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AIR FORCE

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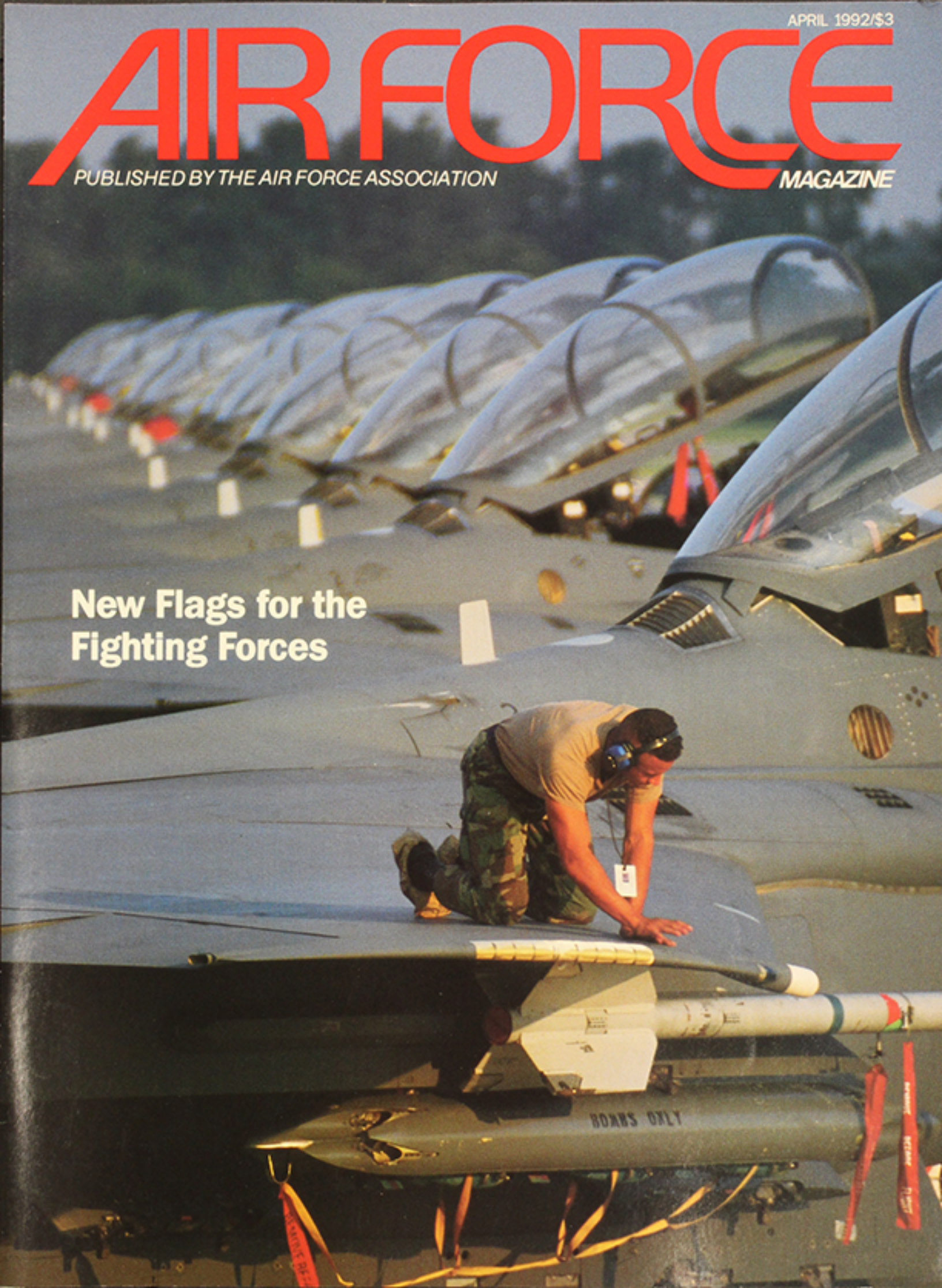
MAGAZINE



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April 1992, Vol. 75, No. 4

AIR FORCE MAGAZINE

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About the cover: A1C Marcel Semien is crew chief for this F-15E of the 355th Fighter Squadron, 4th Wing (note the absence of both "Tactical" and "Fighter"), Seymour Johnson AFB, N. C. See p. 28 for details on the Air Force's new lineup. Photo © Hans Halberstadt/Arms Communications.

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Editorial

By John T. Correll, Editor in Chief

Pain and Regeneration

THESE are painful times for many men and women of the US Air Force. They are absorbing change on a scale without precedent since the Air Force became a separate service in 1947.

Radical manpower reductions are a part of it. By 1993, the Air Force will have twenty-six percent fewer people than it did ten years ago. For some who served well during the Gulf War of 1991, the thanks of a grateful nation will include the premature termination of their military careers.

Concurrently, the force is being reshaped by organizational changes at all levels. Five of the largest major commands in the Air Force lower their flags for the last time this summer, giving way to new commands with unfamiliar names and revised missions.

The bedrock unit of the force—the wing—will be rebuilt along composite lines. Bases are closing at home and abroad. As force structure shrinks, some wings and squadrons will disappear. Some, with famous names and lineage, transfer their designations to units that remain. The 23d Wing, now forming at Pope AFB, N. C., for example, will carry on the heritage of the Flying Tigers.

"We are not paring down the Air Force," Secretary Donald B. Rice told Congress in February. "We are building a new, smaller Air Force from the ground up."

Some aspects of the restructuring, such as getting generals out of the headquarters paper mills and into the field with the troops, will be applauded by all.

It is difficult, especially for those affected directly, to take a long view of other changes now occurring. It is a hard thing to see the force cut by nearly a third—which it will be when the reductions have run their course—and the deactivation of units that inspired strong loyalties and emotions.

Reduction of the armed forces was inevitable. Even before the fall of the Soviet Union, the politicians were determined to cut defense. They were unwilling to fund it at the level of the 1980s, when around six percent of GNP was allocated.

The Soviet collapse gave the reduction a belated rationale. It also shifted the emphasis in US defense planning from globa conflict to regional conflict. The impending change in force structure was so sweeping that, as one Pentagon officer said, "you can't salami-slice it."

The restructuring of the Air Force, however, is not simply an adjustment to diminished budgets. Service leaders declare that changes were overdue in any case. The structure adopted forty-five years ago no longer represented the most logical and efficient organization of either forces or missions.

"We are not paring down the Air Force. We are building a new, smaller Air Force from the ground up."

The distinction between "strategic" and "tactical" airpower, always artificial, had become increasingly untenable. The old organizational arrangement still got the job done, but when the action heated up (the Gulf War of 1991 being the most recent example), it often took improvisation and workarounds to arrive at the right battle force configuration.

All of us will miss Strategic Air Command, Tactical Air Command, Military Airlift Command, Air Force Logistics Command, and Air Force Systems Command after they stand down in June and July.

One of the better perspectives on their passing, however, was offered by Gen. Russell E. Dougherty, former commander in chief of Strategic Air Command. His deep feeling for that organization will be doubted by none who know him.

"I do not think internal Air Force organizations are institutions in their own right," General Dougherty said. "Organizations must be designed to serve a purpose or address a need. I think the Air Force is the overarching institution, and how we organize ourselves internally depends on the circumstances and objectives of our nation."

The new combinations of Air Combat Command, Air Mobility Command, and Air Force Materiel Command reflect the evolution in circumstances and objectives. Furthermore, the new configuration of operational commands and wings is better attuned to the concept of "indivisible airpower," one of the main principles upon which the US Air Force was founded. World War II and every conflict since have demonstrated that airpower is most effective when employed as a unified instrument. The restructured force will be a closer match with that principle.

The changes need time to jell, and it will be surprising if at least a few adjustments to the plan do not develop, but the basic initiative and the spirit behind it look sound. It deserves a chance to work.

We endorse General Dougherty's admonition that Air Force people concentrate on the heritage and mission they all share and that they avoid, as he puts it, "playing Auburn and Alabama" with each other.

The Air Force has earned considerable credit for adapting to new realities and national security requirements. In doing so, it may have chosen regeneration over atrophy. The force goes on from here. ■

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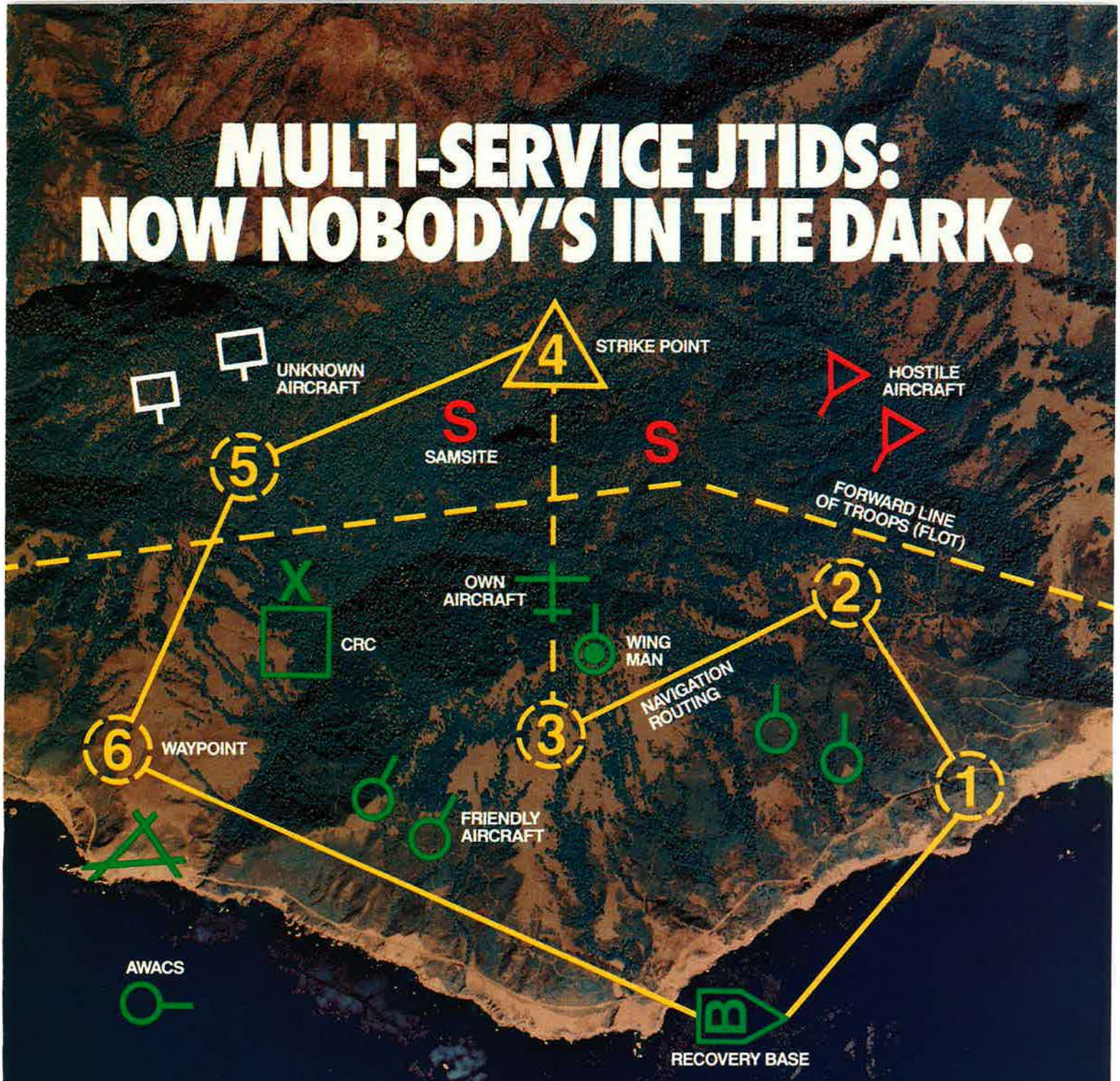

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Letters

Record Replies

Limited space prevents me from offering a comprehensive rebuttal to John T. Correll's predictable misrepresentation of my views on airpower in his February editorial, "Airpower, One Year Later." In writing and speaking on Operation Desert Storm, I have repeatedly declared the obvious: Airpower, broadly defined, was the predominant and determining instrument of Desert Storm's military success.

I have, however, distinguished between those air operations directed against Iraqi forces in the Kuwaiti theater of operations (KTO) and their logistical sustainability, which were an unqualified success, and the strategic bombardment operations conducted against "centers of gravity" targets in Iraq, which were not. Mr. Correll's assertion that the coalition's air effort aimed "to disable Saddam's military operation" (whatever that means) is misleading. With respect to strategic bombardment, coalition objectives were considerably more specific and ambitious. In its interim report on the war, the Defense Department told Congress that Iraq's three principal prewar strategic "centers of gravity" were "the command and control and leadership of the Saddam Hussein regime," Iraq's "weapons of mass destruction capability," and "the various elements of the Republican Guards."

Weighed against these objectives, which the White House and Pentagon reiterated throughout the war, the strategic bombardment effort was largely a bust, though it did demolish Iraq's economic infrastructure for no compelling military reason. A defiant Saddam and his regime remain in power; much of Iraq's chemical, biological, and nascent nuclear munitions capability escaped destruction; and the equivalent of at least four of Saddam's eight prewar Republican Guard divisions, including the four-brigade Baghdad Division (which coalition air forces never seriously attacked), emerged from the war relatively unscathed.

Nor is it clear that coalition air operations effectively severed Iraqi lines of command authority. Mr. Correll asserts that "by sunrise" of the air war's first day, "Saddam's ability to command and control his forces or mount a coherent military response had been destroyed." But a week after the air war began, Gen. Colin Powell stated that Saddam and his henchmen "are still able to command their forces. They have not lost control of their forces or of the country."

Mr. Correll further chides me for taking advantage of hindsight, implying that I believe the war's "outcome was wholly predictable, an easy victory against an inept enemy," though "this was not apparent in the autumn of 1990, when the expectation was for a long, difficult conflict and massive US casualties." As a professor of military history, I know that no war is wholly predictable. As a student of post-Vietnam American politics, I know that neither the Bush nor any other Administration in 1990 would have rushed into a war it expected to be long, difficult, and bloody. (Consider the White House's eagerness for a premature cease-fire and evacuation of Iraq.)

US planners had very good reasons to believe Desert Storm would be brief and easy, relative to past experience in Europe and east Asia. Iraq in 1990 was a country with a GNP equivalent to Portugal's, and the operational setting in the KTO was so favorable that Gen. Michael Dugan was prompted to conclude that if "there was ever a scenario where airpower could be effective, this was it." Lt. Gen. Charles Horner, who planned an air campaign lasting no more than about thirty days, obviously did not anticipate a long and bloody war. Nor did the Army's Gen. H. Norman Schwarzkopf, who saw fit to stockpile only sixty days' worth of ammunition and supplies for his ground offensive. Moreover, prewar predictions of massive US casualties came largely from opinion either enslaved by irrelevant memories of Vietnam or propelled by political or faulty analytical reasons into grossly inflating the Iraqi Army's actual fighting power.

Ironically, the most prescient prewar assessment of Iraq's ability to withstand its first encounter with a modern military opponent was made by the unfortunate General Dugan, who was wrongly cashiered for publicly speculating, among other things, that both Iraq's air force and its army were at best mediocre and would prove much easier marks for their US counterparts than it was politically correct to suggest at the time. General Dugan recognized the "world's fourth largest army" for what it was: a pathetic attempt to buy into military modernity simply by acquiring its outward material and organizational trappings.

Air Force historian Mark Clodfelter has correctly cautioned those wont to see in Desert Storm a long-overdue vindication of Giulio Douhet and Gen. "Billy" Mitchell. The "Gulf War offers no blueprint guaranteeing a successful application of airpower in the future," he writes, because of the extreme unlikelihood of ever again encountering the "combination of a fragmented, semi-industrialized, Third World enemy waging war with Soviet equipment in a desert environment and being led by an international pariah who personally made all key military decisions and relied on an intricate command-and-control network for their implementation."

Jeffrey Record
Arlington, Va.

Separate the Eggs

I was not aware that opinions like that of Dr. Jeffrey Record existed. "Airpower, One Year Later" has enlightened me. Those who would consider the Air Force an "adjunct to the classic forms of military power" must logically say, "So is the Navy." Eons ago, when wars began, armies set out

Do you have a comment about a current issue? Write to "Letters," AIR FORCE Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be concise, timely, and preferably typed. We cannot acknowledge receipt of letters. We reserve the right to condense letters as necessary. Unsigned letters are not acceptable. Photographs cannot be used or returned.—THE EDITORS

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Letters

to conquer. Upon reaching a body of water, they may have built small craft to cross it, thus incorporating a naval tactic into their advance. Would those who agree with Dr. Record consider the navy an adjunct to the army?

The Air Force is just the next logical and necessary progression of technology and international needs. As there were armies before navies and navies before air forces, there will be air forces before "space forces." Times have changed, world orders have evolved, and technology dictates that the US have an Air Force.

I do not know, nor could I effectively argue, the points dealing with incorporation of one service branch into another. In some aspects it sounds like a solid idea, but I do understand the logic and wisdom behind the old saying, "Don't put all your eggs in one basket."

TSgt. George E. Sullivan, USAF
Fort Meade, Md.

"Let's Stick Together"

As a naval officer and a politico-military and strategic planning specialist, I would like to make a few comments regarding "Airpower, One Year Later." Some of your statements are inaccurate and do the US Air Force, our other armed services, and our coalition partners a disservice.

You claim that the "Gulf War lasted for forty-three days, and except for the last 100 hours, nearly all of it was an air campaign." This statement is not true. The Gulf War began on August 2, 1990, when Iraq invaded Kuwait. To imply that it did not start until January 17, 1991, suggests that we started it, because we struck first on that day. The air campaign took place five and a half months into the war.

US forces were present in the region when Iraq invaded Kuwait—the Navy's Middle East Task Force was in the Persian Gulf. Unfortunately, these frigates and destroyers did not deter Saddam, given the depth of his desires, his mistaken perception that the world would not react to his barbarous act, and his misinterpretation of US interests and resolve.

The ships of the Middle East Task Force were quickly reinforced by aircraft carrier battle groups and other ships from the US Navy and many other nations. These forces conducted a successful seaborne interdiction campaign during the months it took to build up air and ground forces in the region. This interdiction campaign continued during the January–February air and ground campaign, and it continues today. The sanctions and interdiction campaign were, and continue to be, effective.

During the Gulf War, thirty-nine other crises occurred. The Navy–Marine Corps team handled many of these, most notably Operation Sharp Edge, the noncombatant evacuation of Liberia, and Operation Eastern Exit, the noncombatant evacuation of Somalia. In both of these, the Navy and Marine Corps were indeed the "force of choice," given the mission requirements. . . .

On January 17, 1991, "airpower" did strike Iraq, 168 days after the beginning of the Gulf War. This "airpower" was joint and combined. To say that it was seventy-nine percent Air Force gives short shrift to the contributions of the other services and members of the coalition. Navy Tomahawk cruise missiles and Navy, Marine Corps, Army, Coast Guard, and coalition aircraft, systems, and personnel contributed to the air campaign. They were an important part of the "parallel warfare" that made the campaign so effective. The "stealthy F-117s" were made much more "stealthy" by the contributions of other forces involved, conducting similar actions against similar targets and providing much needed assistance in such areas as electronic warfare and suppression of enemy air defenses. It was Army Patriots, not Air Force fighters, that countered Iraqi Scuds—another aspect of the "air campaign" you do not discuss.

Your statements, "Lest we mistake this for some noteworthy achievement by airpower" and "critics explain that the outcome was wholly predictable," are *non sequiturs.* Conditions in the region were markedly different in January 1991 from what they were in "autumn 1990, when the expectation was for a long, difficult conflict and massive US casualties." We did overestimate Iraqi capabilities, but we also thought that the defeat of Iraq in battle would rid the world of Saddam. It has not. Remember, the war was ended by a cease-fire, not a peace treaty. Neither the interdiction nor the air and ground campaigns ended the war, but their synergistic effect brought about an end to the "active" conflict. Airpower—joint, combined, manned, and unmanned—was decisive in the war, as were the ground and interdiction operations.

Yes, "the Persian Gulf War was a convincing answer for anyone still harboring an honest doubt." Your editorial suggests to me that it is mostly self-doubt. The other services have always understood the importance of airpower; that is why they all have proud aviation histories and strong air arms. They know what airpower can do.

The Air Force did not do it alone in the Gulf War. It was a conflict in which all the services played their parts well—and much of it in the air. Let us not cheapen the sweet smell of success with the cheap perfume of interservice rivalry. To start a fistfight when we are all bleeding is pointless—let's stick together and make sure our government and people realize what we all bring to the table.

Cmdr. James A. Hazlett, USN
Fairfax, Va.

All Ears

As a former RC-135S Cobra Ball raven, I thoroughly enjoyed "Ears of the Storm" *[February 1992, p. 38].* The RC-135 crews and their aircraft have been shrouded in secrecy for so long that they never receive the recognition they are due.

Theoretically, what I did never really happened—on paper anyway. For that matter, if I mention to anyone, Air Force or civilian, that I was an RC-135S raven, they react with a blank stare. Very few people have ever heard of the airframe.

The efforts of the "RC" maintenance crews and aircrews are nothing short of heroic. Had the RC-135s not participated in Desert Storm, the course of events could have been drastically different. What people do not realize is that these heroics have been going on for decades prior to Desert Storm, and on a routine basis.

Speaking of heroes, the aircraft maintenance technicians deserve kudos. None of the "RC" missions could be accomplished without them. They brave unbelievably poor weather and work insane hours to generate the safest aircraft possible. The RC-135 fleet does not comprise new airframes, which makes the maintenance effort even more of a challenge.

I am proud to have been a raven and a part of the RC-135S Cobra Ball program, and I am proud of the aircrews who flew those arduous missions over the sand—they're simply the best! I am glad to see that they are getting some recognition.

Capt. Stuart D. Fisher, USAF
La Junta, Colo.

As an enlisted RC-135 aircrew member who flew both Proven Force and Desert Storm combat missions during the Persian Gulf War, I read "Ears of the Storm" with interest.

Robert S. Hopkins III refers to the backend reconnaissance crew as "ravens and other US personnel." Unfortunately, Mr. Hopkins forgot to mention one small detail in his article. While ravens are officers, these "other" US personnel are enlisted—two-thirds of the crew on an RC-135 mission. These enlisted aircrew members, who ride in the back of the plane and collect intelligence, come from Air Force Intelligence Command (formerly, Electronic Security Command) and contribute more than their fair share to the missions. While the missions of the RC-135 are highly classified, I do not think national security would have been compromised by mentioning the existence, not to mention the contributions, of the enlisted aircrew members. . . .

MSgt. Stan Corbin, USAF
Goodfellow AFB, Tex.

I have rarely enjoyed an article as much as I enjoyed "Ears of the Storm." My chest swelled as I read of the valuable contributions of the current generation of reconnaissance crews. I boastfully claim a special kinship with them, especially the "backenders."

I was privileged to have been one of the "mission personnel" from the old USAF Security Service—ESC's predecessor—that flew the RC-135 and RC-130 platforms of the 1960s and early 1970s.

Thanks to Robert S. Hopkins III for his words, and a smart salute and proud thumbs-up to all—especially those of the Persian Gulf War and those currently on station, who have ever participated in those missions made up of a "mix of boring flying and moments of confusion, excitement, and concern."

Forrest R. "Froggy" Graham
Salina, Okla.

Recruiting Irony

A year ago the members of the military were the darlings of our nation, Mr. Bush's fair-haired people. They could do no wrong, could have anything they desired, and had the world on a string.

Now, in less than a year's time since Desert Storm, their lives are in a state of flux *["Drawdown and Pain," January 1992, p. 38].* The very people so revered by one and all, especially the President, are slowly but subtly being pressured into career changes—outside the military.

The drawdown, the cutbacks, and the consolidation of forces are drastically minimizing the number of "career" positions in the military. Many thousands (and their families) are being uprooted, unable to pursue those dreams of military careers.

Tens of thousands of efficient, well trained, battle-tested, extremely patriotic personnel, who, until recently, had planned on, dreamed of, and worked toward long military careers have seen those dreams vaporized.

One of the ironies of the drawdown is the military services' pouring of hundreds of thousands, even millions, of tax dollars into the media to entice high school and college students to seek military careers.

Why are huge sums being wasted to lure woefully inexperienced young people to replace expensively trained troops who are being forced out of the service—after being recruited to "lifetime military careers"?

We as a nation asked these dedicated troops to serve us—and they did so, extremely well, willingly, when we needed them. Where are we now that they need us? Discard the weapons of war, yes. The cream of our military? Never.

Lt. Col. Andy Kelly, USAF (Ret.)
Spokane, Wash.

The Need for CAS

In a letter in the January 1992 issue, Andrew Miller speaks of shortcomings of the Automatic Target Handoff System. He may be correct. However, the Army weapons he cites may not be available or may not be available in time. Also, it is possible they may not be deployable.

[If all the weapons Mr. Miller cites were available], the US Army would not need close air support. However, I doubt it.

Prior to US involvement in World War II, writers to *The Infantry Journal* and other publications speculated endlessly about the necessity for close air support. They were wrong. George Patton was right. Billy Mitchell and "Hap" Arnold were right.

From my experience, the main need is for common training, a common "language," and centralized control, a la Desert Storm.

Capt. John A. Hutchison, USAF (Ret.)
Cleveland Heights, Ohio

Identifying Frogfoot

I very much enjoyed Hans Halberstadt's photo essay on "The Changing Face of Soviet Airpower" *[January 1992, p. 30].* However, I must point out that the unidentified aircraft depicted on p. 37 below Col. Alexander Kutuzov of the "Swifts" MiG-29 Fulcrum demonstration team is definitely not a Fulcrum. It is an Su-25 Frogfoot ground-attack aircraft with a 57-mm rocket pod suspended under its wing.

The Frogfoot is not an aerial demonstration team aircraft and certainly would be a nightmare jet for an air-to-air fighter jock like Kutuzov.

Capt. Peter D. Read, USAF
Bergstrom AFB, Tex.

Capitol Hill

By Brian Green, Congressional Editor

The Budget Debate

Most want to cut it more—but maybe not a lot more this year.

A SOLID consensus is developing on Capitol Hill that the defense budget will be reduced over the next several years by a total substantially larger than the $63.8 billion proposed by President Bush.

Senate Majority Leader George Mitchell (D-Me.), Chairman of the House Ways and Means Committee Dan Rostenkowski (D-Ill.), and Chairman of the House Armed Services Committee (HASC) Les Aspin (D-Wis.), among others, are focusing on reductions between Fiscal Years 1993 and 1997 of around $100 billion.

The most detailed set of alternatives to the Administration's defense budget was laid out by Representative Aspin. He examined four budget options, with savings ranging from $15 billion to $231 billion over five years. His preferred alternative would generate $91 billion in savings from FY 1993 to FY 1997. About $7 billion of that would come from the FY 1993 budget now under consideration.

Representative Aspin believes that after these cuts, US military forces would be able to handle simultaneously a Gulf War equivalent, a Korean or other regional conflict, a substantial humanitarian relief effort, and a contingency similar to the Panama invasion. Nevertheless, his preferred alternative would entail deep force reductions. Active-duty strength would fall from 1.6 million envisioned in the Bush proposal to 1.4 million. Active-duty tactical fighter wings would fall from fifteen to ten, Army divisions from twelve to nine, and Navy ships from 450 to 340.

Underpinning the current congressional debate is the dramatic shift in the nature of the threat. The Pentagon has attempted to shape its future force on the basis of possible threats, but this effort was received coldly on Capitol Hill. Sen. Ted Kennedy (D-Mass.) charged at a recent hearing that the budget reflects "business as usual" at the Pentagon because spending would be roughly equivalent to levels in the early 1960s and late 1970s when the US faced a powerful Soviet adversary.

Representative Aspin recently provided an alternative force calculus to judge US force requirements, based on the strength of likely adversaries measured in "Iraq equivalents."

For many in Congress concerned with the bottom line, however, these considerations are too esoteric. Typical of these lawmakers is House Budget Committee Chairman Rep. Leon Panetta (D-Calif.), who argues that the real enemy is a weak economy. "I think the most dangerous threat to our national security right now," he says, "is [the] very heavy debt that we confront in this country." According to Rep. Frank Guarini (D–N. J.), who serves on the Budget and Ways and Means Committees, "Our economic security [will be] our national security in great part." Many who share these concerns want to devote any "peace dividend" from defense reductions to domestic programs.

Critics of the Bush budget also contend that US allies do not bear an appropriate share of the defense burden. The level of support of US forces in both Japan and Europe was criticized in Senate and House hearings.

Some notes of caution are being sounded as well. Secretary of Defense Dick Cheney and Chairman of the Joint Chiefs of Staff Gen. Colin L. Powell have consistently warned in their testimony that reductions beyond those offered in the Administration proposal would hurt morale, readiness, and modernization and, as a result, impair the ability of the military to do its job.

A number of Congressmen, mostly Republicans, have argued that the defense drawdown is proceeding too quickly and cuts too deeply. A more widely held concern in Congress, however, is that big reductions in the defense budget could hurt the economy in the short run, and reluctance to impose deep cuts in FY 1993 may be increasing. Chairman of the Senate Armed Services Committee Sen. Sam Nunn (D-Ga.) contended that "people who are just pulling numbers out of the air for defense don't realize in many cases the kind of human hardship they're talking about. We're talking about two million jobs here." In his view, any peace dividend in the short term will be largely offset by the cost of absorbing displaced military members and defense workers.

Concern also extends to the impact of the cuts on the US industrial base. Some in Congress are wondering how to maintain the industrial capacity to reconstitute high quality forces, should that become necessary. The Administration prototyping plan *[see "Capitol Hill," March 1992, p. 11]* has gotten a tepid reception in testimony from industry representatives.

Representative Aspin has also proposed a plan to maintain a defense industrial base. It is built around selective upgrading of current forces; selective low-rate procurement to sustain critical defense industries; prototyping that would include development of manufacturing technologies as well as operational testing; and "silver bullet" procurement of such weapons as the F-117 Stealth fighter—and potentially the F-22 fighter—that could revolutionize some aspects of combat.

Rep. Dave McCurdy (D-Okla.), chairman of a HASC panel on the defense industrial base, recommends increasing R&D funds for critical technologies, "flexible manufacturing," and small business innovation. He also urges that at least twenty-five percent of the additional defense cuts be earmarked to "improve our economic competitiveness and . . . support growth in technology and manufacturing that can support defense needs if a threat emerges."

Consistent with his view that deep defense reductions are necessary, Senator Kennedy argues that the key industrial base issue is conversion. "We must redirect the talents of our defense scientists, engineers, and skilled workers to the major domestic needs of the nation, needs that have been irresponsibly neglected for the past decade, that are at the heart of our current and chronic economic troubles," he said. ■

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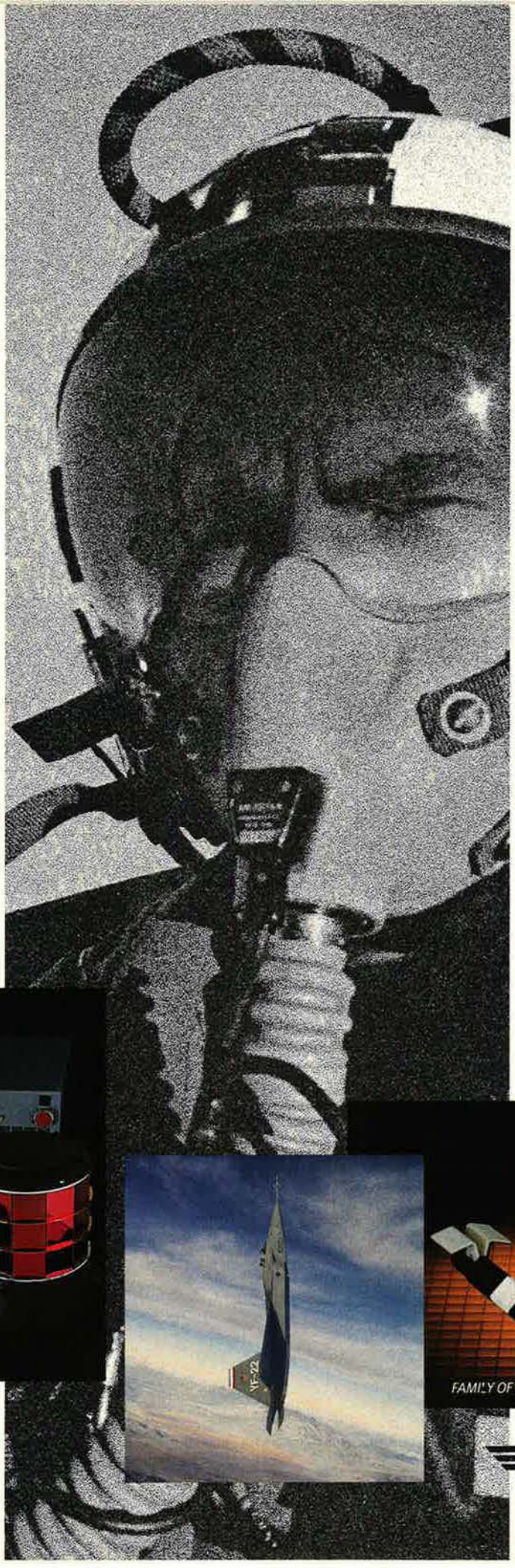
threat."**



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The Chart Page

By Tamar A. Mehuron, Associate Editor

The New Budget at a Glance

In January, President Bush presented to Congress a revised Fiscal Year 1993 budget. This revised budget calls for military spending cuts that go deeper than those proposed in the original Fiscal 1993 budget plan. The proposal for the entire national defense program (DoD activities and defense activities in the Department of Energy and other federal agencies) is $280.9 billion in budget authority and $285.9 in outlays for FY 1993. The **direct program** (DoD) activities only) is $267.6 billion in budget authority and $272.8 billion in outlays.

Pentagon spending, adjusted for inflation, will decline by seven percent between FY 1992 and FY 1993. The $267.6 billion budget for 1993 is nearly $20.2 billion below what Congress approved in FY 1992, once the effects of inflation are taken out. Defense spending reductions from 1985 to 1997 will total more than a third.

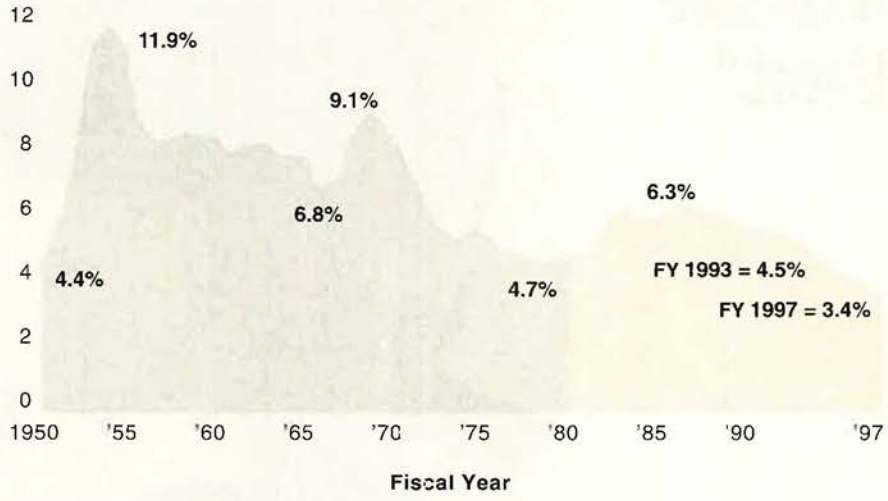
The budget for Fiscal Year 1997, adjusted for inflation, will produce about the same buying power as the budget in 1960 and will be close to the buying power resulting from the 1974–76 post-Vietnam cutbacks.

Funding levels can be expressed in several ways. Totals are most frequently stated as **budget authority** (the value of new obligations, including some to be met in later years, which the government is authorized to incur) or **outlays** (actual expenditures, some of which are funded by budget authority from previous years).

Another difference concerns the value of money. When funding is in **constant,** or **real, dollars**, the effect of inflation has been factored out to make direct comparisons between budget years possible. A specific year, often the present one, is chosen as a baseline for constant dollars. When funding is in **current** or **then-year dollars**, no adjustment for inflation has taken place. This is the actual amount of dollars that has been or is to be spent, budgeted, or forecast.

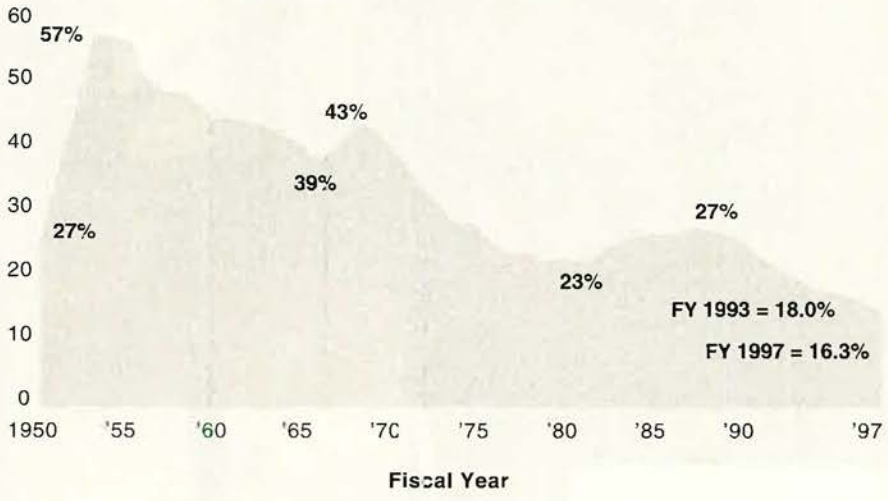
The following charts address only the direct program. In some instances, numbers on the charts in this section may not sum to totals shown because of rounding.

Defense Outlays as a Percentage of GNP



One way to measure the total burden on the economy of defense spending is to look at defense outlays as a percentage of the Gross National Product. By FY 1996, planned defense outlays as a share of GNP would be at their lowest level since 1939. During the "hollow force" period of the late 1970s, defense outlays consumed 4.7 percent of GNP.

Defense Outlays as a Percentage of Federal Outlays



Planned defense outlays represent a declining share of total federal outlays and by FY 1997 will be at their lowest level in fifty years.

Budget Topline

	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997
Budget authority (current $ billions)	277.5[b]	267.6	267.8	269.9	270.4	274.6
Budget authority (constant FY 1993 $ billions)	287.8[b]	267.6	258.0	250.4	241.8	237.5
Outlays (current $ billions)	282.6	272.8	267.4	267.9	270.9	273.6
Outlays (constant FY 1993 $ billions)	293.0	272.8	257.6	248.4	242.1	236.5

Excludes cost of Operations Desert Shield and Desert Storm; also excludes DoE and other related defense figures.

[b]Enacted in FY 1992 DoD Appropriations Act.The FY 1992 figure in this year's budget request ($270.9 billion) differs because it reflects proposed rescision of already appropriated funds and other factors.

How the Budget Dropped

(Budget authority in constant FY 1993 $ billions)

	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997
July 1990 budget, summit baseline	288.2	277.9	268.0	260.5	252.8	248.7
President's FY 1993 DoD budget	287.7	267.6	258.0	250.4	241.8	237.5
Decline in budget authority	.5	10.3	10.0	10.1	11.0	11.2
Percent real decline from prior year	—	7.0[a]	3.6	2.9	3.4	1.8
Cumulative percent real decline since 1985	—	28.8	31.3	33.3	35.6	36.7

The summit baseline is based on defense spending at FY 1991 levels, plus inflation.

[a]From enacted level excluding cost of Operations Desert Shield and Desert Storm.

Cutting the Pie: Who Gets What

(Budget authority in current $ billions)

	FY 1990	FY 1991	FY 1992	FY 1993
Military personnel	78.6	78.4	78.3	77.1
Operations & maintenance	87.0	85.3	86.4	84.5
Procurement	81.4	66.5	58.5	54.4
Research, development, test, and evaluation	36.5	36.1	36.9	38.8
Military construction	5.1	5.2	4.9	6.2
Family housing	3.1	3.3	3.6	4.0
Revolving funds transfer	—	—	—	2.0
All other	-0.7	1.2	2.3	0.6
Total	**291.0**	**276.0**	**270.9[a]**	**267.6**

Excludes cost of Operations Desert Shield and Desert Storm.

[a]Reflects $6.6 billion in rescisions from enacted $277.5 billion FY 1992 budget.

Service Shares

(Budget authority)

	FY 1990	FY 1991	FY 1992	FY 1993
Current dollars[a] (in $ billions)				
Air Force	92.4	83.6	80.2	83.9
Army	77.9	72.5	67.0	63.3
Navy	99.5	94.9	84.8	84.6
Defense Agencies, DoD-wide	21.2	25.0	38.9	35.9
Total	**291.0**	**276.0**	**270.9**[b]	**267.6**
Percentages				
Air Force	31.8	30.3	29.6	31.4
Army	26.8	26.3	24.7	23.7
Navy	34.2	34.4	31.3	31.6
Defense Agencies, DoD-wide	7.3	9.1	14.4	13.4

The Air Force's share of the budget turned up slightly, rising by nearly two percent.

[a]Excludes cost of Operations Desert Shield and Desert Storm.

[b]Reflects $6.6 billion in rescisions from enacted $277.5 billion FY 1992 budget.

Manpower Losses

(End strength in thousands)

	FY 1987	Change, 1987–95	FY 1995	FY 1997	FY 1987–97
Total active-duty	2,174	-530	1,644	1,626	**-548**
Air Force	607	-178	429	430	-177
Army	781	-245	536	536	-245
Marine Corps	199	-29	170	159	-40
Navy	587	-78	509	501	-86
Selected Reserves	**1,151**	**-229**	**922**	**920**	**-231**
Civilians	**1,133**	**-221**	**912**	**904**	**-229**

Under current plans, in FY 1997, total active-duty military personnel will number 1,644,000, down 530,000 from the FY 1987 post-Vietnam peak. By FY 1997, the 904,000 civilian work force will reflect a 20.2 percent reduction from its 1987 high of 1,133,000.

Force Structure Changes

	FY 1991	FY 1995
Army divisions	26 (18 active)	20 (12 active)
Aircraft carriers	15	12
Carrier air wings	15 (13 active)	13 (11 active)
Battle force ships	530	450
Air Force wing equivalents	34 (22 active)	26.5 (15 active)

Funding for Major Systems, FY 1993

($ billions)

Land Forces	
UH-60 helicopter	0.4
RAH-66 helicopter	0.4
Air Forces	
F-22 (Advanced Tactical Fighter)	2.2
C-17 airlifter	2.9
Milstar satellite	1.3
B-2 Stealth bomber	4.0
E-8B Joint STARS aircraft	0.7
Naval Forces	
DDG-51 destroyer	3.5
F/A-18 strike fighter	2.6
Trident II missiles	1.1
Strategic Defense Initiative	5.4

Includes funds for procurement and RDT&E.

Major Program Terminations

($ millions)

Reductions from FY 1992	Budget Level FY 1993	FY 1993–97
TOW Sight Improvement Program	-58	-255
LAMP-H (landing craft)	-11	-98
HARM	-71	-511
Supersonic Low-Altitude Target	-279	-302
Closed Cycle ADCAP propulsion system	-35	-127
SQY-1 ASW combat system	-211	-893
Mk. 50 vertical launch ASROC	-37	-91
SH-2 SLEP	-73	-147
ARS-class salvage ship	—	-334
E-2C early warning aircraft	-444	-444
LSD-41 amphibious ship	-251	-251
Peacekeeper rail-garrison[a]	-100	-202
SRAM II strategic missile[a]	-259	-1,218
SRAM-T	-107	-441
Mobile Small ICBM (launcher)[a]	-291	-672
Space-based wide-area surveillance	-29	-195
KC-135 reengining	-92	-1,128
Total	**-2,348**	**-7,309**

[a]President's Nuclear Initiative, September 27, 1991.

Funding for Major Air Force Systems

($ millions)

	FY 1991	FY 1992	FY 1993
Aircraft Procurement			
B-2A	2,508.4	2,798.2	2,610.7
C-130H	—	289.8	300.4
C-27	79.5	—	—
T-1A Trainer	155.8	156.1	158.6
EFS Trainer	—	14.0	12.3
MH-60G	36.9	23.5	30.1
E-8B (Joint STARS)	—	125.4	361.3
Aircraft modifications	1,477.1	1,810.1	1,732.7
Aircraft spares	510.7	603.4	724.4
Missile Procurement			
Peacekeeper (strategic missile)	398.2	194.5	—
Maverick	383.9	—	—
Spares	76.4	90.0	54.9
Other Procurement			
Sensor-Fuzed Weapon	—	108.7	18.6
Space and Missile Center improvements	47.0	61.2	94.0
Milstar terminals	—	263.9	211.5
Space boosters	207.0	290.5	382.2
Medium Launch Vehicle	269.8	221.3	226.6
Defense Meteorological Satellite	147.7	106.1	31.4
Global Positioning System	156.0	186.8	247.5
Programs in RDT&E			
Advanced Cruise Missile	51.8	28.6	82.3
Milstar ground terminals	—	156.4	1,261.9
B-2	1,715.7	1,548.3	1,261.6
ICBM modernization	581.9	187.3	95.2
AWACS	125.4	205.6	130.9
C-17	732.2	372.8	210.0
F-22	943.5	1,621.1	2,224.3
EW development	79.1	197.7	158.5
Joint STARS	216.1	311.3	355.9
Satellite control network	115.6	111.7	106.5
Titan space launch vehicles	—	140.9	145.9
DoD Joint Programs in RDT&E			
National Aerospace Plane	161.5	200.0	175.0
Strategic Defense Initiative	2,691.9	3,281.8	4,314.7
Tactical Missile Defense	176.9	833.7	997.7

Washington Watch

By Robert S. Dudney, Executive Editor

Behind the Pentagon Numbers

In recent budget cuts, the Defense Department lost another $63.8 billion. Underlying the reductions are fundamental changes in US defense policies.

From missiles to manpower, President Bush's most recent Pentagon spending blueprint promises to bring about wide-ranging change in both the content and the conduct of United States defense.

The Defense Department, in its latest spending revisions, reduced its original Fiscal 1993 budget request by $10.3 billion, lowering it to $267.6 billion. At the same time, the Pentagon chopped its six-year, Fiscal 1992–97 program by a combined $63.8 billion, projecting cumulative spending of about $1.5 trillion. (Some $13.5 billion of these reductions stemmed from lower inflation projections.)

The simple dollar figures, however, do not tell much about what's going on. With the unveiling, on January 29, of the new plan, the Administration disclosed decisions that would:

- Virtually halt the US strategic modernization program, a multibillion-dollar campaign that began early in the Reagan years and spawned mammoth missile, bomber, and submarine programs.
- Greatly diminish the Navy's focus on the undersea threat and leave the Navy without a more advanced successor to its current front-line sub, the SSN-688.
- Vigorously protect the planned 1.6-million-strong US "base force" even if it means sacrificing significant arms programs.
- Initiate a new, more cautious, highly controversial system of weapons acquisition, one that emphasizes research and development over production but foresees few new starts.

The Administration moved to protect a select group of weapons and programs that it deems vital to Washington's new, post–cold war defense strategy focusing on the imperatives of regional conflicts rather than global war. The favored systems include, most prominently, the Air Force's F-22 air-superiority fighter and C-17 transport, the Navy's next *Nimitz*-class aircraft carrier, the Advanced Medium-Range Air-to-Air Missile (AMRAAM), advanced space systems, and ballistic missile defense programs.

The upshot, analysts say, is a substantially altered US defense posture, based on new and different threats, equipment, procedures, and organizational structures.

"No Deeper"

President Bush, taking note of congressional desires to tap the Pentagon budget to fund domestic programs, warned the lawmakers to avoid "recklessness" that could create "hollow" forces of the kind seen in the late 1970s. "These cuts are deep," the President said, "and you must know my resolve: this deep, and no deeper."

Many lawmakers assailed the White House for not cutting defense fast enough. Others vowed to fight for favored programs. Still others were bent on preventing cutbacks in Guard and Reserve units located in their districts. *[See "Capitol Hill," p. 10.]* Service officials say that these demands will produce harsher pressures as Pentagon officials begin to craft the 1994–99 defense plan.

Compared to the enacted Fiscal 1992 budget, the latest proposal represents a real, one-year decline of $20.2 billion, or seven percent. Current plans call for the defense budget to decline an average of almost four percent each year over Fiscal 1993–97.

By Fiscal 1997, the cumulative real decline in budget authority since Fiscal 1985—the peak year of Reagan Administration defense spending—will total thirty-seven percent. That prospective 1997 budget, says the Pentagon, will have the same purchasing power as the one in 1960, before the Kennedy Administration's buildup.

The biggest accounts are those that fund operations and maintenance ($84.5 billion, or 31.6 percent) and personnel ($77.1 billion, or 28.8 percent). Weapons procurement now accounts for only $54.4 billion, or 20.3 percent of the total. Research and development funding comes in at $38.8 bill on, or 14.5 percent. The rest goes to military construction, family housing, and the like.

Service shares remained relatively unchanged. Some $231.8 billion of the total Pentagon budget is allocated to the three military departments, with the Air Force receiving $83.9 billion, or 36.2 percent; the Navy Department (which includes the Navy and Marine Corps) getting $84.6 billion, or 36.5 percent; and the Army getting $63.3 bill on, or 27.3 percent.

The Administration initiated the Fiscal 1993 budget revisions as it struggled to reconcile its defense program with a fading Soviet threat, the hardship of the recession, and the onset of a Presidential election campaign. Nowhere is the impact more evident than in US strategic forces, where the modernization program will be halted far short of its original goals.

In the 1980s, President Reagan presided over numerous strategic offensive programs: the B-1B and B-2 bombers, Advanced Cruise Missile, SRAM II Short-Range Attack Missile, Peacekeeper and Midgetman ICBMs, mobility systems for both missiles, Trident submarines, and Trident II D5 submarine-launched missiles.

In recent years, Defense Secretary Dick Cheney ended production of the Trident ballistic missile submarine (at eighteen boats) and the Peacekeeper. The new Pentagon budget virtually completes the shutdown of strategic programs, with USAF's B-2 Stealth bomber being the most visible victim. President Bush decided to halt the bomber program after production of the twentieth model, rather than after seventy-five as previously planned. Sixteen B-2s have been funded, and the budget seeks another $2.6 billion in procurement funds for the last production purchase of four B-2s. Total B-2 program savings: $14.5 billion through 1997.

The "Essential" B-2

Secretary Cheney said that, even in diminished numbers, the B-2 will be "an essential part" of US power. The current force of B-1Bs and B-52s will be adapted to ensure capabilities for strategic nuclear and conventional missions.

Production of the Air Force's stealthy AGM-129 Advanced Cruise Missile will halt where it is now, with enough money for 640 of the weapons. Earlier plans called for building 1,000 ACMs. The 1993 budget contains no production money for the ACM.

Also canceled is the Air Force's SRAM II bomber weapon, for a savings of $1.2 billion between this year and 1997.

The Air Force's strategic missile program is moribund. For the second year in a row, the Pentagon declined to purchase new Peacekeeper ICBMs. The 1993 budget also zeros out development of the single-warhead Midgetman and development of its mobile basing system. Last September, the President directed the Pentagon to cancel the rail-garrison basing system for Peacekeeper, an order that the budget carries forward. The Air Force will develop an improved guidance system for the Minuteman III ICBM and other measures to extend its service life. The net savings from the curtailed ICBM program is $1 billion.

The Navy will continue to produce the multiple-warhead D5 missile for its Trident submarines, committing $987 million this year to procure another twenty-one of the weapons. However, the budget contains no funds to continue production of the heavier W88 warhead installed on the latest versions of the D5.

The programmed moves dovetail with other nuclear cuts promoted by President Bush. These include elimination of ground-launched tactical nuclear weapons and nuclear weapons aboard warships, the standdown from alert of the US bomber fleet, the standdown and deactivation of 450 Minuteman II ICBMs, and major warhead and launcher reductions under the START Treaty. In return for certain concessions by Russia, President Bush also would eliminate the fifty deployed Peacekeeper ICBMs, convert triple-warhead Minuteman III weapons to single-warhead missiles, pare the sea-based nuclear force by one-third, and shift many US bombers from nuclear to conventional roles.

Equally dramatic has been the change in the Pentagon's view of how to cope with the submarine threat.

Once, the Soviet Navy deployed the world's largest fleet of attack submarines, including some of the quietest found anywhere. For decades, the US Navy has claimed that the threat posed by this Soviet undersea armada was so great that it justified the prosecution of a huge, multibillion-dollar US antisubmarine warfare effort comprising the development and construction of new and quieter boats, sophisticated undersea detection systems, and advanced submarine-hunting aircraft.

Most of that seems to have vanished with the fading of the Soviet Navy, which today is mostly tied up in Russian ports. In its budget documents, the Defense Department suggests that the evaporation of the Soviet naval threat obviates the US Navy's need for the *Seawolf*-class attack submarine, the new, multibillion-dollar warship on which the Navy once counted to hold its edge at sea.

Only One Seawolf

Secretary Cheney canceled the big submarine program, and only the first ship of the class will be built. The Pentagon seeks to rescind approved funds for the second and third ships of the class. The cancellation and rescisions, says the Pentagon, will save $17.5 billion over five years.

For the indefinite future, the Navy will continue to base its submarine and antisubmarine operations on the SSN-688 *Los Angeles*–class boat, one of the quietest and most capable undersea systems. In recent years, the Navy has procured advanced versions of the SSN-688. Meanwhile, the Navy and the Pentagon will investigate lower-cost submarine designs for a new *Centurion*-class submarine. This lower-tech boat would help the fleet modernize and maintain adequate force levels as the *Los Angeles*–class boats leave service.

The disappearance of the USSR as a political entity has had no major impact on the current budget plan. What *has* changed: The US now knows that the former superpower will not be able to modernize at a very rapid pace, if at all.

In another move that surprised many, Secretary Cheney and Gen. Colin L. Powell, Chairman of the Joint Chiefs of Staff, made plain that they intend to fight vigorously to save the planned base force of 1.6 million soldiers, sailors, airmen, and Marines; to find the money to support it, they are willing to throw overboard many hardware programs.

"We're bringing down the force as rapidly as possible," General Powell argued. "It would be very, very imprudent for us to start pulling numbers out of the air."

The statistics tend to confirm that the force structure takes precedence over new systems. In the last budget revisions, Pentagon officials imposed reductions amounting to $50.3 billion over six years. More than $42 billion of this total stemmed from the cancellation of major weapons programs.

Much of the money is needed to help keep the force combat-ready. Flying hours for active Air Force tactical aircrews will hold at about twenty-one hours per month. Active Army ground and air training operations are kept at 800 miles per year for combat vehicles and 14.5 tactical flying hours per month for aircrews. Navy steaming days remain at 50.5 days a quarter for deployed fleets and twenty-nine days a quarter for nondeployed fleets.

Current plans call for the active-duty force to shed 548,000 troops, dropping from 2,174,000 in the peak year of 1987 to 1,626,000 in 1997. The Air Force would lose 177,000 troops, down to 430,000, and settle in at 26.5 fighter wing equivalents and a fleet of about 180 bombers. According to the Air Force, by the end of Fiscal 1993 the service will go down to 27.4 fighter wing equivalents, fifteen of which will be in the active force. The Army would field twelve divisions, down from eighteen. The Navy would maintain about 450 ships and twelve carrier battle groups, down by about one-third.

A Modernization Plan

Senior Pentagon officials say that the current plan anticipated favorable trends in the Soviet empire and that the sudden disappearance of the USSR as a political entity has no major impact. What has changed, they say, is that the US now knows for certain that the former superpower will not be able to modernize the weaponry of its military forces at a very rapid pace, if at all. "Therefore," said Secretary Cheney, "what we've gone after in our own

budget in response to those changes is . . . our own modernization plan."

Among the Air Force terminations were the SRAM-T tactical missile (saving $441 million through 1997), the space-based wide-area surveillance system ($195 million), and the KC-135 reengining program, ($1.1 billion). The AGM-130 glide bomb and the Sensor-Fuzed Weapon will be curtailed but not canceled.

The Navy was stripped of money for developing its high-priority Advanced Air-to-Air Missile program and another $444 million that had been earmarked for six new E-2C Hawkeye planes.

The Army was forced to defer production of the RAH-66 Comanche light helicopter, for a saving of $3.4 billion through 1997. Also dropped was the Air Defense Antitank System ($1.7 billion), the so-called Block III tank ($400 million), and the Line-of-Sight Antitank (LOSAT) weapon ($900 million).

However, the change in outlook goes beyond the mere cancellation of weapon systems. The budget also ushers in a new approach to acquiring weaponry and modernizing the force; new arms are approved much more selectively than in the past and only after much more detailed preparation.

The Pentagon can afford to hold off on new programs, explains Secretary Cheney, because the disintegration of the USSR has "eliminated the urgency" of fielding some new arms. "We can now afford to be more deliberate in the pace at which we modernize our armed forces," said the Secretary.

Simply put, the Defense Department will put into production fewer new advanced weapon systems, will devote more funds to the aggressive pursuit of new technologies, and will spend far more time and effort building, testing, and altering prototypes of new weapons. A new system will move to full-scale production only after the Pentagon verifies the need, has minimized technical, manufacturing, and operational risk, and can find the money.

"I think the main point that I want to make out of this," observed Deputy Defense Secretary Donald Atwood, "is that the new approach to acquisition is going to put greater emphasis on research and development."

In much of the defense industry, however, the reaction has been lukewarm at best. Many contractors maintain that it is not realistic to believe that companies will develop first-class weapon systems without a reasonable expectation that production will follow. They say that the weapon developers will simply disappear or move on to commercial work.

DoD will put into production fewer new advanced weapon systems, will devote more funds to the pursuit of new technologies, and will spend more time and effort building, testing, and altering prototypes of new weapons.

$50 Billion a Year

Mr. Atwood points out, however, that "although we're cutting back in the amount we produce, it is still over $50 billion a year worth of acquisitions." Secretary Cheney also admonishes the industry to "remember what we are going to fund as well as what we are not going to fund. Contrary to some reports . . . we are not canceling all procurement. We are going forward with a number of programs that we think are important."

The prime case in point, for the Air Force, is the F-22 Advanced Tactical Fighter. The new budget contains $2.2 billion for continued development of the F-22. Current plans call for a Lockheed-led contractor team to build 648 of the stealthy new fighters over several decades. The program currently is in the engineering and manufacturing development phase.

"The program appears to be well in hand and moving forward without any significant problems at this point," said Secretary Cheney. "I think it's vital that we do what we have to do to guarantee that we'll always be able to maintain air superiority over any future battlefield."

Also getting a big boost in the budget is the Air Force's C-17 advanced transport. The new plan includes $2.7 billion for eight C-17s. The Air Force also will spend $300 million to procure eight new C-130H tactical transports.

This year, the Air Force will close out its purchases of the multirole F-16 fighter. The budget contains $759 million for twenty-four of the versatile warplanes. Air Force officials say that the service is banking on continued foreign sales to keep the General Dynamics F-16 line open for several more years.

The Air Force plans to spend $361 million this year to purchase the first production E-8A Joint Surveillance and Target Attack Radar System (Joint STARS) aircraft. Gen. John M. "Mike" Loh, commander of Tactical Air Command and the prospective commander of the new Air Combat Command, said at a recent AFA symposium that the Air Force is committed to procurement of twenty Joint STARS planes.

Other well-financed Air Force systems include the AMRAAM ($731 million for 1,050 missiles), the high-speed antiradiation missile ($212 million for 850 weapons), Milstar terminals ($212 million), space boosters ($382 million), Defense Support Program satellites ($287 million), and Global Positioning System satellites ($247 million). The budget also includes $1.3 billion to continue research and development associated with the B-2.

The new budget includes $6.7 billion to procure 127 Navy and Marine aircraft. Funds for forty-eight F/A-18 strike fighters are included. Though the Navy is slowing development of the A-X carrier-based bomber, it still is seeking $165.6 million in research money.

Most critical for the Navy, however, is the fact that the new defense program commits DoD to the construction of another big-deck *Nimitz*-class aircraft carrier. The Administration seeks $865 million this year in long-lead funds and plans to obligate another $4.5 billion in Fiscal 1995. This would be the ninth 90,000-ton nuclear-powered carrier approved for production. (The others are *Nimitz, Eisenhower, Vinson, Theodore Roosevelt, Lincoln, Washington, Stennis,* and *United States.*) The new *Nimitz*-class ship would not enter service until the next century.

Elsewhere, however, Navy shipbuilding looks weak. This year the budget contains $5.3 billion for only six new ships and one conversion. Four of the six new ships are DDG-51–class destroyers, to be built at a cost of $3.4 billion. The other two are coastal mine hunters.

Helping to make ballistic missile defense a high Pentagon priority is the proliferation of missile capability and weapons of mass destruction. At issue is the so-called GPALS systems, for Global Protection Against Limited Strikes, research on which is funded through the Strategic Defense Initiative.

This year, the Pentagon is seeking $5.4 billion in SDI funding, compared to the Fiscal 1992 total of $4.1 billion. The $5.4 billion total includes about $1 billion for development of tactical ballistic missile defense. ■

Aerospace World

By Frank Oliveri, Associate Editor

"Provide Hope" Airlift

Carrying out the first phase of Operation Provide Hope, Air Force transport planes hauled shipments of food and medicine in February to twenty-three locations in twelve republics of the former USSR. Long-range C-5s and C-141s of Military Airlift Command flew from bases in Germany and Turkey to airfields in Russia, Ukraine, Moldova, Armenia, Kazakhstan, Tajikistan, Turkmenistan, Azerbaijan, Uzbekistan, and Kirghizia, bringing essential items to the areas hardest hit by the current blizzard of economic woes.

Plans called for the US to provide several million tons of supplies, including some rations left over from Operation Desert Storm. US military linguists traveled on board the aircraft to communicate with ground controllers and translate instructions for the flight crews. Operation Provide Hope is expected to cost less than $10 million.

In the Fiscal 1992 budget, Congress approved $100 million for humanitarian aid to the Commonwealth of Independent States (CIS), a confederation that includes eleven of the fifteen republics of the former USSR. Other forms of cargo transport will be used in the operation, which will continue through the summer.

Capt. Daniel Muzzio, aircraft commander, 30th Airlift Squadron, 438th Military Airlift Wing, McGuire AFB, N. J., offers a candy bar to Border Guard Victor Prodedovich on the taxiway of Alma Ata Airport during Operation Provide Hope in February. The US operation airlifted food and medical aid to transit points within the CIS.

Aspin's Warning on War Report

As they prepared to receive the Pentagon's official assessment of Gulf War lessons learned, members of the House of Representatives got a stiff warning: Remain skeptical about its conclusions and form independent judgments.

Such was the advice of Rep. Les Aspin, the influential Wisconsin Democrat who chairs the House Armed Services Committee and who expressed concern that the long-awaited Pentagon study, slated for public release last February, had been distorted by back-room political maneuvering.

In a widely publicized statement, Representative Aspin noted the existence of "reports coming from the Pentagon" indicating that "institutional pressures may be influencing the outcome of the Defense Department's analysis of the war." He and others privy to the development of the study claimed that its authors apportioned roughly equal shares of credit to the Air Force, the Army, and the Navy–Marine Corps team.

Representative Aspin argued that the emergence of this "one-third, one-third, one-third" formula was predictable but could not be allowed to be the final word on the Gulf War. He said that settled conclusions about the course and conduct of that war will color defense policies for decades. He asked for a comparison of the Pentagon assessment to an assessment being prepared by his panel.

New Composite Wing

On June 1, the Air Force will formally activate the new 23d Wing, a composite unit now being formed at Pope AFB, N. C., adjacent to Fort Bragg, N. C., home of the Army's 82d Airborne Division. The Army and Air Force units will train together regularly.

The 23d will be USAF's second composite wing, following formation of the 4th Wing at Seymour Johnson AFB, N. C. The wing will comprise C-130 tactical transports, A-10 support fighters, and OA-10 forward air controller aircraft. In time, the Air Force may add other types of aircraft. Specific types and numbers of aircraft will not be finally determined until the Air Force completes an environmental impact study.

The 23d Wing traces its lineage to the 23d Fighter Group, Gen. Claire L. Chennault's "Flying Tigers" of World War II, whose current home is England AFB, La. The 23d served in Desert Storm, flying more than 2,700 combat sorties. The new wing will be a part of the soon-to-be-activated Air Combat Command.

Cheney Touts B-2's Conventional Role

Defense Secretary Dick Cheney claimed that twenty B-2 Stealth bombers will provide the US a significant capability not only for delivering strategic nuclear weapons but

Boeing Product Support Division in Wichita, Kan., has assembled more than sixteen million spare parts to build kits for the KC-135R reengine program since the early 1980s. On February 20, Boeing delivered the 300th kit to the Air Force. Each kit includes struts, nacelles, 12.2 miles of wiring, and other system modification components.

also for conventional combat operations.

The Secretary made that claim in late January, shortly after the Pentagon unveiled a revised Fiscal 1993 budget proposal that calls for terminating the bomber program after the 1993 purchase. The new budget called for spending $2.6 billion in the upcoming fiscal year for four new B-2s. Defense officials say the 1993 buy will bring to twenty the number of B-2s in the force. That figure, however, is based on an assumption that Congress will release fenced Fiscal 1992 money for a sixteenth bomber.

In a flurry of speeches and hearings on Capitol Hill, Secretary Cheney indicated that much of the strategic bomber fleet will be converted to the conventional combat role. The Air Force will now look at new munitions to arm B-2s, B-1Bs, B-52Hs, and B-52Gs. By no means, however, will the B-2's strategic nuclear capabilities decline, said the Secretary.

Ninth *Nimitz*-Class Carrier Planned

Though the overall size of the US Navy is shrinking, the Administration's revised Fiscal 1992–97 defense budget seeks $865 million this year in long-lead funds for a new nuclear-powered, *Nimitz*-class aircraft carrier. The plan calls for obligating an additional $4.5 billion in Fiscal 1995 to fully fund the purchase of the big deck.

The new carrier, which would be the ninth CVN-68–class warship in the US Navy, would not enter service until well past the turn of the century.

In comments to lawmakers, Secretary Cheney maintained that there is ample cause for building a new carrier. Gen. Colin L. Powell, Chairman of the Joint Chiefs of Staff, told the Senate Armed Services Committee in February that the B-2 and Navy carriers play complementary, not competitive, roles in power projection and that carriers could not be traded away to free money for a larger B-2 force.

General Powell's statement came in response to a question posed by SASC Chairman Sen. Sam Nunn (D-Ga.), a strong B-2 proponent. Senator Nunn has often suggested the US should cut the fleet of fourteen carriers—each of which requires thousands of sailors—in favor of a larger B-2 fleet.

The decision was welcome news at Tenneco's Newport News Shipbuilding & Dry Dock Co. of Virginia, Newport News, the last builder of full-sized carriers, recently lost much Navy submarine work.

Secretary Cheney said that industrial base considerations played a part in the carrier decision. This departs from settled Pentagon policy, which officially seeks to avoid approving new weapons in order to preserve certain defense industries. Some fear the Secretary's move has opened the door to other claims for privileged treatment.

Fatal Air Guard Crash

A Kentucky ANG C-130B transport crashed in Evansville, Ind., while practicing touch-and-go exercises. The accident, which occurred in mid-February, killed all five crew members and another eleven people on the ground.

The dead Guardsmen are Maj. Richard Strang, pilot/instructor; Capt. Warren Klingaman, copilot; 2d Lt. Vincent Yancar, copilot; MSgt. William Hawkins, loadmaster; and MSgt. John Medley, flight engineer.

As the aircraft climbed, it failed, banked, and crashed into a hotel. In addition to the eleven dead on the ground, nineteen people were injured.

The Air Force has launched an investigation of the crash. A memorial

USAF Photo by SSgt. Phil Guerrero

Col. Mike Guth, commander of the 48th Fighter Wing, addresses the crowd gathered at RAF Lakenheath, UK, to greet the first F-15E. Over the next two years Lakenheath will receive another forty-four aircraft, which will replace eighty 1971 F-111Fs. The last F-111F will depart by December of this year.

fund has been established to benefit the families of the dead servicemen.

Acquisition Plan Softened

Air Force Secretary Donald B. Rice indicated that the service may be reconsidering its fighter acquisition development plan when written testimony provided to the House Armed Services Committee in February appeared to soften outyear plans.

In his testimony, Dr. Rice said the service was pursuing two new fighter-bomber programs, the Multirole Fighter (MRF) and the A-X interdiction fighter, which is being developed by the Navy. The current plan calls for acquiring the MRF first and then the A-X. If the MRF is an F-16 derivative (the likely choice), initial operational capability would be reached around 2004. IOC for the A-X is not expected until 2012.

However, Dr. Rice testified, "We envisage the Multirole Fighter as eventually replacing the F-16 and are looking at the Navy's A-X as a potential replacement for our longer-range F-111F and F-15E. The timing of these programs will be worked out over the next several years as design studies are completed." By leaving the timing of the programs vague, the Secretary seemed to be signaling that a change is afoot.

The issue first arose during a press conference at the Air Force Association's Air Warfare Symposium in Orlando, Fla., in late January, when Air Force Chief of Staff Gen. Merrill A. McPeak said it was logical for the service to acquire the interdictor first.

"I don't know what the hurry is about getting ready for another large aircraft program here," General McPeak said. "Three, four, five years downstream is the time to start trying to put metrics on that program [MRF], and three or four years downstream, our most pressing need, after the F-22, will likely be an interdiction aircraft." General McPeak said that the oldest airplane in the fighter force was the F-111, while the service is still buying brand-new F-16s. He said this was his "personal view."

Senior Air Force officials, in discussing the acquisition of the two weapons programs, clearly agreed that their top priority was to procure the F-22 air-superiority fighter to replace the aging F-15. The disparity surfaced when officials stated what should come next.

At the same conference, Lt. Gen. John E. Jacquish, principal deputy assistant secretary of the Air Force for Acquisition, and Gen. John M. "Mike" Loh, commander of Tactical Air Command, said the Air Force's plan was to pursue the MRF before the A-X. General Jaquish said that many of the older F-16s would start leaving the force after 2000, bringing a requirement for an aircraft to replace them.

MRF Milestone Zero is expected this summer. Without an early decision on MRF, said experts, General Dynamics might not be able to provide a low-cost F-16 derivative. The Air Force plans to terminate the F-16 program after the Fiscal 1993 buy of twenty-four aircraft. A break in the F-16 line will drive up the costs of an F-16 derivative.

Lockheed Joins Five A-X Teams

Lockheed Sanders is supporting each of the five teams competing for the Navy A-X attack aircraft concept definition study, the contractors disclosed.

The Lockheed electronics unit will provide subcontractor support in electronic combat and self-protection, core system processing, cockpit controls and displays, mission planning, low-probability-of-intercept communications, automated test systems, and antenna arrays.

After ten months of trade-off and risk reduction studies during the initial phase of the program, the Navy will select one team to carry on a demonstration/validation effort involving development, manufacturing, and testing of prototype planes.

Lockheed Sanders and other Lockheed personnel assigned to the competing teams will work independently.

The primary members of the five contractor teams are Lockheed Aeronautical Systems, Boeing, and General Dynamics; Grumman Aerospace, Boeing, and Lockheed Advanced Development Co.; Rockwell International and Lockheed Advanced Development Co.; General Dynamics, McDonnell Douglas, and Northrop; and McDonnell Douglas and LTV Aerospace.

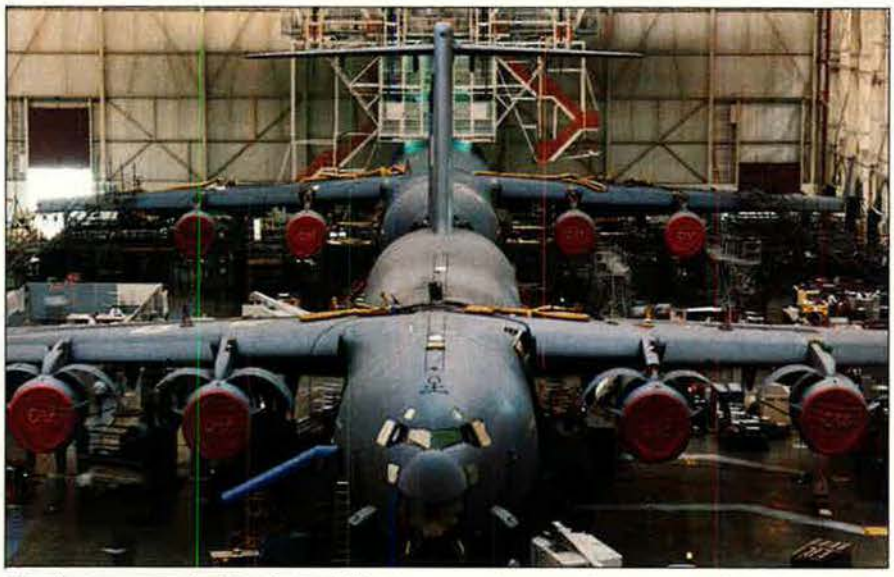
Health-Care Improvements

In order to improve its medical system, the Department of Defense recently approved several new programs, including a coordinated care program that gives local hospital commanders more freedom to manage resources and more discretion to arrange for patient access to civilian health-care facilities.

The January decision is intended to create a military health service system that has sound management, eliminates uncertainty of cost and demand, and introduces accountability into health-care operations.

To achieve the new goals of the system, DoD must integrate the management of its health-care services by closer coordination among the military medical departments, CHAMPUS, and civilian provider networks. This will slow medical cost increases and improve access to treatment at civilian or military medical facilities.

The Pentagon says it will begin to implement the changes in 1994 or 1995.



The first two production C-17 airlifters are nearing completion at the McDonnell Douglas Long Beach, Calif., facility. Both are more than ninety percent complete. On-board testing of hydraulic, electrical, and flight-control systems is being conducted before the aircraft are moved to the flight ramp.

Higher C-17 Cost

The estimated cost to complete the initial C-17 airlifter contract recently rose another $70 million, according to official Air Force estimates. The increase placed the actual cost of the program about $850 million higher than the maximum $6.6 billion allowed under the C-17 fixed-price contract.

The contract between the Air Force and McDonnell Douglas requires the firm to complete development, test, and production of the first six C-17s. While the jump in the completion cost is not large, some analysts saw it as an indication that efforts to stem cost growth in the program have not been completely successful. McDonnell Douglas maintains that it will exceed the contract by about $390 million.

As a result, the Air Force has reduced progress payments to McDonnell Douglas by two percent. The firm indicated that the reduction in progress payments will not have a significant impact on the program.

The C-17 program's "T-1" test aircraft has completed more than 100 flight hours in more than forty flights. McDonnell Douglas claimed that "P-1," the second C-17, would fly in March. T-1 has achieved airspeeds as low as eighty-three knots and as high as 341 knots, flown at altitudes of 35,000 feet, and landed within a distance of 1,600 feet while carrying a gross weight of 350,000 pounds. McDonnell Douglas has ten C-17s in production.

First T-1A Jayhawk Accepted

The Air Force formally accepted in January the first T-1A Jayhawk tanker/transport trainer aircraft. The T-1A is the first of seventy-seven to be built by Beech Aircraft Corp. The fleet is expected to grow to 180 aircraft at a cost to the Air Force of $750 million.

The aircraft is a military version of the Beechcraft 400A business jet and will be assigned to Air Training Command bases. The first jet will go to the 64th Flying Training Wing, Reese AFB, Tex. The aircraft will also be posted in training units at Randolph and Laughlin AFBs, Tex.; Vance AFB, Okla.; and Columbus AFB, Miss.

Beech announced that the Air Force had exercised its third option of the T-1A contract, calling for delivery of thirty-four more aircraft by June 1993. That contract option is worth about $120.2 million and, along with the initial program award and exercised options for aircraft, set the total funded value of the Jayhawk at $348.3 million for seventy-seven aircraft.

More Nuclear Reductions

President Bush proposed reducing the US strategic nuclear arsenal to between 4,500 and 5,000 warheads—a level about forty percent below today's limits and significantly below ceilings permitted under the recently signed Soviet-American Strategic Arms Reduction Talks (START) Treaty.

In his State of the Union Address in late January, the President also asked leaders of the CIS to give up an advantage in landbased multiple-warhead missiles in return for US reductions in its submarine-based nuclear forces. The President's plan calls for eventual elimination of all landbased multiple-warhead systems.

President Bush and Russian President Boris Yeltsin met at Camp David in February to discuss these and other proposals. The meeting produced no formal bilateral agreements.

In advance of the talks, Mr. Yeltsin proposed to cut long-range nuclear warhead totals to between 2,000 and 2,500, but the US is resisting cuts to that level, citing the need to go slow and to preserve a credible nuclear deterrent. Even President Bush's proposals strike some as too extreme. Former Strategic Air Command Commander in Chief Gen. John T. Chain, USAF (Ret.), for example, charged that the elimination of so many nuclear weapon systems would "emasculate our military force."

AMRAAM as ATBM Defense

The Advanced Medium-Range Air-to-Air Missile (AMRAAM) could be used against tactical ballistic missiles in early boost phase and is being considered for that mission, according to TAC Commander Gen. Mike Loh.

Speaking at the AFA symposium, General Loh indicated that AMRAAM could be used as an anti–tactical ballistic missile defense if it were used during the first thirty to sixty seconds of a missile's flight. AMRAAM would be launched from an airborne platform, the General said.

Discussions have taken place between SDIO Director Henry Cooper and General Loh about using AMRAAM against tactical ballistic missiles. In addition, General Loh said, TAC was seeking to reduce the time required to detect a launch and project the flight path. During the Persian Gulf War, that sequence of operations required nearly eight minutes. TAC wants to reduce that to seconds.

Budget Pact Endangered

Sen. Robert Byrd, the West Virginia

Democrat who chairs the Senate Appropriations Committee, warned that he will try to divert money from the defense budget to domestic programs. The Byrd move, announced in January, would demolish the strictures of the 1990 Budget Enforcement Act.

In his floor speech announcing his intent, Senator Byrd alluded to a Congressional Budget Office report that proposed diverting $60 billion in defense funds to domestic accounts. CBO said that this transfer would allow Congress to avoid cuts in politically popular programs at least through Fiscal 1995.

The budget agreement, signed in fall 1990 before the collapse of the Soviet Union, forbade Congress to shift funds until Fiscal 1994. The President, who proposed to slash defense by an additional $50 billion over the next five years, said he would use the savings to offset the deficit, an action permitted under the Budget Enforcement Act.

V-22 Performance Questioned

Donald Yockey, the Under Secretary of Defense for Acquisition, ordered the Navy's acquisition executive to provide information to determine whether the controversial V-22 tiltrotor aircraft has satisfied all the performance requirements under the original fixed-price contract.

Mr. Yockey's order came in a memorandum to the Secretary of the Navy, which resulted from a Defense Acquisition Board meeting held in mid-January. Information presented at the meeting included proposed alternatives for the continuing development of V-22 on a cost reimbursement contract.

Congress has provided more than $600 million for further development and procurement of V-22s in the Fiscal 1992 defense budget. However, Defense Secretary Dick Cheney has indicated that DoD may not spend those funds.

Mr. Yockey sought to discover what performance the contractor is required to demonstrate during the period of the existing $1.8 billion development contract, what additional contributions to the achievement of program requirements will come from separate technology contracts issued in June 1991, what other items the government must fund to make the V-22 meet the Joint Service Operational Requirement, and what these improvements will cost.

A-12 Probe Dropped

The Justice Department dropped a preliminary criminal investigation into billing procedures of McDonnell Douglas and General Dynamics in the terminated Navy A-12 program. The department announced that it was closing the case after review of information received from the Pentagon Inspector General and the Defense Criminal Investigative Service.

The A-12 Stealth aircraft was terminated in January 1991. The program was years behind schedule and more than a $1 billion over expected cost. The contractors and the government, each of which has blamed the other, have been trying to settle their differences out of court for several months. The government seeks to recoup more than $1 billion in progress payments, claiming the work had not been completed. The contractors seek to have the Pentagon change its description of the stop-work order from "default" to "for the convenience of the government." The latter definition would relieve the contractors of financial penalties.

NASA Chief Sacked

Adm. Richard Truly, administrator of NASA, was forced to resign in February. The surprise move pushed into the open the sharp differences between Admiral Truly and Vice President Dan Quayle's National Space Council staff over the current and future direction of the space agency.

Admiral Truly submitted a resignation letter after meeting with President Bush. It said that he was resigning "with the deepest regret." Admiral Truly indicated that he was as surprised as anyone by the sacking. President Bush praised the Admiral for his leadership as the top administrator and as associate administrator for spaceflight after the *Challenger* disaster in 1986.

GPS Equipment Production

Under Secretary Yockey approved production of the Navstar Global Positioning System's (GPS) User Equipment Phase III. However, he ordered that the cost of the system be watched carefully.

As a result of a January 22 Defense Acquisition Board (DAB) meeting, Mr. Yockey gave the go-ahead for full-rate production, but production costs for the first fifty-eight of the systems must be provided to DoD's Cost Analysis Improvement Group.

United Technologies Cuts

United Technologies Corp. announced that it would cut 13,900 jobs and take a $1 billion loss for the year in an attempt to cut costs in the face of a rapidly shrinking defense budget and the effects of a persistent recession.

The company said that the cuts would occur over four years. The reduction amounts to a seven percent cut in the worldwide work force of 186,000. Manufacturing capacity will be reduced by sixteen percent, following the closing of about 100 plants. The firm will suffer a $1.28 billion charge to cover the costs of severance pay and plant closings and a $256 million charge for environmental improvements.

P&W Tests Thrust Vectoring

In February, Pratt & Whitney began testing an axisymmetric, thrust-vectoring nozzle on its F100-PW-229 Increased Performance Engine (IPE). The system is being tested at P&W's

Senior Staff Changes

PROMOTIONS: To be **Major General:** Jay D. **Blume,** Jr.; Roy D. **Bridges,** Jr.; Patrick P. **Caruana;** Stephen P. **Condon;** Gary L. **Curtin;** Kenneth E. **Eickmann;** Phillip J. **Ford;** Carl E. **Franklin.** John C. **Griffith;** Otto K. **Habedank;** James L. **Hobson,** Jr.; William E. **Jones;** Nicholas B. **Kehoe** III; Robert E. **Linhard;** Michael D. **McGinty;** Richard B. **Myers.** Philip W. **Nuber;** Everett H. **Pratt,** Jr.; Glenn A. **Profitt** II; Ronald N. **Running;** Garry A. **Schnelzer;** Paul E. **Stein;** Ralph G. **Tourino.**

To be **Brigadier General:** Donald J. **Harlin.**

CHANGE: B/G (M/G selectee) James L. Hobson, Jr., from Cmdr., 322d AD, MAC, and DCS/Airlift Forces, USAFE, Ramstein AB, Germany, to Cmdr., 435th AW, MAC, Rhein-Main AB, Germany, replacing Col. Donald A. Streater.

SENIOR ENLISTED ADVISOR (SEA) CHANGES: CMSgt. David J. Campanale, to SEA, Hq. MAC, Scott AFB, Ill., replacing CMSgt. Richard A. Young . . . **CMSgt. James B. Livesay,** to SEA, Hq. PACAF, Hickam AFB, Hawaii, replacing CMSgt. Robert W. Hall.

Government Engines and Space Business facility in West Palm Beach, Fla. The plan is to test the nozzles at idle thrust and then increase to rated thrust levels.

Thrust vectoring can improve maneuverability in flight and increase range. General Electric, P&W's prime competitor, has a similar program and tested its own vectoring nozzle last summer. GE hopes to flight-test its system sometime this year.

In other engine news, P&W resumed field service evaluation of its F100-PW-229 IPE at Nellis AFB, Nev., following problems with the engine's fourth-stage turbine blades, which delayed the program for several weeks. P&W flies three F-16Cs and five F-15Es with the IPEs, which are said to be functioning well.

Army Stays With Dragon II

The Army chose a system already in its inventory, the Dragon II missile, to serve as its interim antitank weapon until its follow-on, the Javelin missile, comes on line.

Dragon II defeated the Swedish-built Bofors Bill in a competition that has lasted several years. Though the Army found it superior overall to the Bofors Bill, Dragon II is unable to defeat reactive armor. Bofors Bill is advertised as being able to defeat such armor.

The fire-and-forget Javelin will not be operational until the mid-1990s. The Army said Dragon II was superior to Bofors Bill in such key factors as operational effectiveness, cost, suitability, and performance.

News Notes

- The provisional headquarters of the new US Strategic Command became operational in January at Offutt AFB, Neb., under the command of Brig. Gen. Robert Linhard. Formal establishment will take place June 1.
- All of Military Airlift Command's aircraft will change colors from camouflage to a flat gray. The first aircraft, a C-5A, received the makeover in January.
- Some 3,000 surviving veterans of the Bataan Death March, one of the worst Japanese atrocities of the World War II Pacific campaign, will receive the Bronze Star to honor their bravery. Navy Secretary H. Lawrence Garrett III issued the executive order authorizing the move.
- Hughes Aircraft Co. successfully tested a Maverick missile equipped with a millimeter-wave seeker, which scored a lethal hit in February on an air defense target at Eglin AFB, Fla. It was the second in a series of tests against priority moving and stationary targets. The seeker is designed to locate and engage targets autonomously (*i.e.,* without communication from a launch platform).
- The Navy completed the second ship-launch test flight of a Harpoon antiship missile with Block 1D system improvements in late November at the Pacific Missile Test Center at Point Mugu, Calif. This launch completes the development test phase of the ten flight test program.
- The Air Force awarded contracts in January to E-Systems ($12.9 million), Raytheon Co. ($13.8 million), and Stanford Telecommunications Corp. ($12.5 million) for demonstration of small, low-cost, extremely high frequency terminals for the Milstar satellite communications system. At the end of two years, one contractor will be selected for the engineering and production phase.
- The F-117A System Program Office (SPO), Special Operations Forces SPO, and Systems SPO have been merged to form a new Aircraft SPO at Wright-Patterson AFB, Ohio. The move results from the Defense Management Review.
- *Stars and Stripes* is celebrating its fiftieth anniversary this month. The

newspaper, written by and for the US GI, was first published in London in 1942.

■ The Navy and General Electric reached a settlement on repairing cracked welds on the SSN-21 *Seawolf*-class attack submarine, with the Navy paying an additional $58 million for the finished sub.

■ LTV Corp. agreed in principle to sell its Aerospace and Defense Group to a firm formed by Lockheed and Martin Marietta in February. The new company will be called Vought Corp.

■ The Air Force is seeking information from industry on development of an Advanced Capability Antiradiation Missile, according to *Commerce Business Daily* in January. AFSC's Aeronautical Systems Division would develop the missile for use in air defense suppression.

■ General Powell has commissioned a book that outlines the importance of teamwork on the battlefield. The book is one response to lessons learned in Desert Storm. *Joint Warfare of the US Armed Forces* was ordered for the top officers and enlisted troops in the US armed forces.

■ A NASA-modified F/A-18, using integrated thrust-vectoring and flight-control systems, demonstrated stabilized flight at up to seventy degrees angle of attack in January. NASA is studying enhanced high alpha maneuvering.

■ Giat Industries delivered its first production Leclerc main battle tank to the French government in January. The first French unit will become fully equipped with the tank in 1995.

During a February test, this Hughes Advanced Surface-to-Air Missile (ASAM-I) fulfilled its predicted performance parameters. ASAM-I, based on the Advanced Medium-Range Air-to-Air Missile, has a larger rocket motor, designed to provide significantly more impulse and greater range and altitude performance from a ground launch.

■ The first twenty-three C-26B mission support aircraft were delivered to the 128th Tactical Fighter Wing at Truax Field in Madison, Wis., in January. They were flown there by pilots from the Wisconsin ANG. The delivery is part of a $235 million contract.

■ MAC completed its final objective wing restructuring with the organizational changes at the 1605th Military Airlift Support Wing at Lajes Field, Azores, in January. Under the new structure, deputy commanders for operations, maintenance, and resources are replaced by commanders for operations, logistics, support, and others.

■ The Hunter Short-Range Unmanned Aerial Vehicle system, being jointly developed by Israel Aircraft Industries Ltd., Malat UAV Pland, and TRW Avionics & Surveillance Group, successfully completed the first relay of two unmanned vehicles ever performed under government supervision. During the January flight at the Army's Electronic Proving Ground in Arizona, imaging data from the penetrator UAV's sensor were transmitted to the ground station via the relay UAV for nearly three hours.

■ The Miniature Receive Terminal (MRT) for the B-1B bomber successfully passed a field reliability growth test in January. Rockwell International Corp.'s Command and Control Systems Division developed the unit. The MRT is a critical link in the Minimum Essential Emergency Communications Network, linking the national command authorities to the US strategic bomber force.

Honors

Dr. Fred Diamond, chief scientist at Rome Laboratory, Griffiss AFB, N. Y., received a Senior Executive Service Presidential Award of Distinguished Executive. Dr. Diamond was cited for his more than forty years of service as a scientist and engineer, making major contributions in radar and communication technologies.

Purchases

The Army awarded Bell Helicopter Textron a $42 million firm fixed-price contract for twenty-eight OH-58D air-

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craft for the Army retrofit program. Expected completion: October 30, 1993.

The Air Force awarded Hughes Aircraft Co. a $12.4 million face-value increase to a time and materials contract for technical support of the Lot IV buy of the Advanced Medium-Range Air-to-Air Missile. Expected completion: December 1992.

The Navy awarded Honeywell a $20.2 million fixed-price incentive contract for guidance system components for the fleet ballistic missile program. Expected completion: May 31, 1994.

The Air Force awarded Westinghouse Electric Corp. a $15.2 million firm fixed-price contract for spares applicable to the F-16C/D AN/APG-68 radar. Expected completion: December 1993.

The Air Force awarded Northrop a $20 million face-value increase to a cost plus incentive fee contract for an engineering change proposal to revalidate and revise the requirement baseline of the B-2 aircraft training system for the B-2 research and development effort. Expected completion: December 1995.

Obituaries

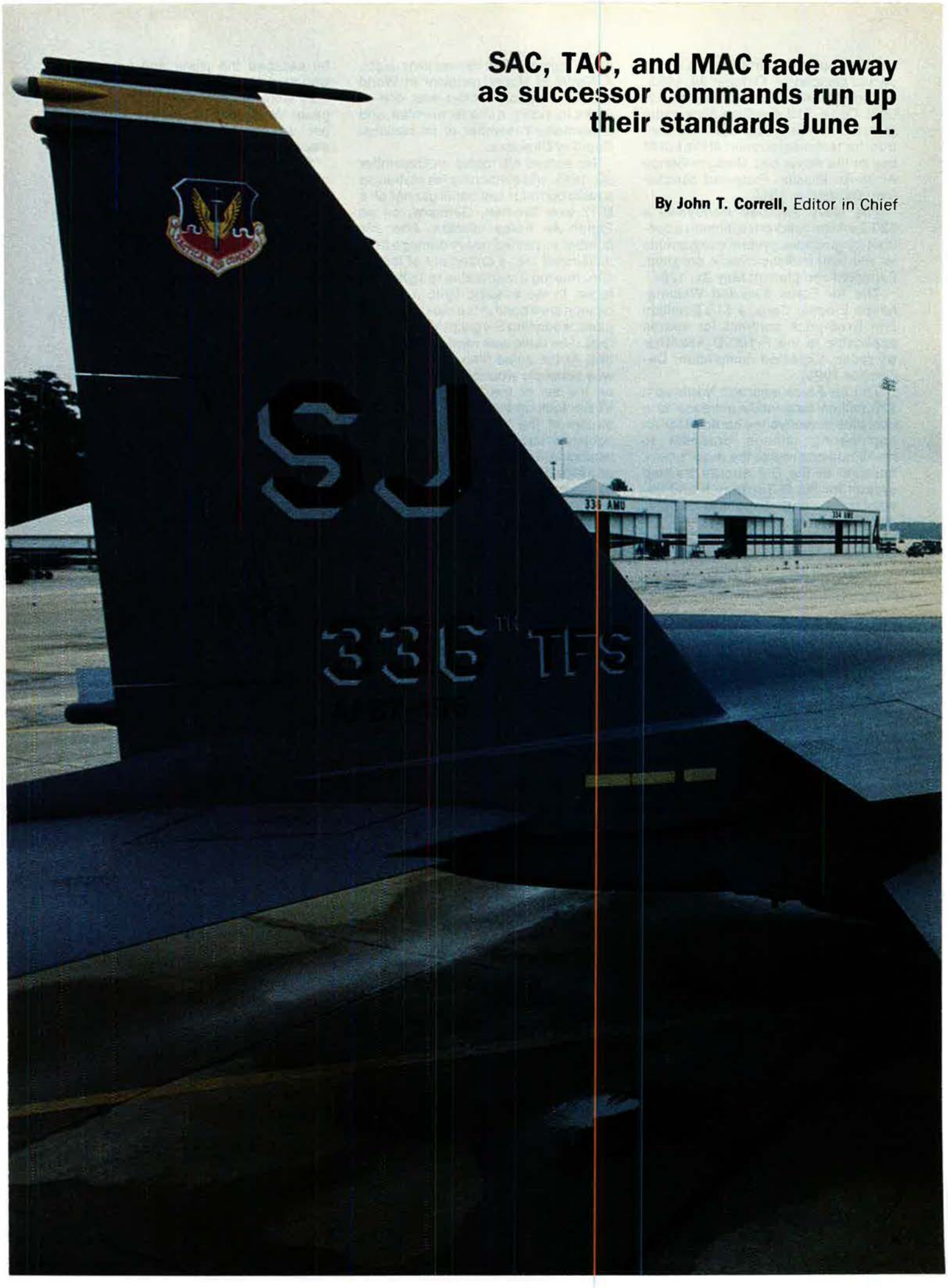
TSgt. Forrest L. Vosler, USAAF (Ret.), died of a heart attack in February in Titusville, Fla. He was sixty-eight. A Medal of Honor recipient in World War II, Sergeant Vosler was one of AFA's founders, a charter member, and a permanent member of its National Board of Directors.

He earned his medal on December 20, 1943, while manning his station as a radio operator and aerial gunner on a B-17 over Bremen, Germany, on an Eighth Air Force mission. After his bomber sustained heavy damage from antiaircraft fire, it drifted out of formation, making it vulnerable to fighter attacks. In the ensuing fight, a 20-mm cannon shell burst in the radio compartment, wounding Sergeant Vosler in the legs. The radio was rendered inoperative. At the same time, the tailgunner was seriously wounded by a direct hit on the tail of the bomber. Sergeant Vosler took up the slack with a steady stream of fire to keep the swarming fighters at bay. Another shell exploded, wounding Sergeant Vosler in the chest and face. He kept firing his gun. Surviving its ordeal over the North Sea, the bomber was forced to ditch off Cromer, England. Although blinded by metal fragments, Sergeant Vosler was able to repair the damaged radio and send distress signals between periods of unconsciousness. After the ditching, he escaped the plane and kept the wounded tailgunner afloat until both men were pulled into a dinghy. Sergeant Vosler was discharged in October 1944 after prolonged hospital treatment.

Sven Dodington, the inventor of several basic navigation systems used to guide aircraft, died in January of natural causes in Whippany, N. J. He was seventy-nine. Mr. Dodington developed tactical air navigation and distance measuring equipment, which directed planes to airports using radio beacons.

Gen. Vernon E. Megee, USMC (Ret.), a pioneer in Marine Corps combat aviation, died of pneumonia in January at Albuquerque, N. M., at the age of ninety-one. He had been ill for some time. General Megee rose from private to four-star rank in forty years with the Marines. General Megee was the first to use aircraft in a close air support role while being directed by ground commanders. He retired in 1959.

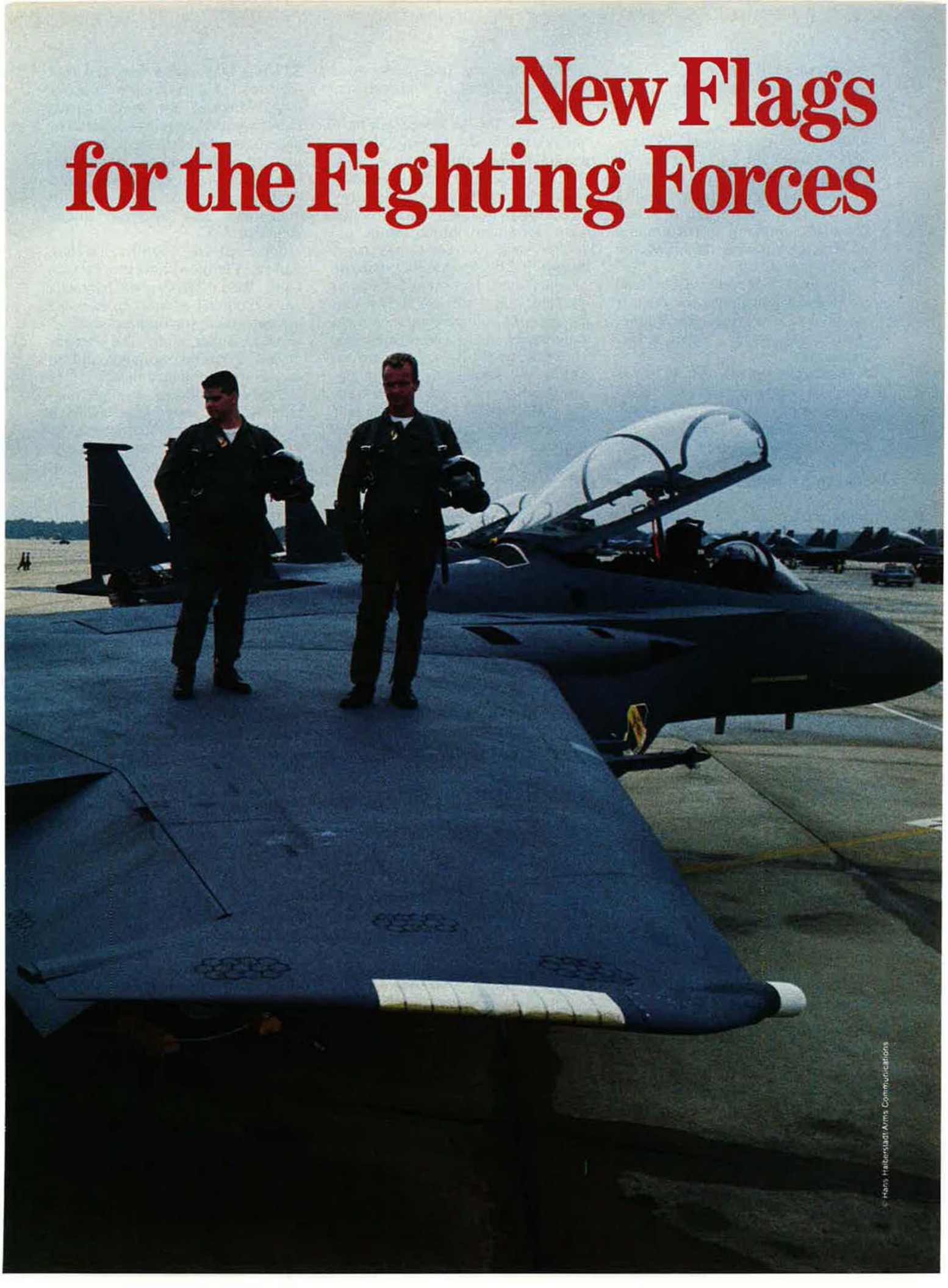
L. Eugene Root, an aircraft designer and missile builder, died in January after suffering a stroke in Menlo Park, Calif. He was eighty-one. Mr. Root worked for Lockheed on the Polaris program, among other programs. ■



SAC, TAC, and MAC fade away as successor commands run up their standards June 1.

By John T. Correll, Editor in Chief

New Flags for the Fighting Forces



Two months from now, the flags go up on the biggest reorganization of Air Force operational commands in forty years.

Tactical Air Command, Military Airlift Command, and Strategic Air Command will be deactivated June 1. Bombers, fighters, and missiles will regroup under the new Air Combat Command. Airlifters and most tankers transfer to Air Mobility Command.

A joint US Strategic Command assumes responsibility for nuclear weapons of all services. It will adopt the old SAC motto, "Peace is Our Profession."

Concurrently, the Air Force is rapidly realigning itself into "composite" wings, each of them an integrated package of aircraft and capabilities to carry out a combat mission. With few exceptions, the traditional wing—specialized in function and aircraft—will be a thing of the past.

"The era of *dis*integrated airpower is over," said Gen. Merrill A. McPeak, USAF Chief of Staff, at an Air Force Association symposium in Orlando, Fla., January 30.

The new wing structure streamlines leadership into a commander (more often than not a general officer), a vice commander, and three group commanders. "Of the ninety-nine wings we expect to have in 1995, seventy-six have transitioned to the new format," General McPeak said.

By 1995, the Air Force will have thirty percent fewer people and operational wings than it did in 1988. The latest defense budget proposal would not cut force structure any deeper than that, but it does reduce plans for aircraft procurement.

The Air Force now stands to get twenty B-2 bombers rather than the seventy-five it had wanted. General McPeak said that these B-2s would be grouped, along with their own tankers, into a new composite wing.

"With twenty B-2s, I can put together two squadrons of eight operational aircraft each," said Gen. John M. "Mike" Loh, commander of Tactical Air Command—and heir apparent to Air Combat Command. At any given time, the other four will be in depot or pipeline status or in use for testing.

The Air Force regards the B-2 as such a valuable asset that it will employ to the best advantage possible whatever numbers it can get. "If we were issued *one* B-2, we would look hard at operating it," General McPeak said.

Not Without Pain

Gen. George Lee Butler, the last commander of Strategic Air Command and the first commander of STRATCOM, acknowledged that the June 1 changes are traumatic for many who had developed a strong identity with the organizations to be disbanded. Nevertheless, he said, the end of the cold war, the evolution of the Air Force mission, and a decline in force structure made it "inevitable" and "essential" to disestablish SAC.

Although SAC performed well in Korea, Vietnam, and the Persian Gulf, "the hard truth about Strategic Air Command is that we're not a conventional warfighting outfit," General Butler said. "The essence of SAC from the beginning, and today, is nuclear deterrence."

The conventional bomber mission will be better handled by a command organized for the employment of general-purpose forces, he said, and it also makes sense to consolidate authority for the nation's residual nuclear assets and forces in STRATCOM.

On its present course, SAC was shrinking toward "less than 85,000 people, no more than sixteen bases, 200 bombers max—none on alert—half the tankers in the Guard and Reserve. Less than the size that 2d Air Force was in 1961.

"Is that a major command?" he asked. Better to make the change than "trying to maintain a Strategic Air Command that was a shrunken, truncated version of its former self."

New Roles, New Standard

It should be of some comfort to those shedding their SAC patches June 1 that long-range conventional bombers figure centrally into plans for the new Air Force.

The operational concept in conventional conflict, said Lt. Gen. John E. Jaquish, principal deputy assistant secretary of the Air Force for Acquisition, will be first to send "our most capable systems," such as B-2 bombers and F-117 and F-22 Stealth fighters.

General Loh said the stealthy B-2, which can carry sixteen precision guided weapons, is pivotal. "The role I see for the B-2 is hitting those key targets early, before we have a chance to suppress all the defenses," he said. "That's sixteen precision weapons on sixteen aircraft and 256 targets you can attack."

In the second phase of conflict, "continued hostilities," General

Seymour Johnson AFB, N. C., is home to the 4th Wing, the first new combat-oriented composite wing. In the Persian Gulf War, 4th Wing's F-15Es and KC-10s deployed to Saudi Arabia together. Above and on preceding page, weapon systems operator 1st Lt. Ray Roth (left) and pilot 1st Lt. Dan Holmes fly this F-15E of the 336th Fighter Squadron. The "T" for "tactical" in its designation is destined to disappear, just one of many changes in store for the Air Force in the next few months.

Jaquish said the Air Force would employ its older and less sophisticated aircraft, the F-15s, F-16s, and multirole fighters, which would be available in greater numbers.

The Air Force's job in these early phases of conflict is to "knock the enemy down and keep him there while our follow-on forces move into place," General Loh said.

While the B-2 and the F-22 Stealth fighter lead Air Combat Command's shopping list for new systems, General Loh does not overlook the bombers already in the force.

In the opening hours of the Persian Gulf War, B-52s flying a marathon round-trip mission from Barksdale AFB, La., launched conventional cruise missiles into Baghdad as part of the initial strike on Saddam Hussein's integrated air defense system. That capability could prove useful again in the future.

"I want us to take a look at the B-1 with a fresh set of eyes," General Loh said. With the B-2 program capped at twenty aircraft, the Air Force will increase its efforts to convert the B-1B into a state-of-the-art conventional bomber.

General Loh said that the B-1's present electronic countermeasures—regarded as a problem for the past several years—are probably adequate for conventional missions flown at low altitude and high speed but that corrective work on the ECM suite will continue because of the residual nuclear role.

For conventional work, he proposes to install a new fire-control system and other capabilities that will allow the B-1 "to deliver several varieties of conventional weapons that we deliver now from airplanes like the F-15E and the F-117."

Air Combat Command can pitch out the old "Red-Blue scenario studies," General Loh said, because "there's a new standard out there that we created in the Gulf: that is to win quickly, decisively, with overwhelming advantage, and with few casualties."

Congress and the public now expect US armed forces to prevail by "99-1, not 55-54 in double overtime," he said.

© James Benson

With the end of the cold war, emphasis has shifted from a strategic nuclear role to a conventional one for long-range bombers like this B-52. The Gulf War highlighted the bombers' conventional capabilities, and USAF decided to implement a new force structure rather than maintain a truncated version of Strategic Air Command.

The "Mission of Choice"

The Air Force is more than passing proud of what it achieved in the Gulf War last year, but those who expected it to campaign on that basis for a single-dimension airpower strategy are wrong. USAF seems as committed as ever to the combined-arms approach.

"In my view, close air support is the Air Force mission of choice," General McPeak said. "Ideally, we would devote all of our combat sorties to CAS. That would mean we had the air superiority and interdiction problems under control, and we could give everything we had to supporting our guys on the ground.

"Don't get me wrong. Some contingencies will allow for—indeed, demand—independent air intervention, or for much of the load to be carried by airpower. But where American troops are engaged on the ground, protecting them and making their job easy should be our principal concern."

USAF photo by Sgt. Greg Ford

This A-10 is from the new composite 23d Wing, now forming at Pope AFB, N. C. The new wing will eventually have F-16s and C-130s as well. It will work closely with the Army's 82d Airborne Division at Fort Bragg, combining to create what General McPeak calls "the nation's premier forcible-entry capability for the future."

General McPeak was visibly enthusiastic about the 23d Wing, now forming as a composite unit at Pope AFB, N. C. It will eventually have A-10, OA-10, and F-16 fighter and attack aircraft and its own C-130 transports. This wing and the 82d Airborne Division next door at Fort Bragg will be "the nation's premier forcible-entry capability for the future," General McPeak said.

In some contingencies the 23d Wing may operate without the airborne, General McPeak said, "but make no mistake, the idea is to form an air-ground team."

Given the expected force structure of 26.5 general-purpose wings, the Air Force will allocate about a half dozen of them to close air support. The two A-10 wings, one in the active force and the other in the Air Guard, will be so designated.

The additional close air support and battlefield air interdiction mission will go to four or five F-16 wings, General Loh says, probably those already equipped with the Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) system, because the requirement is for support around the clock and the Air Force cannot afford to equip its entire F-16 fleet with LANTIRN.

General McPeak also clarified the Air Force's position on the concept, which worked so well in the Gulf War, of a single air boss and a central air tasking order.

"There are doctrinal disagreements about how to employ air in a theater of operations," he said. "We feel—I think correctly so—that whoever provides the majority of the air assets . . . ought to have overall tasking authority for everything in the theater.

"It doesn't always have to be the Air Force. In some contingencies, we may not be there or we may be there in very small numbers. It may be a situation where the Navy floats a deck in there and they provide most of the airpower."

In such cases, he said, "the senior naval aviator ought to be putting out an air tasking order," and "what we're saying is that the right way to do this is have one guy run it. Whoever provides the majority of the air is the logical guy."

Combat Force Modernization

The B-2 program, although reduced, may now stabilize at the level of twenty aircraft. The next big force modernization program in line is the F-22, which General Jaquish said "will be the Air Force air-superiority fighter for the next thirty to forty years." He declared the F-22 "the linchpin to success in Phase One [initial hostilities of a conflict] and thus the overall campaign."

Two other aircraft modernization programs will follow. The "concept exploration" stage of development is scheduled to begin this summer for a multirole fighter that will replace the F-16 after the turn of the century. The Air Force also plans to buy the A-X advanced interdiction aircraft, which will be fielded first by the Navy.

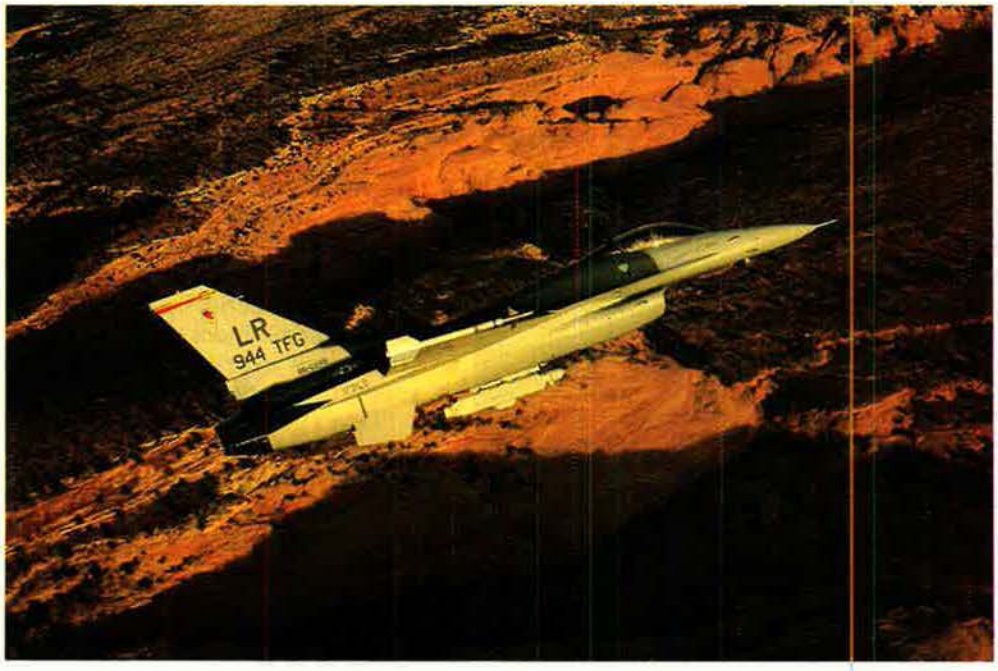
The announced plan has been to acquire the multirole fighter before the A-X, but General McPeak said at a press conference in Orlando that he did not regard the MRF as "a program that I think we need to get into a crash dive on."

Pressed for money, the Air Force may settle for a variant of an existing aircraft rather than an all-new one for the MRF. "If we had to buy one today, it would probably be an F-16," General McPeak said, adding, "But we don't have to buy one today."

Partly as a result of its Gulf War experience, the Air Force will put more emphasis on capability to defeat tactical ballistic missiles.

"The Scud, an unsophisticated, thirty-year-old system, caused immense problems for us," General Loh said. "We can't let that deficiency go unanswered. We need a theater missile defense system that finds and destroys missiles at launch, or preferably before launch. It's a tough problem, but that's an Air Force mission."

Possibilities include upgrading AWACS and ground-based radars to detect missile launches faster and project their flight paths and impact points more accurately. Some of the



© Joe Towers

Guard and Reserve forces showed their mettle in the Gulf War, fighting alongside active-duty units and validating the total force concept. Force-mix questions become increasingly important as the drawdown continues. This multirole F-16C fighter is from the 944th Tactical Fighter Group, an AFRES unit based at Luke AFB, Ariz.

work done during the cold war to counter Soviet mobile ICBMs and other "relocatable" targets may be applicable, General Loh said.

The Air Force is investigating ways to "intercept a tactical ballistic missile in the early boost phase, from the moment of launch through its first thirty or sixty seconds of flight, and attack it with an AMRAAM [Advanced Medium-Range Air-to-Air Missile] or an AMRAAM-modified kind of missile from some airborne platform," he said.

Hit Hard—and From Home

With a third fewer fighter wings than it had in 1988, fewer bases abroad, and the public expectation for Operation Desert Storm–style overwhelming performance—the 99-1 standard rather than 55-54 in overtime—Air Combat Command is considering its task soberly.

Under current national security guidance, the command is supposed to be able to fight two regional conflicts simultaneously.

"One in Europe and one in the Pacific is our most demanding scenario," General Loh said. "We are currently at risk and have insufficient general forces should this kind of scenario occur.

"If you feel that a European conflict is unlikely, then consider a combined Pacific and Middle East scenario. During Desert Storm, we actually used thirty-three percent more fighter forces than the current guidance for that single regional contingency provides. Many of those fighters were our most capable front-line aircraft. The coalition aircraft contribution was the greatest since World War II."

Should crises develop concurrently in the Pacific and Mideast, "we would require every available fighter wing and most of the bombers in the entire Air Force, both active and reserve, to apply the overwhelming force strategy that worked so successfully in the Gulf. A further force cut (and I've heard numbers like twenty to twenty-five percent reduction) in the base force would force us to fight even up, not with overwhelming or even decisive advantage in such a scenario.

"I think all of us agree that that's an unacceptable option, given our mission, our set of responsibilities, and the new standard that we have set for ourselves and that America expects of us."

Staff photo by Guy Aceto

A ground crew of the 60th Fighter Squadron, 33d Fighter Wing, Eglin AFB, Fla., wrestles an AIM-7 Sparrow into position. With a third fewer fighter wings, there will be fewer people on the ground and in the air to get the job done, even as global power projection from US bases becomes more critical.

The watchword for general-purpose airpower, General Loh said, will be the ability to "strike immediately, strike hard, strike alone if necessary—and from home."

Projecting global power from US bases may be critical. The idea is to send a comparatively small force of highly capable aircraft to blunt or contain a crisis until the rest of the force can get there.

"Today—we know because we've been offered some—you can buy a MiG-29 for $24.2 million on the open market," General Loh said. "All you need is cold, hard cash, and the now service-oriented Russians will deliver it to your airfield. This means the sophisticated systems we've worked hard to counter aren't concentrated in one area or manned by one enemy. We expect to face top-notch technology anywhere we're called to go."

Force Mix Questions

Since the new defense budget holds the line on force structure—personnel levels as well as units—the Air Force will avoid, for now at least, the decision on where to cut next. Most of the reductions so far have been absorbed by the active-duty forces. Further cuts would make it difficult to avoid the politically explosive issue of eliminating more Guard and Reserve units.

General Loh said that, in 1988, sixty-seven percent of the fighter and attack force were in the active-duty force and thirty-three percent in the Guard and Reserve. By 1995, the active-duty component will be down to fifty-six percent of that force.

He acknowledged the fighting quality of the reserve components but said that several factors limit the share of the force mix they should account for.

One of these is the rotation base. If too much of the Stateside force structure is in the reserve, an unduly high percentage of the assignments for active-duty forces will be overseas. Already, General Loh said, aircrew members spend eight years of a twenty-year career overseas.

In addition, the active-duty force provides much of the common infrastructure and support for all components, conducts testing and development, and bears the tasking for the most immediate response to crisis.

For both force management and operational reasons, said General Loh, "putting more than thirty-five or forty percent of our general-purpose force structure in the [Guard and] Reserve will tend to decrease our ability to project immediate and decisive global power, so I'm a little concerned that we don't make that ratio too low."

Change in Major Theaters

US Air Forces in Europe, which recently fielded eight fighter wings, is drawing down to three and a half. Basically, USAFE will be organized to hold the line and receive reinforcements in a part of the world where instability has replaced direct East-West confrontation as the immediate cause for concern.

The changes coming to the Air Force are unprecedented, but whatever the commands are called, Air Force personnel will adapt and continue to perform their missions. The latest defense budget holds the line on personnel levels, avoiding for a time cuts deeper than those already planned.

"The USSR has broken into at least fifteen fractious pieces, where more than 100 different ethnic groups now struggle for political identity, geographical separation, military stability, and economic survival," said Gen. Robert C. Oaks, USAFE commander in chief.

"Within those fifteen new and fragile republics, millions of trained but hungry troops are still in uniform. Hundreds of thousands more, recently trained soldiers, are now civilians, without meaningful work or hopeful prospects.

"The vast array of modern military equipment built up by the Soviet Union in past years is still present and still lethal."

Military activity is booming along the Pacific rim. "Japan, for example, builds its own F-15s and, soon, modified F-16s," said Gen. Jimmie V. Adams, commander in chief of Pacific Air Forces. "It is developing indigenous main battle tanks and naval vessels. According to the US Arms Control and Disarmament Agency, India, Pakistan, and South Korea are developing surface-to-surface missiles. North Korea is also developing such a missile."

General Adams cited four weapon systems that are "made to order" for PACAF's needs.

The F-22 Stealth fighter heads his list for several reasons, including the fact that "four of the most capable air defense sectors in the world are in my area of operations."

PACAF also wants the C-17 airlifter, for mobility, reinforcement, and resupply, and the E-8A Joint STARS, whose deep-looking radar was so effective in targeting enemy ground forces in the Gulf War.

The fourth big item on General Adams's list—theater battle management—was less predictable. General Adams, who was deputy chief of staff for Plans and Operations at the time of the Gulf War, said that planning and executing a consolidated air tasking order was "a major headache" because various USAF commands and the naval air components were using different computer battle management systems.

The air campaign in the Gulf War ran basically from TAC's Computer Assisted Force Management System (CAFMS), which required an adjustment by USAFE units, accustomed to operating on a system called "Eifel," and PACAF units, which had both its own "Constant Watch" system and another used previously by the Alaskan Air Command.

(During Operation Desert Storm, the Air Force offered CAFMS terminals to the Navy, but ships did not have the transmission facilities to use them. In the end, the ATO was couriered nightly on computer disks to carriers in the Red Sea and the Persian Gulf.)

"We are getting there," General Adams said. "The Air Force operational commands and the Navy have finally agreed to pursue 'TAF [tactical air forces] standards'—essentially the TAC system—and the Navy has already begun installing the system on its carriers. TBM [tactical battle management] is critical to the joint combined air operations we expect to conduct in future wars."

The Materiel Merger

This summer's round of reorganizations will also merge the Logistics and Systems Commands into the new Air Force Materiel Command.

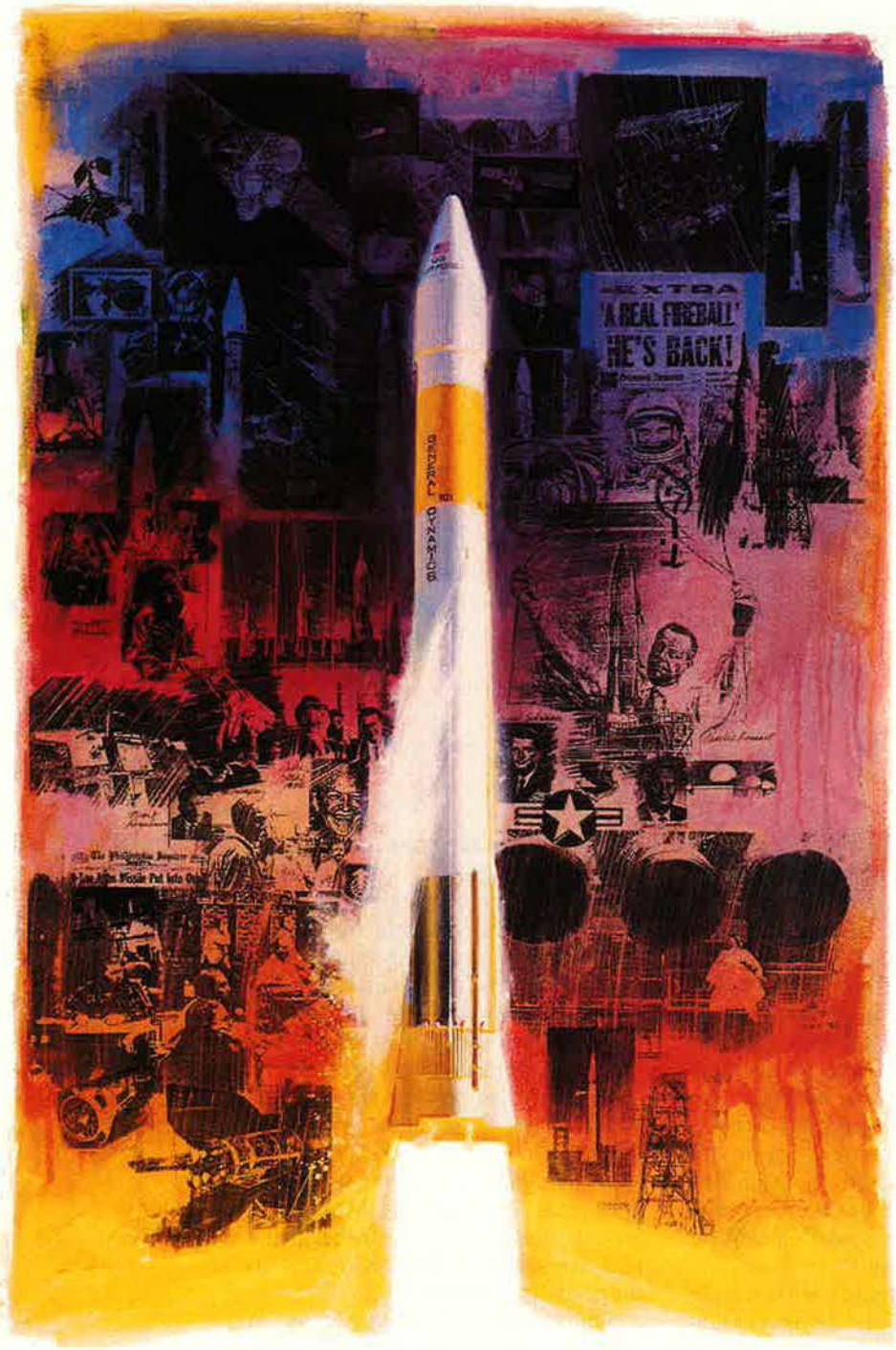
In Orlando, Gen. Charles C. McDonald, the last commander of AFLC, reported that Air Force Logistics Command, which won the 1991 President's award for quality from the Federal Quality Institute and which has gotten universally good marks for its contributions in the Gulf War, approaches the merger still working to improve its operation.

For example, he said, the TF39 engine that powers the C-5 airlifters was originally manufactured, on average, to a tolerance of about .004 of an inch. "We today produce those engines to about .002.

"All this is the result of process action teams taking a look at the C-5 engine down at San Antonio [Air Logistics Center]. One of our young technicians, not an engineer, said—and it's blindingly obvious in retrospect—that we were focusing our attention on the rotating parts, but that the tolerance between the static parts and the rotating parts is just as important.

"So we now focus on the casing just as hard as we do on the high-pressure turbine and the hot sections and the rotating parts. The bottom line is that the engines we hang on the C-5 today will be there a year and a half longer than the ones we hung there previously." ■

ATLAS.



HELPING TO SECURE THE FUTURE.

An Air Force Atlas II has successfully launched the first of ten Defense Satellite Communication System IIIB (DSCS IIIB) spacecraft. This marks the second flight of the new series of Atlas II launch vehicles and the first for the Air Force MLV II program.

With sixty new generation Atlas II vehicles in production and two state-of-the-art, multi-million dollar launch pads operational at Cape Canaveral, Atlas reliability will provide significant value to DSCS IIIB and other future missions.

GENERAL DYNAMICS

Space Systems Division

1991 was the year of restructuring. Now the Air Force turns its attention to the next special concern.

The Year of Training

By Peter Grier

LAST year, senior Air Force officials devoted lots of time and energy to reorganizing the service, bringing historic changes to the command structure. In 1992, they are turning their attention to a second basic service task: training.

"I want to examine closely how we prepare our people to do their jobs," Gen. Merrill A. McPeak, the Chief of Staff, recently remarked at the Air Force Association's Air Warfare Symposium in Orlando, Fla. "Training will be the basis of a quality Air Force, and this will be the year of training."

This effort will start with simple questions, as did the restructuring of the commands. What is the Air Force trying to accomplish with its training? Where should the training be done? Would a consolidated training command be more effective than today's setup?

Three task groups have been named to study the training problem, said General McPeak. They have an unlimited charter to look for things that could be done better, top to bottom. "By June, we should have in hand a sufficient understanding of the problem so that we can begin to make some decisions," said the General.

The Air Force practice of extensive on-the-job training for all career fields is one thing that will be examined. "We're unbalanced right now in the direction of the operational units doing way too much training," said General McPeak.

Lt. Gen. Joseph W. Ashy, head of Air Training Command, is already deep into this process. General Ashy says he has spent considerable time with General McPeak in recent months, sorting through the activities under his command to judge their efficiency.

The technical training portion of General Ashy's operation has received particular attention. "I can assure you we're taking this very seriously," he said at AFA's symposium in January.

Already, big changes are under way in ATC with the transition from all-purpose undergraduate pilot training (UPT) to specialized undergraduate pilot training (SUPT). When implemented this year, SUPT will split USAF pilot trainees into fighter/bomber and tanker/transport classes.

Pilot instructor trainers at Randolph AFB, Tex., prepare for an instructor proficiency flight. This year, Air Training Command will switch to specialized undergraduate pilot training in order to produce pilots more experienced in the type of planes to which they will be assigned.

USAF photo by SMSgt. Bob Wickley

ATC is getting ready for a procurement push that will have the command buying three new aircraft models by the turn of the century. At the same time, the shrinking of the force will close two ATC technical training centers, resulting in downtime for training programs in some skills.

Promising—but expensive—new training technologies loom on the horizon. "We need to make sure we're getting better," said General Ashy, but "at reduced cost."

Customers and Products

The switch to SUPT is meant to answer one of those simple questions General McPeak talks about: How can ATC produce better products for its customers? The "customers" in this case are Air Force flying commands, and the better "products" will be pilots more experienced in the type of planes to which they are assigned.

The old undergraduate pilot training proceeded down a single track. First, pilot candidates were screened for their raw flying ability in a military version of the basic Cessna Model 172 single-engine propeller-driven plane, the T-41 Mescalero. Then came common primary training in the venerable T-37 Tweet. Finally, they received advanced flight training in the equally aged T-38 Talon.

The new SUPT track begins the same way, with screening at one of two locations: Hondo, Tex. (an auxiliary field at Kelly AFB, Tex.), and the US Air Force Academy at Colorado Springs, Colo. The screening course is being increased from nineteen to twenty-one hours, with some solo sorties thrown in. The Air Force will soon begin phasing out the T-41 as a screening aircraft in favor of the new Enhanced Flight Screener (EFS).

Primary training will still be the same for all students. It will be given in the T-37 until the new Joint Primary Aircraft Training System (JPATS) comes on board.

Then, however, the pilot "assembly line" splits in two. Students in training to fly bombers or fighters will continue in the T-38. Those in tanker and transport training will move on to the new T-1A Jayhawk, a military version of a Beechcraft business jet. "Based on your merit or ranking in the class, you can choose either the bomber/fighter track or the tanker/transport track," said General Ashy.

Of course, the size and configuration of the future force structure will dictate how many slots are available for what kind of training. Current plans call for thirty-five percent of pilot students to take the bomber/fighter track, with eight percent ending up in bombers for their first assignment and twenty-seven percent in fighters.

Of the sixty-five percent of student flyers that enter the tanker/transport track, twenty-five percent will end up in tankers and forty percent in transports.

Total class size will shrink drastically. Last year, ATC trained some 1,500 pilots. That number is projected to drop to 700 in Fiscal 1993. It will bottom out at 500 in Fiscal Years 1994 and 1995.

"Not too long ago, we were training 4,000 pilots a year," General Ashy notes.

Such a drop in demand allows ATC to be even more selective about the quality of those entering the program. Already the average

college graduate candidate has well over a 3.0 grade point average, and almost ninety percent have degrees in a science or technology. Almost all have private pilot's licenses.

"I wouldn't qualify today," said General Ashy. "It's incredible, the quality we have."

The Procurement Plan Pays Off

These high-quality candidates will soon be training in new higher-quality airplanes. After making do with the same old aircraft for decades, ATC is finally seeing its procurement planning begin to pay off. The Air Force and the Navy have agreed to a Joint Trainer Master Plan, directed by Congress, that sets out procurement strategy from 1992 until well into the next century.

Heading the list of initiatives on the master plan are Service Life Extension Programs for the aging T-37s and T-38s. The airframes of both were first fielded in the 1950s, and the modifications focus on structural strengthening, not avionics updates. Work is currently being done by the San Antonio Air Logistics Center at Randolph AFB, Tex.

The noisy, unpressurized T-37 is getting banjo fittings to reinforce its tail and forward wing spar replacements, among other things. The T-38 Pacer Classic program includes installing aluminum flight controls, replacing dorsal longerons, improving wheels and brakes, and adding a flight loads computer. The T-38 update, said General Ashy, "has kept the airplane in very safe condition, and it will fly well past the year 2000."

In addition to pursuing the updates of old airplanes, ATC has three new aircraft programs coming up, with a fourth only a few years beyond.

The contract award for the EFS is scheduled for May. Plans call for first delivery in June 1993.

The EFS is a nondevelopmental aircraft program to replace the old high-wing Cessna Model 172 with a modern, single-engine, propeller craft. It will be capable of 140 knots, to shorten time spent getting to flight areas, and must be able to handle a twenty-knot crosswind easily. The Air Force Academy currently loses much screening time because of crosswinds.

The aircraft will also be certified for aerobatics and suitable for flight in an overhead traffic pattern. General Ashy said that such patterns now "cause a lot of trouble, believe it or not, in the T-37 program."

The contract award for JPATS, which will replace the T-37 and the Navy's T-34, is scheduled for February 1994. First delivery should occur slightly more than two years after that award.

JPATS is also supposed to be an off-the-shelf product. It will be a small jet, tolerant of student errors, capable of 250 knots at low level, with a G-loading of +6 Gs to −3 Gs and a twenty-five-knot crosswind limit for takeoffs and landings.

Crosswinds are common at such ATC flight training bases as Reese AFB, Tex., and Vance AFB, Okla. "The crosswind limit is really going to give us a boost . . . because we lose about fifteen to twenty percent of our sorties at Vance and Reese based on crosswind," said General Ashy. "This will cut it to zero."

The third new Air Force training aircraft of the 1990s is the T-1A Jayhawk, which is being delivered. McDonnell Douglas is the system integrator; Beechcraft builds the airframe and Quintron the simulators.

The Jayhawk differs from a standard business jet in that it has beefed-up landing gear and a third seat for an observation pilot.

"We think it's an excellent little airplane," said General Ashy.

Cost Is an Issue

While students in the tanker/transport track will use the new T-1A, those in bomber/fighter training will continue with the T-38 for the foreseeable future. The Joint Trainer Master Plan has a T-38 replacement penciled in, but deployment of this new Bomber/Fighter Training System (BFTS) is set for 2007. The Air Force won't even start work on a requirements document for the BFTS until later this year or early next.

Staff photo by Guy Aceto

The new Joint Primary Aircraft Training System (JPATS) will replace the T-37 and the Navy's T-34 around 1997. JPATS will be a small jet, tolerant of student errors, capable of 250 knots at low level, with a G-loading of +6 Gs to −3 Gs and a twenty-five-knot crosswind limit for takeoffs and landings.

Photo by Paul Kennedy

ATC's technical training will be reorganized around four "families" of training courses: communications-electronics at Keesler AFB, Miss.; intelligence and space at Goodfellow AFB, Tex.; air base support at Lackland AFB, Tex.; and aircraft maintenance at Sheppard AFB, Tex. (right).

"There will probably be some development requirements here," said General Ashy, "but, obviously, cost will have to be considered."

Cost is already an issue in technical training. In today's smaller Air Force, ATC can't afford to keep operating its current number of technical training centers. Not too long ago, the Air Force was putting up to 80,000 persons a year through basic training at Lackland AFB, Tex., with technical training the next stop for the vast majority of them. Now the basic training accession rate is around 30,000.

Over the next several years, two technical training centers will close. Chanute AFB, Ill., will go first, followed shortly thereafter by Lowry AFB, Colo. Some forty percent of ATC's resident technical training will be uprooted.

The remaining four centers will be organized around "families" of training courses. The communications-electronics family will be based at Keesler AFB, Miss.; intelligence and space at Goodfellow AFB, Tex.; air base support at Lackland; and aircraft maintenance at Sheppard AFB, Tex.

The time required to resettle courses from the closing bases, combined with delays and shortfalls in construction money, will result in "some very considerable downtimes" for certain disciplines, said General Ashy. Training in small missile maintenance, for instance, could be shut down for as long as twenty-one months. Vehicle-transport training could be down for twenty-six months.

Frontloading and Rearloading

ATC brass has spent much time recently figuring how to work around these potential downtimes. ATC plans to use mobile training teams and share existing buildings until permanent facilities are built. Big classes will be pushed through before bases close and right after the relocated courses reopen for business. By exploiting this "frontloading and rearloading," said General Ashy, "we can work around the problem and meet all the needs of our customers."

He notes that much of ATC's technical training operation remains "paper-based" but that computers are now an integral part of Air Force training technology. Goodfellow and Keesler, in particular, already make heavy use of computer-based courses that allow students to interact with a keyboard and screen.

The interactive videodisc is another advanced computer teaching aid that ATC uses. With this technology, students can work through lessons at their own pace, touching the screen to bring up the next installment of still photos and text. However, General Ashy complains that this approach is somewhat inflexible, as the videodisc can't be easily changed.

Video teletraining is now an option. This approach is, in essence, closed-circuit TV, with an expert at a central location conducting a course that can be beamed to sites around the country. It is more flexible, but since it has to be widely transmitted by satellite or land line, its costs are high.

"It's going to have to be cost-effective if we're going to use it," says General Ashy.

ATC sees digital interactive video as a promising technology. It differs from videodiscs in that it can be easily changed and brings motion to the training experience.

Then there's the promise of the "virtual" environment, something General Ashy judges an "incredible technology." Through use of projection goggles and sensor-studded gloves, the virtual environment seeks to duplicate the actual experience of flying a plane or maintaining equipment, down to the resistance on a wrench and the bump of turbulence.

"We could easily spend the Air Force budget on these sorts of things," notes General Ashy, "so it's going to have to be better *and* cheaper." ■

Peter Grier is the Washington defense correspondent for the Christian Science Monitor *and a regular contributor to* Air Force *Magazine. His most recent article, "Last Days at Clark," appeared in the February 1992 issue.*

Off-the-shelf plans did not suffice for the air campaign that General Schwarzkopf envisioned in the Gulf.

Plan of Attack

By James P. Coyne

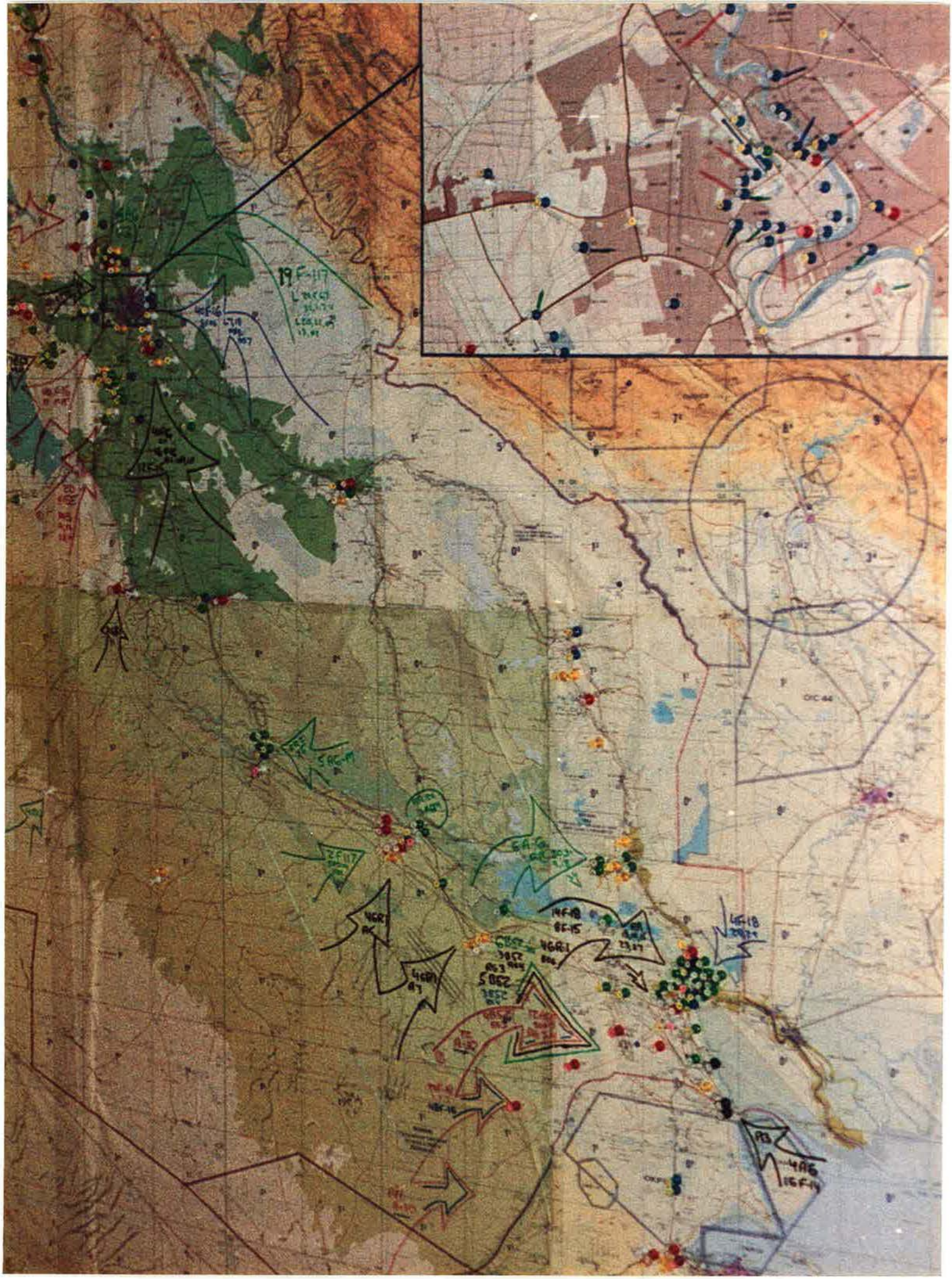
For years, Col. John A. Warden, the US Air Force's honcho for strategic war planning, had promised his wife Margie that, someday, they would take a Caribbean cruise. Someday arrived. And that's where they were—on a cruise ship south of Cuba—when he got word over the ship's television news program of the August 2, 1990, invasion of Kuwait. The frustrated Colonel Warden was unable to get back to Washington until early Sunday morning, August 5.

On Monday, in the Pentagon, Colonel Warden convened a small task force of planning and operational staff officers to develop a basic conceptual plan for the defense of Saudi Arabia. Most of these officers were assigned to the "Checkmate" division of the Air Staff. For years, the Checkmate staff had been busy analyzing operational aspects of a war with the Soviet Union. They were experts at computerized war gaming and combat simulation. Months before, when Saddam Hussein had begun his belligerent posturing toward Kuwait, they had begun to talk basic planning concepts for a war that might be fought in defense of Saudi Arabia.

Colonel Warden assembled his group in the Checkmate office suite, an austere, restricted-access vault several floors below ground level in the basement of the Pentagon. There, in a large briefing room with walls covered by floor-to-ceiling maps of the Soviet Union and eastern Europe, he stood before a large greaseboard and conducted a brainstorming session. As worthwhile ideas were expressed, he scrawled them on the board. By the end of the day, they had outlined a plan.

The group continued to work all day Tuesday. On Wednesday, August 7, Colonel Warden was called to the office of Gen. John M. Loh, the Air Force Vice Chief of Staff. Colonel Warden remembers that General Loh

Targets for the Persian Gulf air war are seen in this detail of a map that hung in "the Black Hole," a room in the headquarters of the Royal Saudi Air Force that served as an office for Brig. Gen. Buster C. Glosson's planning and operational action group. The Black Hole was a hive of action throughout the conflict.



had a direct question. "General Schwarzkopf has requested us to develop a strategic air campaign plan," Loh said. "What do you have to answer the mail?"

Gen. H. Norman Schwarzkopf, Commander in Chief of US Central Command, and Lt. Gen. Charles A. Horner, commander of Central Air Forces, had developed a bare-bones plan of their own for the deployment and reception of aircraft into Saudi Arabia and for defense against an attack by Saddam. Their staffs were almost swamped with detailed planning for the reception and beddown of coalition forces in the Persian Gulf.

Meeting within the Black Hole are General Glosson (second from left), Col. Tony Tolin (standing), and Lt. Col. Dave Deptula (far right). While they discuss the January 30, 1991, attack plan, Maj. Ernie Norsworthy (left) works on an F-16 issue. As more wings came into the area of operations, the staff grew.

Instant Thunder

Colonel Warden's plan was for an attack into Iraq to force Iraq to withdraw. He had already named the plan Instant Thunder to emphasize that it would be the direct opposite of Rolling Thunder, the gradually escalating air war over North Vietnam. He told General Loh they were just finishing something he thought would be appropriate. In the afternoon, he gave General Loh a twelve-page briefing paper outlining a conceptual strategic air campaign against Iraq.

General Loh liked it and suggested a few changes. Gen. Michael J. Dugan, the Air Force Chief of Staff, liked it, too. On Friday, August 9, Colonel Warden and a small team of his officers, along with Maj. Gen. Robert M. Alexander, USAF director of Plans, briefed the plan to General Schwarzkopf at his headquarters at MacDill AFB, Fla.

The plan was based on concepts set forth by Colonel Warden in his 1988 book *The Air Campaign*. In the book, Colonel Warden postulated five concentric "rings," or "centers of gravity," for strategic planning. The center ring, the most important, was the enemy's leadership. Outside that was key production—oil and electricity, for example. The third ring was infrastructure: roads, railroads, lines of communication. The fourth ring was population. The outside ring was fielded military forces.

The Checkmate group roughed in their ideas on a greaseboard, with the five strategic rings marked across the top.

"By attacking leadership," recalled Lt. Col. Bernard E. Harvey, a key member of Colonel Warden's brain trust, "we meant to attack leadership facilities, and we did that throughout the war. The places [from which] Saddam and his other leaders would direct operations are certainly military targets.

"The target, really, was Saddam's regime. What we wanted to do was isolate them and incapacitate them. Isolate them so Saddam could not lie and tell the people we were attacking them directly. Isolate him from his military forces so he couldn't order the army to attack or use weapons of mass destruction, or, if he could order them, not be able to orchestrate their activities."

The whole point, concluded Colonel Harvey, was "to inflict strategic paralysis on his regime so it wasn't even able to perform the normal functions of government."

Also under "Leadership," Colonel Warden listed telecommunications and command, control, and communications, because Saddam used them so extensively. He employed television not only to disinform but also to intimidate and to maintain his iron grip on the people.

The telephone system was another tool for domination. "We discovered that almost the primary function of the telephone system was to allow surveillance of the population," Colonel Harvey said. Most phone calls funneled back to a very small number of buildings in Baghdad.

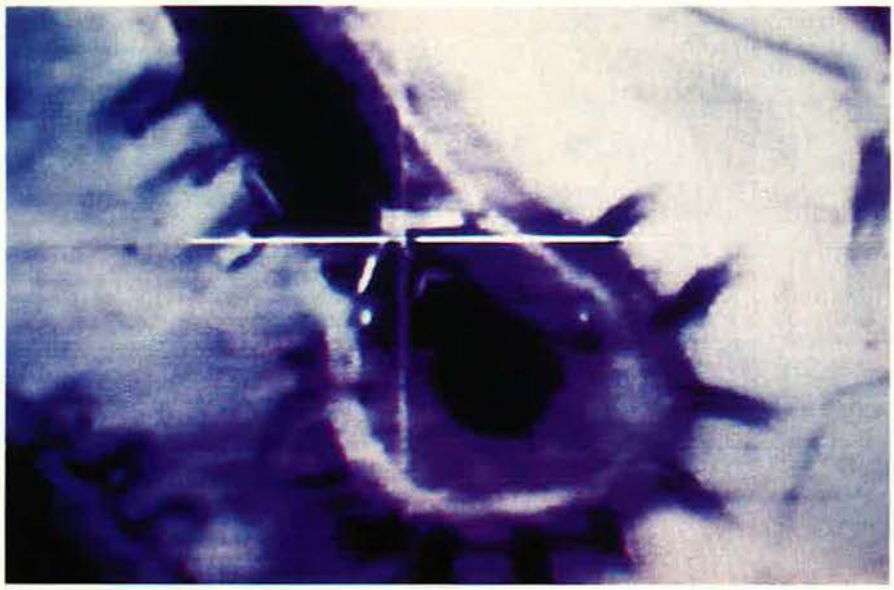
"In fact, we found out that more than half of Iraqi military land communications ran through the commercial telephone system. So the telephone system became a 'doable' target."

One, Not Ten Thousand

"Doable" meant "without unnecessary civilian casualties or collateral damage," he said. "It would have taken in the vicinity of 10,000 bombs in World War II to inflict the damage we did to the Al Karakh International Telecommunications Center building in downtown Baghdad with one smart bomb—and, of course, we would have killed thousands of civilians and destroyed other facilities we didn't want to destroy."

Under "Key Production," the group listed, among other things, electricity. "We didn't want to destroy his electrical system for ten years," Colonel Harvey said. Rather than targeting generator buildings, the group targeted the switching grid yards that stood next to all electrical generating plants. "Then, once the war is over, if outside assistance were able to be flown in, in a matter of a couple of months, a switching yard could be restored." Sometimes transformers were targeted. They are easier to replace than generating facilities.

Under "Infrastructure," they listed railroads, roads, and bridges. "We intended only to destroy a couple of railroad bridges to cut communications between Baghdad and Basra," Colonel Harvey said. "Later on, when it became necessary to build more



The coalition's air plan was designed to cripple Saddam Hussein's warmaking capability before the onset of a ground campaign. Iraq's air force was attacked early and hard, elimininating it as a serious factor. This photo shows the result of an Air Force attack on a loaded Tu-16 "Badger" aircraft.

than just a strategic plan, highway bridges were added as a way of isolating the army in Kuwait."

Under "Population," the group listed psychological operations. "We avoided attacking the population at all costs," Colonel Harvey said. By dropping leaflets and "other psychological warfare operations I can't go into, we simply told people to stay home, to stop working for the regime, and [we assured] them we did not want to hurt them.

"Psychological operations had a significant impact on the army in Kuwait. A lot of enemy prisoners of war had leaflets in their pockets or said that they had read them."

The last ring was "Fielded Forces." "We needed to take away Saddam's threat to his neighbors and the region," said Colonel Harvey. "We had to try to take out his ballistic missile capability, his long-range aircraft, and, of course, we needed to take apart the Republican Guard. First, we had to take out his strategic air defense systems to be able to hit all the other targets."

Sitting at the conference table in a large office at Central Command headquarters, with the bright Florida sunshine streaming through big windows, Colonel Warden was conscious that the air campaign he was proposing to General Schwarzkopf did not follow the dictates of the Army's AirLand Battle Doctrine. That doctrine postulated a relatively short air campaign followed by a ground force attack with air support. Colonel Warden's Air Force plan was designed virtually to destroy Saddam Hussein's warfighting capability before a coalition ground attack took place.

Schwarzkopf Says Yes

That concept appealed to General Schwarzkopf. He knew that, while his mission at that time was defensive, the President's stated objectives to restore the Kuwaiti government, protect regional stability, and remove the Iraqi Army were inherently offensive operations. It would take months to build up his ground forces enough to fight an offensive campaign. Only airpower could go on the offensive quickly.

While Colonel Warden briefed his plan, General Schwarzkopf asked few questions. When it was over, he expressed confidence that the plan could be carried out and told Colonel Warden to lay it before Gen. Colin L. Powell, the Chairman of the Joint Chiefs of Staff and principal military advisor to the President.

Returning to Washington, Colonel Warden briefed the plan to the JCS Chairman in his office on the Pentagon's second floor. General Powell listened intently and said he liked the plan—so far. Colonel Warden felt very confident about it. "I think the Iraqis will withdraw from Kuwait as a result of the strategic campaign," he recalls telling General Powell.

"I don't want them to withdraw," General Powell replied. "I want to destroy them. You need to have another phase to do that. I want to kill all their tanks."

"At that point," Colonel Warden said, "we started working not only the strategic campaign but also the beginning of what we came to call 'the operational-level campaign,' which was the direct attack on the Iraqi army in Kuwait itself."

General Powell directed Colonel Warden to add Army, Navy, and

Precision weapons struck this hardened aircraft shelter at Tallil AB, Iraq, blowing out its concrete doors and charring the interior. The Air Force attacked most of Iraq's 600 or so hardened aircraft shelters, destroying or badly damaging at least 375 and probably destroying at least 140 aircraft.

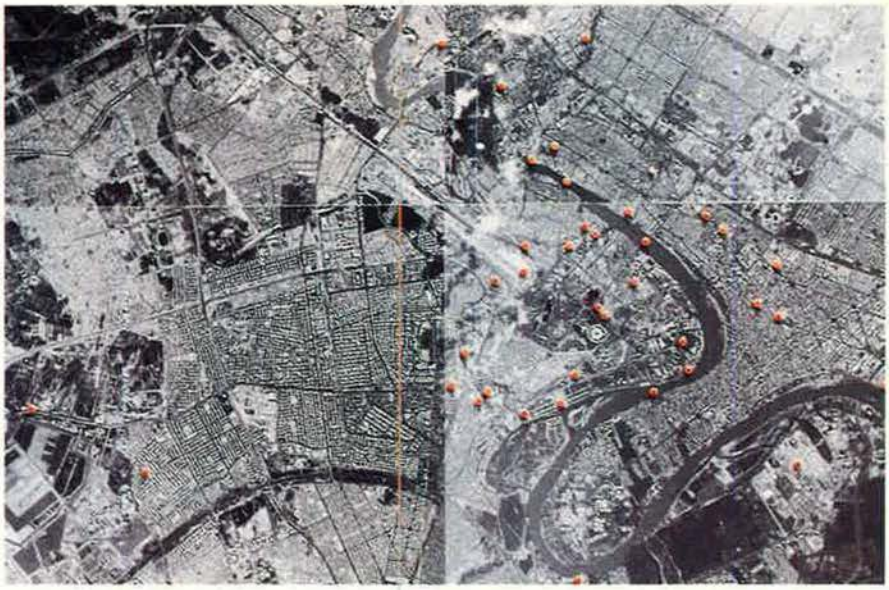
Marine Corps officers to his Checkmate planning team. "You're a joint group now," he said.

"We called the Army and Navy planners," Colonel Warden said, "and, within a few hours, we had Army and Navy aviators working in the basement with us. We had about 100 people at that point working out of Checkmate, of which maybe twenty to thirty percent were Navy and Marine."

"We worked out of the Checkmate war planning room, Army, Navy, Marine, and Air Force planners, for over a week," Colonel Harvey recalled, "sitting around the conference tables nominating targets and battling to come up with a good consensus."

"Soon," Colonel Warden said, "all the Soviet and Warsaw Pact wall maps were covered by big maps of Iraq, Kuwait, and the whole war zone. On one wall, we had a huge satellite picture of Baghdad. Intelligence people and others who had worked in Baghdad, like Ambassador [April] Glaspie, for example, were invited in to help us identify targets. Standing in front of the satellite photo, they would say, for example, 'There was a military command center on the second floor of that building. I drove by it on the way to work.' We'd check the information against other sources, and if it checked out, we'd put it on the list of targets."

The result, Colonel Warden said, was "a full draft operations order that went down just short of flag level."



This US satellite photo of downtown Baghdad hung on a wall in Col. John Warden's office. The yellow pushpins represent high-priority air targets. These include command-and-control centers, military airfields, leadership strongholds, storage depots, and electrical power facilities.

Enthusiasm for Airpower

They briefed the expanded plan to General Schwarzkopf on August 16. "He said some really nice things about airpower—that, in fact, the strength of the United States is in its airpower," Colonel Warden said. "He said that he would not be confident of driving the Iraqis out of Kuwait with ground forces alone, even if he had twelve months to do a buildup, because Iraq had one of the best defensive armies in the world and probably the best defensive combat engineers in the world. So he was very enthusiastic about the application of airpower."

General Schwarzkopf directed Colonel Warden to take his plan to General Horner, who was then "CINCCENT Forward" in Riyadh, Saudi Arabia. "Brief him," General Schwarzkopf said, "and hand it off to him."

Colonel Warden took three key staff officers with him: Colonel Harvey and two other lieutenant colonels, Ronald Stanfill and David A. Deptula, who had helped develop the plan. After the briefing, on August 19, Colonel Warden returned to Washington. At General Horner's request, the three lieutenant colonels remained behind.

On the afternoon of August 20, Colonels Deptula, Harvey, and Stanfill briefed the concept plan to Brig. Gen. Buster C. Glosson. Unknown to the briefers, on August 16 General Horner had informed General Glosson that he was to take command of preparing a Joint Strategic Air Campaign Plan, operations order, execution plan, and air tasking order for the first forty-eight hours.

That evening, General Glosson approached the group of young officers and said, "I hope you guys brought more than three days' supply of underwear." They extended their stay.

Colonel Deptula was one of the first members of General Glosson's "Black Hole" team, a special planning and operational action group that worked, at first, out of a large room next to General Horner's office

Lt. Col. Bruce Wright, commander of the 614th Tactical Fighter Squadron, 401st Fighter Wing, Torrejon AB, Spain, briefs squadron members on upcoming offensive operations. The 401st, a USAFE wing, was shortly to conduct the first daylight attacks in support of the liberation of Kuwait.

deep inside the Royal Saudi Air Force Building. There, General Glosson went to work. For a staff, he tasked the commander of each wing deployed to Saudi Arabia to assign two aircrews who were expert in employing that wing's weaponry. He acquired computer experts from the CENTAF staff to operate the Air Force's computer-assisted force management system (CAFMS). As more wings came into the area of operations, General Glosson's staff grew.

General Horner tasked General Glosson to prepare an executable air tasking order within a week. The ATO, issued every day, would provide detailed information on each day's flying activities, including assigned targets; type and number of weapons to strike them; which aircraft would carry them; from what bases, air refueling tracks, aircraft, and altitudes; and quantities of fuel to be transferred to the fighters, takeoff and landing times, restricted areas, intelligence information, and other information vital for each flight. The tracks and altitudes of all supporting aircraft, such as E-3 Airborne Warning and Control System planes and E-8 Joint STARS planes, had to be factored in.

Daily Additions

Every day there were new coalition air force assets to be assigned to targets. New targets were steadily added to the list. More weapons and types of weaponry became available. Weapons were carefully matched against targets to achieve specific results. Strike packages of fighter-bombers, electronic warfare and electronic combat aircraft, air-superiority fighters, and defense suppression aircraft had to be assembled. At the same time, the coalition air forces were flying hundreds of training sorties all over the Persian Gulf area.

Colonel Deptula became General Glosson's chief planner for the air campaign. "There were long, long days," Colonel Deptula says. "Basically, what we would do was write out what became known as the master attack plan, one single document that would lay out sequentially the time, where we were going, what we were attacking, with what, and how we were attacking, in a logical format. That's what we did for five months."

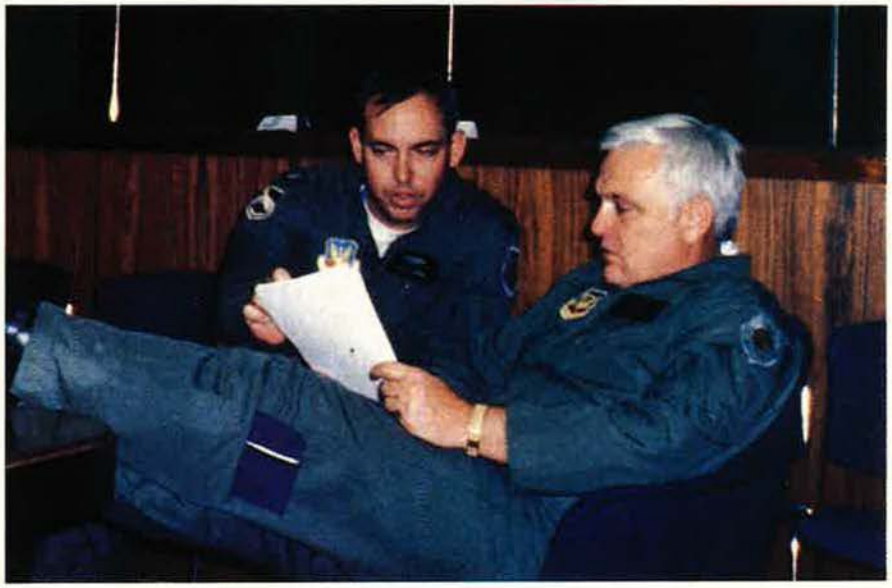
General Glosson's Black Hole group conceptualized five basic objectives.

US Navy photo by PH1 DeWayne B. Smith

The huge number of coalition aircraft had to be coordinated day after day, and air traffic controllers had their hands full managing the detailed air tasking order. This is an internal view of an in-theater control and reporting center, taken at the height of the air war in late January 1991.

They were to isolate and incapacitate Saddam's regime, gain and maintain air superiority, destroy his weapons of mass destruction (nuclear, biological, and chemical weapons and production facilities), eliminate Iraq's offensive military capability, and render the army in the Kuwaiti theater of operations ineffective.

Using those objectives, Colonel Deptula recalled, the people in the Black Hole developed twelve target sets, or groups of targets, to be hit. The leadership and command-and-control set, for example, included not only control nodes in the communications network but also television towers and transmission facilities. The primacy of air superiority generated a strategic air defense network target set and an airfield target set. There was a chemical target set and sets for Scud missiles; military production, storage, and support; the Republican Guard; electric grids; oil production, transportation, and refining; bridges; and lines of communication—highways, railroads, and the like.



On August 26, 1990, Colonel Deptula (left) and General Glosson review the initial attack plan, which would go later that day to Lt. Gen. Charles A. Horner, the "air boss" of the coalition war effort. Colonel Deptula and General Glosson put in "long, long days" in the Black Hole laying out the master attack plan.

The Master Attack Plan

The master attack plan was the engine of the planning process, since it provided a detailed script of what was to happen when, exactly who was to do it, and with what. "The best weapon system to achieve the desired effect was selected—regardless of service or country of origin," Colonel Deptula said. General Horner requested weaponry not already in the theater through the CINC.

Force packages—groups of attacking aircraft—were constructed to exploit specific coalition advantages and enemy weaknesses. For example, night operations were stressed, as were stealth, precision weaponry, cruise missiles, reconnaissance drones, night-capable attack helicopters, and in-flight refueling options.

Colonel Deptula recalled that weapon system experts from CENTAF staff and field units worked with specialists on intelligence, logistics, and weather. They factored in such specifics as bomb loads and aimpoints. According to their degree of participation in operations, the Royal Air Force, the Royal Saudi Air Force, and other coalition air forces also provided experts.

During the months before Operation Desert Storm began, the Black Hole staff began assigning groups of aircraft—as many as eighty—to operate together as they would in the war. They did this in southern Saudi Arabia, far beyond the surveillance of Iraqi radar.

Finally, the air offensive began in the early hours of January 17, 1991.

"We had 160 tankers airborne on several tracks at one time," Colonel Deptula said. "Tankers were stacked three deep, with only 500 feet separation between them. The weather was marginal to bad. Hundreds of fighters rendezvoused with their tankers, sometimes in clouds."

The grand air armada, with more than 300 strike aircraft and additional support aircraft, joined up. Everybody flew exact headings and altitudes without any midair collisions.

"For some time," Colonel Deptula said, "we had been flying a tanker or two straight for the border, turning back before crossing it. The Iraqis were used to seeing that on their radars. The big difference on the first night of the attack was, when [the tanker] turned around, a whole mess of F-117s kept on going—F-117s the Iraqis couldn't see. Those F-117s dropped the first bombs on Iraq, taking out an interceptor operations center in the southwest corner." *[See "A Strike by Stealth," March 1992, p. 38.]*

At war's end, some key Black Hole planners posed for this photo. Seated, from left: Maj. Ernie Norsworthy and Capt. Randy O'Boyle; standing, from left: Maj. Cliff Williford, Maj. Chip Setnor, RAF Wing Cmdr. Mick Richardson, SSgt. Heidi Pacheco, Lt. Col. Dave Deptula, Capt. Bill Bruner, Col. Tony Tolin, Maj. Charlie Allen, Capt. John Glock, and Lt. Col. Phil Faye.

In an interview after the war, General Glosson recounted the sequence of events of that first night: H-hour was 3:00 a.m., Baghdad time. Eleven hours and twenty-five minutes before H-hour, B-52s armed with AGM-86C conventional air-launched cruise missiles took off from Barksdale AFB, La. Seven hours before H-hour, more B-52s took off from Diego Garcia in the Indian Ocean.

"Next," said General Glosson, "the F-117s took off from their base well to the south of the border. Other attackers took off to rendezvous with their tankers. At H minus one hour and twenty-nine minutes, a Tomahawk Land Attack Missile was launched from the USS *San Jacinto* in the Red Sea."

As the ground-hugging Navy Tomahawks and Air Force ALCMs flew through the night toward their targets at subsonic speeds, Army and Air Force helicopters and Air Force fighters opened the war.

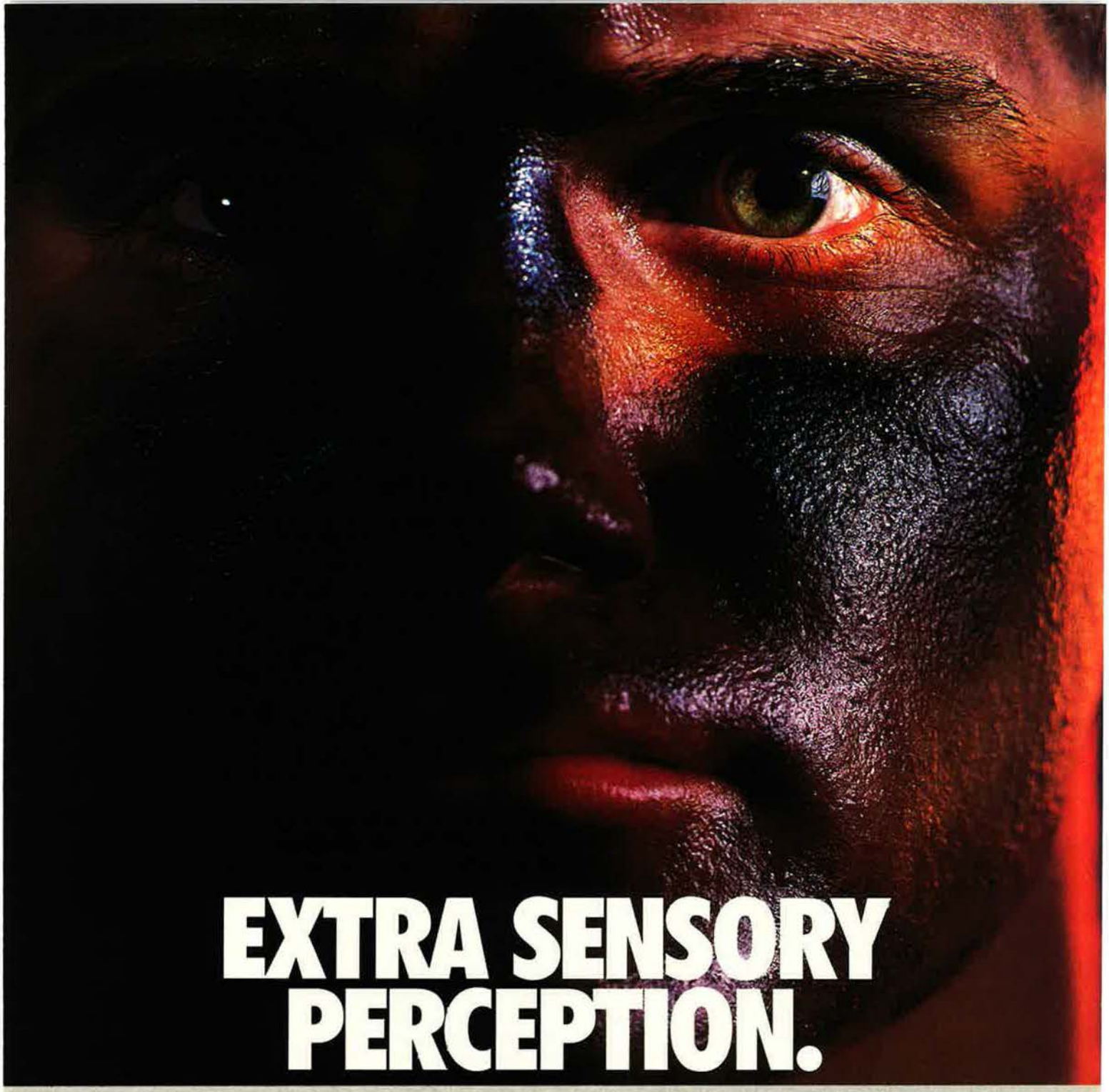
At H minus twenty-two minutes and H minus twenty-one minutes, two teams of Apache helicopters launched Hellfire missiles to knock out two radar sites in western Iraq, opening a gap in the Iraqi air defense net for conventional fighters. At H minus nine minutes, an F-117 knocked out an interceptor operations center in the southwest quadrant. Still the Iraqis did not launch interceptors.

"So," concluded General Glosson, "we were able to maintain total tactical surprise. At H-hour, an F-117 took out a main communications center in downtown Baghdad."

In General Horner's headquarters, there was silence as the clock ticked toward H-hour, 3:00 a.m.

"General Horner sent [Maj. Mark B.] 'Buck' Rogers upstairs to his office," Colonel Deptula remembered. "He [Horner] said, 'Turn on the TV and see what's on CNN.' After a while, Buck called down and said, 'Baghdad just went off the air!' There's a cheer. I look at my watch and it's exactly 3:00 a.m." ■

James P. Coyne is a veteran fighter pilot. He retired from the Air Force in 1984 as a colonel, served Air Force *Magazine as Senior Editor, and then became Editor in Chief of* Signal *Magazine. This article is adapted from his forthcoming Air Force Association book,* Airpower in the Gulf, *which will be published by the Aerospace Education Foundation. His most recent article for* Air Force *Magazine was "A Strike by Stealth" in the March 1992 issue.*



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Was the campaign against Saddam's missiles the "failure" and "disaster" that some critics now proclaim?

Scud War, Round Two

By Stewart M. Powell

IN THE year since the US-led coalition overwhelmed Iraq's missile-equipped military forces, a second "War of the Scuds" has erupted over the effectiveness of American efforts to destroy Iraq's ballistic missiles on the ground and in the air.

The combat this time is rhetorical, pitting analysts and partisans of all stripes in a debate that will shape the future of US tactics and defenses against the mobile ballistic missiles that are becoming the weapon of choice throughout the Third World.

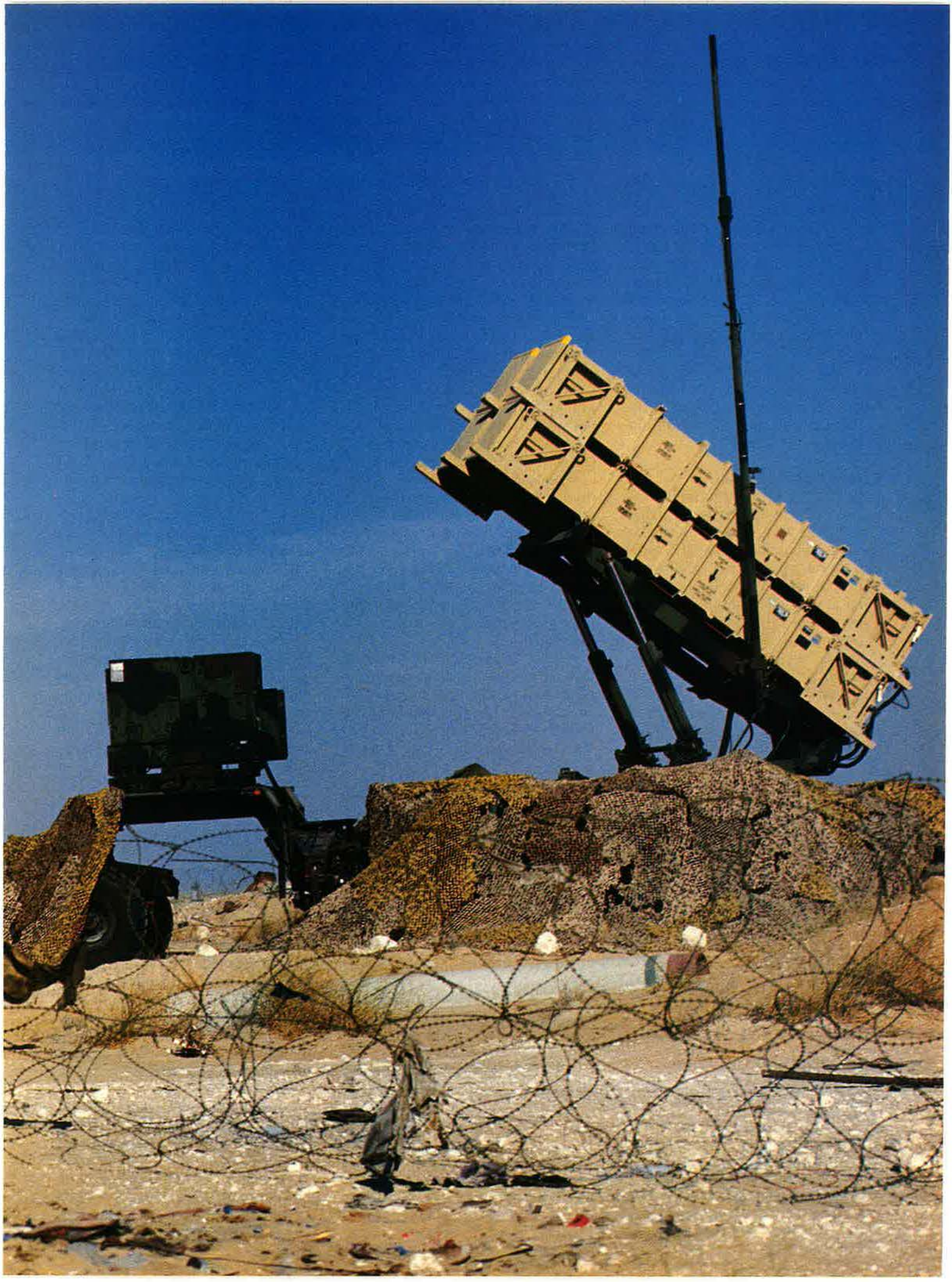
With increasing force and frequency, critics have challenged the Pentagon's claims that the innovative air campaign that relied on US Air Force systems scored heavily against mobile Scuds before they were fired against allied targets. Naval affairs analyst Norman Friedman, author of *Desert Victory* and a regular contributor to the US Naval Institute's *Proceedings*, is leading the challenge to the air-to-ground offensive, calling the effort "a miserable and telling disaster."

Critics also question the effectiveness of the Army's Patriot system, which repeatedly unleashed $600,000 missiles into the skies over Israel and Saudi Arabia to intercept inbound Scuds. Theodore A. Postol of the Massachusetts Institute of Technology has led postwar revisionism with his detailed contentions that the surface-to-air portion of the anti-Scud effort was "a nearly total failure."

Both the Air Force and the Patriot have their staunch defenders, however. The difficulties of combating the Scud threat during Operation Desert Storm are being taken to heart throughout the armed services, propelling new efforts to deal with a persistent, elusive menace that will only increase on the battlefields of the future.

Official reports show that Iraqi military forces mounted eighty-six Scud strikes at targets in Saudi Arabia or in Israel. The aging, thirty-seven-foot-long, 14,000-pound missile initially packed a 1,000-pound, high-explosive warhead before it was modified with longer fuel sections and lighter warheads for greater range. These variants included the 400-mile Al Hussein, with a 550-pound warhead, and the 500-mile Al

Critics and defenders of the Patriot antimissile system (right, in Saudi Arabia) have renewed the Scud war, with the fighting taking place in think tanks and universities rather than in desert sky and sand. Assessments of the Patriot's performance differ markedly.



Abbas, with a 275-pound warhead.

The potential lethality of every Scud missile was underscored in the final days of the forty-three-day war when one of the weapons, exploiting what the Army later called "an inexact computer software calculation," slipped past the net of a Patriot battery and slammed into a US barracks near Dhahran. The Scud demolished the rear-echelon building, killing twenty-eight Americans and wounding ninety-eight others.

Still, the Scud was far less potent as a military weapon than as a tool of political manipulation. Saddam used his Scuds to strike terror into the heart of far richer, better-armed nations—and, very nearly, to bring Israel into the war and thereby undermine the thirty-three-nation coalition.

Potent Political Punch

The Scud attacks carried immense political punch, taking allied commanders by surprise. Only at the last minute had Gen. H. Norman Schwarzkopf, the coalition's supreme military leader, broken open cargo space aboard C-5 and C-141 airlifters to send additional Patriots to Saudi Arabia to beef up defenses. When the first Scuds hit, General Schwarzkopf called them "militarily insignificant."

Yet constant media coverage of Scuds striking cities jolted public confidence, particularly amid fears that the Scuds might carry chemicals. "Now that we are into it," said Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, in the early days of the war, "we are finding that [the Scud campaign is] taking more of an effort on our part than we had anticipated."

Some analysts are highly critical of the Scud-busting operation, claiming it not only occupied unexpectedly large amounts of military resources, as General Powell conceded, but also produced fewer results than had been implied by officials. Mr. Friedman is one of the foremost critics, and his critique is sweeping. "Allowed to roam quite freely over a flat Iraqi landscape," he maintains, "the [Air Force] could not find a handful of mobile missile launchers even though the launchers were not masked in any way."

What really happened? Commanders had given priority to crushing the Iraqi Air Force of 750 combat aircraft and disabling its twenty-four main operating fields and thirty dispersal fields. Even before that phase of the war ended, leaders had to take steps to shift the pattern of attacks to destroy mobile launchers.

Prewar US intelligence had no firm fix on how many missiles Iraq possessed. Estimates ranged from 400 to 1,000. The weapons could be fired from dozens of fixed, surveyed sites, from up to fifty Soviet-made missile transporter-erector-launchers (TELs) and dozens of Iraqi-made mobile erector-launchers (MELs).

The allied campaign used virtually every system available. Bombers hammered production and storage facilities and fixed sites. Satellites detected the launches and relayed six minutes' warning downrange. The allies designated several "Scud boxes" to help strike aircraft narrow the search for the elusive targets that would emerge from hiding, fire, and hide again, within minutes.

The campaign was "intense and ran throughout the war," the Air Force said in a postwar white paper. By day, Scud-busting fell to many of the 144 A-10 Thunderbolt II attack planes based in the theater. A-10 pilots eyeballed suspect vehicles on highways and attacked them with 30-mm depleted-uranium ammunition or Maverick antiarmor missiles. The A-10s fired 5,274 Mavericks—ninety percent of the total launched by Air Force systems—and many were aimed at suspected Scud systems. Many of the 249 F-16s in the theater were at some point diverted to bomb Scud sites.

By night, F-15E dual-role fighters equipped with Low-Altitude Navigation and Targeting Infrared for Night (LANTIRN) attack equipment routinely orbited in two-ship patrols to dive beneath clouds and strike Scuds with precision weapons.

USAF photo by Sgt. Pedro Ybanez

Though Iraq had many mobile Scuds, it could launch only eighty-six against Saudi Arabia and Israel. The missile's political impact far outweighed its military significance, spurring the US to improve its antimissile capability to ensure results like this in any future effort against surface-to-surface missiles.

Joint STARS Lends a Hand

On occasion, F-15Es would be directed to the Scuds by one of the two E-8A Joint Surveillance and Target Attack Radar System aircraft in the theater. The Joint STARS aircraft had been rushed from development testing into combat to put their powerful side-looking ground surveillance radar to work.

Navy aircraft flying off three carriers in the Red Sea played a smaller Scud-hunting role, devoting an estimated ten percent of their sorties to the mission. F-14s and S-3s tracked the missiles, and then A-6E attack planes bombed them.

Also taking part were US and British commandos, who used laser designators to target Iraqi missiles for coalition aircrews. Lt. Gen. E. M. Flanagan, Jr., reported in *Army* Magazine that commandos operat-

The anti-Scud campaign was not limited to Patriot launches. F-15Es (above, equipped with LANTIRN pods), A-10s, F-16s, and Navy A-6Es joined the hunt. F-14s and S-3s tracked the missiles for the Navy planes, and the F-15Es sometimes got a big assist from the new E-8A Joint STARS aircraft.

ing in western Iraq found nine mobile launchers under a bridge on the Baghdad–Amman highway. Another commando mission uncovered preparations for a final, last-ditch barrage of up to twenty-nine missiles that would saturate and overwhelm the six Patriot batteries in Israel. The site was destroyed.

By war's end, allied aircraft had flown 2,493 sorties against Scud targets, the majority of these in the first three weeks of the air war. The final tally of Scuds actually destroyed was never really known. Postwar accounts showed scores of launchers unscathed and Iraqi Scud production continuing.

Washington readily acknowledged that the effort was not perfect. The Air Force conceded difficulties with Scud-busting in a report issued last September. The mission "posed one of the air campaign's most serious challenges," said the report. "Although air attacks dramatically reduced the frequency of Scud launches, the mobile missiles proved particularly difficult to detect and were never fully suppressed."

"We thought from the beginning that we would have to attack Scuds," said Gen. Merrill A. McPeak, the Air Force Chief of Staff. "What surprised us was [that] we put about three times the effort that we thought we would on this job."

William J. Perry, Under Secretary of Defense for Research and Engineering during the Carter Administration and now codirector of Stanford University's Center for International Security and Arms Control, concluded that, in general, the armed forces had done a satisfactory job, given the difficulty of the task. He added, however, that the US "could have done better" against the missiles had the military authorities "anticipated the difficulty and been better prepared."

The number of missile launches dropped steadily from an average of five per day in the first ten days of the war to one per day for the last thirty-three days. In the end, officials used this reduced rate of launches as the yardstick of success and made no claims that the US had eliminated the Scud threat. "I don't think you can put a hard percentage on the amount of his [Scud] capability that's been destroyed," admitted Secretary of Defense Dick Cheney. "It's a nebulous kind of thing."

Forced to Move Out

It is clear that, at a minimum, the unrelenting air war forced Iraq to move Scud operations away from the surveyed launch areas within range of Riyadh and Tel Aviv and launch from less satisfactory points. This reduced the Scuds' chances of actually hitting their targets. The harassing air operations also cut down the number of Scud launches.

On eighty-six occasions, however, Iraq successfully launched Scuds: forty times against targets in Israel and forty-six times against targets in Saudi Arabia. It was then that the surface-to-air portion of the Scud war came into play. Fifty-three of these Scuds came within Patriot "coverage" areas in Israel and Saudi Arabia. The rest fell beyond Patriot range or harmlessly into empty desert or the sea.

Neither the Army nor Raytheon Corp., the manufacturer of the

This Scud, targeted by a LANTIRN pod, is soon to be rendered harmless in a big way. In all, 2,493 sorties were flown against Scud targets—three times the anticipated effort. The Air Force asserts that Scud launches were "dramatically reduced" but concedes that they were "never fully suppressed."

Patriot, would detail the Patriot's performance on an attack-by-attack basis. Official statements, however, disclose that US forces fired a total of 158 Patriots, including one that was misfired at an allied aircraft returning to Turkey (it missed). According to Army figures, Patriots "successfully engaged" more than eighty percent of the Saudi Arabia–bound Scuds within its coverage range. The Army says that Patriots succeeded more than fifty percent of the time against Scuds plummeting toward Israel.

The first attack on Saudi Arabia, however, revealed a complication that dogged the Patriot throughout the war. High in space, a US satellite detected five missile launches, but, by the time the Scuds reentered the atmosphere six minutes later at a speed of 4,000 miles per hour, the five missiles had broken into four-

© Greg Mathieson

During and immediately after the Gulf War, the Army's Patriot received high praise, but controversy now swirls around the antimissile system. Its defenders point out that it was designed to defend "point" targets (i.e., small military sites, such as airfields) not "area" targets (i.e., large populated areas).

teen missile parts, including five warheads. The Patriot, an anti-aircraft system that had undergone software modifications to become an antimissile defense system, fired twenty-eight of its interceptor missiles, two for each incoming Scud object. It was an astonishing show of force, but it cost $16.8 million.

What is believed to be the first missile-to-missile "interception" in the history of combat took place 17,000 feet over Dhahran at 4:45 a.m. on January 17. A 200-pound Patriot proximity-fuze warhead showered its target with shrapnel, rendering it harmless. Israel, which absorbed four days of Iraqi Scud attacks without defenses, asked Washington to deploy US-manned Patriot batteries to join a pair of Israeli batteries that were manned by troops rushed back from training at Fort Bliss, Tex. Within twenty-eight hours, four US batteries with thirty-two Patriots were flown to Israel and set up.

Many Israelis viewed the Patriots as a source of absolute protection against attacks such as the ones in the first four days of the war, which wounded 115 and damaged 2,698 dwellings.

Little-understood at the time, however, was the Patriot's design as a defender of small military sites—so-called "point" targets—and not of vast, populated "area" targets. By that standard, said Maj. Pete Keating, an Army spokesman, the Patriot met its requirement and thus "succeeded" if it destroyed an incoming warhead, "dudded" its mechanisms, knocked it off course, or caused a partial burn of explosives.

Israel's Higher Standard

For Israelis, however, the standard of success was quite different—destruction of warheads and fragments from missiles—and they contend that the Patriot didn't hack it. The Israeli newspaper *Ma'ariv* calculated that eleven Scuds engaged by Patriots caused more destruction than the thirteen Scuds that hit Israel before the Patriots arrived.

The postwar clamor over the Patriot kept Israel's wartime sacrifice in the spotlight as the nation sought support from Washington for its Arrow antimissile program. The debate was intensified by the entrance of Mr. Postol, the MIT physicist who had once served as a science advisor in the Pentagon. His critique was contained in a detailed, fifty-two-page analysis published by Harvard University in the professional journal *International Security*. Said Mr. Postol, "Our first wartime experience with tactical ballistic missile defenses resulted in what may well have been a nearly total failure to intercept quite primitive attacking missiles."

His theme was echoed by Israeli scientists and military officers who traveled to Huntsville, Ala., for after-action meetings with US officers and officials. They said Israel's own postwar studies concluded that Patriots had destroyed less than twenty percent of warheads bound for Israeli targets. They claimed that twelve videotaped Patriot-Scud engagements showed not a single warhead destroyed.

The claims were seized on by critics of the Pentagon's Strategic Defense Initiative. Mr. Postol said that the breakup of Scuds simulated the dispersal of "decoys" that any future missile defense system would encounter. The Gulf War, he added, showed that missile defense systems could "likely be defeated" by simple decoys.

Stanford University's Professor Perry took a more moderate stance on the issue. The former Pentagon official said that the Patriot did as well as could be expected but that better defenses of the future had to pay "serious attention" to the problem of decoys.

Harold Brown, Secretary of Defense during the Carter Administration and one of the top technical and strategic experts in the US, hailed the Patriot's performance but cautioned that the results of the Gulf War did "nothing to contradict" his

A larger complement of Joint STARS aircraft (only two developmental models were available during the war) will surely help counter future mobile missile threats. Because of the many demands for its data, the modified Boeing 707 with its powerful side-looking radar could only perform Scud-hunting as a sideline.

long-held belief that existing technology offers "no reasonable prospect" of protecting the entire US from "a sophisticated, large-scale nuclear attack."

Arguing for Arrow

Others used the Patriot's performance as ammunition to bolster the case for continued US funding of Israel's own $2 billion Arrow. Tailored to defend densely populated areas, the Arrow was designed to intercept missiles at an altitude of twenty-four miles, four times higher than the Patriot's engagement altitude.

"The danger is that [US] research and development activities will continue on the false assumption that Patriot had an impressive success in intercepting Scuds," warned Reuven Pedatzur, an analyst publishing a study on the Arrow for the Jaffee Center for Strategic Studies at Tel Aviv University.

The postwar controversy, coupled with Israel's wartime restraint, sped Washington's approval of substantial funds for the next phase of Arrow. During his first postwar visit to Israel, Secretary Cheney agreed to provide seventy-two percent of $300 million budgeted for the second phase of development.

Brig. Gen. Robert A. Drolet, the Army's Program Executive Officer for Air Defense at Redstone Arsenal, Ala., said the Army was "highly satisfied" with the weapon's performance. The Defense Department, in a postwar report, said that Patriot had performed a key war-related mission by "frustrating Saddam's most politically visible weapon." The US weapon "countered a sense of helplessness that civilian populations would otherwise have encountered."

Raytheon Corp., in a twenty-eight-page, point-by-point rebuttal of Mr. Postol's allegations, highlighted the Patriot's technical prowess as well as its contribution to the alliance. Robert M. Stein, manager of Raytheon's advanced air defense programs, observed that the Patriot's performance could be "measured" by the facts that the coalition "did not falter," Israel stayed out of the war, and "widespread loss of civilian life was not inflicted—although the potential was clearly there."

Mr. Stein readily conceded the difficulties of building an impenetrable shield. "We as designers and manufacturers of these systems wish we knew how to achieve a 100 percent success rate under all conditions in wartime," he said. "We do not."

The war was hardly over before efforts were under way to improve tactics and systems to thwart mobile missiles. Officials moved to overcome gaps in real-time intelligence that impaired operations. As the Air Force white paper noted, Scud-hunting "hinged on the accuracy" of intelligence. The Air Force and the Defense Intelligence Agency forged ahead to bolster cooperation between intelligence agencies and attack forces.

A Promising Partnership

One promising point was the partnership between the F-15E and Joint STARS. Mr. Perry argues that, had more than two E-8s been available, Scud-busting might have been far more fruitful because the coalition could have put one of the surveillance planes on the job full-time, rather than as a sideline. The E-8 might have developed a "reasonably reliable signature of Scud activities" to enable the small force of strike aircraft to mount an effective campaign, he said.

The Pentagon also mapped immediate improvements in the Patriot to provide a fourfold increase in the area protected by a battery as well as to boost the altitude of interception by forty percent. With a second phase of follow-on upgrades by the late 1990s, the Patriot may be able to defend an area twenty times larger and intercept missiles at twice the altitude.

Even so, all signs are that the second round of the War of the Scuds will last considerably longer than the first. House Government Operations Committee Chairman Rep. John Conyers (D-Mich.), who also chairs that panel's Legislation and National Security Subcommittee, vowed an inquiry into the Patriot's performance. Said he, "What I'm beginning to feel is that this wonderful system wasn't so wonderful after all."

The outcome of the debate is uncertain, but it is sure to have a major impact on the direction of US military tactics and systems. ■

Stewart M. Powell, national security correspondent for Hearst Newspapers, covered Operations Desert Shield and Desert Storm in Saudi Arabia and elsewhere on the Arabian peninsula. He has covered security affairs in the US and abroad for more than a decade. His most recent article for AIR FORCE *Magazine was "Friendly Fire" in the December 1991 issue.*

"I Could Never Be So Lucky Again." by William S. Phillips. © The Greenwich Workshop, Inc., Trumbull, CT 06611

The Doolittle Raid

THE raid that Jimmy Doolittle led against Japan on April 18, 1942—fifty years ago this month—will always be remembered as one of the epic missions of World War II. Launching sixteen medium bombers from the short deck of an aircraft carrier would have been considered impossible if anyone had advanced the idea before the war; but wars always promote innovation, and legends, as a consequence, are born.

The tales of war usually become more exciting but less accurate in the retelling. Sometimes, however, the aftermath of an event is more extraordinary and absorbing than the actual wartime act itself. The Doolittle Raid and its aftermath were of that rare type.

Immediately after the mission, when the world learned that Tokyo and four other Japanese cities had been bombed, there were speculations that the raiders had flown from Alaska or from the island of Midway. President Roosevelt, to preserve the security of the mission, said they had come from "Shangri-La," the mythical city of James Hilton's *Lost Horizon*. The President's statement created an air of mystery that briefly confounded the Japanese and delighted the Allies.

When the public learned that the raid had been led by the famous Jimmy Doolittle, known mostly as a daredevil racing pilot; that he had been promoted to brigadier general, skipping the rank of colonel; and that he had received the Medal of Honor for the operation, speculation about the mission began in earnest. Books and motion picture projects were proposed.

Of the books, the first (and best known, even today) was Capt. Ted W. Lawson's *Thirty Seconds Over Tokyo*, written in 1943 with Bob Considine. It purported to be the story of the entire raid, but it was only one man's story, and no one in the US knew the truth about the fate of the eight raiders who had been captured. It was not revealed that the five men interned by the USSR had escaped after fourteen months of confinement and that they were forbidden to tell their story until after the war.

Fifty years ago this month, sixteen B-25s were launched from the carrier *Hornet* and flew into history and legend.

By C. V. Glines

Debunking the Myths

In 1944, the film "The Purple Heart," written by Darryl F. Zanuck (under the name Melville Crossman), became the first aviation film to depict the raid. It was a fictional effort based on the Japanese announcement that the US prisoners had been executed after confessing they had bombed nonmilitary targets. The men were supposed to have been beheaded by samurai.

In truth, three flyers were executed by a firing squad. Five others saw their sentences reduced from death to life in prison. One of these died of malnutrition. The other four were freed by commandos of the Office of Strategic Services (OSS). The team parachuted into Peking for the rescue.

Stephen Pendo observes in *Aviation in the Cinema*, "Critics praised the film for its effective portrayal of the brutal Japanese."

Later in 1944, the film version of *Thirty Seconds Over Tokyo* was released. It is still shown regularly and will no doubt be seen many times this month. It, too, took some license with the facts but is nevertheless considered a classic war film.

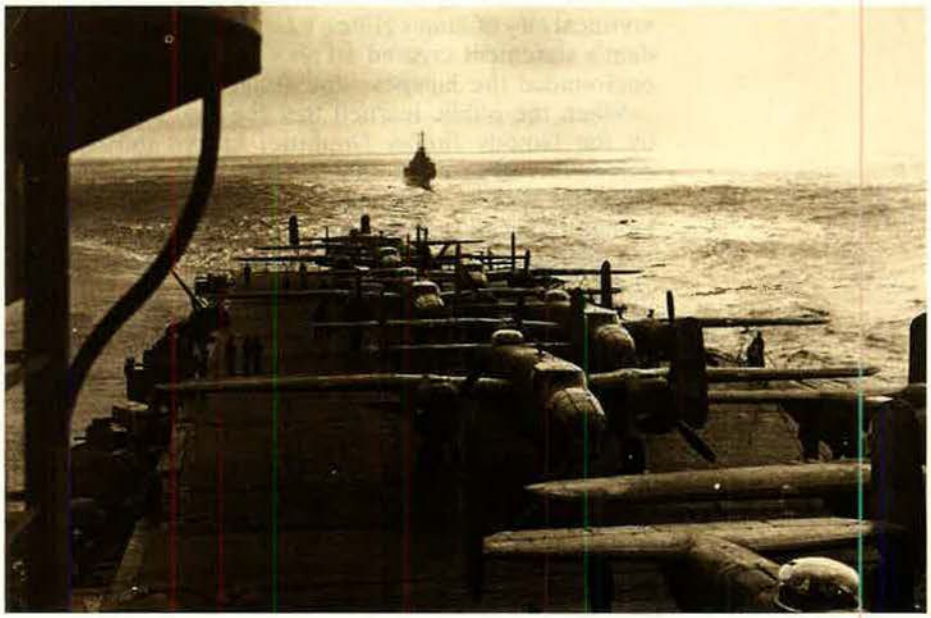
Unfortunately, many writers have taken license with the facts of the raid. Their fictions have been perpetuated by other writers, innocent of any knowledge of the facts, using previous writings as authentic sources. For example, some of these writers state that Jimmy Doolittle was the first to launch a B-25 bomber off a carrier. Not so. Others were at the controls when two B-25s were launched from the carrier *Hornet* off Norfolk, Va., on February 2, 1942.

Moreover, it is not true that all of the pilots who flew on the famous raid practiced short field takeoffs at Eglin in Florida. Capt. Edward J. "Ski" York and Lt. (later Col.) Robert G. Emmens arrived late at Eglin and received no instruction or practice. They stated they had no difficulty on the mission. However, it was their aircraft whose engines had been tampered with and which consumed excessive fuel en route to the target. They proceeded to the Soviet Union, where they were interned. Lieutenant Emmens published his account of the experience in the 1949 book *Guests of the Kremlin*.

Over the years, writers have credited the conception of the Tokyo raid variously to Doolittle, Gen. Henry H. "Hap" Arnold, or even President Roosevelt. Again, not so. It was conceived merely as a possibility by Navy Capt. Francis S. Low, a submariner on the staff of Adm. Ernest J. King, chief of naval operations. The idea was relayed to General Arnold, who then put Doolittle in charge of AAF preparations after Doolittle had agreed that it was possible to launch B-25s from a carrier.

A few writers have postulated incorrectly that the B-25s were to return to the carrier. That was never considered.

It has been assumed that the Navy task force returned to Pearl Harbor without mishap. Also not true. Three Navy scout planes were lost, and three more were damaged in landing accidents after the B-25s were launched. Two men died in a ditching, and a deckhand lost an arm when he was blown into the propeller of the last B-25 as it was maneuvered into takeoff position.



Space was at a premium on the deck of the Hornet as it maneuvered close enough to Japan to launch the sixteen B-25s (left). Opposite, a glum Colonel Doolittle sits beside his wrecked bomber, contemplating both his present fix and the court-martial he believes awaits him in the US. Rarely had a man been more incorrect in gauging his future prospects.

One writer has called the mission a "fluke," while another has ridiculed it as a senseless risk because all planes were lost and too little damage was done to the Japanese targets, if indeed anything of a military nature was hit. Some others, apparently believing Japanese reports, stated that some B-25s were shot down over Japan. The truth is that none suffered any major damage, although crew members reported that one or two may have taken a few inconsequential hits from fighters or ground fire.

Unprecedented Morale Boost

It is true that sixteen B-25s, carrying 32,000 pounds of bombs, could not wreck Japan's economy, no matter how accurately the bombs were dropped. But Japan's capital had been bombed by American planes, giving the United States a boost of morale that was unmatched up to that time. The Allies had had no encouraging news of any kind since the bombing of Pearl Harbor four months

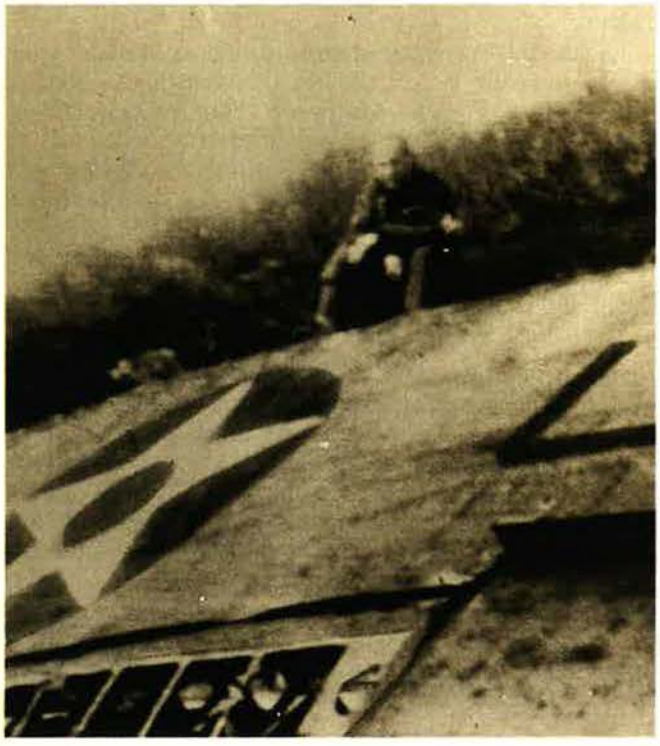
earlier. The Imperial Japanese forces had rampaged across the Pacific. Guam, Singapore, Wake Island, and Hong Kong had fallen. In the Philippines, Lt. Gen. Jonathan Wainwright was making a last stand at Corregidor.

The purpose of the Tokyo raid, according to Doolittle, was "to bomb and fire the industrial center of Japan." However, he felt that its real value would lie in its psychological impact on the Japanese people and their leaders.

"An action of this kind is most desirable now due to the psychological effect on the American public, our allies, and our enemies," said Doolittle in a February 1942 paper. He added that "it is anticipated that this will not only cause confusion and impede production but will undoubtedly facilitate operation against Japan in other theaters due to their probable withdrawal of troops for the purpose of defending the home country."

That their home islands and their capital had been bombed in a surprise attack, by American warplanes, precisely as the Japanese had struck Pearl Harbor, shattered Japanese morale. The raid was a *touché* not lost on the Japanese military psyche. The Japanese high command had lost face and was thoroughly embarrassed at the invasion of Japanese airspace after it had promised the people that their homes would never suffer war damage. Premier Hideki Tojo minimized the effect of the attack and boasted, "Japan has never lost a war in all the 2,600 years of her glorious history."

For Japanese military leaders, though, the sting went deep. Proof was seen in the bloodbath that Japanese forces inflicted on the Chinese. Fifty-three battalions of the Japanese Army, which had been occupying the coastal areas of China for several years, immediately began a massive campaign of wanton slaughter against the Chinese, who had helped the Americans escape after they bailed out or crash-landed on the mainland.



Wholesale Horrors

Generalissimo Chiang Kai-shek, the Chinese Nationalist leader who opposed such a raid and was not informed about it beforehand, cabled President Roosevelt: "After they had been caught unawares by the falling of American bombs on Tokyo, Japanese troops attacked the coastal areas of China where many of the American flyers had landed. These Japanese troops slaughtered every man, woman, and child in those areas—let me repeat—these Japanese troops slaughtered every man, woman, and child in those areas, reproducing on a wholesale scale the horrors which the world had seen at Lidice" (Czechoslovakia, where Nazi German troopers massacred civilians).

Chiang's assessment was reiterated by Gen. Claire L. Chennault. In his memoirs, General Chennault wrote that the Japanese army drove 200 miles inland and slashed through 20,000 square miles of Chinese territory to seek revenge. They murdered hundreds of villagers who fell under the slightest suspicion of having helped the Doolittle crews. "Entire villages through which the raiders had passed were slaughtered to the last child and burned to the ground," wrote General Chennault. "One sizable city was razed for no other reason than the sentiment displayed by its citizens in filling up . . . bomb craters on the nearby airfield."

As Doolittle predicted, Japanese fighters were recalled from the Solomons to defend Japan, although Adm. Isoroku Yamamoto, commander in chief of the Imperial Fleet, ridiculed the operation, publicly calling it the "Do Nothing Raid." Nevertheless, Admiral Yamamoto worried that it could happen again. He ordered Operation MI, the fateful plan that led to the attack on Midway Island in June 1942.

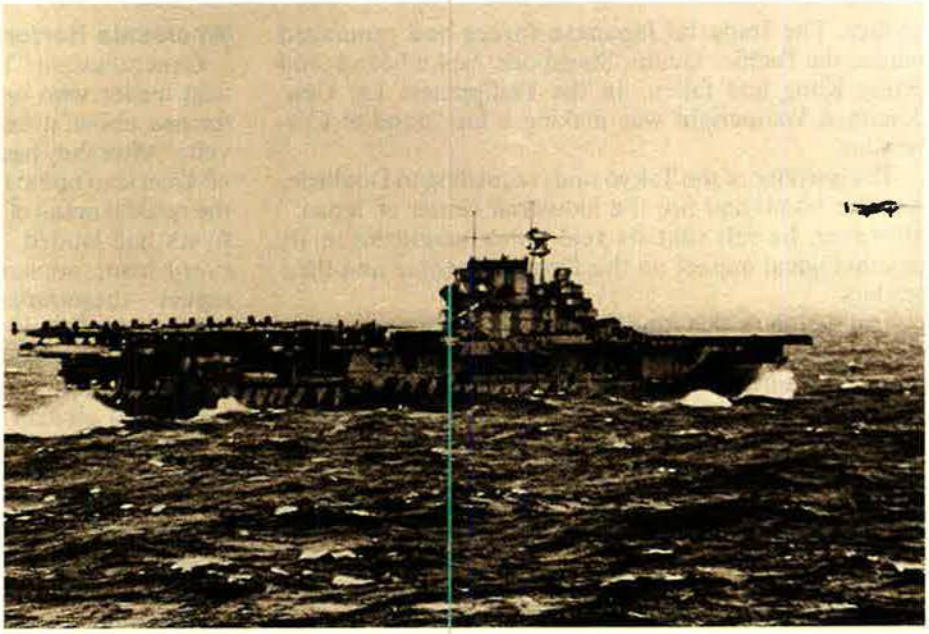
The order required Japanese naval forces to "invade and occupy Midway Island and key points in the western Aleutians in cooperation with the Army, in order to prevent enemy task forces from making attacks against the homeland." Admiral Yamamoto hoped not only to capture Midway and thus expand the Japanese perimeter but also to lure the US Navy into a duel at sea in which his overwhelming forces could (he thought) defeat the American fleet with ease.

His forces attacked Dutch Harbor in the Aleutians and occupied Attu and Kiska islands. However, the Imperial Fleet lost at Midway, one of the decisive battles of the Pacific war. Thus the Doolittle Raid had an impact on the war far more significant than was generally known until years later.

The Doolittle Raid was the first war action in which the Army Air Forces and Navy teamed in a full-scale operation against the enemy. The Doolittle Raiders were the first to fly medium bombers (usually landbased) from a carrier deck on a combat mission and first to use new cruise-control techniques in attacking a distant target. Their incendiary bombs were the prototypes for those used later in the war. The use of motion picture cameras to record the bomb drops was adopted by the AAF.

Expecting a Court-Martial

Doolittle honestly believed he had failed miserably in his mission. None of his sixteen aircraft could get to their destination in China. He thought he would be



A B-25 heads for Tokyo, 800 miles away, a journey made more heroic by the possibility that the raiders might be met by Japanese fighters. When a ship was spotted in the Hornet's vicinity, fear of detection prompted the Navy task force to launch the B-25s ahead of schedule—and out of fuel range of China. After the Japanese opened the Pacific war with a string of unqualified successes, the Doolittle Raid brought the war home to them in dramatic fashion.

court-martialed. After all, the secondary part of the mission was to ferry and deliver the B-25s to Tenth Air Force units being formed in the China-Burma-India theater. That half of the mission had not been accomplished. Not even the B-25 that landed in the USSR was ever returned, although it may be assumed that it was eventually used against German forces.

The raid led to the deaths of seven crew members. Cpl. Leland D. Faktor and Sgts. William J. Dieter and Donald E. Fitzmaurice died on ditching or bailout; Lt. Dean E. Hallmark, Lt. William G. Farrow, and Sgt. Harold A. Spatz were executed in Japan; Lt. Robert J. Meder starved in a Japanese prison.

Four men barely survived their forty months as prisoners of war in Japanese hands and were released in August 1945. They were Lt. George Barr, Lt. Robert L. Hite, Lt. Chase J. Nielsen, and Cpl. Jacob DeShazer. Sergeant DeShazer returned to Japan as a missionary and served there for more than thirty years.

Lt. (later Brig. Gen.) Everett W. "Brick" Holstrom stayed and flew missions in Burma, China, and Hong Kong. Sgt. Adam R. Williams, an engineer/gunner, was credited with shooting down four Mitsubishi A6M Zeros. Sergeant Williams and Sgt. Douglas V. Radney were wounded during combat missions; Capt. Robert M. Gray, Lt. Eugene F. McGurl, and Sgts. Omer A. Duquette, Melvin J. Gardner, and George E. Larkin were killed in the CBI theater during combat missions. Gray AAF at Fort Hood, Tex., was named after Captain Gray. Lt. (later Brig. Gen.) Richard A. Knobloch was commended for pushing armed fragmentation bombs out of a B-25 when its bomb bay doors only half opened. Lt. Thadd H. Blanton barely escaped captivity by the Japanese in Burma.

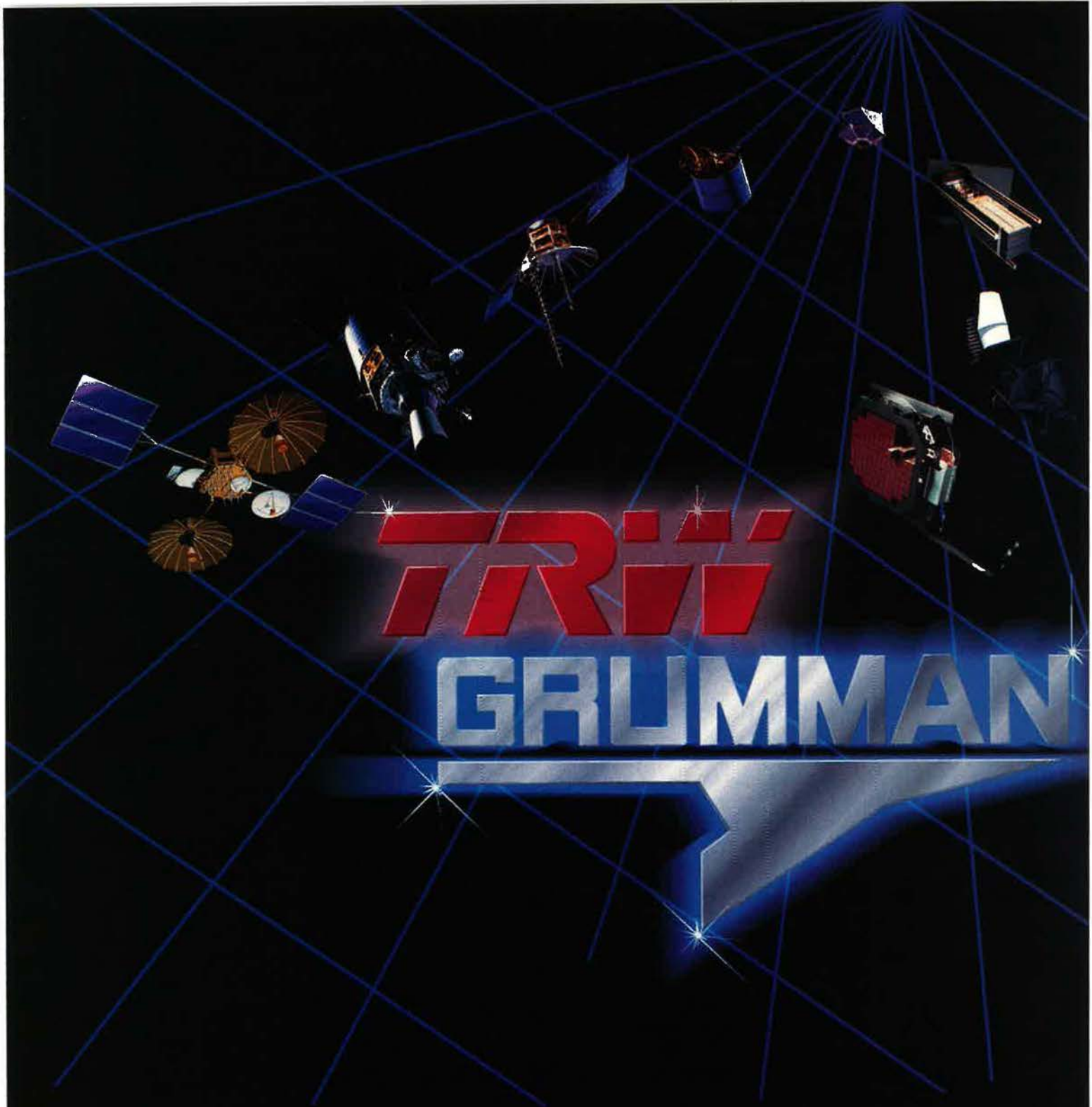
Four members of Captain Lawson's crew were seriously injured in a ditching offshore. Lawson and his copilot, Lt. Dean Davenport, were thrown through the windshield when their plane hit the water and were seriously injured. The navigator and bombardier, Lts. Charles L. McClure and Robert S. Clever, were also badly hurt. The uninjured engineer/gunner, Cpl. David J. Thatcher, cared for their wounds and saved the officers from discovery.

Dr. (Lt.) T. Robert White, a flight surgeon who had volunteered to go on the mission as a gunner and had survived a ditching, providentially caught up with this crew and treated them as best he could in a Chinese hospital. Lawson's life was at stake, and blood transfusions were necessary. Dr. White amputated Lawson's leg and gave two pints of his own blood. Corporal Thatcher and Lieutenant White were both awarded the Silver Star for their gallantry in assisting their fellow raiders.

Of the crew members that returned to the US, most served overseas later in the war, many during Doolittle's command of Twelfth Air Force. Four officers, Capt. (later Maj. Gen.) David M. Jones and Capt. (later Col.) C. Ross Greening and Lts. Thomas C. Griffin and Griffith P. Williams, became prisoners of war after being shot down during missions in 1943. Lts. Richard E. Miller, Donald G. Smith, and Denver V. Truelove and Sgts. Edwin V. Bain and Paul J. Leonard died serving in Twelfth Air Force.

Out of a total of eighty Tokyo Raiders, forty-one survive. This month, many of them will meet in Columbia, S. C., as guests of the city. As they have at each of their reunions, the Tokyo Raiders will drink a solemn toast "to those who have gone." This is what their leader, ninety-five years old, said in his memoirs: "I know a commander is not supposed to have any favorites, but these men are mine. I care deeply for them and have always considered them part of my family." ■

C. V. Glines has written three books about the raid: Doolittle's Tokyo Raiders, Four Came Home, *and* The Doolittle Raid. *He wrote* Jimmy Doolittle: Master of the Calculated Risk *and assisted General Doolittle in the preparation of his autobiography,* I Could Never Be So Lucky Again. *Mr. Glines's most recent article for* AIR FORCE *Magazine was "The Pigeon Project" in the February 1992 issue.*



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A Checklist of USAF Test and Training Programs

Work in progress at Air Force Systems Command's Range Systems Program Office, Eglin AFB, Fla.; Air Force Flight Test Center, Edwards AFB, Calif.; and the 4950th Test Wing, Wright-Patterson AFB, Ohio

Aeronautical Systems Division
Range System Program Office
Eglin AFB, Fla.

Advanced Threat Training Emitter System
Program to provide advanced threat signals to SAC's Strategic Training Range Complex. Additions of red and blue or gray signals will be carried out by development of additional hardware compatible with existing Mini-MUTES (multiple threat emitter system) control units *[see below]*. The ATTES units will be high-powered, remotely controlled, and capable of autonomously acquiring and tracking participant aircraft. **Contractor:** Pre-RFP. **Status:** Indefinite.

Air Combat Maneuvering Instrumentation (ACMI)/ Aircraft Central Computer Interface Subsystems
The ACCIS is an interface unit designed to let pre-MSIP (Multistage Improvement Program) F-15 aircraft perform on the ACMI in the same fashion as MSIP F-15s. **Contractor:** Manufacturing Technology, Inc. **Status:** Production.

ACMI/Aircraft Instrumentation Subsystem Pods
Production of the airborne portion of the ACMI system. Pods can be carried on any AIM-9 missile rail; some can be carried on AIM-120 rails. Pods are interoperable on all eight- and 36-aircraft ACMI systems, as well as on all US Navy Tactical Aircrew Combat Training System (TACTS) ranges. Program includes fully automated/computerized pod test sets, which are deployed at each AIS pod maintenance facility. **Contractors:** Cubic Corp., Kollsman Corp., Metric. **Status:** Production.

ACMI Interoperability
Series of projects to upgrade all existing/operational ACMIs. Level I involves all Air Force and Navy aircraft. The system is designed to allow fighters in simulated combat to easily identify eliminated players. **Contractor:** Cubic Corp. **Status:** Production.

ACMI/Langley Display and Debriefing Subsystem
Development of a Red Flag Measurement Display and Debriefing Subsystem (DDS) to be installed in conjunction with the TACTS upgrade at NAS Oceana, Va. This upgrade, in addition to expanding the range area, changes Oceana from an eight-aircraft configuration to a 36-aircraft configuration and changes the graphics displays from stroker to raster scan. **Contractor:** Advanced Data Tech Inc. **Status:** Initial operational capability (IOC).

ACMI Mini-DDS
Joint USAF-Navy project to provide a majority of the debriefing information currently available on the ACMI DDS to widely scattered users at their home bases at greatly reduced cost. The program will use state-of-the-art mini- and microcomputer equipment to reduce the cost of ACMI debriefing facilities. **Contractor:** TBD. **Status:** Full-scale development (FSD).

ACMI Upgrades
Projects to upgrade all existing/operational ACMIs. Projects will implement the AIM-9 product improvement and AIM-7 off-boresight target designation logic; replace large screen displays at Nellis AFB, Nev., Tyndall AFB, Fla., Langley AFB, Va., and Eglin AFB, Fla.; replace computers at Tyndall; and implement Mode VI on the Tyndall, Nellis, USAFE, Luke (Ariz.), Holloman (N. M.), and Korean ACMIs. **Contractor:** Cubic Corp. **Status:** Production, product improvement.

Alaska ACMI
Project to improve training of Air Force fighter pilots in fighter tactics and techniques in Alaska. The range, approximately 100 nautical miles west of Elmendorf AFB, Alaska, provides real-time monitoring and control of aircraft during combat training and records events for postmission debriefing and analysis. **Contractor:** Kollsman Corp. **Status:** Production.

AN/MST-T1V Mini-MUTES
Production of a variant of the AN/MST-T1A that allows dispersion of emitter signals to simulate an integrated air defense system. The remote emitters will be unmanned and will radiate multiple threat signals. **Contractors:** General Dynamics (GD), Harris. **Status:** Production.

Bomber Airborne Instrumentation Subsystem
Project to develop internally mounted subsystem to perform the functions of the P4AM AIS pod and allow SAC bomber aircraft to play on ACMI and TACTS ranges. The program consists of internal modification and interface of B-52 and B-1 aircraft to allow rack mounting of the BAIS electronic components, the BAIS box itself, and an organizational level test set. **Contractor:** Kollsman Corp. **Status:** Preproduction.

Egyptian ACMI
Program that provides capability to train aircrews in air-to-air and air-to-ground combat as well as electronic warfare. It will support both the Egyptian Air Force and the US Air Force in Egypt. System provides real-time monitoring and control of aircraft during combat training and records events for postmission debriefing and analysis. **Contractor:** Cubic Corp. **Status:** IOC, product improvement.

Global Positioning System Production
Development of High-Dynamics Instrumentation Set, a full mil-spec GPS five-channel CA/P-code receiver for use in high-speed aircraft and in pods mounted on the aircraft. Data-link subsystem is used for data communication between the participants and the RR/P and host range. Ancillary equipment includes a control display unit to communicate with GPS instrumentation sets and a data retrieval unit to download recorded data for transfer to a host range computer. **Contractor:** Interstate Electronics. **Status:** Low-rate initial production.

GPS/Strategic Training Route Complex
Program to integrate the GPS software and hardware and transitional devices into the STRC sites. **Contractor:** Interstate Electronics. **Status:** Program definition.

GPS Translator Range Applications
Program to develop and test translators for test and training ranges. Translator will be used for low-volume requirements and will receive L-band signals from all satellites in view, shift signals to another frequency (commonly, S-band), and transmit this broadband information to the ground station for reduction. **Contractor:** Interstate Electronics. **Status:** FSD.

Ground Jammer Follow-On (AN/MLQ-T4)
Production of I/J-band radar jammer that includes functional duplication of known threat jammers. Modular construction and software changes will permit low-cost updates. **Contractor:** American Electronic Lab, Inc. **Status:** Production.

Ground Transmitters GPS Range Applications
Program to develop and test ground transmitters. The GT provides equipment that will enable triservice test and training ranges to augment GPS coverage when less than four Navstar satellites are in view. The SDI mission uses this increase in coverage to track an interceptor missile and a reentry vehicle. **Contractor:** Stanford Telecom, Inc. **Status:** FSD.

Gulfport North Range ACMI
Program to expand existing Gulfport overwater ACMI to instrument airspace surrounding Camp Shelby, Miss. The north range consists of an additional Tracking Instrumentation Subsystem (TIS) master and 13 remotes (including one collocated with the master and one collocated with the microwave data-link relay). The south range will be used primarily for air-to-air training and the north range for air-to-ground training of Guard, Air Force, and Navy pilots. **Contractor:** Industrial Data Link. **Status:** Production.

Gulf Range Drone Control System Upgrade
Program to replace all computer hardware of the older GRDCUS with a more powerful computer system to control both full-scale and subscale drones. It will include a mobile control system. The mobile system is part of the test equipment being acquired for the QF-4 full-scale aerial target and is designed to land damaged drones. This upgrade will also include a capability to accept the use of GPS data for time and space positioning information (TSPI). **Contractor:** TBD. **Status:** Program definition.

Joint Air Combat Training System
Program to provide next-generation ACMI. Features will include GPS-based TSPI; secure data link; and expanded capability in terms of participants, threat environment, and airspace. Threats will be computer-generated, requiring a two-way interface. USAF priority aircraft are F-15, F-16, and F-22. Navy priority aircraft are F/A-18, F-14, and A-6. Nellis AFB will be the first user.

Contractor: TBD. **Status:** Pre–Engineering and manufacturing development (pre-EMD).

Low-Cost GPS C/A Receiver GPS Range Applications
Program to provide the US Army with up to 400 C/A receiver units. This will be a two-step competitive acquisition to procure approximately 700 units. **Contractor:** TBD. **Status:** Production.

Mid-Atlantic Tracking System and Western Space and Missile Center Upgrade, Navstar GPS Range Applications
Program to develop and integrate selected GPS equipment into the MATS at the Naval Air Test Center, Patuxent River, Md., and the Western Test Range at the WSMC at Vandenberg AFB, Calif. **Contractor:** Interstate Electronics. **Status:** FSD.

Missile Endgame Scoring System
Program will provide for development, test, and production options for QF-106 and BQM-34A aerial targets. **Contractor:** Motorola. **Status:** FSD.

National Training Center/Air Warrior Integration System
Program to place an ACMI range over the existing Army National Training Center Range at Fort Irwin, Calif. Data from the Army tracking system will be shared and integrated with the ACMI data stream so that weapon events can be conducted among both Army and Air Force players. Specially modified AIS pods will form part of the system to allow the Army system to designate airborne targets. **Contractor:** Cubic Corp. **Status:** Production.

Naval Weapons Center Range Development Program, GPS Range Applications
Program to provide Naval Weapons Center, China Lake, Calif., with a TSPI system to support Integrated Naval Air Defense Simulation testing requirements, evaluation of new airborne countermeasures equipment, and tactics development. **Contractor:** Interstate Electronics. **Status:** FSD.

Navstar GPS Range Applications
Development and demonstration of a GPS system to calculate a participant's TSPI and telemeter this information to a central location for display and processing. This will be demonstrated at seven DoD ranges and as part of the SDI ballistic missile program. The system will use GPS receivers, translators, and ground processors. **Contractor:** Interstate Electronics. **Status:** FSD.

Okinawa ACMI
ACMI system to be installed in the water 90 nautical miles northeast of Okinawa, Japan. It will include six large semisubmersible buoys and will be capable of handling eight high-activity targets. **Contractor:** Cubic Corp. **Status:** IOC.

On-Board Electronic Warfare Simulator
Program to provide F-16 and F-15E aircrews with realistic electronic combat threat indications. This ground-independent, computerized threat simulator will cause aircraft radar warning receivers to react visually and aurally as though threats actually existed. **Contractor:** TBD. **Status:** EMD/production.

PACAF Measurement and Debriefing System/USAFE MDS
Program to upgrade the PACAF and USAFE ACMIs with the next-generation MDS capability. This involves the replacement of the eight-aircraft system with more modern systems such as the 36/45-high-activity-aircraft system, 70 ground threats, and GPS/CGTS capability. **Contractor:** TBD. **Status:** Program definition.

QF-4 Full-Scale Aerial Target
Program to convert retired F-4 aircraft to full-scale aerial targets for use in support of aircrew training, tactical air forces weapon systems evaluation, and development/test programs. **Contractor:** TBD. **Status:** FSD and production.

QF-106 Full-Scale Aerial Target
Conversion of retired F-106 aircraft to full-scale aerial targets for use in support of aircrew training, tactical air forces weapon systems evaluation, and development/test programs. **Contractor:** Honeywell, Inc. **Status:** Production.

Range Control System
The RCS will support safety, overall management, and ground-control intercept training at the range control facility at Tyndall AFB, Fla. The RCS will receive and display sensor input and provide the capability to receive and display other future sensor system inputs. **Contractor:** Rome Air Development Center. **Status:** Production.

Shoot-Kill Indication Pods
Program to develop a SKI device to operate in conjunction with an ACMI AIS pod. The device will generate smoke to simulate missile/gun firing for a "shooting" aircraft and kill by the "targeted" aircraft. **Contractor:** TBD. **Status:** Preproduction.

Strategic Training Route Complex/Route Integration Instrumentation System
Program to provide RIIS for a SAC training complex in the northwest US. Encompasses communication, control, information processing, and debriefing display capability for the STRC. The RIIS aircrew-debriefing function will provide capability to review missions, analyze associated events, and evaluate aircrew performance. **Contractor:** GTE. **Status:** Production.

Translator Processing System GPS Range Applications
Program to develop and test the TPS for test and training ranges. TPS will receive telemetry signals from the translator and process the position of the translator to the ground controller. The TPS provides tracking for the Army's SDI interceptor missile and reentry vehicle. **Contractor:** Interstate Electronics. **Status:** FSD.

Wisconsin ACMI
Measurement and debriefing system to be installed at Volk Field ANGB, Wis. The system includes a dual TIS with two master stations and 18 associated remotes. It provides instruments for military operating areas and other airspace surrounding the Combat Readiness Training Center at Volk Field, 90 miles northwest of Madison. **Contractor:** Kollsman Corp. **Status:** Production.

Air Force Flight Test Center Edwards AFB, Calif.

AC-130U Gunship
Development of the modification of the C-130H aircraft into the AC-130 gunship for US special operations forces (SOFs). Modification efforts include the addition of 25-mm, 40-mm, and 105-mm guns, infrared sensor, all-light-level television, dual mode attack radar, armament for the aircraft, a battle management center, and a defensive system suite. **Contractor:** Rockwell International. **Status:** Qualification test and evaluation, qualification operational test and evaluation (OTE).

Advanced Cruise Missile Variant
Program to formulate the development, test, and evaluation of the ACMV. This version of the Advanced Cruise Missile will be incorporated into the 1995 revision of the Single Integrated Operational Plan. **Contractors:** GD, Convair, Boeing. **Status:** EMD.

Advanced Fighter Technology Integration/F-16
Test program for use in development and integration of advanced avionic and flight-control systems. The AFTI/F-16 is a highly modified, full-scale development aircraft designed to develop, integrate, flight test demonstrate, and implement promising new technologies applicable to present and future fighter aircraft. Currently evaluating technologies for the close air support mission. **Contractors:** Air Force Flight Test Center, NASA Ames Dryden Flight Test Facility, GD. **Status:** Ongoing.

B-2 Advanced Technology Bomber
Continuing flight test of the B-2 Advanced Technology Bomber over the full range of operational situations. **Contractor:** Northrop B-2 Division. **Status:** Development, test, and evaluation.

C-17 Airlifter
Program to conduct full range of tests on the C-17, a four-engine turbofan aircraft designed to provide worldwide direct airlift of US combat forces, equipment, and supplies over intercontinental distances and within operating theaters. It is designed to deliver passengers and outsize/oversize/bulk cargo in both the airdrop and conventional modes and to augment aeromedical evacuation and special operations. **Contractor:** McDonnell Douglas (MD). **Status:** Ongoing.

F-15/APG-63 Radar Annual Operational Flight Program
Program to incorporate software changes recommended by TAC. These include air-to-air missile integration and development, test, and evaluation of APG-63 electronic counter-countermeasures (ECCM) features. Test programs are conducted in formal phases. The radar OFPs are released annually to TAC as part of two avionics suites—the Multistage Improvement Program APG-63 and pre-MSIP. **Contractors:** MD, Hughes. **Status:** Development, test, and evaluation.

F-15/APG-70 Radar and AMRAAM Integration
Evaluation of the F-15/APG-70 radar software support for the Advanced Medium-Range Air-to-Air Missile. Capability is assessed for each annual OFP following completion of OFP development, test, and evaluation. **Contractors:** MD, Hughes. **Status:** Integration verification.

F-15/APG-70 Radar Operational Flight Program
Program to incorporate software changes recommended by TAC. These include air-to-air missile integration and development, test, and evaluation of APG-70 electronic counter-countermeasures features. Test programs are conducted in formal phases. The radar OFPs are released annually to TAC as part of two avionics suites—the Multistage Improvement Program APG-70 and the F-15E. **Contractors:** MD, Hughes. **Status:** Development, test, and evaluation.

F-15E Aircraft and F100-PW-229 Operability
Program to conduct operability and full performance testing of the combination of the F-15E and the Pratt & Whitney engine. Operability testing is

performed on an F-15A before proceeding with testing of the F-15E. **Contractors:** MD, Pratt & Whitney (P&W). **Status:** Engine development.

F-15E Follow-On Test and Evaluation
Comprehensive evaluation of the F-15E Dual-Role Fighter. Major test areas are avionics integration, LANTIRN navigation and targeting pods, weapons delivery, performance and flying qualities, APG-70 radar (in both air-to-air and air-to-ground modes), heavy gross weight, increased performance engines, human factors, structural vibration and acoustics, and annual OFP updates. **Contractor:** MD. **Status:** Follow-on development, test, and evaluation.

F-16 Combined Test Force/Block 30 Close Air Support
An MSIP retrofit of avionics systems for the F-16C/D dedicated to the close air support mission. Implements new avionics architecture based on the Modular Mission Computer and several sensor and display modes to enhance close air support operations. **Contractors:** GD, Westinghouse. **Status:** Development, test planning.

F-16 Combined Test Force/Block 30 System Capability Upgrade
An MSIP production upgrade of avionics systems for Block 30 F-16C/Ds. Integrates several sensor and display modes to enhance versatility in both air-to-ground and air-to-air operations. **Contractors:** GD, Westinghouse. **Status:** Ongoing.

F-16 Combined Test Force/Block 40 Avionics Integration
Testing program to help upgrade the avionics systems as part of the MSIP for F-16C/D production. Includes avionics architecture based on a General Avionics Computer, LANTIRN compatibility, GPS, Digital Flight Control System, and Wide Field of View Holographic HUD. **Contractors:** GD, Westinghouse, Martin Marietta. **Status:** Flight test, reporting.

F-16 Combined Test Force/Block 50 Avionics Integration
An MSIP production upgrade of avionics systems for F-16C/D. Integrates modes to enhance air-to-ground operations, including AGM-65G Maverick and AGM-88 HARM. **Contractors:** GD, Westinghouse. **Status:** Development, test planning, risk reduction, flight test.

F-16 Combined Test Force/F-16A/B Air Defense Fighter
MSIP retrofit of avionics systems for the F-16A/B aircraft dedicated to the air defense fighter mission. Integrates beyond-visual-range missile capabilities, advanced IFF, and several sensor and display modes to enhance air defense operations. **Contractors:** GD, Westinghouse. **Status:** Flight test, reporting.

F-16 Combined Test Force/F-16A/B Midlife Update
A retrofit of avionics systems to extend viability of Block 15 (USAF) and Block 10 (European Participating Air Forces) F-16A/Bs past 2000. Includes implementation of the Modular Mission Computer–based avionics architecture. **Contractors:** GD, Westinghouse. **Status:** Development, test planning.

F-16 Combined Test Force/F100-PW-229
Testing of the Increased Performance Engine (IPE) version of the existing F100 engine being developed for the Block 52 F-16C/D. **Contractors:** GD, P&W. **Status:** Flight test, reporting.

F-16 Combined Test Force/F110-GE-129
Testing of the IPE version of the existing F110 engine being developed for the Block 50 F-16C/D of the 1990s. Will compete with P&W IPE. **Contractors:** GD, General Electric (GE). **Status:** Flight test, reporting.

F-16 Combined Test Force/LANTIRN
Program to conduct follow-on development, test, and evaluation of system enhancements to the two-pod navigation and targeting system for nighttime, under-the-weather ground attack. **Contractors:** GD, Martin Marietta. **Status:** Flight test, reporting.

F-22
Program in which combined test force conducts development, test, and evaluation of the YF-22/YF119 prototype aircraft and engine in preparation for the F-22 air-superiority fighter, which will replace the F-15. **Contractors:** Lockheed, Boeing, GD, P&W. **Status:** EMD.

Integrated Controls and Avionics for Air Superiority
Testing of ICAAS system designed to incorporate sensor inputs through mission management computers. System aims to enhance situational awareness and improve the pilot's ability to plan his attack against multiple targets. **Contractor:** MD. **Status:** Ongoing.

MC-130H Combat Talon II
Program to evaluate the modification of the C-130H aircraft into the MC-130H configuration for US SOFs. Modifications include terrain-following/terrain-avoidance radar, integrated avionics systems, and a defensive avionics suite. **Contractor:** IBM. **Status:** Qualification test and evaluation, qualification OTE, development improvements testing.

STOL/Maneuvering Technology Demonstrator
Testing of specially modified F-15 aircraft, which was designed to demonstrate thrust reversing and thrust vectoring in support of an improved short takeoff and landing capability without harming up-and-away capabilities. **Contractors:** MD, P&W. **Status:** First phase ended, continuing evaluation of results.

Variable In-Flight Stability Test Aircraft/F-16
VISTA/F-16 is modified to function as a general-purpose fighter simulator to replace the NT-33. A five-month flight program is planned for Fiscal 1992 to help validate the simulator. **Contractors:** GD, Calspan Corp. **Status:** Ongoing.

X-29 Vortex Flow Control
Program designed to investigate the ability to control asymmetric nose vortices at high angles of attack, using forebody blowing to enhance control and stability. **Contractor:** Grumman. **Status:** Continuing evaluation of data.

X-30 National Aerospace Plane
Program to investigate possible simulation, ground support system design, and instrumentation in support of the joint Air Force, NASA, and Navy NASP effort, whose goal is to develop and verify the technologies needed to build military and civilian single-stage-to-orbit and hypersonic cruise vehicles. **Contractors:** Rockwell, MD, GD, Rocketdyne, P&W. **Status:** Planning.

X-31 Enhanced Fighter Maneuverability
Testing of the EFM, a program intended to verify and validate the tactical utility of maneuvering at very high angles of attack. Includes use of two X-31A vehicles with Post-Stall Techniques enabled by thrust vectoring and specialized control systems. Participants include the International Test Organization, composed of US government, German government, and industry participants. **Contractors:** Rockwell International, Messerschmitt-Bölkow-Blohm. **Status:** Flight test and documentation.

4950th Test Wing
Wright-Patterson AFB, Ohio

Advanced Range Instrumentation Aircraft Scoring Systems
Program to provide state-of-the-art, broad-ocean-area coverage of reentry vehicles for weapon system testing. Functions previously requiring both EC-135 and P-3 aircraft are combined in the EC-18 ARIA aircraft. The Sonobuoy Missile Impact Location System acquires and processes missile impact data. Impact times and locations of multiple reentry bodies are determined using deep-ocean transponders as geodetic references. Associated programs will collect optical data on reentry vehicles during the terminal phases of flight and sample meteorological parameters from the surface to 80,000 feet. **Contractors:** Applied Physics Laboratory (Johns Hopkins U.), E-Systems. **Status:** One aircraft operationally capable in January 1992.

Cruise Missile Mission Control Aircraft
The CMMCA (designated EC-18D) will provide a stand-alone asset for OT&E (off-range) and a range support asset for DT&E (on-range) cruise missile testing. By combining the aspects of telemetry reception and real-time display, remote command and control, and radar surveillance into one airframe, cruise missile testing will not require the large airborne support group currently used. IOC is planned for FY 1993. **Contractors:** Chrysler Technological Airborne Systems, Hughes. **Status:** First aircraft in systems ground testing.

ECCM/Advanced Radar Test-Bed
In support of the ECCM master plan, the ECCM/ARTB is an airborne platform for development, test, and evaluation of advanced radar systems and ECCM techniques, to include multisensor integration. This unique Air Force resource is designed to support development of current airborne radar systems and advanced technology programs into the next century. The NC-141A test-bed reached IOC in FY 1991. **Contractor:** Lockheed-Georgia. **Status:** Ground and flight testing for projects of the Wright Laboratory's Avionics Directorate, Warner-Robins ALC, and other special projects.

Integrated Data Facility
The IDF will standardize, modernize, and enhance the capability for processing flight-test data. It will consist of a ground-based laboratories (GBL) module, a real-time test data monitoring module, and a module for improved data computation and analysis. The GBL module will provide for ground integration and checkout of test item hardware prior to aircraft installation. Local and wide area networks will provide for efficient sharing of data and computational resources. Full operational capability is scheduled for FY 1994. **Contractors:** Many. **Status:** Several components are operational.

Photo Safety Chase
The 4950th Test Wing has developed a full complement of photo safety chase aircraft especially suited for medium- and low-speed aircraft. **Contractors:** Many. **Status:** Ongoing.

Testing Off-the-Shelf Aircraft
Commercial aircraft purchased for military applications are evaluated against applicable military requirements both during source selection and after contract award. Areas of evaluation include ground handling, maintenance, flying quality, performance, human factors, and technical orders. Several programs are ongoing: T-1A, C-27, C-26, and Enhanced Flight Screener. Recent evaluations include the VC-25A Air Force One replacement aircraft and C-29. **Contractor:** None. **Status:** Continuing. ■

Combined personnel cuts in the armed forces and defense industry may hit two million.

Veterans Flood the Job Market

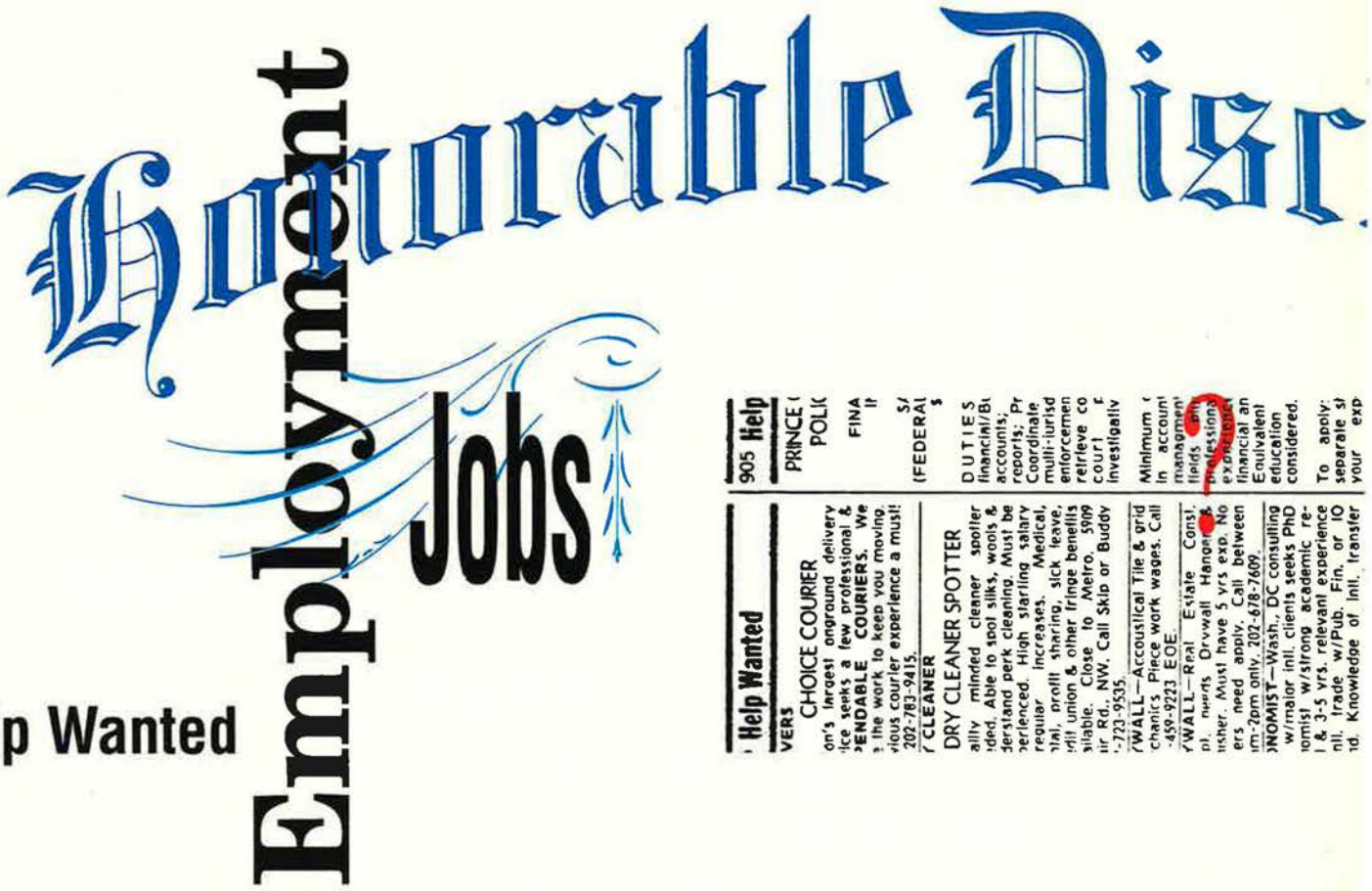
By Larry Grossman

SEVERAL months ago, an enormous public outcry arose when General Motors announced plans to lay off 74,000 workers by 1995. The magnitude of the layoff—and the difficulty of finding new jobs for the workers—seemed to boggle the public's mind. At the Pentagon, however, Defense Secretary Dick Cheney faces the task of carrying out force cuts ten times greater than GM's.

Under currently approved plans, by 1995 the Defense Department will have reduced the active-duty force to about 1.6 million soldiers, sailors, airmen, and Marines—a figure down by 530,000 from peak strength in 1987. Moreover, the number of civilian defense workers will drop over the same period by 221,000, from some 1.1 million to 912,000. The combined reduction is huge: about 750,000.

The cold war is over, and these hundreds of thousands of servicemen and -women and civilian defense workers soon will drop from the Pentagon's payroll and look for work. Many economists, labor leaders, and defense experts wonder if the economy can absorb them. Washington's labor forecasters predict a much tighter—and thus more competitive—work force over the next fifteen years.

With the help of Congress, the Pentagon has expanded transition assistance as the reductions gain momentum. "We have an obligation to help people who are separating from the military," says Lt. Gen. Billy Boles, Air Force deputy chief of staff for Personnel. The General adds, however, "There is nothing within our budget to allow us to keep people we don't need, just



because it would be tough for them to find a job."

The scope and magnitude of the coming reductions were underscored early this year by Gen. Colin L. Powell, Chairman of the Joint Chiefs of Staff. General Powell told the Senate Armed Services Committee that during 1992 the services will chop 138,000 positions. The Army alone will lose 70,000 billets, nearly as many as GM will cut over several years.

The indirect effects of the end of the cold war also are large. One study prepared by the independent, Washington, D. C.–based Defense Budget Project predicted that the defense industry would lose 800,000 jobs between 1990 and 1996 as a result of a twenty-two percent reduction in Pentagon spending established in the July 1990 Budget Enforcement Act.

Send Out More Résumés

However, the real situation is even worse than the one portrayed in that remarkably bleak DBP study, which was completed well before Secretary Cheney's recent decision to halt B-2 bomber production at twenty planes (rather than at seventy-five) and to cancel the *Seawolf*-class submarine after one boat (vs. thirty).

"Send another 250,000 résumés to Temps & Co.," said one congressional budget analyst, certain that defense industry job losses will increase even further because of the reductions in the revised Cheney Fiscal 1992–97 six-year defense plan.

Sen. Sam Nunn, the influential Georgia Democrat who chairs the Armed Services Committee, has done calculations of his own and concludes that the wind-down of the cold war will eliminate two million jobs. "It's a real irony," said the Senator, "that the victory of the United States in the cold war means the loss of two million defense-related jobs. These people are going to be losing their jobs because they won. That's a paradox that we have not faced in many years."

It comes at a bad time. The Labor Department's chief employment forecaster, the Bureau of Labor Statistics (BLS), projects that the work force will increase by 1.3 percent between 1990 and 2005, down significantly from the 1.9 percent growth registered in the previous fifteen-year period. In the 1975–89 period, the influx of baby boomers caused the force to grow rapidly. In the late 1980s, as this wave leveled off, growth slowed.

That might seem to be good news for job-hunting veterans; the BLS data indicate that veterans will have to contend with fewer civilian competitors for jobs. However, it is not the full story. BLS also predicts that, in 1990–2005, the American economy will spin off far fewer new jobs to begin with. Between 1975 and 1990, the US created a record-breaking 34.9 million employment slots, swelling the total from 87.6 million to 122.5 million. By contrast, reports BLS, the nation will add only about 14.2 million new jobs in the next fifteen years.

US policymakers, worried about the futures of service members, have begun to take notice of such trends. Senator Nunn says that the nation owes the active-duty, civilian, and industry workers more than a "thank you" for a job well done for the duration of the cold war.

"We owe them an opportunity to use their skills that helped win the cold war to address some of our most pressing public- and private-sector needs," he said, adding that "these talented people can be the real peace dividend for the nation, if we can find creative ways to use them."

The Nunn Plan

In February, Senator Nunn offered a broad transition plan to cushion the loss of jobs. The Senator's plan would authorize early retirement for military members with fifteen to twenty years of service. Retired personnel who choose to enter "approved jobs" in education, law enforcement, medical services, and other "critical fields" would be eligible to increase by one their official number of military retirement years, giving them higher retirement pay. The Senator's plan also includes education and training programs for those military personnel opting for employment in a "critical job."

Often at odds over defense spending, weapons, and force structure, senior Defense Department officials and the leaders on Capitol Hill already have worked closely to draft legislation to ensure that the military's uniformed and civilian talent gets help making the transition to the private sector.

For example, the Pentagon and Congress fashioned Operation Transition, the Defense Department's partnership with corporations, associations, and entrepreneurs to direct departing defense personnel to civilian jobs. The Pentagon is helping service members make themselves more attractive to employers.

The Defense Department has created a nationwide electronic bulletin board: the Defense Outplacement Referral System (DORS), a computerized database that will match the résumé of a service member, Pentagon civilian, or job-hunting spouse anywhere in the country with compatible jobs listed by the federal government and private companies.

"DORS is an opportunity for employees to get a jump on the job-hunting game," says Sara Ratcliff, the Pentagon's deputy assistant secretary for Civilian Personnel Policy. "If they anticipate that they are likely to be affected by either a base closure, work load reduction, or some sort of downsizing action, this gives them an opportunity to start planning ahead before they actually receive a RIF [reduction in force] notice."

Pentagon employees can put résumés into a computerized databank. Uniformed personnel register through a family service center, while civilians go through the nearest civilian personnel office. Military Airlift Command employees go to their base's education center.

Potential employers use the telephone to gain access to the résumé pool and find workers with specific skills and experience. To obtain basic information about a prospective employee, a firm need only have a touch-tone telephone and a fax machine.

Dialing the "900" number costs $5 for the first minute and $1 for every subsequent minute. The employer can get up to twenty-five résumés by fax the same day or up to 100 mini-résumés by mail the next business day.

After the employer calls the DORS hotline and enters job criteria into the system, the computer searches its electronic inventory of applicants, identifies prospective workers, and transmits information to the employer. Firms can call (703) 614-5344 for information from the Transition Support and Services Directorate at the Pentagon.

Far-Flung Systems

DORS went on line in November, initially at seventy-nine domestic installations. In the first month, more than 3,000 résumés were placed in the system and more than 100 potential employers requested résumés. According to Operation Transition officials, the system will soon be up and running at every US base and at overseas installations in Belgium, Germany, Italy, Spain, Turkey, Britain, Guam, the Philippines, and South Korea by the end of 1992.

Defense Department transition officials are also working with state employment agencies to see if the states can use the list to enroll military and civilian workers in state employment pools automatically.

Once registered with the DORS program, prospective employers can post two-week or six-month job ads on the transition bulletin board, using a toll-free number. Prototyping of the system began at thirty-five installations in February. Training programs offered by the Defense, Labor, and Veterans Affairs Departments will also be posted electronically.

The jobs that new veterans will find, however, will be very different from those found by veterans of World War II, Korea, and Vietnam.

BLS reports that one of the most significant trends of the 1990–2005 period will be the continued rapid decline in manufacturing and equally strong gains made by the service industries.

Between 1990 and 2005, predicts BLS, more than 600,000 manufacturing jobs will disappear. BLS says that, of the twenty fastest-growing US industries, only one—miscellaneous publishing—is a manufacturing industry. Eighteen of the twenty biggest decliners are manufacturing industries.

The service industry, led by the health-care, computer, and legal professions, is expected to contribute nearly fifty percent of all new jobs created through 2005. The airlines are expected to continue a fairly rapid expansion. In 1990, the nation's airlines employed approximately 90,000 pilots and flight engineers and 32,000 air traffic controllers. "Outlook 1990–2005," the recent BLS study, anticipates a demand for as many as 36,000 more pilots and 3,000 more air traffic managers by 2005.

The labor force will continue to grow more high-tech as the new century approaches, with advances driven by the spread of computers and industrial automation. Employment of systems analysts and computer scientists is expected to grow by 78.9 percent to satisfy the hunger for scientific research in office and factory automation and telecommunications technology. The number of computer programmers is expected to increase by 56.1 percent as government and industry seek new applications for computers and improvements to existing software. With more computers and data-processing equipment in use, sixty percent more high-tech maintenance workers will be needed.

Teachers in Demand

Projected increases in student enrollments and declining teacher-student ratios in public schools are expected to spur the demand for teachers in elementary and secondary schools by 313,000 and 437,000 jobs, respectively. "Outlook 1990–2005" also projects enrollment increasing much faster in secondary schools than in elementary schools. The trend toward greater reliance on teachers' aides and educational assistants is also assumed to continue through 2005, resulting in an increase of 278,000 jobs for these workers in elementary and secondary schools.

As part of its transition plan, the Army has been strongly encouraging its departing men and women to consider teaching as a new career. Using information from the Education Department, the Army has hooked up hotlines throughout the US, Germany, South Korea, and Panama to assist former service members and military civilians interested in obtaining teaching certificates. In just four months of operation, more than 11,000 calls were received from military personnel.

The Army is quick to call attention to the one-third of its officers leaving the service who are qualified to teach high school math. According to a recent Army survey, ten to twenty percent have engineering backgrounds qualifying them to teach high school physics.

So far, some thirty states, led by New Jersey and Texas, have established alternate routes to the classroom for veterans with particular expertise or skills. In Alexandria, Va., a nonprofit group named "Cities in Schools" is developing a program to enable departing military personnel to direct dropout-prevention efforts. Such programs have been strongly backed by the American Federation of Teachers and other associations.

Black leaders and sociology experts voice concern about whether the nation adequately understands the complexity of the transition for minority troops or has adequate plans to cope with it.

Pentagon officials proclaim that the coming drawdown will be color- and gender-blind. "The reduction in force is based solely on our needs: the number and kinds of people we need to keep," says General Boles. "Enlistment, reenlistment, or separation are completely race-, gender-, and religion-neutral. There is no quota at either end of the system."

African-Americans constitute about twenty percent of the population, but DoD reports show that twenty-three percent of the military is black. According to the Air Force, blacks, Hispanics, and other minority citizens make up twenty-two percent of the force, up from fourteen percent in 1975.

The Discrimination Factor

Col. Michael Shane, director of the Army's enlistment center, told a recent conference, "At least 100,000 fewer blacks can be expected on active duty five years from now." One congressional military personnel expert privately predicts that thirty percent of those likely to be discharged from the armed services are black.

No one has sought establishment of special transition programs to assist minorities, but there is concern that minority veterans will encounter substantial discrimination in the private sector and that they will find it especially difficult to start new careers.

"We are not as worried about there being a disparate impact on women and minorities in the drawdown itself as we are concerned about what happens to them as they go out into the public," says Ms. Ratcliff.

Professor Paul Andrisoni of Temple University's School of Business and Management told a recent meeting of top Pentagon officials that there is ample evidence that blacks and other minorities encounter much discrimination when they are discharged from the military.

As the US labor force is restructured and grows more competitive in this decade and into the twenty-first century, a great premium will be placed on education and vocational training. The "most significant" finding of its future work force projections, says BLS, "is the continuing above-average growth rate for jobs that require relatively higher levels of education."

Workers will soon discover the "increasing importance of post-secondary education and training because the restructuring is toward occupations that are most likely to experience the fastest growth," according to "Outlook 1990–2005." This trend is reflected in the growing proportions of executive, administrative, and managerial workers; professional specialty workers, such as those in the legal or health-care professions; and technical and related support workers.

In 1990, the US unemployment rate stood at about five percent. Of those without a high school diploma, however, some twelve percent were unemployed, compared to 6.3 percent of those who completed high school. The disparity between unemployment rates for those with and without college degrees is projected to widen over the next fifteen years.

Virtually all observers note that the US military services today are filled with some of the smartest, most disciplined, and best-educated men and women to be found anywhere in the nation. Some ninety-eight percent of the military's enlisted ranks hold high school diplomas, compared with eighty-three percent of the general American population.

In the Air Force, ninety-nine percent of the enlisted force have graduated from high school, while four percent hold college degrees. In addition, about ninety-five percent have some technical training that new employees in the private sector are unlikely to receive.

"A person who has worked for four or more years in the military probably has more technical experience [in] his or her job than his or her classmate from high school," says General Boles. "I can't think of too many companies that have a formal training program for ninety-five percent of their employees." ■

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For coalition airmen, Persian Gulf storms and atmospheric upsets were a bigger problem than the Iraqi air force.

When Weather Is an Enemy

By Peter Bacqué

EARLY in the Persian Gulf War, thick clouds blanketed the region forty percent of the time. Prewar weather studies predicted there would be cloud cover only eighteen percent of the time. USAF officers claim that this and other unexpected weather conditions caused the Air Force to forgo many attacks on primary targets.

In fact, Gulf storms and atmospheric phenomena proved more effective foes than the Iraqi Air Force, whether the mission involved air-to-air or air-to-ground operations. "This is perhaps the thing that hurt us the worst," claimed Gen. Merrill A. McPeak, USAF Chief of Staff. "This was certainly the poorest weather in fourteen years in the Baghdad and Kuwait area," twice as bad as worst-case estimates.

For Air Force planners, knowing that weather would be clear over the theater meant increasing the number of combat sorties. Cloud cover over the battlefields could cause a shift in the types of aircraft or aircraft weapons used in an attack.

The Iraqis also learned to play the weather game. In clear weather, allied pilots looking for Scud missiles could spot the launchers easily enough. As the war went on, however, the Iraqis would wait for cloudy weather before rolling out the missiles, a tactic that helped them escape detection.

"[Poor] weather is never a friend under most circumstances," concluded 1st Lt. Neal J. Culiner, an Air Force pilot who flew thirty-nine A-10 missions in eighty-six hours of combat time with the 76th Fighter Squadron of the 23d Fighter Wing.

The critical importance of weather is nothing new. "Weather has always played a role in warfare," notes historian Richard Hallion. "People advanced under cover of fog; people used rain and sleet and snow to mask their approach."

History records that, in the fifth century BC, storms wrecked Xerxes's Persian fleet, depriving him of half his strength and dooming his plans to invade Greece. In 1281, the original kamikaze—Japanese for "divine wind"—sank a Mongol fleet attempting to invade Japan. The Spanish Armada suffered a similar fate in 1588. Napoleon's Grand Army met disaster in Russia's 1812 winter.

Monsoons hit during the Tet offensive of 1968. Gen. William C. Westmoreland wrote that "poor visibility . . . because of low clouds and

KC-10 pilots from the 4th Wing, 433rd Aerial Refueling Squadron, Seymour Johnson AFB, N. C., contend with hazardous conditions during a refueling operation. Adverse weather and poor visibility over the Persian Gulf increased the risk of midair collisions during Operations Desert Shield and Desert Storm.

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persistent ground fog made helicopter movements hazardous if not impossible" and "posed major problems for close air support and supply by air."

Wrecking Headquarters Plans

Since Vietnam, the US experience has been marked with examples of the power of weather to impede—or wreck—plans made in headquarters. In April 1980, the US hostage-rescue mission to Iran went disastrously awry when a huge, unexpected dust storm, whipped up by desert winds, choked Iran's airspace and caused several helicopters to malfunction and abort their mission. In the invasion of Grenada in 1983, unexpectedly rough seas caused considerable problems for Navy SEAL operations. In Operation Just Cause in 1989, surface winds over targets in Panama, blowing from an unexpected direction, forced the pilots of two F-117 Stealth fighters into an unsuccessful in-flight adjustment of their attack.

Thus, Operation Desert Storm represents only the latest and most extensive textbook case of how frequently wartime operations are at the mercy of weather.

Pilots prefer "VFR-VMC," which stands for "visual flight rules" and "visual meteorological conditions." In the US, this usually means clear visibility of at least three miles, with specified distances from clouds.

"You try to maintain VFR-VMC conditions at all times," said Capt. David R. Evans, an F-15 pilot with the 27th Fighter Squadron of the 1st Fighter Wing. Captain Evans logged thirty missions during 150 hours of combat flying as a wingman and flight lead in Desert Storm. "I never once kept in the weather. I always looked for clear airspace."

The Air Force, faced with the need to avoid thick barrages of Iraqi antiaircraft fire, adopted the tactics of flying at medium and higher altitudes. Consequently, weather abnormalities, which bloom in the lower atmosphere, posed problems for any type of mission requiring keen, unobstructed vision. Clouds often lay between the pilot and the targets or threats.

"Naturally, [the more] you can stay above that lethal area," said Lt. Col. William Campenni, a Virginia ANG F-16 pilot, "the better the survival, but the trade-off is that the farther off you stay, the greater the dispersion of weapons and the less the accuracy with nonsmart bombs."

"Over bad guy country, you use the weather," said Captain Evans. "You wanted to know where the tops of the clouds were and where the bottom of the clouds were and where it was clear and what the winds were."

Fighter pilots primarily needed to know at what levels they would encounter clouds. They wanted to be high enough to see and avoid surface-to-air missiles rocketing up through the cover, said Captain Evans. Although the aircraft had equipment that would warn of an enemy radar "lock," many SAMs were launched ballistically. Moreover, there was no way to know whether antiaircraft artillery was firing at you.

If you are flying above an undercast, "you can't see AAA coming from the guns," Lieutenant Culiner said. "You can't see their sparkles or tracers" as the pilot can when there is no weather obstruction.

"Sight Is Life"

It's another instance of "sight is life" in air combat. "If you don't see it," Captain Evans said, "you won't know what hit you."

Pilots have a simple reason for wanting to avoid flying in clouds or other forms of instrument meteorological conditions, which fall below the minimum requirements for VFR.

"Weather puts an increase in your task loading," said Captain Evans. "You have to devote a lot more time to maintaining wings level. You have to maintain aircraft control first. It's a lot more difficult. You start getting the 'leans.' "

Weather also hampers identification, friend or foe (IFF) operations, a limitation especially despised by F-15 pilots, who seek to avoid close-in "knife fights" with enemy aircraft. However, said Captain Evans, "if you cannot get a positive identification on the guy, if you can't say this guy is a no-kidding bad guy, we won't shoot."

Clouds are not the only concern. Wind poses different kinds of problems.

High winds could cause fighters to end up in places they never expected to be. Air Force pilots flying combat air patrol hundreds of miles into enemy territory frequently checked the winds to make sure that they were not blowing the fast-moving aircraft into the kill ring of a surface-to-air missile battery.

Winds aloft played hob in other ways. Some B-52s had difficulty meeting their time over target (TOT) windows against sites in the Gulf theater, said Air Force officials, because operations planners initially used canned wind data of 270 degrees at fifty knots. In fact, "there's a fairly strong jet stream over the target area," said Col. George L. Frederick, Jr., commander of the Air Weather Service during Desert Storm. The discrepancy in data could cause bombers to miss their TOT windows. In some cases, said Air Force officials, B-52 engines were damaged because crews were forced to fly them at maximum thrust to make up for lost time.

"One sortie was actually unable to deliver its ordnance because they were too late over target," one officer reported.

Captain Evans remembered one luckless pilot in his squadron who ended up flying a mission of ten hours or so when the weather near his fighter base turned sour. "Vis[ibility] was about zero and ceiling down to zero," when the pilot returned to base, he recalled. With tankers available, however, the waste-not-want-not unit sent the F-15 to man a combat air patrol until the airfield's weather lifted.

Two Views of Clouds

Aviators in the air-to-ground war that preceded the ground attacks into Kuwait and Iraq had their own set of weather concerns.

"Overall," said Lieutenant Culiner, the A-10 pilot, "I'd prefer clear weather with a slight haze." Under that weather condition, he explained, haze tends to mask aircraft at altitudes above 8,000 feet, and gunners on the ground have a difficult time spotting the target to get off a shot.

Cloudy weather finds no favor with the air-to-ground types. "All that the clouds do is highlight an airplane as far as viewing from the ground," said Lieutenant Culiner. Enemy gunners "can get AAA to [detonate] right under the clouds. If you're skimming under the clouds, they know one of the variables. You want to be above the clouds on the way inbound."

Clouds also affect the ability to drop ordnance. If the target area was obscured in clouds or smoke, A-10 pilots would abort the mission. "We'd go as far as we could and see if the weather was clear," Lieutenant Culiner said, but "we would never press through a certain amount of cloud."

Though pilots returning from such aborted missions were asked to pickle off their bombs north of the border in order to have a psychological impact on Iraqi forces, they would not drop them through the clouds, hoping to avoid unintended damage.

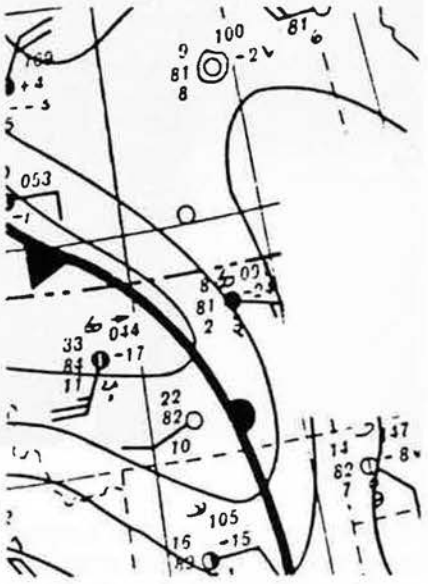
The heavy weather posed another problem for aircrews. "We didn't want to descend in the clouds because of the AAA and the SAMs," said Lieutenant Culiner. "If you got hit, you would be disoriented. . . . If there's a cloud rolling in, you wait. . . . You're not going in a second time."

Attack crews also pointed out that, because large bombs throw up lots of dirt and smoke, the attackers must take into account the direction and velocity of winds. If not, the pilots might have a poor view of the target.

Lieutenant Culiner recalled a day in the Gulf War when a passing north-south cold front produced a broken cloud deck that extended eastward over Kuwait. It forced the US pilots to carry out the attack along a different axis. The new route came in from the west, where the Republican Guard posed a heavier threat to the aircraft.

Pilots say that weather had a critical influence on aerial refueling operations, heightening the risk of mid-air collisions.

"If a high-value target area is determined, you've got to have a tanker track to provide the most advantageous point for the fighter package you've got going in there," said Capt. Gary Grigorian, Desert Storm weather officer for the 263d Tactical Fighter Wing (Provisional). If a nearby storm



system is large, he said, "we may be out of luck." Poor visibility in clouds, turbulence on the boom, and icing can foul the best-laid plans for taking on jet fuel.

"Several days, it was sporty trying to find tankers in the weather," Lieutenant Culiner said. Even air-to-air radar did not completely solve the problem.

"It can be pretty dark in there," Colonel Campenni said. "In some of those clouds, it's hard just seeing where a guy's wingtip is, and it's practically in your face."

Captain Evans points out that icy weather conditions also have a major influence on tanking locations. In Desert Storm, "they put an awful lot of airplanes on the tankers in a little bit of airspace," he noted. Typically, a tanker would have eight fighters on its wings, with four or five tankers in the cell. Having a gaggle of airplanes thrashing around inside a cloud—especially at night—is no joyride.

"You'd like to see the guy in front of you," Captain Evans observed,

noting that this is not possible with an iced-up windscreen.

"I had times when I was on the boom and saw an EC-135 go by my wingtip," Lieutenant Culiner said of his experience tanking in Desert Storm. "It was a swarm of bees."

Clouds can influence the effectiveness of infrared missiles in air-to-air warfare. Clouds often confuse an IR missile because they can represent a large source of built-up heat, just the sort of thing that the missile is designed to seek out. "On a good summer cumulus day, you can see the seeker head go to the clouds," one pilot reports. "You can hear the [missile's] growl. It's going to go for the best heat source it can find there in that bandwidth."

Curiously, the absence of clouds—conditions of exceptionally bright sunshine—can have the same effect. "The sun's the biggest flare in the world," one Air Force pilot points out. "If you're the guy taking the shot, you don't want your shot spoiled because the other guy's going into the sun."

Even the most exotic weapons have weather limitations. "They have to see the target too, in terms of whatever the sensor is," said Colonel Campenni, the Air Guardsman. "If it's infrared, it has to see infrared, and even infrared seekers have to see their designated bandwidth."

Poor weather degrades the accuracy of guided air-to-ground weapons such as the AGM-65 Maverick missile, a system based on infrared technologies. "Weather will cause you to have less standoff [distance from the target]," Lieutenant Culiner said. "We'd have a nine-, ten-mile shot with infrared Mavericks, but it was less in weather."

Blinding the Eyeball

Seeker heads on smart weapons are extremely sensitive to weather conditions. Sleet or even heavy rain can score a seeker head's "eyeball" and degrade its capability. Pilots make every effort to fly around showers or out of icy conditions to keep their sensitive weapons in optimum shape.

Because the effectiveness of so many high-technology military systems, such as smart bombs and night vision devices, is critically dependent on the condition of the atmosphere, understanding the weather is becoming more, not less, important.

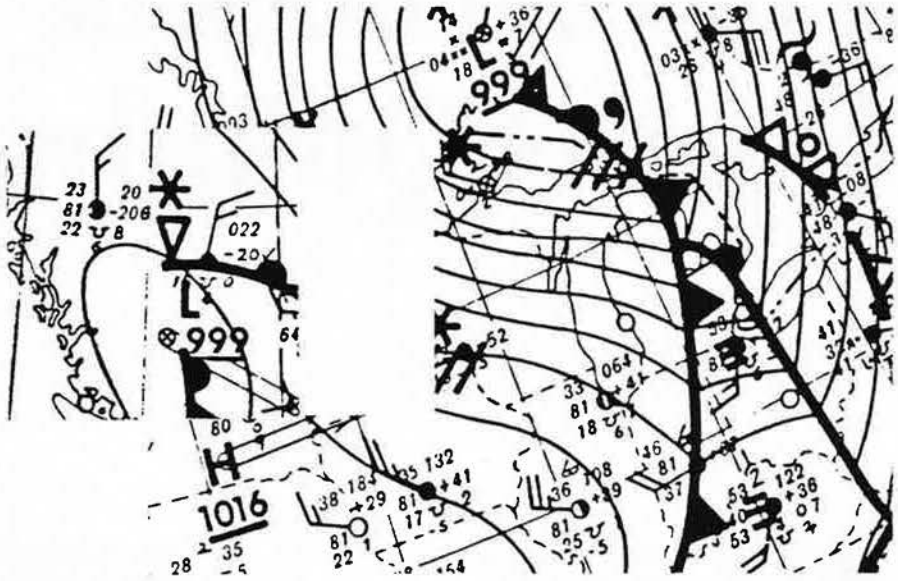
Smart electro-optical systems, such as Maverick and the cruise missile, are particularly vulnerable to weather effects. They require specialized weather forecasts tailored to their missions. In Operations Desert Shield and Desert Storm, the Navy's weather service turned out a prediction tailored for the Tomahawk sea-launched cruise missile every hour for 100 days.

Electro-optical systems require a specific range of temperature contrast. An aircrew using an infrared sensor looks for a hot target against a cold background, which shows up on a video display as a white spot on a dark screen. Weather conditions, however, may have made the target colder than the background, so the crew never finds it.

"Weather and the importance of having all-weather systems is one of the significant lessons relearned" from the Gulf War, said Lt. Col. David A. Deptula, a key member of the team of Air Force officers who conceived the air campaign at the heart of Operation Desert Storm.

He noted that weather had to be taken into account even if an operation was built around the most sophisticated weapon. "The F-117 Stealth fighter and precision guided munitions truly revolutionized what we can do with warfare," said Colonel Deptula, "but weather still had significant effect." He and others have noted that the F-117 had to abandon many targets because low cloud cover made foolproof identification impossible.

One of Colonel Deptula's greatest frustrations was "not seeing a single cloud over Riyadh, not a single one, period, dot" from August to November. Came January, "they had the worst weather in fourteen years. . . . It made my life real, real difficult."



In his basement office at Royal Saudi Air Force headquarters, Colonel Deptula hung a weather map behind his chair. "I did targeting that way," he said, comparing the weather situation with a menu of possible objectives across Iraq, so that if the weather was sour in one area, the air commanders could redirect sorties instead of canceling them.

If nothing else, the war provided a forceful reminder that technology and tactics will take a military force only so far. "There used to be the myth of the all-weather airplane or all-weather military," remarks Colonel Frederick of the Air Weather Service. "We have to constantly remind our customers, the operations people, there are going to be times when weather's going to affect their operations, and focus on those things." ■

Peter Bacqué covers military affairs and aviation for the Richmond, Va., Times-Dispatch. *He holds an airline transport pilot's license. This is his first article for* Air Force *Magazine.*

She was the first woman to fly the Channel, but the big news that day was the sinking of the *Titanic*.

The Bad Luck of Harriet Quimby

By Terry Gwynn-Jones

WHEN the SS *Titanic* struck an iceberg in mid-Atlantic in April 1912, its loss was a tragedy of a special kind for New York journalist Harriet Quimby. With it sank her chance of aviation fame in her lifetime.

In what may be the world's greatest upstage, the *Titanic* disaster denied Quimby a chance to achieve the same kind of renown accorded Amelia Earhart a generation later. Just hours after the great White Star liner plunged to the bottom, Quimby became the first woman to fly the English Channel. That was eighty years ago this month.

Harriet Quimby loved defying convention. Flying was still a cross-your-fingers gamble when she became America's first licensed woman pilot in 1911 and decided to emulate the feat of the French pilot Louis Blériot. Blériot had become world famous following his epochal, twenty-two-mile flight across the English Channel. At a time when flying was measured by minutes aloft, this was a feat of incredible courage.

Quimby was born in Coldwater, Mich., in 1875. Her father, a former

National Air and Space Museum

On the bitterly cold morning of April 16, 1912, Harriet Quimby climbs into the cockpit as English pilot Gustav Hamel and a ground crew hold back her Blériot XI. To gain a global reputation, Quimby made a dangerous solo cross-Channel flight from Dover on the south coast of England to Calais on the northern coast of France.

cook in the Union Army, never made much money. When the family moved to San Francisco, Mrs. Quimby supported it by making herbal medicines and sewing fruit sacks. She was determined that her two daughters would rise above their poverty and break into society circles. She contrived a phony background for them of family wealth and European education. The Quimby girls had the poise and intelligence to carry off the act.

In 1902, Harriet Quimby began writing for the San Francisco newspapers *Call* and *Chronicle*. She was one of the first journalists to use a typewriter and drove around town in a yellow touring car. Her portrait hung in the all-male Bohemian Club on San Francisco's Nob Hill until the establishment was destroyed in the great 1906 earthquake.

In 1905, she moved to New York and became theater critic and women's editor of the prestigious *Leslie's Illustrated Weekly.*

Drawn to Aviation

Quimby first became attracted to aviation in 1910 when she attended the Belmont Park aviation meet in search of a story. Inspired by the performances of the showboating aviators, particularly John Moisant of the US, she enrolled at a Long Island flying school owned by Moisant's brother.

To conceal her identity as a woman flyer during her training, Quimby designed her own special flying dress, made of plum-colored satin with a hood that hid her hair. The dress could be quickly converted to pantaloons.

Just two days after gaining her license, Quimby thrilled 20,000 spectators—and earned $1,500—by making a moonlight flight over Staten Island. A month later, she won $600 racing against France's Helene Dutrieu at a country fair.

In March 1912, after touring Mexico with the Moisant International Flyers, she sailed to Europe. There she purchased a monoplane from Blériot. To establish a global reputation, she decided to attempt the dangerous cross-Channel flight from Dover on the south coast of England to Calais on the northern coast of France. The resultant fame would allow Quimby to increase her appearance fee. Famous aviators, such as England's Claude Grahame-White, were paid $50,000 to appear at some American air shows.

Quimby enlisted English pilot Gustav Hamel to help plan the flight and teach her how to navigate by a compass. At 5:30 a.m. on April 16, 1912, all was ready.

***Adventurous by nature, Harriet Quimby rose above her family's poverty and lived up to the standard of family wealth and European education contrived by her mother. Quimby cut a glamorous figure in 1905 as theater critic and women's editor of the prestigious New York magazine* Leslie's Illustrated Weekly.**

It was bitterly cold, and fog lay over the Channel. Quimby decided to go ahead and bundled herself up against the cold. Under her satin flying suit she wore two pairs of silk overalls and over it wrapped a woolen overcoat, a raincoat, and a sealskin shawl.

Hamel helped her up into the exposed wicker, strapped a hot water bottle to her waist, and jammed a portable compass between her knees. Her mechanic gave a sharp swing to the propeller, and the little Gnôme rotary engine crackled into life, streaming oily exhaust smoke over six men who grimly held on to the aircraft.

At her signal, the ground crew members let go. The Blériot XI gathered speed on its bicycle-like wheels. Then it was tail up, a couple of bounces, and Quimby was airborne.

"In an instant I was beyond the cliffs and over the Channel," Harriet Quimby recalled. "Then the thickening fog obscured my view. I could not see ahead of me at all, nor could I see the water below. There was only one thing for me to do, and that was to keep my eyes fixed on the compass."

By all the rules of good airmanship, she should have turned back. Cloud flying was unknown in those days, and her aircraft had no blind-flying instruments. Nevertheless, luck and seat-of-the-pants flying skill enabled Quimby to keep the Blériot on an even keel. Occasionally she glanced from the compass to a small bronze statue she carried for good luck.

Crossing the Channel

With no protective windscreen, however, she was at the mercy of the weather and, despite the precautions, Quimby was assaulted by bitter cold as she approached mid-Channel. Her every nerve strained to sense the slightest change in the airplane's attitude. The minutes passed like hours. Should she lose control, or should the engine fail, there would be little chance of surviving a crash landing in the fog-shrouded sea.

"The machine was wet," Quimby later recalled, "and my face so covered with dampness that I had to push my goggles up on my forehead. I could not see through them. I knew that France must be in sight if only I could get below the fog. So I dropped down till I was only about half my previous height [altitude]. The sunlight struck on my face and my eyes lit upon the white and sandy shores of France."

She landed on a beach at Hardelot, thirty miles south of Calais. People came running from all directions and hoisted the exultant American airwoman shoulder high. Considering the weather conditions and her inexperience, Quimby's success was little short of a miracle.

Relaxing in her hotel that night, she pictured tomorrow's headlines: "American Airwoman Conquers Channel."

Poor Harriet Quimby. She could not have picked a less propitious day. When the story of her courage and skill reached news editors' desks, it was soon swamped beneath a mountain of copy detailing the *Titanic* tragedy. Her front-page triumph was tucked far inside the next day's newspapers.

Ten weeks later, Harriet Quimby was dead, a casualty of aviation's age of innocence. Like most early flyers, she had not equipped her new Blériot two-seater with seat belts. While performing at the 1912 Boston Air Meeting, as a result of air turbulence or overcontrolling her notoriously unstable machine, she and her passenger were catapulted from the cockpit. They fell to their deaths in front of a horrified crowd.

Harriet Quimby finally made front-page headlines. ■

Terry Gwynn-Jones served as a fighter pilot with the RAAF, the RAF, and the Royal Canadian Air Force. In 1976, he set an around-the-world speed record for piston-engine aircraft. His most recent book, Farther and Faster *(Smithsonian Institution Press), is a history of speed and distance competition in aviation. His by-line last appeared in* AIR FORCE *Magazine with "The Royal Australian Air Force" in the August 1985 issue.*

Thirty-third Annual

Outstanding Squadron Dinner

Saturday, May 23
Outstanding Squadron Dinner

AFA's 33d Annual Outstanding Squadron Dinner will be held at The Broadmoor Hotel on Saturday, May 23. The dinner honors cadets of the United States Air Force Academy for the 1991–1992 school year. The featured speaker is a graduate, Class of 1960, **Gen. John M. Loh,** Commander, Tactical Air Command.

Thursday, May 21
Golf Tournament and Reception

The golf tournament will be held at 12:00 noon on The Broadmoor West Course. The price is $115 per person. This includes golf, greens fees, golf cart, and reception. The fee is $35 for the reception only. For more information on both the dinner and the golf tournament, call Dottie Flanagan at (703) 247-5805.

Friday, May 22
Air Force Acquisition Update

The second annual Air Force Acquisition Update, sponsored by the Colorado Springs/Lance P. Sijan Chapter of AFA, will focus on the theme "The Changing Air Force Acquisition Environment." The program is aimed at industry executives and government leaders.

The following speakers have already accepted:
Gen. Donald J. Kutyna, CINCNORAD, USCINCSPACE
Lt. Gen. Thomas S. Moorman, Jr., Commander, Air Force Space Command
Maj. Gen. Joseph W. Ralston, Director, Operational Requirements (Hq. USAF)
Brig. Gen. Kenneth R. Israel, Program Executive Officer, C³I Systems
One or more senior industry participants

The following have been invited:
Hon. Donald C. Fraser, Deputy Under Secretary of Defense for Acquisition
Dr. Victor H. Reis, Director of Defense Research and Engineering
Hon. John J. Welch, Jr., Assistant Secretary of the Air Force (Acquisition)

The 1992 Air Force Acquisition Update will be held at Peterson AFB, Colo., and will require a Department of Defense SECRET (NOFORN) clearance. The local AFA chapter has made arrangements to certify the need-to-know requirements in accordance with DoD 5220.22-M. The cost for the symposium is $225 for AFA individual or Industrial Associate members ($250 nonmember) and $50 for US military government employees. The registration fee includes coffee and doughnuts, lunch, and a reception in honor of the speakers following the symposium. Additional individual reception tickets are $30 (spouses and individuals not registered for the Acquisition Update). For more information, contact Andrea Schmeyer at (719) 570-6200. Fax: (719) 570-6202.

Registration Form

AFA's 33d Annual Outstanding Squadron Dinner • Saturday, May 23, 1992

Please mail this form to:

ATTN: D. Flanagan
Air Force Association
1501 Lee Highway
Arlington VA 22209-1198
or call: (703) 247-5805

Please type or print

Advance registration closes Friday, May 15.

Refunds must be requested in writing and postmarked no later than Wednesday, May 13.

— My check for $90, payable to the Air Force Association, covering the Outstanding Squadron Dinner, is enclosed.
— Enclosed is $35 for a guest Golf Reception ticket.
— Send information on the Acquisition Update and Reception.

Name _____ Title _____ Affiliation _____

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State _____ Zip _____ Area code and telephone _____

Valor

By John L. Frisbee, Contributing Editor

In Defiance of Death

Horribly wounded, the young lieutenant disguised his suffering and resisted approaching death until his mission was completed.

AT THE beginning, in February 1942, Seventh Air Force was responsible for defending the Hawaiian Islands. Until it was committed to sustained combat in the central Pacific late in 1943, the Seventh also was, in effect, a replacement pool for Fifth and Thirteenth Air Forces in their times of need. Such obscurity was not welcomed by the men of the Seventh—or by Maj. Gen. Willis Hale, who commanded that air force from mid-1942 to April 1944. When the Seventh entered combat in 1943, it numbered only two B-24 groups, one B-25 group, and two fighter outfits equipped with obsolescent P-40s, P-39s, and a few A-24 dive bombers. It was known as "Hale's Handful."

The Seventh's combat mission was to support the Army, Marine Corps, and Navy in a campaign to seize bases in the Gilbert Islands, from which they would advance through the Marshalls to capture the major enemy base at Kwajalein—an important stepping-stone in the island-hopping strategy that would put Allied forces in striking distance of the Japanese home islands. The Seventh launched its part in the campaign with only five B-24 squadrons, two B-25 squadrons, and three fighter squadrons.

The Japanese, heavily committed to operations in the southwest Pacific, were forced to fight a delaying action in the Gilberts and Marshalls. Their most active air base was at Maloelap Atoll in the Marshalls, some 600 miles north of General Hale's B-25s at Tarawa. The Japanese could send up as many as fifty fighters to defend Maloelap. B-25 missions against that base were unescorted because of the limited range of Hale's fighters. To avoid detection, bombing and strafing attacks were at minimum altitude. Losses to fighters and AAA were heavy.

On January 25, 1944, the 396th Bomb Squadron sent its B-25s against Maloelap, determined to eliminate that hornets' nest. The copilot of one bomber was twenty-one-year-old 2d Lt. Malcolm Knickerbocker, who had left Duke University to join the AAF and had earned his wings only six months earlier. Lieutenant Knickerbocker was as close to Hollywood's concept of the all-American youth as one could have found. What happened that January day is one of the most poignant stories of heroism in World War II, told in a letter to Knickerbocker's parents from his squadron commander, Maj. Andrew McDavid, and in the citation for the lieutenant's posthumous Distinguished Service Cross.

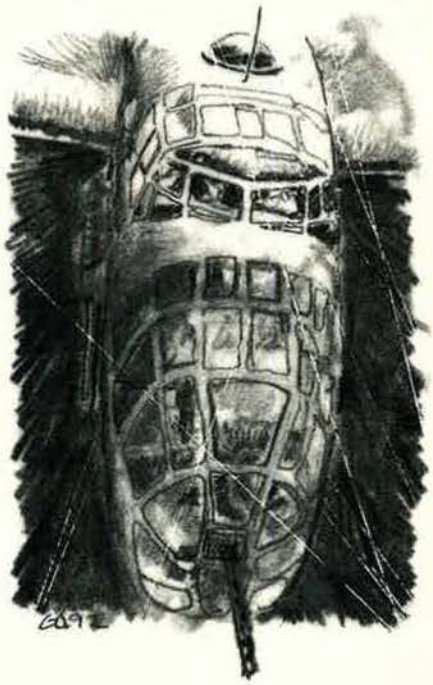
The B-25s approached Maloelap at wavetop level but did not escape detection. Enemy fighters had time to get off the ground and hit the B-25s as they swept the base with machine-gun and cannon fire. One of the fighters came in on the right of Knickerbocker's B-25, firing at close range. A 20-mm explosive shell hit his right leg, exploding on contact and completely severing his leg at the hip socket.

Crewmen could not remove Lieutenant Knickerbocker from the B-25's cramped cockpit. Because of the location of his wound, it was impossible to apply a tourniquet. The best that could be done was to administer plasma and reduce the flow of blood with compresses. In a supreme exercise of will, Knickerbocker conquered the shock and pain of his horrible mutilation. He never lost consciousness. The enemy attack continued for fifteen minutes while Knickerbocker helped the pilot handle the bomber in evasive maneuvers. From time to time, he gave crew members a reassuring smile and the OK signal with his thumb and forefinger in an extraordinary display of self-control. He must have known that he could not survive, but he would fight to stave off death until the mission was completed.

The nearest friendly base was at Makin Atoll, an hour's flight from Maloelap. Approaching the landing strip at Makin, Lieutenant Knickerbocker, weakened by great loss of blood, completed the copilot's prelanding duties. As the B-25 turned on final approach, a safe landing assured, Malcolm Knickerbocker died. Awed by Knickerbocker's gallantry through unimaginable suffering, men who lived daily with the violence of war wept when his torn body was taken from the plane.

The next day, Lieutenant Knickerbocker's suffering and death were avenged by P-40 pilots of the 45th Fighter Squadron based at Makin. From a holding pattern stacked at 8,000 to 10,000 feet, they ambushed Japanese fighters that were pursuing low-flying B-25s on their return from Maloelap. The P-40s shot down ten confirmed, with two probably destroyed, breaking the back of the enemy fighter threat at Maloelap. There could have been no finer tribute to a gallant airman. ■

Thanks to Donald Heath, Malcolm Knickerbocker's uncle, for making family papers available through Warren Sheldon, who called this story to our attention.



Industrial Associates

Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies support the objectives of AFA as they relate to the responsible use of aerospace technology for the betterment of society and the maintenance of adequate aerospace power as a requisite of national security and international amity.

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Williams International
ZF Industries, Inc.

Books

By Frank Oliveri, Associate Editor

The Art of Maneuver: Maneuver-Warfare Theory and AirLand Battle, by Robert Leonhard. This theoretical study of maneuver tactics looks at the US Army and finds that we do not understand the importance of maneuver as classical writers on the subject going back to Sun Tzu have understood it. The author, in fact, finds that the US is culturally predisposed to see war as an attritional phenomenon, giving as an example the emphasis on body count and overwhelming force in the Vietnam War. However, Mr. Leonhard notes the success of maneuver as implemented in Operation Desert Storm. Presidio Press, 505-B San Marin Dr., Suite 300, Novato, CA 94945-1340. 1991. Including graphics and index, 315. $24.95.

Hitler's Panzers East: World War II Reinterpreted, by R. H. S. Stolfi. This book argues a highly controversial claim: Hitler's Germany had sufficient military strength to crush the Soviet Red Army in August 1941, but the Nazi leader decided not to do so, opting instead to have his forces dig in and defend the Nazi-occupied Ukraine against a potential siege that never occurred. The University of Oklahoma Press, 1005 Asp Ave., Norman, OK 73019-0445. 1991. Including footnotes and bibliography, 261 pages. $24.95.

Mustang Designer: Edgar Schmued and the Development of the P-51, by Ray Wagner. One of the most famous tactical fighters in US history, the P-51 Mustang helped turn the tide of the World War II air battle in favor of the US and its allies. Here is a behind-the-scenes look at the development of the Mustang and a unique view of the war as seen from the industrial home front. Orion Books, 201 E. 50th St., New York, NY 10022. 1990. Including photos and index, 240 pages. $27.95.

On Final Approach: The Women Airforce Service Pilots of World War II, by Byrd Howell Granger. This well-documented, comprehensive history of WASPs in World War II is the culmination of twelve years of work. Dr. Granger tells the stories of 1,104 WASP pilots, each of whom, in the parlance of the day, "freed a man to fight." Falconer Publishing Co., P. O. Box 5034, Scottsdale, AZ 85261-5034. 1991. Including photos and index, 711 pages. $39.95.

Pearl Harbor: The Verdict of History, by Gordon W. Prange. This sequel to the author's classic, *At Dawn We Slept,* tells of the impact of the Japanese attack from the perspective of the White House and the offices of Cabinet members, the Joint Chiefs of Staff, and the local US commanders, as well as the war rooms of the Imperial Japanese military forces. The author concludes that the Japanese forces were fated to be victorious because they were better prepared and trained than the American defenders.

Prange died in 1980. This is a reissue, first published by McGraw Hill in 1986. Penguin Books, 375 Hudson St., New York, NY 10014. 1991. Including index, appendix, and footnotes. 697 pages. $16.95.

The Reagan Wars: A Constitutional Perspective on War Powers and the Presidency, by David Locke Hall. Exploring a modern commander in chief's use of military force, this book discusses four significant armed expeditions that took place during the Reagan years: the 1982–84 Marine peacekeeping mission in Lebanon, the October 1983 strike against Grenada, the air strikes against Libya in April 1986, and the 1987–88 Earnest Will deployment of naval forces to the Persian Gulf. Issues concerning the legality of President Reagan's actions are also discussed. Westview Press, 5500 Central Ave., Boulder, CO 80301-2847. 1991. Including index, 279 pages. $46.95.

Sacred Vessels: The Cult of the Battleship and the Rise of the US Navy, by Robert L. O'Connell. Here is an irreverent look at one of the oldest symbols of naval power, the battleship. With some wit, the author attempts to demonstrate that the battleship was never in fact an effective weapon, even before it was indisputably outclassed by the aircraft carrier and modern submarines. Westview Press. 1991. Including photos, footnotes and index, 409 pages. $24.95.

Salzburg Under Siege: US Occupation, 1945–1955, by Donald R. Whitnah and Florentine E. Whitnah. The authors, who took part in the occupation of Salzburg, Austria, look into US leaders' methods for helping to restore law and order in the city, reopen schools, and provide food and clothing to a people devastated by war. Greenwood Press Inc., 88 Post Road West, Box 5007, Westport, CT 06881. 1991. Including footnotes, bibliography, and index, 163 pages. $45.00.

Sled Driver: Flying the World's Fastest Jet, by Brian Shul. Few people have flown the SR-71 Blackbird. The author, a former "Sled" pilot, takes the reader through the interview process, the trainer process, preflight, suiting up, launch, and the difficult refueling phase of SR-71 flight. This may be the closest thing to being in the cockpit of this legendary aircraft. MACH 1, Inc., P. O. Box 7360, Chico, CA 95927. 1991. Including photos, 151 pages. $38.00.

There's a War To Be Won: The United States Army in World War II, by Geoffrey Perret. This unusual perspective on the Army during World War II concludes that the Army was surprisingly well prepared for war on December 7, 1941. The service's thorough revamping during the 1930s left it well organized for the impending struggle. Random House, 201 E. 50th St., New York, NY 10022. 1991. Including photos and index, 623 pages. $30.00.

Valley of Decision: The Siege of Khe Sanh, by John Prados and Ray W. Stubbe. This comprehensive history of the battle for Khe Sanh includes firsthand testimony and gripping action narratives. Mr. Stubbe provides unprecedented insight into the battle as he witnessed it every day in his capacity as the "Chaplain of Khe Sanh." Houghton Mifflin Co., 2 Park St., Boston, MA 02108. 1991. Including photos and index, 551 pages. $29.95.

Other Titles of Note

The Collapse of Communism, by the correspondents of the New York *Times.* A blow-by-blow, nearly day-by-day documentation of the decline and fall of communism in eastern Europe from 1989 through 1991. Time Books/Random House. 1992. Including index, 600 pages. $13.00.

Comanche Six: Company Commander in Vietnam, by James Estep. "The company commander's war" from a company commander's point of view: war as "man's ultimate competitive sport." Presidio Press. 1991. Including photos and glossary, 254 pages. $19.95.

In the Shadow of Trinity: An American Airman in Occupied Japan, by Robert V. Vaughn. The experiences of a US airman assigned to duty in occupied Japan after World War II. Sunflower University Press, 1531 Yuma (Box 1009), Manhattan, KS 66502-4228. 1991. Including photos and index, 179 pages. $16.95.

Singing the Vietnam Blues: Songs of the Air Force in Southeast Asia, by Joseph F. Tuso. Hundreds of songs from the Vietnam War, reflecting the special language of pilots and navigators and the black humor of the Vietnam experience. Texas A&M University Press, College Station, TX 77843-4354. 1990. Including glossary, 265 pages. $14.95. ■

AFA State Contacts

Following each state name are the names of the communities in which AFA chapters are located. Information regarding these chapters or any of AFA's activities within the state may be obtained from the appropriate contact.

ALABAMA (Birmingham, Gadsden, Huntsville, Mobile, Montgomery): **William M. Voigt,** 401 N. 20th St., Birmingham, AL 35203 (phone 205-254-2330).

ALASKA (Anchorage, Fairbanks): **Larry D. Willingham,** 20151 Lucas Ave., Eagle River, AK 99577 (phone 907-694-4034).

ARIZONA (Green Valley, Phoenix, Prescott, Sedona, Sierra Vista, Sun City, Tucson): **William A. Lafferty,** 1342 W. Placita Salubre, Green Valley, AZ 85614 (phone 602-625-9449).

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HAWAII (Honolulu, Maui): **John A. Parrish, Jr.,** 98-1349 Kulawai St., Aiea, HI 96701 (phone 808-488-2467).

IDAHO (Boise, Mountain Home, Twin Falls): **Ralph D. Townsend,** P. O. Box 45, Boise, ID 83707-0045 (phone 208-389-5226).

ILLINOIS (Belleville, Champaign, Chicago, Elmhurst, Moline, Peoria, Rockford, Springfield-Decatur): **Thomas A. Hilquist,** 533 N. Elmore, Park Ridge, IL 60068 (phone 312-694-7143).

INDIANA (Bloomington, Evansville, Fort Wayne, Grissom AFB, Indianapolis, Lafayette, Marion, Mentone, South Bend, Terre Haute): **Harold F. Henneke,** 359 W. Edgewood Ave., Indianapolis, IN 46217 (phone 317-786-5865).

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MASSACHUSETTS (Bedford, Boston, East Longmeadow, Falmouth, Florence, Hanscom AFB, Taunton, Worcester): **David R. Cummock,** 174 South Blvd., West Springfield, MA 01089 (phone 413-737-5466).

MICHIGAN (Alpena, Battle Creek, Detroit, East Lansing, Kalamazoo, Marquette, Mount Clemens, Oscoda, Petoskey, Southfield): **Art Tesner,** 1909 Tahoe Cir., Okemos, MI 48864 (phone 517-349-7665).

MINNESOTA (Duluth, Minneapolis–Saint Paul): **J. Robin Wohnsigl,** 8288 131st St. W., Apple Valley, MN 55124 (phone 612-726-6872).

MISSISSIPPI (Biloxi Columbus, Jackson): **R. E. "Gene" Smith,** 2080 Airport Rd., Columbus, MS 39701 (phone 601-327-4422).

MISSOURI (Richards-Gebaur AFB, Springfield, Saint Louis, Whiteman AFB): **Otis M. Lytle, Jr.,** 804 E. Rosebrier, Springfield, MO 65807-3734 (phone 417-882-9394).

MONTANA (Bozeman, Great Falls): **Jack R. Thibaudeau,** 3604 Central Ave. Great Falls, MT 59401 (phone 406-453-1222).

NEBRASKA (Lincoln, Omaha): **Ralph Bradley,** 1221 N. 101st St., Omaha, NE 68114 (phone 402-392-1904).

NEVADA (Las Vegas, Reno): **George A. Peterson,** 3828 Cavalry Dr. Las Vegas, NV 89121 (phone 702-796-8888).

NEW HAMPSHIRE (Manchester, Pease AFB): **Frederic C. Armstrong,** 206 Woodland Rd., Hampton, NH 03842-1426 (phone 603-926-9867).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Newark, Old Bridge, Trenton, Wallington, West Orange, Whitehouse Station): **Dolores Vallone,** 143 Marne Rd., Hopatcong, NJ 07843 (phone 201-770-0829).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Robert H. Johnson,** P. O. Box 5051, Kirtland AFB, NM 87185 (phone 505-293-2529).

NEW YORK (Albany, Bethpage, Binghamton, Brooklyn, Buffalo, Chautauqua, Griffiss AFB, Hudson Valley, Nassau County, New York City, Niagara Falls, Plattsburgh, Rochester, Staten Island, Suffolk County, Syracuse, Westhampton Beach, White Plains): **James A. Riccardi,** 5293 Wilcox Rd., Whitesboro, NY 13492 (phone 315-330-7661).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Greenville, Havelock, Hickory, Kitty Hawk, Littleton, Raleigh, Wilmington): **Norman E. Davis,** P. O. Box 387, Wrightsville Beach, NC 28480 (phone 919-256-6036).

NORTH DAKOTA (Fargo, Grand Forks, Minot): **Ruby G. Crites,** 110 SW 18th, Minot, ND 58701 (phone 701-839-2700).

OHIO (Akron, Cincinnati, Cleveland, Columbus, Dayton, Mansfield, Newark, Youngstown): **Jerry D. Schmidt,** 4140 Chico Ct., Springfield, OH 45502 (phone 513-257-4055).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **Kenneth W. Calhoun,** P. O. Box 300217, Midwest City, OK 73110 (phone 405-732-7438).

OREGON (Eugene, Klamath Falls, Portland): **John Lee,** P. O. Box 3759, Salem, OR 97302 (phone 503-581-3682).

PENNSYLVANIA (Allentown, Altoona, Beaver Falls, Bensalem, Coraopolis, Drexel Hill, Erie, Harrisburg, Homestead, Indiana, Johnstown, Lewistown, Philadelphia, Pittsburgh, Scranton, Shiremanstown, State College, Washington, Willow Grove, York): **Eugene Goldenberg,** 2345 Griffith St., Philadelphia, PA 19152-3311 (phone 215-332-4241).

PUERTO RICO (San Juan): **Vincent Aponte,** P. O. Box 8204, Santurce, PR 00910 (phone 809-764-8900).

RHODE ISLAND (Warwick): **John A. Powell,** 700 St. Paul's St., North Smithfield, RI 02895 (phone 401-766-3797).

SOUTH CAROLINA (Charleston, Clemson, Columbia, Myrtle Beach, Sumter): **Charles W. Myers,** 42 Palmer Dr., Sumter, SC 29150 (phone 803-775-7352).

SOUTH DAKOTA (Belle Fourche, Rapid City, Sioux Falls): **Robert Jamison,** 1506 S. Duluth Ave., Sioux Falls, SD 57105 (phone 605-339-7100).

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tullahoma): **Wayne L. Stephenson,** 12409 Valencia Point, Knoxville, TN 37922-2415 (phone 615-966-2569).

TEXAS (Abilene, Amarillo, Austin, Big Spring, College Station, Commerce, Corpus Christi, Dallas, Del Rio, Denton, El Paso, Fort Worth, Harlingen, Houston, Kerrville, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **L. B. "Buck" Webber,** P. O. Box 619119, D/FW Airport, TX 75267 (phone 214-456-8231).

UTAH (Bountiful, Clearfield, Ogden, Salt Lake City): **Dan Hendrickson,** 1930 North 2600 East, Layton, UT 84040 (phone 801-776-2101).

VERMONT (Burlington): **Eugene A. Meiler,** 35 Pine Haven Shore, Shelburne, VT 05482 (phone 802-864-8000).

VIRGINIA (Alexandria, Charlottesville, Danville, Harrisonburg, Langley AFB, Lynchburg, McLean, Norfolk, Petersburg, Richmond, Roanoke): **Mary Anne Thompson,** 3146 Valentino Ct., Oakton, VA 22124-2836 (phone 703-734-6071).

WASHINGTON (Seattle, Spokane, Tacoma): **Gordon O. Wohlfeil,** 2021 Narrows View #224, Gig Harbor, WA 98335 (phone 206-851-6865).

WISCONSIN (Madison, Milwaukee, Mitchell Field): **Gilbert M. Kwiatkowski,** 8260 W. Sheridan Ave., Milwaukee, WI 53218-3548 (phone 414-463-1849).

WYOMING (Cheyenne): **Robert S. Rowland,** 9001 Red Fox Rd., Cheyenne, WY 82009 (phone 307-632-8746).

AFA/AEF Report

By Daniel M. Sheehan, Assistant Managing Editor

Flourishing Florida

Florida is home to a particularly robust AFA presence, and one of its stars is the **Central Florida Chapter,** which has sponsored the annual Tactical Air Forces Gala for the past eight years. Showing no signs of flagging, this year's gala raised a record-setting $30,000 for the Aerospace Education Foundation. The gala, held in conjunction with AFA's Air Warfare symposium, drew a crowd of more than 1,000 and honored advances in aerospace technology.

Engineer Dr. Hans von Ohain, a jet engine pioneer; industrialist Benjamin Cosgrove, a driving force at Boeing; innovator Ben Rich, longtime head of Lockheed's famed "Skunk Works"; and Capt. Warner Miller, a geodesy expert instrumental in the success of the Global Positioning System program, received Ira C. Eaker Fellowships to honor their technological achievements.

Attendees could acquaint themselves with the latest in aerospace advances, displayed in seventy-five exhibits by forty-four companies. They also heard speeches by USAF Chief of Staff Gen. Merrill A. McPeak, TAC Commander Gen. John M. Loh, SAC Commander in Chief Gen. George L. Butler, PACAF Commander in Chief Gen. Jimmie V. Adams, USAFE Commander in Chief Gen. Robert C. Oaks, AFLC Commander Gen. Charles C. McDonald, ATC Commander Lt. Gen. Joseph W. Ashy, and Principal Deputy Assistant Secretary of the Air Force for Acquisition Lt. Gen. John E. Jaquish, assessing changing patterns in air warfare.

The events in Orlando were not all business-oriented, however. The golf tournament drew 240 participants, and the audience at the gala was treated to a full evening's slate of entertainment.

The **Cape Canaveral Chapter** took advantage of the January 22 space shuttle launch to organize a congressional reception for visiting dignitaries. Congressional staffers Larry Cox of the House Intelligence Committee, Steve Rossetti of the House Armed Services Committee, and Ron Kelly of the Senate Armed Services Committee, accompanied by Legislative Liaisons Lt. Col. Robert Jewell of Air Force Space Command and Elvia Thompson of NASA, were greeted at the reception by Chapter President Jim Marshall, Treasurer Ken Frey, Secretary Gene Smith, and former President Chris Bailey.

An exuberant AEF Chairman James Keck (left) accepts a $30,000 check on behalf of the foundation from Gala Chairman Martin Harris (second from left) and Central Florida Chapter President Richard Ortega (right) while AEF President Gerald Hasler shows his approval. Four Ira C. Eaker Fellowships were also presented at this year's Tactical Air Forces Gala in Orlando, Fla.

Also at the Patrick AFB Officers Club event were Brig. Gen. Jimmey R. Morrell, commander of the Eastern Space and Missile Center; Col. James Jaeger, commander of the Air Force Technical Applications Center; other senior Air Force officers from Patrick AFB; community leaders; and senior managers from fifteen aerospace companies.

Although the **West Palm Beach Chapter** is considerably smaller than the Cape Canaveral and Central Florida Chapters, it can still mount a highly successful program. The Air Force continues to glean information from Desert Shield and Desert Storm, and West Palm Beach Chapter members are learning right along with it. Maj. Gen. Richard D. Smith, commander of San Antonio Air Logistics Center, delivered an informative address to a chapter meeting, discussing problems and successes of the operations from a logistics perspective. He bestowed high praise on the "Blue Twos—the two-stripers who fix the airplanes" and on Pratt & Whitney's F100 engine. Chapter President Robert Munson, former Chapter President Robert Carroll III, and Pratt & Whitney *News* editor Tom Callaghan joined 150 other guests in applauding the General's speech.

New European Spirit

AFA's Gold Membership Awards are difficult to come by—a chapter must increase its membership rolls by at least ten percent. The hard-charging **Lufbery-Campbell (Germany) Chapter** earned one in 1991, following back-to-back Diamond Awards (for growing by more than twenty percent) in 1989 and 1990, displaying an aggressive spirit that has made the Ramstein-based organization AFA's largest overseas chapter. Chapter President Lt. Col. James G. "Snake" Clark gives much of the credit to Membership Chairman Capt. Yolanda Cruz and her staff, led by SMSgt. Michael W. Finley, for compiling the chapter's enviable recruiting record.

New Jersey Gov. Jim Florio (center) has been working hard to keep McGuire AFB up and running. In recognition, N. J. AFA endowed a $1,000 scholarship in the governor's name. The scholarship will go to a state resident majoring in aerospace studies. Presenting the award are New Jersey AFA Trustee Clyde W. Jackson (left) and Vice President for Govenment Relations Edgar Wolf, Jr.

The chapter honored Sergeant Finley and nine other membership key workers at an awards luncheon held at the Ramstein NCO Club. USAFE Commander in Chief Gen. Robert C. Oaks presented the awards and honored past President Nita Wilkinson, a national Medal of Merit recipient. Col. Mike Gallagher, who brought home AFA's prestigious Gill Robb Wilson Award (for outstanding contribution in Arts and Letters) for his stellar efforts in dealing with the media during Operations Desert Shield and Desert Storm, gave the chapter's Gold Award to President Clark.

Hoosier Happenings

One of the great success stories of Operation Desert Storm was the accelerated production of Meals, Ready to Eat (MREs) for the troops in the field. Before the war, three producers supplied three million MREs per month. By the end of the war, twenty-two producers were supplying sixteen million per month. Members of the **P-47 Memorial (Ind.) Chapter,** which received its charter from National Vice President (Great Lakes Region) Cecil Hopper last August, decided to check out this remarkable product, which also helped stave off starvation in the former Soviet Union last winter.

Twenty-five chapter members and guests toured an Ameriqual Co. plant under the guidance of production supervisor Jess Barnett, a retired Air Force chief master sergeant and chapter member. The plant churned out 50,000 chicken stew and ham-and-egg MREs per day during Operation Desert Storm. Chapter Secretary Leo Johnson reports that the taste of the product compares favorably with the K rations and C rations of days gone by.

Also in Indiana, **Gus Grissom Chapter** President Edward L. Frickey was honored by the Civil Air Patrol National Headquarters and by Indiana AFA for his career endeavors in aerospace education. Mr. Frickey has championed aerospace education for years from his post at Purdue University.

Gen. Michael J. Dugan, USAF (Ret.) (center), spoke at the Golden Gate Chapter's Kitty Hawk Dinner at the Presidio Officers Club. Chapter President Herbert M. Levy (left) and former Chapter President Don Kosevac talked with the General after his speech about the Persian Gulf War and his time as Chief of Staff. The chapter presented General Dugan with colors that had flown over the Presidio.

National President O. R. Crawford has been promulgating AFA's role in informing the public about the restructuring of USAF. He focused on that topic in his recent talk to the Panama City (Fla.) Chapter. Here, he receives a plaque from Chapter President Loren D. Evenson in thanks for his speech. Earlier, Mr. Crawford did the honors, presenting awards to Tyndall AFB's top NCOs.

Chapter News

The **Greater Seattle (Wash.) Chapter** welcomed Maj. Gen. John A. Corder, commander of the Air Warfare Center at Eglin AFB, Fla., to a recent dinner meeting. General Corder gave chapter members a behind-the-scenes look at planning and preparations for Desert Storm from his vantage point as deputy commander for Operations, Central Air Forces. He discussed the execution of up to 3,000 sorties per day, stressing electronic combat and the contributions of the E-8A Joint STARS aircraft.

Chapter Presicent William E. Dunne and National Director Sherman W. Wilkins presented a Jimmy Doolittle Fellowship to General Corder after his speech. National Vice President (Northwest Region) Alwyn T. Lloyd gave out tokens of appreciation on behalf of the region to the 62d Military Airlift Wing's Capt. R. Steve Bunn and Senior Enlisted Advisor CMSgt. William R. Haire.

In South Carolina, the leadership torch of the **Charleston Chapter** has passed to a new president. Retired South Carolina ANG Brig. Gen. Frank Rogers took over from Jim Friar during ceremonies attended by State President Tony Meyers. Vice Presicent Col. Joe Castanguay, Secretary John Hewell, and Treasurer George Porcher were installed at the same ceremony before a group of more than 125 people.

The Amarillo Civic Center was the site for the **Panhandle (Tex.) Chapter's** Yellow Ribbon Ball. Former Chapter President Guy W. Leach organized the successful fund-raiser, which drew a record crowd of 350. National President O. R. Crawford, National Vice President (Southwest Region) Aaron C. Burleson, Kansas President Sam Gardner, and 27th Fighter Wing Commander Col. Arnold Franklin attended the ball. Executive Director Monroe Hatch served as guest speaker, and Barry L. Smith was the master of ceremonies.

With some sadness, members of the **Phoenix Sky Harbor (Ariz.) Chapter** got together to hear details about the imminent closing of nearby Williams AFB. Col. Kurt Anderson, commander of the 82d Flying Training Wing, explained the month-by-month steps that will culminate in the closing of Williams in September 1993. National Vice President (Far West Region) Robert Munn and State President Bill Lafferty attended the meeting, hosted by Chapter President Davis Rohr. Former National President Joe Foss, a Medal of Honor recipient, gave Colonel Anderson a copy of his latest book, *Top Guns,* in appreciation for his talk.

The **Red River Valley (N. D.) Chapter** did its part to support Operation White Christmas at Grand Forks AFB, N. D. Outgoing Chapter President Maury Rothkopf donated the chapter's $250 check to 2d Lt. Gregg Easterbrook, publicity officer for the operation, which distributes commissary gift certificates to deserving military families in an effort to enhance their enjoyment of the holiday season.

Coming Events

April 3–4, **Northeast Region Workshop,** Mechanicsburg, Pa.; May 1–2, **North Carolina State Convention,** Raleigh, N. C.; May 9, **Massachusetts State Convention,** Hanscom AFB, Mass.; May 9, **New England Region Workshop,** Hanscom AFB, Mass.; May 15–16, **Maryland State Convention,** Andrews AFB, Md.; May 15–17, **Alaska State Convention,** Anchorage, Alaska; May 15–17, **New Jersey State Convention,** Atlantic City, N. J.; May 16–17, **Oregon State Convention,** Klamath Falls, Ore.; May 22–24, **South Carolina State Convention,** Columbia, S. C.; May 23, **Alabama State Convention,** Birmingham, Ala.; May 29–31, **New York State Convention,** Tarrytown, N. Y.; June 5–6, **Tennessee State Convention,** Memphis, Tenn.; June 9–10, **Utah State Convention,** Ogden, Utah; June 13–14, **South Dakota State Convention,** Pierre, S. D.; June 26–27, **Mississippi State Convention,** Columbus, Miss.; June 26–27, **Missouri State Convention,** Whiteman AFB, Mo.; July 10–12, **Kansas State Convention,** Wichita, Kan.; July 17–18, **Arkansas State Convention,** Little Rock, Ark.; July 17–18, **Colorado State Convention,** Lowry AFB, Colo.; July 17–19, **Georgia State Convention,** Savannah, Ga.; July 17–19, **Michigan State Convention,** Marquette, Mich.; July 17–19, **Pennsylvania State Convention,** Harrisburg, Pa.; July 17–19, **Texas State Convention,** San Angelo, Tex.; July 24–25, **Florida State Convention,** Panama City, Fla.; July 24–26, **Washington State Convention,** Tacoma, Wash.; July 31–August 1, **Arizona-Nevada (Combined) State Convention,** Las Vegas, Nev.; August 7–9, **California State Convention,** San Bernardino, Calif.; August 14–15, **Louisiana State Convention,** Bossier City, La.; August 22–23, **Indiana State Convention,** Kokomo, Ind.; August 28–29, **New Mexico State Convention,** Alamogordo, N. M.; September 14–16, **AFA National Convention and Aerospace Development Briefings and Displays,** Washington, D. C.

The **Scott Berkeley (N. C.) Chapter** brought NASA astronaut Dr. W. E. Thornton, who flew on the space shuttle *Challenger* in 1983 and 1985, to the Seymour Johnson AFB Community Appreciation Day. Dr. Thornton held an audience of hundreds of children and teachers spellbound with his tales about the wonders of space. The children are part of the Young

Astronauts Program, sponsored by the Scott Berkeley Chapter.

Masone Memorial Fund

The **Eglin (Fla.) Chapter** has started a fund to honor the late D. N. Masone *[see February 1992 "AFA/AEF Report," p. 83].* The fund will support the continuation of Mr. Masone's life's work on the Enlisted Men's Widows and Dependents Home. Donations will provide medical care and an independent assisted living program to the 390 residents of the Teresa Village and Bob Hope Village. Contributions can be sent to the Nick Masone Memorial Fund, 571 Mooney Rd., Fort Walton Beach, FL 32547-1859.

Have AFA News?

Contributions to "AFA/AEF Report" should be sent to Dave Noerr, AFA National Headquarters, 1501 Lee Highway, Arlington, VA 22209-1198. ■

Unit Reunions

B-58 Hustler
The B-58 Hustler Association will hold a reunion June 5–7, 1992, at the Green Oaks Inn in Fort Worth, Tex. **Contact:** Col. George Moore, USAF (Ret.), 6109 Merrymount Rd., Fort Worth, TX 76107. Phone: (817) 732-6879.

Chambley AB
Personnel who served at Chambley AB, France, will hold a reunion May 22–25, 1992, at the Embassy Suites Hotel in Atlanta, Ga. Former military and civilian personnel and dependents are invited. **Contact:** Charles R. Timms, P. O. Box 6892, Marietta, GA 30065. Phone: (404) 565-1180.

Langley Aero Club
Members of the Langley Aero Club will hold a thirty-fourth-anniversary reunion banquet May 29, 1992, at the Radisson Hotel in Hampton, Va. **Contact:** Clifford F. Moriarty III, 3-B Eagan Ave., Langley AFB, VA 23655. Phone: (804) 764-7667 or (804) 865-8898.

N. C. ANG Pilots and Navigators
Former North Carolina ANG pilots and navigators will hold a reunion June 12–13, 1992, at the Ramada Inn in Charlotte, N. C. **Contact:** Blaine Nash, 918 Hartford Ave., Charlotte, NC 28209. Phone: (704) 523-3054.

2d Emergency Rescue Squadron
The 2d Emergency Rescue Squadron (5th and 13th Air Forces) will hold a reunion September 10–12, 1992, in Portland, Ore. **Contact:** Frank Rauschkolb, 2451 S. W. Crestdale Dr., Portland, OR 97225. Phone: (503) 292-4364.

2d Photo Mapping Squadron
Veterans of the 2d Photo Mapping Squadron (World War II) will hold a reunion October 22–25, 1992, at the Marriott Pavilion Hotel in St. Louis, Mo. **Contact:** Maynard E. White, 2309 Thorndale Ct., Elkhart, IN 46517. Phone: (219) 294-7177.

3d Photo Recon Squadron
Veterans of the 3d Photo Reconnaissance Squadron (World War II) will hold a reunion September 25–27, 1992, in Reno, Nev. **Contact:** W. H. Walker, 208 Windy Ln., Rockwell, TX 75087. Phone: (214) 771-6067.

3d Service Group
Veterans of the 3d Service Group "Blue Hornets" stationed at Selfridge Field, Mich., and in Europe will hold a reunion September 26–28, 1992, in Punta Gorda, Fla. **Contact:** Maj. A. L. Braun, USAF (Ret.), 824 Ellicott Cir., Port Charlotte, FL 33952. Phone: (813) 624-0751.

36th MAS/36th TAS/36th TCS
Members of the 36th Airlift Squadron and its predecessors will hold a fiftieth-anniversary reunion June 5–6, 1992, at McChord AFB, Wash. **Contact:** Capt. James D. Dineen, USAF, 36th Airlift Squadron, McChord AFB, WA 98438. Phone: (206) 984-2197.

37th Fighter Wing
Military and key civilian personnel associated with the 4461st Support Group/4450th Tactical Group/37th Fighter Wing and the F-117A Stealth fighter program will hold a reunion May 22–25, 1992, at the Hilton Hotel in Las Vegas, Nev. **Contact:** USA Hosts/Nighthawks '92, Stealth Fighter Association, P. O. Box 9571, Las Vegas, NV 89115. Phone: (702) 798-0000 or (800) 634-6133.

48th Fighter Squadron
Veterans of the 48th Fighter Squadron, 14th Fighter Group (World War II), will hold a reunion June 7–10, 1992, at the Galt House East, Louisville, Ky. **Contact:** Carl Lindstrom, 8804 Marksfield Rd., Louisville, KY 40222. Phone: (502) 423-7776.

50th Tactical Airlift Squadron
Veterans of the 50th Troop Carrier Squadron (World War II) and the 50th Tactical Airlift Squadron will hold a fiftieth-anniversary reunion June 12–14, 1992, in Little Rock, Ark. **Contact:** Capt. Jeffrey M. Gagnon, USAF, 50th TAS/DOLN, Little Rock AFB, AR 72099-5000 (please include SASE). Phone: (501) 988-3685 or (501) 834-3233.

53d Fighter Group
Veterans of the 53d Fighter Group (World War II and after) are planning a reunion May 1–3, 1992, in Nashville, Tenn. **Contact:** Elmer E. Johnson, 1815 S. E. 6th Terrace, Cape Coral, FL 33990. Phone: (813) 574-4044.

Readers wishing to submit reunion notices to "Unit Reunions" should mail their notices well in advance of the event to "Unit Reunions," Air Force Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Please designate the unit holding the reunion, time, location, and a contact for more information.

54th Fighter Group
The 54th Fighter Group will hold a reunion October 1–4, 1992, in Colorado Springs, Colo. **Contact:** Maj. Gen. Charles M. McCorkle, USAF (Ret.), 9524 Bay Ct., Carmel, CA 93923.

64th Troop Carrier Group
Members of the 64th Troop Carrier Group will hold a reunion September 24–27, 1992, in St. Louis, Mo. **Contact:** William A. Dewey, 2137 Lyans, LaCanada, CA 91011. Phone: (818) 248-0569.

65th AAFTD
Military and civilian personnel of the 65th AAFTD who served between November 1941 and December 1944 will hold a reunion May 23–24, 1992, in Decatur, Ala. **Contact:** James P. Owens, 630 St. Andrews Dr., Gulf Shores, AL 36542. Phone: (205) 943-7736 or (205) 968-6301.

77th Bomb Squadron
Members of the 77th Bomb Squadron "Bullet Shot" will hold a reunion July 17–19, 1992, in Rapid City, S. D. **Contact:** Lt. Col. Randy Wimmer, ANG, 1516 S. 8th St., Fargo, ND 58103. Phone: (701) 293-7567 or (701) 232-2008.

79th Fighter Group
Members of the 79th Fighter Group, which included the 85th, 86th, and 87th Fighter Squadrons (World War II), will hold a reunion June 4–7, 1992, at the Hilton Hotel in Charlotte, N. C. **Contact:** Edwin Newbould, 1206 S. E. 27th Terrace, Cape Coral, FL 33904 Phone: (813) 574-7098.

246th Signal Operations Co.
The 246th Signal Operations Co. (World War II) will hold a reunion July 30–August 1, 1992, in Augusta, Ga. **Contact:** Johnnie Huggins, 30031 S. W. 169th Ave., Homestead, FL 33030. Phone: (305) 247-0150.

308th Airdrome Squadron
Veterans of the 308th Airdrome Squadron (World War II) will hold a reunion June 3–7, 1992, in Grand Rapids, Mich. **Contact:** Herb Sterling, 608 Covell Rd., N. W. Grand Rapids, MI 49504-4844. Phone: (616) 453-2180.

308th Fighter Squadron
Veterans of the 308th Fighter Squadron, 31st Fighter Group, will hold a reunion June 18–21, 1992, in Dayton, Ohio. **Contacts:** Albert P. Quint, 1704 Home-

stead Trail, Mequon, WI 53092. Phone: (414) 242-2489. Ross E. Stober, 1841 W. Spring St., Lima, OH 45805. Phone: (419) 222-6619.

310th Fighter Squadron
The 310th Fighter Squadron (World War II) and the 310th Fighter-Bomber Squadron (Korea) will hold a reunion June 11–14, 1992, in Colorado Springs, Colo. **Contact:** Oscar G. Layton, 2156 Riverbrook Rd., Decatur, GA 30035. Phone: (404) 981-4276.

314th Composite Wing
Veterans of the 314th Composite Wing, 5th Air Force, and Hq. Squadrons will hold a reunion June 17–21, 1992, in Atlantic City, N. J. **Contact:** Bob Kendall, Box 35372, Louisville, KY 40232.

315th Fighter Squadron
Veterans of the 315th Fighter Squadron, 324th Fighter Group (World War II), will hold a reunion June 4–7, 1992, at the Valley Forge Hilton Hotel in King of Prussia, Pa. **Contact:** Eugene J. Orlandi, 311 North St., East Northport, NY 11731. Phone: (516) 368-9193.

351st Bomb Group
The 351st Bomb Group, which was based in Polebrook, England, during World War II, will hold a reunion June 24–27, 1992, in Worcester, Mass. **Contact:** Fred Dundas, 6018 Buckskin Cir., Indianapolis, IN 46250. Phone: (317) 842-1945.

355th Fighter Group
Veterans of the 355th Fighter Group, 8th Air Force (World War II), stationed at Steeple Morden, England, will hold a reunion September 10–13, 1992, in New Orleans, La. **Contact:** Robert E. Kuhnert, 4230 Shroyer Rd., Dayton, OH 45429. Phone: (513) 294-2986.

364th Fighter Group
Veterans of the 364th Fighter Group, 8th Air Force (World War II), stationed in Honington, England, will hold a reunion September 23–26, 1992, in Memphis, Tenn. **Contact:** Dan Leftwich, 6630 Calcero Ct., Dayton, OH 45415. Phone: (513) 890-364[illegible].

401st Bomb Group
Veterans of the 401st Bomb Group, 8th Air Force, will hold a reunion September 16–20, 1992, in Norfolk, Va. **Contact:** Ralph Trout, P. O. Box 22044, Tampa, FL 33622.

416th Bomb Group
The 416th Bomb Group (World War II) will hold a reunion May 29–31, 1992, at the Perdido Beach Hilton Resort in Perdido, Ala. **Contact:** John E. Wilson, 625 Edgewood Acres, Luverne, AL 36049. Phone: (205) 335-6363.

456th Troop Carrier Wing
Members of the 456th Troop Carrier Wing, which included the 780th, 781st, and 782d Troop Carrier Squadrons, will hold a reunion September 25–27, 1992, at the Elk Creek Lodge in Black Hills, S. D. **Contact:** Lt. Col. Gerald E. Teachout, USAF (Ret.), HCR 80, Box 766, Piedmont, SD 57769-9520. Phone: (605) 787-4560.

482d Bomb Group
Veterans of the 482d Bomb Group, 8th Air Force (World War II), will hold a reunion September 9–18, 1992, at RAF Alconbury, England. **Contact:** Peter F. Ardizzi, P. O. Box 482, Warminster, PA 18974-0482. Phone: (215) 675-9194.

487th Bomb Group
The 487th Bomb Group, 8th Air Force (World War II), will hold a reunion June 17–20, 1992, in Savannah, Ga. **Contact:** Henry Hughey, 1529 Delia Dr., Decatur, GA 30033. Phone: (404) 939-2462.

530th Fighter Squadron
Members of the 530th Fighter Squadron, 311th Fighter Group (World War II), will hold a reunion September 9–13, 1992, at the Old Colony Inn in Alexandria, Va. **Contact:** F. H. Wilbourne, 4118 Keagy Rd., Salem, VA 24153. Phone: (703) 387-0562.

932d Air Control/Warning Squadron
Members of the 932d Air Control and Warning Squadron/Air Defense Squadron will hold a reunion May 3–8, 1992, in Rockville, Iceland. All former personnel are welcome. **Contact:** Capt. Lee Carey, USAF, PSC 1003 Box 1094-R, FPO AE 09728-0305. Phone: 354-25-5303 or Fax: 354-25-5302.

3083d Aviation Depot Group
Members of the 3083d Aviation Depot Group will hold a reunion May 14–18, 1992, in Las Vegas, Nev. **Contact:** 3083d ADG Reunion Committee, 24601 Chrisanta Dr., Mission Viejo, CA 92691. Phone: (714) 586-7761.

V Bomber Command
For the purpose of planning a reunion in June 1992, I would like to hear from former members of V Bomber Command (5th Bomber Command/5th Air Force) and Hq. Squadrons who served in the southwest Pacific. **Contact:** Ed Bottom, Box 35372, Louisville, KY 40232.

Class 45-A
Seeking contact with members of Class 45-A who served at Moody Field, Ga., for a reunion in late May 1992, in Washington, D. C. **Contact:** Edmund R. Galli, 108 Putney Ln., Malvern, PA 19355. Phone: (215) 296-2499. ■

Bulletin Board

Seeking contact with relatives and friends of two members of West Point Class of 1945. **Capt. Charles William Pratt,** USAF, 4th Fighter Group, Korea, was declared MIA November 8, 1951, and declared KIA December 31, 1953. **Lt. Charles Howard King,** USAF, was killed in an aircraft accident at Tempelhof Airport, Berlin, July 25, 1948, while flying in the Berlin Airlift. **Contact:** Col. Charles L. Gandy, Jr., USAF (Ret.), 9098 Maple Hill Dr., Boise, ID 83709.

Seeking current addresses of members of the classes of 1966, 1967, and 1968 of **Wheelus High School,** Wheelus AB, Libya. **Contact:** Joseph S. Northrop, 1525 Cherry St., Huntington, IN 46750.

Seeking contact with **SSgt. Walter Edgar Baker,** USAF, who was stationed at RAF Greenham Common, England, in 1957. He knew Margery Goslin, who worked as a cashier in the NCO club. **Contact:** Madeline Sue (Goslin) Smyth, 61 Southend, Cold Ash, Newbury, Berkshire RG13 4BW, England.

Seeking contact with surviving **World War I pilots** who would be interested in attending Aerodrome '92 in September, a convention of builders, owners, and pilots of flyable World War I aircraft replicas. **Contact:** James L. Brewer, 3331 Simpson Point, Grant, AL 35747.

Seeking L-Bird enthusiasts interested in attending the International Liaison Pilot and Aircraft Association's second **worldwide gathering of L-Birds,** July 27–29, 1992, in Keokuk, Iowa. The event is a prelude to the air show and convention in Oshkosh, Wis. **Contacts:** Irv Lindner, Rte. 1, Keokuk, IA 52632. Bill Stratton, 16518 Ledgestone, San Antonio, TX 78232.

If you need information on an individual, unit, or aircraft, or if you want to collect, donate, or trade USAF-related items, write to "Bulletin Board," AIR FORCE Magazine, 1501 Lee Highway, Arlington, VA 22209-1198. Letters should be brief and typewritten; we reserve the right to condense them as necessary. We cannot acknowledge receipt of letters. Unsigned letters, items or services for sale or otherwise intended to bring in money, and photographs will not be used or returned.—THE EDITORS

Seeking information on **Lt. Col. John Pace,** (spelling uncertain) who was at RAF Greenham Common, UK, in 1943–44. He may have been with the 438th Troop Carrier Group, 53d Troop Carrier Wing, or the 82d Service Group. **Contacts:** MSgt. J. M. Bartels, 137 S. W. 7th, Moore, OK 73160. M. Miles, 15 Speen Lodge Ct., Speen, Newbury, Berkshire RG13 1QS, England.

Seeking the whereabouts of **Col. John G. Eriksen,** commanding officer of Waller Field, Trinidad, in World War II. Also seeking **George Alfred Bennett,** who graduated from Spence Field, Ga., in Class 43-C. **Contact:** Lt. Col. Robert W. Bliss, AFRES (Ret.), P. O. Box 107, Orford, NH 03777-0107.

Seeking the whereabouts of **Tom J. Miller** from Thomasville, Ga., who was a fighter pilot with the 370th Service Squadron in Australia in March 1943. **Contact:** Robert Sherrard, 715 Cranbrook, St. Louis, MO 63122.

Seeking information on **Sgt. Albert B. "Red" Coven,** a B-24 flight crew member of the 791st Bomb Squadron, 8th Air Force, who was killed in action August 3, 1944, over France. **Contact:** MSgt. Fred Schnettler, USAF (Ret.), 817 Stratford Dr., East Meadow, NY 11554.

Seeking contact with members of John "Jack" Weaver's bomber crew of the **360th Bomb Squadron,** 303d Bomb Group, from November 1944 to May 1945. **Contact:** SSgt. Arthur L. Bailey, USAAF, (Ret.), P. O. Box 263, Santa Maria, CA 93456.

Seeking a patch, cap, or appreciation-of-service plaque from the **18th Special Operations Squadron,** 56th Special Operations Wing. **Contact:** Lou Dunham, 9916 Falls Rd., Potomac, MD 20854.

Seeking information on **James Woods,** an American fighter pilot shot down over Yunan Province

near the China-Burma border, who was captured by one of the hill tribes of China, lived with them, and returned to the US at the end of World War II. **Contact:** Charles Webb, 30 Primrose Ct., Hydethorpe Rd., London SW12 0JQ, England.

Seeking contact with members of the **31st Strategic Fighter Wing,** which was activated at Turner AFB, Ga., in 1947 or 1948 under the command of Col. William L. Lee. **Contact:** Lon Atkin, P. O. Box 50902, Amarillo, TX 79159.

Seeking contact with **Sgt. Lois M. Behrend** from Milwaukee, Wis., who was a member of the Women's Army Corps during World War II, stationed at US Strategic Forces Europe, Office of the Director of Medical Service, St. Germain-en-Laye, France, in 1944–45. **Contact:** Rita Crean Tlamsa, 162 Ellison Ave., Bronxville, NY 10708.

For a history, I am seeking reminiscences, information, and photos of **B-29s, B-50s, B-36s, and B-47s** taken during tours in the UK. **Contact:** Michael Bower, 32 Netherhall Way, Cambridge CB1 4NY, England.

Collector seeks **military payment certificates,** used overseas from 1946 to 1972. **Contact:** Nick Schrier, 4121 Exa Ct., Sacramento, CA 95821.

Seeking information on my relative **Marvin,** who was based at RAF Lakenheath, England, in January 1952. **Contact:** Diane Westwood, 43 Kelsey Crescent, Cherry Hinton, Cambridge CB14XT, England.

Air University and Squadron Officer School are seeking **autobiographical accounts of Operations Desert Storm and Desert Shield** from company grade officers who participated. Please include your story (2,500 words or less), pictures or artwork, brief biography, official photo, telephone number, and a SASE for anything you want returned. **Contact:** Capt. Michael P. Vriesenga, USAF, Air University, Squadron Officer School, Maxwell AFB, AL 36112-5582.

Seeking contact with personnel assigned to **1st Composite Squadron** on Ascension Island between August 1942 and October 1944. **Contact:** Lt. Col. Gerald E. Gomme, USAF (Ret.), 712 29th St., Manhattan Beach, CA 90266-2306.

Seeking photos of and information on **markings of P-39s, P-37s, P-43s, and P-26s** in the Pacific theater in 1941–42. Also seeking information from veterans who encountered Me-109s, FW-190s, and Me-262s on intercept or ground attack missions in the winter of 1944–45. **Contact:** H. Brooks Whelan, P. O. Box 512, South Orleans, MA 02662.

Seeking **patches** and other memorabilia of the following aircraft: SR-71, U-2, TR-1, and ER-2. **Contact:** John Stone, 419 Wallace Ave., #3, Louisville, KY 40207.

Seeking **postcards** of USAF and other military aircraft. **Contact:** SMSgt. William A. Peters, USAF (Ret.), P. O. Box 1621, Sandwich, MA 02563-1621.

Seeking contact with **Frencey DuMont Bennett,** a B-29 aircraft commander with 1st Bomb Squadron, 9th Bomb Group, at Travis AFB, Calif., in 1950–51. **Contact:** Lt. Col. Donald D. Mitchell, USAF (Ret.), 729 Parkside Dr., N. E., Albuquerque, NM 87123.

Writer seeks contact with veterans who were with **90th Squadron,** 3d Attack Group, Durand Field, Port Moresby, New Guinea, in February–April 1943. **Contact:** James F. Sellers, 3525 McClaflin Dr., Enid, OK 73701.

Seeking contact with World War II veterans of the **459th Service Squadron,** 318th Service Group, interested in joining the 458th Service Squadron in forming an association. **Contact:** G. Paul Gerbracht, 2114 W. 29th St., Erie, PA 16508.

Seeking donations of old **patches** and emblems to help with recruiting efforts. **Contact:** Capt. Barbara J. Richardson, USAF, ADCO, AFROTC Det. 535, Syracuse University, Syracuse, NY 13244-1140.

For a book, I am seeking firsthand accounts of pilots and crew of aircraft that saw combat in **Operation Desert Storm. Contact:** Barry Smith, 16960 Sorrel Ct., Morgan Hill, CA 95037.

Seeking contact with **Lt. Walter L. Elkens** and **Sgt. Harvey L. Wallin,** members of Capt. Thomas G. A. Welch's B-29 crew with the 468th Bomb Group in 1944–45. **Contact:** Ralph P. Holton, 205 Hazel Dr., Vestal, NY 13850.

Writer seeks contact with anyone who worked with **Maj. Gen. Frank O'Driscol Hunter,** a World War I ace and the first commander of 8th Air Force Fighter Command in World War II. **Contact:** Fred Alexander, 87 Industrial Park Rd., Franklin, NC 28734.

Seeking contact with all personnel assigned to **Kelly Field or Duncan Field,** Tex., between 1935 and World War II. **Contact:** CMSgt. R. W. Dyer, USAF (Ret.), 718 Windrock Dr., San Antonio, TX 78239.

Seeking contact with members of the **69th Tactical Missile Squadron,** redesignated 405th TMS, stationed in West Germany in 1957–59. **Contact:** Dick Weigert, 5950 Turner Rd., Union City, PA 16438.

Seeking to trade USAF **patches,** pilot scarves, and decals. I am especially interested in memorabilia related to FB-111s at Pease AFB, N. H., and the 509th BMW. **Contact:** Curt Lenz, 32 June St., Nashua, NH 03060-5345.

Seeking information on and photos of **Lt. Ernest J. Sierens** from Mount Clemens, Mich. He was a B-17 pilot with the 547th Bomb Squadron, 384th Bomb Group, and was killed during his seventh combat mission, a raid over Germany on August 12, 1943. I am especially interested in this mission. **Contact:** Cmdr. Michael B. Clay, USN, 7304 Lightship Ct., Burke, VA 22015-4418.

Collector seeks to purchase **tour and souvenir jackets** from the 1950s. These flashy jackets are colorfully embroidered with military insignia, maps, airplanes, tigers, eagles, or similar designs. **Contact:** Greg West, 824 N. 25th St., Philadelphia, PA 19130.

Seeking detailed information on **Army Air Force Bases in the northwest** US (Wash., Idaho, Mont., and Ore.). I am especially interested in units and aircraft assigned to these bases. I am also interested in stories from pilots who flew F-101A Voodoos in 1954–57. **Contact:** Dennis E. Kelsey, HCR 99370, Lind, WA 99341.

Collector seeks **models of missiles** and rockets, especially manufacturer's models. **Contact:** Capt. Scott D. Mattson, USAF, 1231B S. Hickam Dr., Grand Forks AFB, ND 58204.

Seeking contact with the following members of the 6th Troop Carrier Squadron, stationed in New Guinea in 1943–44: **Cpl. Pat DeGeorge** and **Sgt. Tony Scarsella. Contacts:** Belee Vella, Farleigh 4741, Mackay, Queensland, Australia. Frank Bissett, 844 Surf Ave., Beachwood, NJ 08722.

Collector seeks World War II **airplane spotter models** of air force and navy aircraft, both Allied and Axis. **Contact:** Linwood M. Lockhart, 12310 River Rd., Richmond, VA 23233.

Seeking the whereabouts of **Lynda Mills,** who attended Yamato High School in Tokyo, Japan, in 1959–61. **Contact:** David (Peacher) TallEagle, 641 W. Ave. J Suite 333, Lancaster, CA 93534.

Collector seeks copies of photos showing three or four groups of **military personnel at Nichols Field,** the Philippines, on August 20, 1945, waiting for the Japanese surrender party to emerge from the C-54 they flew in from Ie Shima. **Contact:** Mike Merryman, 2613 Furon Rd., Centralia, WA 98531.

Researcher seeks recollections, photographs, and memorabilia from "flying the blowtorch era," the ground and flight **operations of jet aircraft** from 1945 to 1960. **Contact:** Mark D. Bacon, 24364 Pansy Ct., Apt. D, Elmendorf AFB, AK 99506.

Seeking the whereabouts of **(Joseph) Bruce Hamilton,** a 1973 graduate of San Diego State University who trained as a USAF pilot in Texas shortly thereafter. **Contact:** K. Franklin, 7205 Via Capri, La Jolla, CA 92037.

Seeking contact with **Michael Taylor,** a USAF officer last known to be stationed in Germany. He has been a member of USAF since 1979. **Contact:** Wadell K. Callahan, P. O. Box 1000, Marion, IL 62959.

Seeking photos of **B-32s. Contact:** Robert E. Frederickson, 8422 Chestnut Ave., South Gate, CA 90280.

Seeking information on and the whereabouts of **Col. James H. Morris,** USAF (Ret.), for a book about the 1949 *Lucky Lady II* flight. **Contact:** V. S. Williams, 5312 Alta Bahia Ct., San Diego, CA 92109.

Seeking USAAF/USAF uniforms, photos, flight gear, insignia, and **patches from 1941–51.** Also seeking

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stories from this period, the Air Force's "transitional" decade. **Contact:** George E. Dively, Jr., P. O. Box 10743, Alexandria, VA 22310-0743.

Seeking contact with **Louis John** of West Chester, Pa., an NCO based at RAF Manston, England, in 1955–58. **Contact:** F. Feast, 13 Kingsand Rd., Lee, London SE12 0LE, England.

Seeking contact with surviving crew members or families of lost crew members of ***Haley's Comet,*** plane #350, 425th Bomb Squadron, 308th Bomb Group, which was lost January 25, 1944, on a mission from Kunming, China, to Chabua, India. **Contact:** George R. Maupin, Jr., 13685 Braun Rd., Golden, CO 80401.

Seeking contact with anyone who worked on or flew **F-4E #68-420.** I am especially interested in pictures and historical information. **Contact:** Bill Crean, 842 Waterford Dr., Delran, NJ 08075-2220.

Seeking information on the whereabouts of **Wilbur K. Doyle** from St. Louis, Mo., who was at the A-26 training base at Marianna, Fla., in the autumn of 1944 and later was with the 572d Bomb Squadron, 391st Bomb Group, 9th Air Force, at Roye/Amy, France. **Contact:** Deane R. Brandon, 2801 Juanipero Way, Medford, OR 97504.

Seeking contact with **Bill Miner,** whose last known address was in Seattle, Wash. We served together at CFB Comox, British Columbia, in 1974–77. **Contact:** David B. Carter, P. O. Box 265, CFB Shearwater, Nova Scotia B0J 3A0, Canada.

The US Fish and Wildlife Service would like to contact anyone who observed or took pictures of the seabirds and the seabird nesting cliffs on **Middleton Island, Alaska, in 1956–63.** The 720th Aircraft Control and Warning Squadron was stationed there at that time. **Contact:** Bay Roberts, USFWS-Research, 1011 E. Tudor Rd., Anchorage, AK 99503.

Seeking information on the whereabouts of **Sgt. Erik Duane Mumford, USAF,** last known to be stationed in Germany. **Contact:** Shirley A. Collins, 1233 Eldridge St., Clearwater, FL 34615.

For a history of the B-29 and its operations against Japan, I am seeking to locate, borrow, or copy **diaries and annotated logs** related to its design, production, and use in training and combat, from both officer and enlisted air and ground crews. **Contact:** Kenneth P. Werrell, Dept. of History, Radford University, Radford, VA 24142.

Seeking contact with **MSgt. Michael J. Gormiller,** USAF (Ret.), last known to be a civil servant in Madrid, Spain. He retired in 1984 from Nellis AFB, Nev., and his previous assignments included Andrews AFB, Md., in 1974–77, Offutt AFB, Neb., in 1977–79, and Turkey in 1979–80. **Contact:** SSgt. Theresa (Barker) Stanfield, USAF, PSC 76, Box 416, APO AE 09720.

Seeking contact with anyone who knew **SSgt. Robert H. Castle,** a B-17 ball turret gunner with the 335th Bomb Squadron, 95th Bomb Group, killed in action June 22, 1943. I am especially interested in his final mission. **Contact:** Capt. Robert H. Castle, AFRES, 705 Briarwood Dr., Midwest City, OK 73130.

Author researching the air war in the Balkans in June 1944 wishes to contact former members of the **332d Fighter Group** and of the **60th Troop Carrier Wing. Contact:** Michael O'Hagan, 309-11 Cooperage Pl., Victoria, British Columbia V9A7J9, Canada.

Seeking contact with the following members of the **29th Air Service Group,** who served at Nagoya AB,

Japan, from 1945 to 1948: Maj. Howard J. Caquehn, 1st Sgt. Lester T. Bailey, Sergeant Black, Sgt. M. Strang, and PFC Steiniek. **Contact:** Frank Pace, 315 W. 15th St., Dover, OH 44622.

Military **aviation patch** collector seeks new trading partners from around the world. **Contact:** Richard Rochon, 55 de Rouville #1, Gatineau, Quebec J8T 7H7, Canada.

Seeking information on the whereabouts of **Jesse E. Redding** and **David Trail,** both of Randleman, N. C., who were both stationed at RAF Sculthorpe, England, in the early 1950s. **Contacts:** Richard L. McCormick, 307 S. Meridian, Greenwood, IN 46143. Jack Carter, 1800 Fairview, Ruston, LA 71270.

Seeking information on the whereabouts of **SSgt. Glenn Lloyd Singletary,** who was stationed at RAF Manston, England, between 1953 and 1957. He may have been from the Boston area. **Contact:** Susan Murdy, 12A Elmfield House, King St., London N2 8ES, England.

Seeking contact with members of **Pilot Class 45-B,** Decatur, Ala. **Contact:** Pat McNair, 2910 Goddard Pl., Midland, TX 79705.

Collector seeks Air Force unit **patches,** official and unofficial, especially from missile and aircraft units. **Contact:** SSgt. Rodney Arnnotte, USAF, 122 Tamarack, Vandenberg AFB, CA 93437.

Seeking contact with two crew members of the 418th Bomb Squadron, 100th Bomb Group, who were POWs in Stalag 17 from September 16, 1943: **Alford M. Clark,** from Dodge, Mass., and **Ira F. Bardman,** from Greenland, Pa. **Contact:** Willis F. Brown, 406 San Jose St., Fairfield, CA 94533.

Seeking information on the whereabouts of **Lt. Col. James Beard,** an F-102 pilot in 1958, who then flew B-52s and was an instructor during the 1960s. His last known address was Hahn AB, Germany. **Contact:** Gaylord Don Harvey, 907 Haltown, San Antonio, TX 78213.

Seeking USAF **patches** of fighter squadrons, bomb wings, or other insignia. **Contact:** Perry Rondou, P. O. Box 12526, Green Bay, WI 54304.

Seeking information from combat pilots who flew on **CAS missions during Operation Desert Storm,** especially lessons learned, positive and negative experiences, and tactics. **Contact:** Maj. John L. Albert, USAF, US Consulate General, APO AE 09215.

I have about a dozen copies of a commemorative newspaper, ***England at War, 1942,*** printed by the Yorkshire *Post*, available for anyone who served in the UK at that time who is interested in them. **Contact:** Herbert Foster, 58 Hammerton St., Pudsey, West Yorkshire LS28 7DD, England.

For an exhibition at the Grantham Museum, I am seeking contact with World War II **veterans who were based in Lincolnshire,** England. **Contact:** Grantham Museum, L. Budreau, St. Peter's Hill, Grantham, Lincolnshire NG31 6PY, England.

Seeking contact with anyone who can pinpoint the spot at Station 150, Boxted, England, **where the FW-190 was buried.** It was allegedly buried because the base was moving to Little Walden and no replacement engine was available. **Contacts:** Bill Billings, 56th Fighter Group Assn., 102 Stoney Brook Rd., Columbia, NJ 07832. Roger Freeman, Mays Barn, Dedham, Colchester, Essex CO07 6EW, England.

Collector seeks **Six-Pack patch** with F-106 on it from the 191st FIG (ANG), Selfridge Field, Mich., from the early 1970s. **Contact:** Charles Marotske, 7945 S. Verdev Dr., Oak Creek, WI 53154-3007.

Seeking information on the whereabouts of **Charles Freeman,** who was at Chanute Field, Ill., in 1939–40 and in the Pearl Harbor area on December 7, 1941. I believe he was originally from Canton, Ill. **Contact:** Floyd M. Black, 1356 Skyridge Dr., Crystal Lake, IL 60014.

For a book on the world's test pilot schools, I am seeking information on the USAF **Test Pilot School** at Edwards AFB, Calif. **Contact:** Terry C. Treadwell, 45 Forest View Rd., Bournemouth BH9 3BH, England.

Seeking contact with World War II **flight officers.** I am interested in your reactions to your appointment. **Contact:** Martin L. Cook, 6010 2d St. N. W., Washington, DC 20011.

Fairchild AFB, Wash., is seeking photographs of past **commanders of the 92d Wing,** especially Col. William M. Reid, Lt. Col. James W. Wilson, Col. Albert J. Shower, Col. Claude E. Putnam, Col. Edward A. Perry, and Col. Edison F. Arnold. **Contact:** Sgt. Tracy M. Partelow, USAF, 92d Wing Historian, Fairchild AFB, WA 99011-5000.

Seeking contact with anyone who knew **SSgt. Harold L. DeLay,** especially 2d Lt. Lawson D. Campbell, Sgt. Harold W. Beaver, and Sgt. Tony Gemondo, who were members of his crew but were not aboard his bomber February 25, 1944, when it went down. **Contact:** Theresa Jones, Hq. USAREUR, CMR 420, Box 1952, APO AE 09063.

Seeking contact with anyone who knew my grandmother, **Britta Sundberg,** a Swede living in northern Morocco during World War II who worked at the PX at the US air base in Casablanca. I am especially interested in contacting Capt. E. W. Grimes, Maj. P. W. Graham, and Lt. John Soltis. **Contact:** Agneta Lif, Söndagsvägen 104, 123 60 Farsta, Sweden.

Seeking correspondence with graduates of the **USAFE NCO Academy,** especially members of Class 57-D. **Contact:** Thomas W. Young, Sr., 830 W. Amsden St., Denison, TX 75020-7929.

Collector has several items of British insignia available in exchange for an **officer's cap badge** and World War II patches of 5th and 6th squadrons. **Contact:** Ross G. Penny, 50 Leinster Rd., Old Swan, Liverpool L13 5SX, England.

Seeking information on the whereabouts of **Charles Koehler,** from Chula Vista, Calif., who was with SAC at Wright-Patterson AFB, Ohio, in the mid-1960s before going to Germany. **Contact:** J. Hollar, 8781 Meadowcreek Dr., Dayton, OH 45458.

Seeking the serial number and photos of the RB-26C ***Lonesome Lil*** of the 6166th AWRF or 12th Tactical Reconnaissance Squadron, 67th Tactical Reconnaissance Wing, Kimpo, South Korea, in 1953–54. It was probably from the Kentucky ANG. **Contact:** R. H. Langill, P. O. Box 162, Plainfield, NH 03781.

Collector seeks **US Army Air Corps and USAAF memorabilia** from World War I to World War II. I am especially interested in leather flight jackets, uniforms, flight equipment, and photo albums. **Contact:** Jon Cerar, 425 John St., Carlinville, IL 62626.

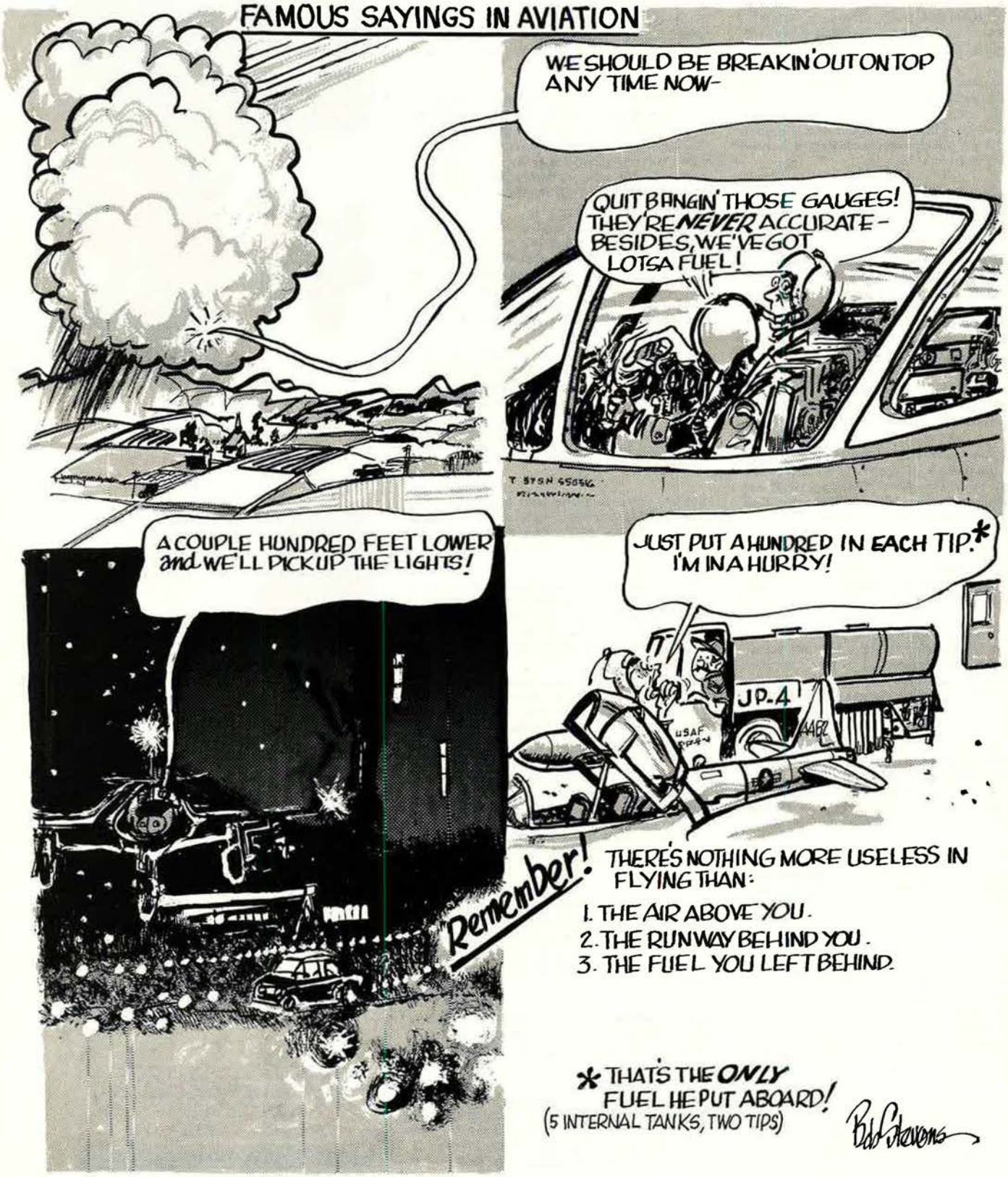
Seeking **patches** from the 645th Bomb Squadron and 410th Bomb Group. **Contact:** James A. McGovern, 6252 Harding Ave., Harrisburg, PA 17112.

Seeking information on **Leighton Elliott, Frank Riley,** and **Mike Olzak.** They were aircraft mechanics students stationed at Chanute Field, Ill., from November 1940 to May 1941. **Contact:** Walter D. Schau, Rte. 1, Box 167, Millsap, TX 76066. ■

Bob Stevens'

"There I was..."

I MUST CONFESS THAT IN 50+ YEARS OF FLYING I'VE UTTERED MOST OF THESE OLD SAWS. AS A MATTER OF FACT, NO. 3 ALMOST DID ME IN. (IT'S NOT JUST WHAT YOU SAY, BUT **HOW** YOU SAY IT!)



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