisoning or asphyxiation from carbon monoxide, or (4) During any period while the policy is in force under the waiver of premium provision of the master policy, or (5) From an aviation accident, military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved.

OTHER FACTS ABOUT YOUR POLICY

All certificates are dated and take effect on the last day of the month in which your application for coverage is postmarked. Coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the Insurance Regulations of the District of Columbia.

The insurance will be provided under the group insurance policy issued by United Benefit Life Insurance Company to the Air Force Association. However, National Guard and Reserve members who are permanent residents of Ohio, Texas, Wisconsin, and New Jersey, will not be covered under the group policy, but will be eligible for individual policies providing somewhat similar benefits.

EQUAL COVERAGE—AT THE SAME LOW PREMIUM—FOR FLYING AND NON-FLYING PERSONNEL

All policyholders are insured for the same basic amounts, at the same low premium, whether or not they are on flying status. This eliminates the penalty of lower coverage for the man on flying status whose death is caused (as most are) by illness or ordinary accident. There is one exception* to this provision which is clearly stated below the benefit table on the opposite page.

PROFESSIONALLY ADMINISTERED

Military Group Life Insurance is administered by professionally trained insurance personnel within the Air Force Association. This provides efficient, thorough service at the lowest possible cost.

OTHER BENEFITS

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RETAINED AFTER
LEAVING ACTIVE
DUTY TO AGE 65.**

**GUARANTEED CON-
VERSION TO PERM-
ANENT INSURANCE**

**WAIVER OF PREMIUM
FOR DISABILITY**

**FULL CHOICE OF
SETTLEMENT
OPTIONS**

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Premiums may be paid direct to AFA in quarterly (\$30), semiannual (\$60), or annual (\$120) installments. AFA will send statements 30 days before each premium due date. Active-duty personnel may also pay monthly by government allotment (\$10), thereby having their premiums paid automatically and preventing any possible lapse in coverage.

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☐ I am an AFA member.

I understand the conditions governing AFA's Group Life Insurance Plan. I certify that I am eligible for this insurance under the category indicated, that I am currently in good health, and that I have successfully passed, within the past two year period, the last physical examination required by my branch of service. (Reserve and Guard personnel not on extended active duty must include with this application a copy of their most recently completed SF88.)

Signature of Applicant

Date

Application must be accompanied by check or money order. Send remittance to:

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Please indicate below the form of payment you elect:

☐ Monthly government allotment (I enclose \$20 to cover the period necessary for my allotment to be processed.)

☐ Quarterly (I enclose \$30)

☐ Semi-annually (I enclose \$60)

☐ Annually (I enclose \$120)

Category of eligibility (please check appropriate box)

☐ Active Duty, Air Force

☐ Ready Reserve, Air Force

☐ Air National Guard

Mount Clemens, Mich., Chapter President Marjorie O. Hunt presents AFA Chapter Citations to, from right, Capt. George Kimmell, Lt. Col. Donald Zedler, and Capt. Charles Bailey. The program's featured speaker, Lt. Col. Stephen Harrison, left, and the Military Host, Col. Kenneth E. Rosebush, Commander, 1st Fighter Wing, at Selfridge AFB, Mich., seem to be enjoying the presentation (see story).



Distinguished guests included Maj. Gen. T. Alan Bennett, USAF (Ret.), former Commander of OOAMA and a staunch supporter of AFA; Jack Alston, Commander, Hill AFB; Lt. Col. Kenneth R. Bland, Commander, Salt Lake City District, Defense Contract Administration Service; Dick Nelson, principal, Borah High School, Boise, Idaho; and Michael Nisos, Managing Director, Aerospace Education Foundation, Washington, D. C.

Out-of-state AFA leaders who attended included AFA National Directors James Trail and Dale Hendry from Boise, Idaho; Idaho State AFA President Charles F. Barnes; Colorado State President, Gen. Robert Lee, USAF (Ret.); Colorado State AFA Secretary S. Parks Deming; Cheyenne, Wyo., Chapter President Howard Hembry; and Boise Valley, Idaho, Chapter President Donald Riley.

General Chairman Nolan Manfull was ably assisted by an executive committee comprised of Walter Ullrich, Utah State Board of Vocational Education; William G. Bruhn and Wilford Thornock, Small Business Administration; Richard B. Weed, Utah Department of Employment Security; William M. Pierce, Hercules, Inc.; Lyle Stoner; Nathan H. Mazer; David H. Whitesides; and Jack C. Price, Utah State AFA Vice President.

Other AFAers who contributed invaluable to the success of the program included Robert Walker, Wayne Gamble, Verl Williams, Ray Dunn, Lee Gilbert, Craig Pack, Lynn Summers, Robert Russell, Claudia Sabodski, Donald and Doris Edvalson, Michael Manfull, Earl Nye. Also Frank Perry, Eddie Soliz, Dale Johnston, Lois Bowden, Rae Ann Burgess, Charles Kinney, Robert Bowman, Monty Groosbeck, George Lowe,

Harry Cleveland, Raymond Cassell, Dewey Wright, Glen Jensen, and Janice Johansen.

AFA's Mount Clemens, Mich., Chapter recently sponsored its second annual Aerospace Education Seminar. The Chapter's first program of this type, in 1967, contributed to selection of the Chapter to receive the AFA Exceptional Service Plaque for Aerospace Education at last month's AFA National Convention in Atlanta.

Held in the Selfridge AFB Theater, the one-day program opened with a band concert by the Lake Shore Pep Band, John Allen, Director.

After welcoming remarks from Chapter President Marjorie O. Hunt, and the Military Host, Col. Kenneth E. Rosebush, Commander, 1st Fighter Wing, Selfridge AFB, the keynote address, "Prophesying for the Future," was delivered by William Leavitt,

Senior Editor (Science and Education), AIR FORCE/SPACE DIGEST.

The morning session concluded with a presentation on the Air Training Command by Maj. David C. Frankenburg, Chief, and Capt. James D. Whitford, Command Briefing Officer, both from the Presentation Division, ATC, Randolph AFB, Tex.

The first presentation of the afternoon, "Space and the Newest Frontier," was made by Calvin W. Weiss, Chief, Educational Services Officer, Public Affairs Division, NASA, Lewis Research Center, Cleveland, Ohio.

The next presentation, entitled "Doom," was made by John V. Sorenson, Assistant Deputy Chief of Staff for Aerospace Education, National Headquarters, Civil Air Patrol, Maxwell AFB, Ala.

A Southeast Asia Panel presentation concluded the afternoon program. Mr. Leavitt served as moderator;



Dr. Clayton Gross, right, President of AFA's Oregon State Organization, admires the Continental Air Command's Certificate of Recognition presented to Lt. Col. Leverett Richards, AFRes, left, Aviation Editor of the Portland *Oregonian*, on the eve of his retirement from the Reserve, at a Portland Chapter meeting.

panel members were Lt. Col. Hugh McManus, Commander, 1st USAF Hospital, Selfridge AFB; Lt. Col. Donald Zedler, Director of Current Operations, Deputy Chief of Staff (Operations), and Capt. Charles Bailey, Information Officer—all from Hq. 5th Reserve Region, Continental Air Command; and Capt. George Kimmell, Commander, 2031st Communications Squadron, Selfridge AFB.

The evening banquet was held in the Selfridge AFB Officers' Open Mess. Lt. Col. Stephen Harrison, Industrial College of the Armed Forces, a former forward air controller (FAC), was the featured speaker. Dave Woodling of radio station WBRB served as master of ceremonies.

President Hunt and her committee members—Ed Jerawski, Zeke Vogt, Elvira Hauslein, Dorothy Hyne, Marion McCurdy, Frank Munt, and Ann Gabler—are to be congratulated on another outstanding and extremely effective program in support of AFA's mission.

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The Alaska State AFA Organization's First Annual Convention was recently held in Anchorage. AFA National Director Arthur F. Kelly, senior vice president of Western Airlines and a former AFA national president, was the featured speaker at the Convention banquet.

The eight airmen vying for the Alaskan Air Command's 1967 Outstanding Airman of the Year title were special guests of honor at the Convention. During the banquet, it was announced that MSgt. Patrick L. Rabun had been selected for this honor and would be a guest of the Air Force Association at its National Convention in Atlanta.

The Convention program included a presentation by the Alaskan Air Command on search and rescue activities in Alaska, and a presentation by six Vietnam returnees on their experiences in the air war there.

Robert C. Reeve, president of Reeve Aleutian Airways, Inc., was elected president of the Alaska State AFA Organization.

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CROSS COUNTRY . . . Col. Daniel "Chappie" James, Jr., Vice Commander, 33d Tactical Fighter Wing, Eglin AFB, Fla., was the featured speaker at a recent meeting of AFA's Eglin Chapter. Colonel James, recipient of an AFA Citation of Honor at the National Convention in Atlanta, spoke on America's need for patriotism. . . . Lt. Gen. Ira C. Eaker, USAF (Ret.), was the guest speaker at a re-



Award recipients Robert S. Stevenson, left, Chairman of Allis-Chalmers, and Maj. Gen. Woodrow P. Swancutt, right, Vice Commander, 2d Air Force, Barksdale AFB, La., display their awards to Brig. Gen. Joseph J. Lingle, AFRes, an AFA National Director, second from left; and Maj. Gen. James B. Knapp, second from right, Chief of Staff, Strategic Air Command, Offutt AFB, Neb. The award to Allis-Chalmers was from the Secretary of the Air Force, in recognition of the company's support of the Air Reserve Forces. General Swancutt received the Billy Mitchell Memorial Award. Both awards were presented at the Billy Mitchell, Wis., Chapter's recent Billy Mitchell Memorial Award Dinner. General Knapp was the keynote speaker at the annual award dinner.

cent meeting of the Florida West Coast Chapter. General Eaker, who recently returned from a lengthy visit to battle areas and combat air bases in Vietnam and Thailand, spoke on "War in Vietnam." . . . Congratulations to Burlington, Vt., Chapter member Dr. Lauritz S. Larsen on his recent appointment as the Vermont Com-

missioner of Highways. . . . Coming events: Weber Valley, Utah, Air Show, July 4. . . . Beaver Valley Chapter, Pa., Air Show, July 13-14. . . . New York State AFA Convention, Rome, August 24. . . . AFA's Fall Meeting and Aerospace Development Briefings, Washington, D. C., September 16-18.

—DON STEELE

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by military and industry leaders.

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ANNUAL BANQUET
Wednesday

INDUSTRIAL LUNCHEON
Thursday

All activities are in compliance with D.O.D. directive. Complimentary military invitations are sponsored by AFCEA only.



Bob Stevens' "There I was..."

As we've noted in this space several times before, nothing—well, hardly anything—seemed to work out in the crisp and correct manner outlined in the book. It made you wonder if maybe you'd have been better off in the Navy . . .



P.S. IT'S HAPPENED TO MANY A GOOD MAN—



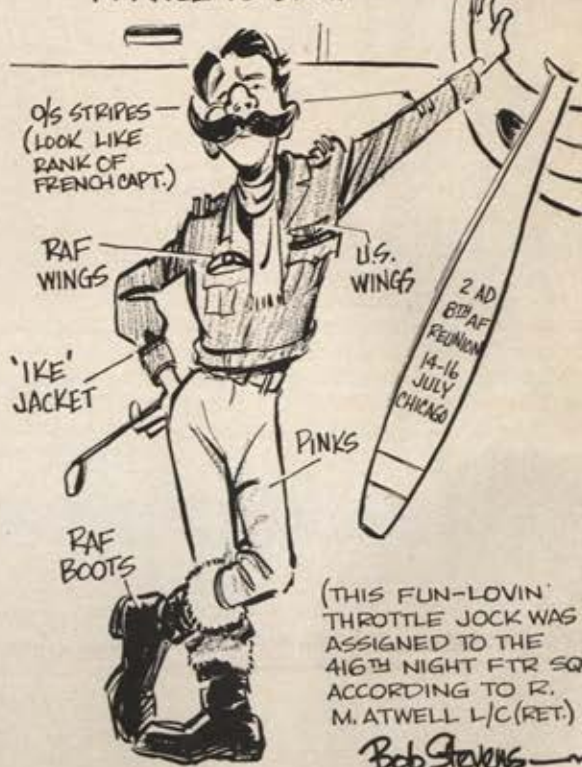
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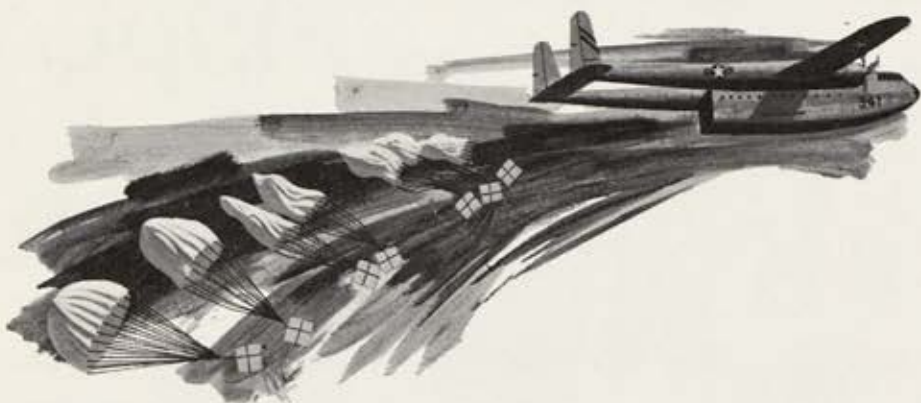


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Bob Stevens

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AIR RESCUE: A transponder located in an airman's survival pack makes it possible for search aircraft to accurately fix his position at the maximum radar range.



INSTRUMENT LANDING: A transponder set up off the approach end of the runway at small temporary airfields provides radar equipped aircraft with a tactical instrument landing capability.



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