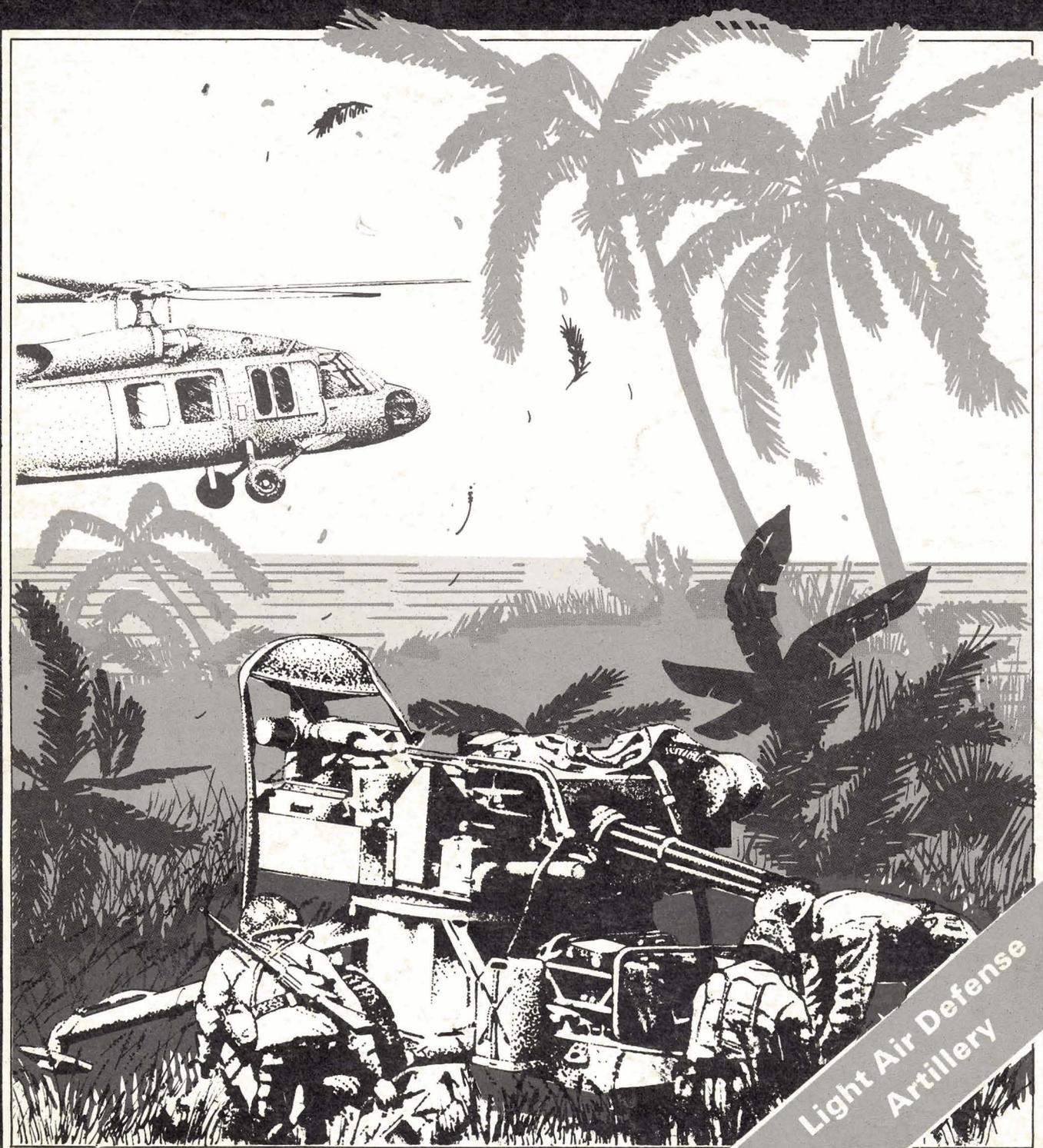


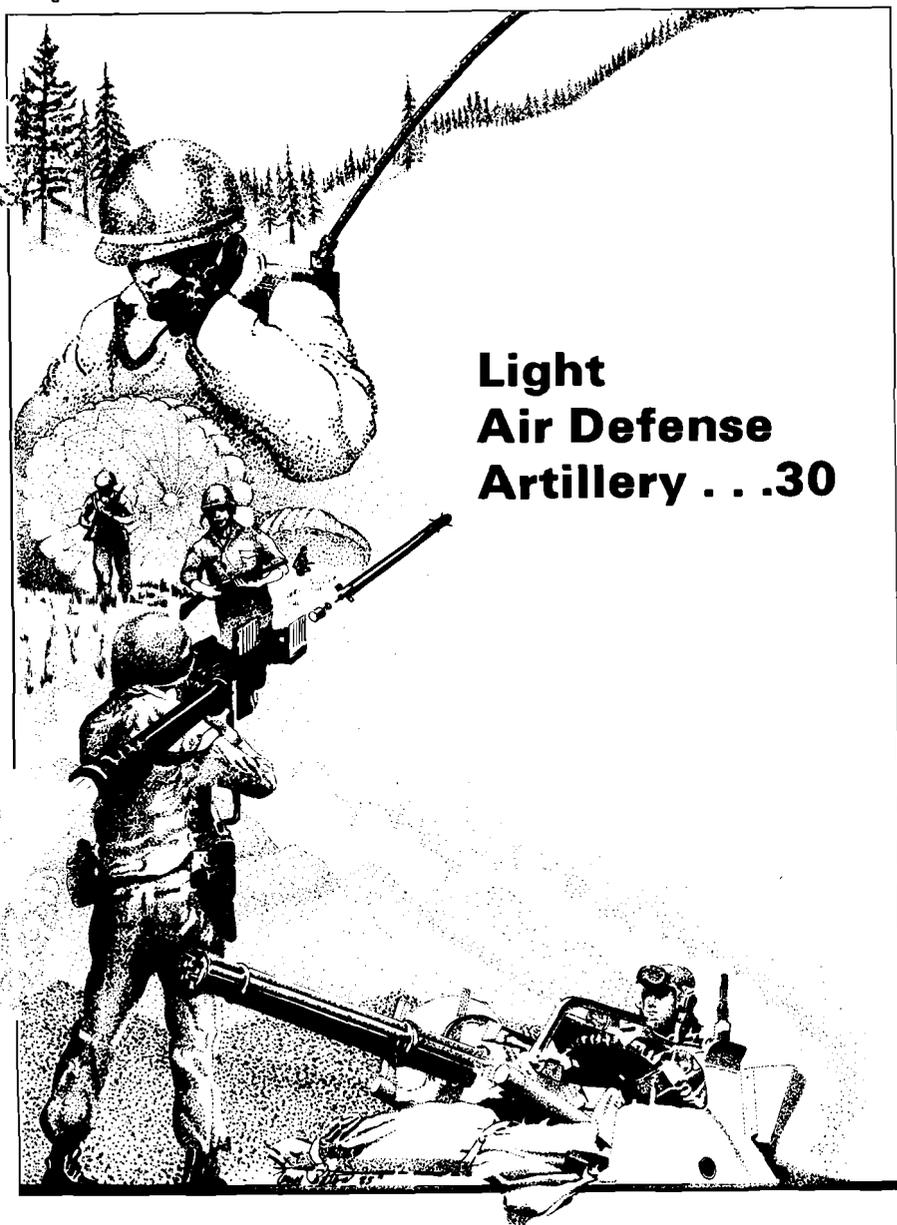
AIR DEFENSE ARTILLERY



Light Air Defense
Artillery

FALL 1985

AIR DEFENSE ARTILLERY



Light Air Defense Artillery . . .30

The light division air defense artillery battalion is designed to provide air defense protection for rapidly deployable divisions in low-intensity contingency operations. A 10-page section beginning on Page 30 describes the battalion's configuration, training and tactics. *Air Defense Artillery* wishes to thank the soldiers of the 1st Battalion, 51st Air Defense Artillery, Fort Ord, Calif., and Tactics Department, USAADASCH, Fort Bliss, Texas, who contributed their time, effort and expertise to the preparation of the section.

JOHN O. MARSH JR.
SECRETARY OF THE ARMY
MAJ. GEN. DONALD R. INFANTE
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BRIG. GEN. WILLIAM H. RILEY JR.
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TERRY G. SMITH
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BLAIR CASE
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CLAIRE B. STARNES
ASSISTANT EDITOR
BARBARA J. SORENSEN
ASSISTANT EDITOR
VALDA J. COMFORT
EDITORIAL ASSISTANT

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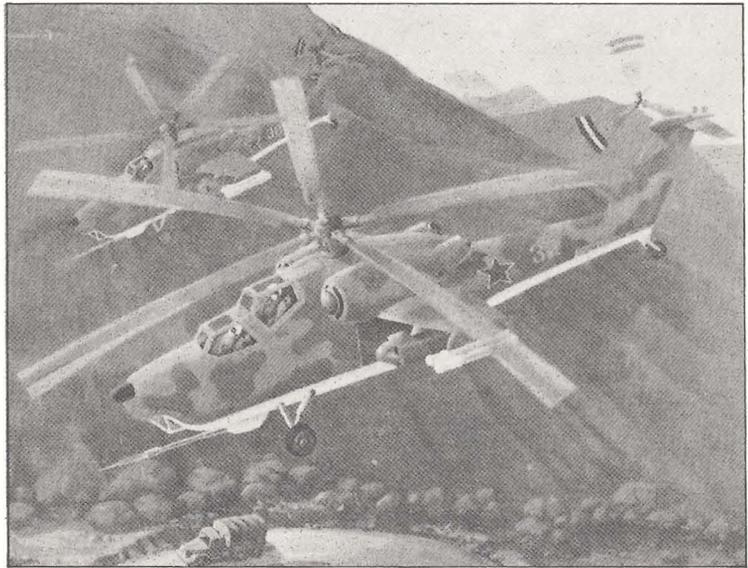
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Intercept Point

A new guy on the block often brings an uncertainty that results in a waste of time as folks “try to feel the new man out.” Nothing is more precious than a soldier’s time except soldier care. To save time over the next few editions, “Intercept Point” will contain my thoughts on a broad range of subjects about soldiers and soldiering. Nothing is directive. However, my intention is to use the column to partially fulfill my responsibilities as a teacher and mentor. Be assured, they are my thoughts; not a ghostwriter’s. My sincere hope is that they help make you a better soldier.

Our mission, simply stated, is to be ready to go to war on short notice. In four words: shoot, move, communicate and sustain. Our top priorities are training and maintenance. However, our most important resource is our soldiers. Their care is paramount. Take care of them in every way. Soldier care builds confidence in their leadership. Individual confidence adds up to unit cohesion—an esprit that makes the difference when all else fails.

We are about to spend approximately \$11 billion over the next five years on new and improved air defense weapons. Without trained, motivated, well-led soldiers, this is wasted money. Superb soldiers with good weapons of war, not weapons alone, make the difference.

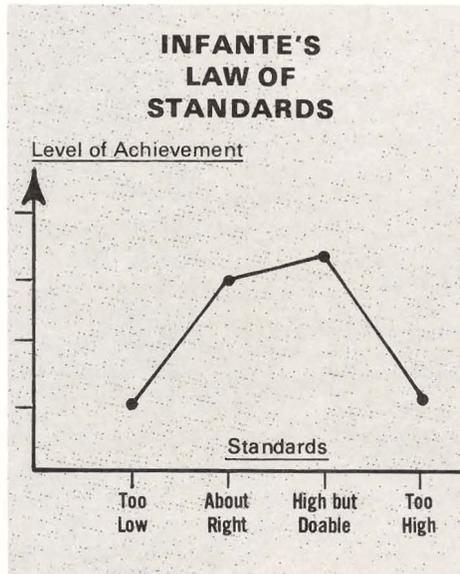
First, a few words about soldier care. You take care of soldiers in all ways. Hard training, conducting a tough physical training program, keeping the billets secure, paying them on time, listening to what’s on their minds—all these are ways of showing true soldier care. In this regard, you may fool generals as they pass through, but you can’t fool soldiers. They know when you’re blowing smoke. Be sincere about soldier care. If it is not in your heart to be sincere, find a new occupation. The Army has no room for uncaring leaders at any grade. Our soldiers and their lives are too precious.

Next, a few thoughts on establishing standards. A most difficult area. One which requires the highest degree of professionalism. One where you pay a price if your standards are either too low or too high. My operations research training taught me to think in graphs.



Maj. Gen. Donald R. Infante addresses air defense artillery soldiers as he assumes command of the U.S. Army Air Defense Artillery School and Fort Bliss, Texas. Infante became chief of Air Defense Artillery during a change of command ceremony in August.

The graph below illustrates the importance of setting challenging but realistic training.



What this says is:

■ Standards that are too high are just as bad as standards that are too low.

■ Soldiers will do what you ask of them to a point. Ask nothing and you’ll receive nothing.

■ Set your standards so high as to be

unachievable, and your soldiers will doubt your leadership abilities. Why try to do the unachievable?

■ High standards that are doable—that push soldiers to the limits—are what set an “exceptional” unit apart from just a “good” unit.

How about the total leader? What makes one? My mathematical mind divides characteristics of the total leader into the following parts:

■ A total leader is one who fulfills individual responsibilities. Individual responsibilities include:

—setting the example. Leaders have a “fishbowl” existence. Realize it and accept the challenge.

—being tactically and technically proficient. Knowing the training manual. Knowing the capabilities and limitations of your weapons. Knowing how to deploy them so as to best support the air-land battle.

—taking pride in your physical appearance. Leaders cast an image. Pride in your uniform indicates pride in yourself and in being a professional.

—having a sense of inner peace and strength. Honesty in all dealings. Selflessly placing unit and mission

continued on Page 60

On Track

The commandant of the Non-commissioned Officers Academy, Fort Bliss, Texas, called SFC Alaberto De Leon "the best junior NCO I ever saw." De Leon, an instructor at the academy, died recently of a brain tumor. He never won a decoration for bravery or served in a combat zone. But the academy named a room in his memory because soldiers who served with him thought that De Leon exemplified the best qualities of the professional NCO.

The "SFC Alaberto De Leon Room" is a type of shrine that celebrates the Army NCO and NCO traditions. The room is unique. There is no other like it in the Army. We will have to hope that Sergeant De Leon is not unique; that there are other soldiers willing to care as much and give as much.

De Leon was one of those promising young NCOs that we old soldiers keep an eye on; the type of young NCO we hoped would lead the Army into the year 2000 and beyond. For those of us who had witnessed the slow rekindling of a martial spirit following the long demoralizing years of Vietnam, soldiers like De Leon represent the future of the NCO corps.

I knew him best by reputation, but as I attended the dedication ceremonies for the "SFC De Leon Room," I realized I probably knew De Leon better than I thought because I know what type of person it takes to make a good NCO. There are certain traits that all good NCOs have in common. If De Leon was a model NCO, it's certain soldiers who served with him could say the following:

- *He had character.*
- *He was highly competent.*
- *He cared about soldiers.*
- *He never lost sight of the mission.*
- *He was proud to be an NCO and was quick to assert an NCO's authority.*

In most ways, De Leon was a traditional NCO.

The essential central characteristic for sergeants is the same as that for generals: character. So it is safe to say that De Leon had character. He didn't start out with material advantages, but the slogan, "Be all you can be!" certainly fit him. He had character, and his character allowed him to exert



CSM Frederick T. Stafford Jr.

the self-discipline that being a leader demands. And he had motivation. Before he became a model NCO, De Leon was a model private.

But you don't just throw stripes on a young soldier, not even one with De Leon's character, potential and motivation, and expect him to be a leader. He worked hard to develop professional competence as he began his climb up the NCO ladder. He realized that no soldier is willing to follow a leader whose competence he doubts, and his sense of integrity would not allow him to be a fake.

It is safe to say that De Leon was highly competent at the mechanics of being a soldier, but he also knew that competence alone is not enough. He developed leadership skills by listening and learning from older and more experienced soldiers. He never became so enthralled by machines and weapon systems that he forgot that the individual soldier is our most important concern and our most valuable asset. The NCO has to love the soldier and has to do whatever it takes to train and take care of the soldier. De Leon cared about soldiers. He thought of the Army as a way of life, a profession, a calling and not a job. He realized that everything that affects soldiers—on duty and off—is NCO business, and he knew the job doesn't end just because the sun goes down. He was all business on duty, but loyal, sincere and friendly off

duty. He understood men and how to handle them, and he had that invaluable ingredient—a sense of humor with the touch and common sense of how and when to use it. I know De Leon cared about soldiers, because the job of being an NCO is impossible unless you care.

He took the mission seriously. The Army doesn't make sense unless you believe in the mission, and it's impossible to perform well unless you believe in what you're doing. Our mission as NCOs is to see that our soldiers are trained in accordance with established training doctrine. De Leon never forgot that. And he never forgot that NCOs in our Army have more authority than those in most other armies. He knew how important it is for NCOs to exercise that authority, and that the soldier wants someone who is willing to step in and take charge. He stepped in and took charge.

I've attended many ceremonies for fallen comrades during my 35 years in the Army, but the ceremonies have never lost their poignancy. The dedication of the "SFC Alaberto De Leon Room" was no exception. The Army and the battlefields of Korea and Vietnam have taught me, however, that no soldier—not even one as splendid as De Leon—is irreplaceable. The Army will go on—must go on—despite the loss of such soldiers. I often wonder where we get such soldiers, and the answer is always the same. We get them from the same place we got De Leon—from the Non-commissioned Officer Education System to which De Leon devoted the final years of his interrupted career.

The system works. De Leon was proof of it. We have a lot of things going for us. We have good soldiers in today's Army. They are well educated, highly motivated and eager to learn. I see that in my visits to ADA units in the field. I saw it that day at the NCO Academy when the NCOs of tomorrow snapped to attention as SFC De Leon was awarded a Meritorious Service Medal posthumously.

They too will learn to lead.

Sergeant First Class Alaberto De Leon set them a good example.





ROTC cadets yell in both relief and satisfaction as they near the end of air-assault training during spring camp at Schofield Barracks, Hawaii. The cadets were hosted by B Battery, 1/62 ADA. (Photo by Sp4 Robert Lindsay)

1/62 ADA Hosts Student Camp

by Sp4 Robert P. Lindsay

The 1st Battalion, 62nd Air Defense Artillery, Schofield Barracks, Hawaii, hosted a spring camp program for more than 600 junior ROTC cadets from high schools in Hawaii and Alaska.

The 1/62 ADA provided the assistance and guidance for the three-night, four-day camp. "The spring camp program began about eight years ago," said Capt. Robert Raymond, B Battery commander. "The ADA was initially given the responsibility, and it just kind of stuck with the battalion, rotating among the batteries."

The unit provided transportation, equipment, training coordination and medical support, and acted as camp counselors to guide and advise the cadet chain of command. "The cadets have the responsibility to control their troops," Raymond said. "We're not out here to run a miniature basic training.

The cadets are the ones running the show as far as taking care of the troops, making sure that they are squared away and getting from point A to point B.

"The only constraint that they had as far as training was a time limit. Each area of training was broken off into a two-hour block. Because of that constraint, during the Leadership Reaction Course, for example, they weren't able to work on every problem presented. But other than that, it was the same training as any other soldier would receive."

The ROTC cadets received training in leadership, land navigation, squad tactics and rappelling, and qualified with the M-16 rifle.

The best outcome of the camp, Raymond believes, is the understanding that these young men and women developed for the men and women of the Army. "When the counselors are stay-

ing with these kids for three nights and four days, there's going to be interaction," he said. "In most cases the cadet began to look on the soldier the same way as the soldier began to look on the cadet—as one of their own. They really looked out for each other."

A 10th grader, 1st Lt. Arlyn Kepco, said, "I thought the camp would be hard. But once you became involved, got your confidence, then you knew you'd make it. I really liked it when everyone helped each other and worked together, pushing each other to make it. Teamwork is what did it."

2/5 ADA Faces Expert Enemies

by SFC Charlie Lopez

Not one to exaggerate, Sp4 Robert Crosler, B Battery, 2nd Battalion, 5th Air Defense Artillery, Fort Hood, Texas, admitted, "I've killed 15 to 20 aircraft since I've been here."

Vapor Trails

Crosler and approximately 45 other "shoot 'em down" soldiers of 2/5 ADA were part of a task force training at Fort Hunter Liggett, Calif. "I've been in the 'zone' for about 90 days and this is very realistic training," the air defender said. The "zone" is what the soldiers call Hunter Liggett because of its isolation; it's 23 miles to the nearest town.

The air defense artillerymen fought an opposing force of Air Force A-7 and A-10 jet aircraft. The Vulcan, Chaparral and Stinger crews, also capable of battling the Army's newest attack helicopter—the AH-64 Apache, racked up an impressive number of "kills."



Sp4 Robert Crosler, assisted by PFC Bobby Dennis, takes aim at an opposing force aircraft while Pvt. 2 Charles Samuels, data collector at Fort Hunter Liggett, Calif., confirms their kill. (Photo by SFC Charles Lopez)

During a daytime battle, Crosler and his Stinger crew chief, PFC Bobby Dennis, caught the opposing force's A-7 with an exposed belly and promptly "blew him away."

The enemy A-7s and A-10s entered the battlefield from unexpected directions and looked for targets while taking evasive action. "The enemy drops flares behind them and tries to draw our Stinger missiles away from the aircraft, but we take countermeasures and we're doing very well," Crosler said.

This exercise demonstrated the combat capabilities of the "shoot 'em down" soldiers and emphasized their value as an integral part of the combined arms team.



Pvt. 2 Robert Diamond, 10th ADA Brigade, finds the next location on a map during the land navigation phase of the German-American Survival Cup. (Photo by Sp5 Laura Bower)

10th ADA Beats Annual Record In Survival Cup

by Sp5 Laura Bower

The 10th Air Defense Artillery Brigade, 32nd Army Air Defense Command, places highly each year it competes in the German-American Survival Cup, and each year the brigade's team has placed higher than the last. This year's record will be hard to beat because the 1985 team took first place among American teams and sixth overall among the 23 entered teams.

The two-day annual "ordeal" is

an exercise in survival techniques. Teams are tested on 14 tasks that measure their ability to reach an objective under severe conditions and over rough terrain.

Teams left the starting point at staggered intervals, beginning at midnight. Laden with 16-pound backpacks, M-16s and protective masks, the teams were given only grid coordinates to guide them on their way.

Some of the tasks the teams attempted were 25- and 35-kilometer forced marches, crawling under barbed wire, crossing rivers using only a log

Vapor Trails

and rope, responding to chemical attacks, giving emergency first aid and firing at targets.

The 10th ADA Brigade's team was the last to start but the second to finish in the timed portion of the event. They placed first among Americans, scoring highly in almost all areas. They finished first in the three-mile run, the entire team doing it in 18 minutes. They had the second best firing scores overall.

The competition offered more than an opportunity to display skills and compete against peers, according to Sp4 Robert Naboth. It also allowed the American soldiers an inside view of their German counterparts. "We slept at their *kaserne* and traded our food rations, and they showed us how to break down their weapons," he said.

"Land navigation was most interesting for me," said Sgt. Jerry Kellem. "We [the team] are from the Patriot security platoon, so this was a chance to refresh our skills."

Air Defender's Boot Tree Attracts Curious Tourists

by Jim Hekel

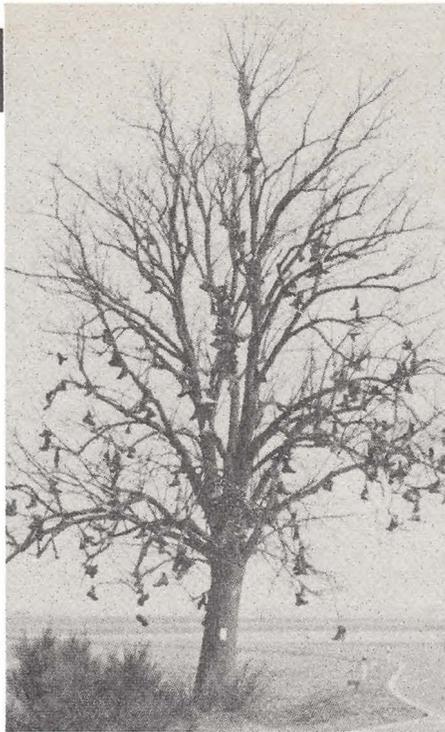
Tourist season has arrived in West Germany and one U.S. air defense artillery unit is expecting a lot of visitors.

The tourists won't be coming to see the soldiers of D Battery, 2nd Battalion, 62nd Air Defense Artillery, 32nd Army Air Defense Command, crew their Hawks. Rather, they will be coming to see an interesting tree—a boot tree.

American soldiers leaving the battery have been throwing pairs of boots onto the large tree for more than 20 years. Today there are more than 200 pairs of boots hanging from "Delta's Boot Tree."

"About 100 cars stop over a weekend to look at it," said SFC Randall Lippencott, platoon sergeant. "We see license plates on cars that stop out here from all over the country."

At first local citizens nearby were not very happy about the tree. "Around the year 1962, soldiers decided they would throw their boots up in the tree as they were leaving," said Sgt. James Cullen, security NCO. "The Germans were going to cut it down until it became a tourist attraction."



Approximately 200 pairs of boots hang in D Battery, 2/62 ADA's legendary tree. (Photo by Jim Hekel)

There are many legends surrounding the tree. For instance, a former battery commander who did not like the tree ordered it cut down. The mayor of the local village told him, "If you cut it down, I will throw you in jail."

A far more pertinent legend worries some of Delta's troops as they near their rotation time. "Legend has it that if your boots fall out of the tree, you will be back in a year," said Sp4 Mark Stephenson.

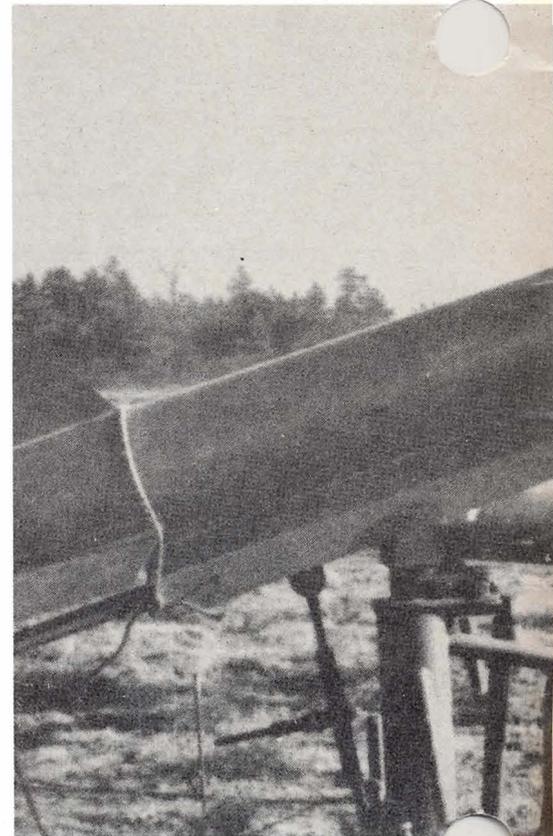
ADA Redeye 'Sentinels' Fire As Heavy Mountain Fog Lifts

by Lt. Col. Paul Haggerty

After a heavy fog lifted from Timber Mountain, the "Sentinels" of 4th Battalion, 61st Air Defense Artillery, Fort Carson, Colo., fired their Redeyes and destroyed 14 of 16 targets. Interestingly, some of the missiles fired were older than the 18-year-olds who fired them.

Roars of approval came from other gunners of the battalion as hits were registered by the firing line against ballistic aerial target systems (BATS).

Gunners were given five to nine seconds to lock on and engage the target. The BATS were assembled and moved about by C Battery soldiers. Electrical-wire connecting and firing were under the supervision of SSgt. Norman Ellis and Sgt. Donald Scott. Private Brian



Pvt. 1 Brian Campbell prepares BATS for firing.

Campbell said, "It was kind of scary preparing the BATS for firing."

Prior to green time at the range, SSgt. Eddie Castillo, C Battery, briefed Maj. Gen. Gerald T. Bartlett, 4th Infantry Division commander, on the Redeye trainer, a device by which a gunner can tell if his tracking procedures will cause a hit or miss. Bartlett got a hit.

Air Defenders Motivated by Three-dimensional Battle

by Sp4 Gary Posselt

In position and waiting patiently for the inevitable attack, Chaparral, Stinger and Vulcan gunners scanned the treeline for enemy aircraft. Within minutes, the peaceful European countryside became a modern battlefield when Cobra and OH-58 helicopters attacked a truck convoy.

The turret of the Chaparral missile system swung in the direction of the approaching hostile aircraft; the gunner tracked his target and then fired simulated missile. An amber light, attached to the Cobra, lit. The gunner's crewmates knew he had destroyed the enemy aircraft.

They knew he had hit his target

**AIR DEFENSE
ARTILLERY**



because, for the first time in U.S. Army Europe, the air defense weapon systems and the helicopters were fitted with the Multiple Integrated Laser Engagement System/Air Ground Engagement System (MILES/AGES).

Seven instructors from the Army Training Support Center, Fort Lee, Va., conducted the training as part of the recently completed Armywide program for training air defense artillery units in both Europe and the United States.

Air defense was provided by B Battery, 2nd Battalion, 59th Air Defense Artillery; the opposing ground force was B Troop, 1st Squadron, 1st Cavalry. The 501st Aviation Battalion (Combat) contributed the support.

The first three days consisted of mounting the MILES/AGES on the aircraft and air defense systems. Selected personnel were trained to plan, prepare and conduct the exercise. A mock battle was held on the fourth and fifth days.

"We've never been able to play three-dimensional MILES/AGES before," said Capt. Robert Coleman, an instructor. "Infantry and armor units have had the system for years, but the third

dimension of aviation was never there before.

"For example, if a Cobra came up over the treeline and someone spotted it, an umpire would subjectively figure out what effect that would have on the battle. Now, the Cobra pilot has to do everything, and at the same time somebody is shooting at him with an air defense system. This makes training more realistic. Now we can learn things that only combat taught us in the past."

"Using MILES/AGES really motivates us because we know when we hit an aircraft," Sp4 Anthony Allison, B Battery, said. "However, I think it's harder to hit helicopters with the MILES/AGES system than it would be to hit them with an actual Stinger."

Hard Times for 69th ADA

by Ernest Jones

Staged in the mud and mist, in a place more accustomed to hawk birds than Hawk missile systems, the 69th Air Defense Artillery Brigade left its Wuerzburg home for a 10-day field exercise near Hardheim, West Germany.

The mission of the 69th Air Defense Artillery Brigade, 32nd Army Air Defense Command, was to test its deployment skills and to set up a "business as usual" operation. The command post exercise (CPX) also centered on how the brigade would set up communications with its subordinate battalions.

Shunning the often used "village-concept role" for a CPX, the brigade deployed to the woods to work out of vans instead of offices.

Mud became a factor in the exercise in and around the field site. A brigade mechanic, Sgt. Aaron Brooks, doubled as the wrecker driver during the exercise. Undaunted by the mud, he said, "I have enjoyed doing my job pretty well."

All the staff sections in the brigade had a part to play in the exercise. The S-1 was responsible for safety reports. The S-2 controlled security in the operations area, and the S-3 scheduled the training.

A vital link in the exercise, B Company, 11th Air Defense Signal Battalion, supplied the communications for the brigade to its higher headquarters and its four air defense artillery battalions. Although the change from village to field was a shock to many soldiers, it suited the mission for the signal unit. "It's much easier for us to set up in the field than in a village because of the restrictions in the towns," said Capt. Angelo Sanders, B Company commander.



Sgt. Aaron Brooks, 69th ADA Brigade, positions the boom on his recovery vehicle preparing to help mired vehicles out of the muddy field site. (Photo by Don Foltz)

Vapor Trails

Grimy Overalls Signify Pride for Air Defense Mechanics

by Sp4 Susan Durban

Yes, they leap greasy pits in a single bound, stop rushing motorists with a single turn of the wrench and even outrun dead-lined vehicles.

Why would they do it? "We like to keep people happy," said SSgt. Michael Chapman, a mechanic with the 11th Air Defense Signal Battalion, 32nd

Army Air Defense Command, West Germany.

The soldiers who work in the unit's motor pool take pride in their grimy overalls, and swagger with superiority over those soldiers who tempt fate by walking into their "grease-monkey" domain.

Maybe it's hard for some soldiers to respect a fellow who wears his hat backward, whose work boots look like they've been trampled by a herd of buf-

falo and whose coveralls look like Salvation Army hand-me-downs. It's tough to keep a straight face while talking to a mechanic who wears black and blue camouflage.

But credit must be given to those soldiers who keep the battalion rolling from hilltop to hilltop. There are rumors that mechanics are only the men-under-the-hood, but there are many aspects to their profession. They are secretaries keeping the files in the military license catalog, inspectors for the government, hat-checkers for pieces of loaned equipment and rescuers of stranded vehicles.

A mechanic, Sgt. Jamie R. Griffith, claims to be much more. "I came in the service to work on trucks, but I've also learned quite a bit about electrical systems. Almost anything mechanical falls into the category of a mechanic," he said.

According to a highly esteemed mechanical wizard, Sp4 Billy Olinger, "People come in all the time with something broken and they expect miracles. We sometimes have to act like we're miracle workers and get the job done."



Pvt. 2 Jesse Carmona, generator mechanic, rolls under his vehicle to give it a tender loving maintenance check. (Photo by Sp4 Susan Durban)



Sp4 Ronald Curtis (right) and Sp4 Vince Woods move equipment at the 11th Air Defense Signal Battalion's motor pool. (Photo by Sp4 Susan Durban)



SOVIET MILITARY POWER: THE AIR THREAT

It is incumbent upon the United States and its allies to have a full and precise understanding of the Soviet challenge as we take the steps necessary to preserve our freedom, to ensure an effective deterrent to the threat and use of force, and, at the same time, to seek genuine and equitable arms reductions, contributing to global stability and to our transcending goal as a free people—the goal of peace and security.

—Caspar W. Weinberger, Secretary of Defense

The fourth edition of *Soviet Military Power*, prepared by the Defense Intelligence Agency and released in April 1985, focuses on the introduction of new nuclear and conventional Soviet military capabilities, and on Soviet advances in directed-energy weapons and space. It also examines the doctrine guiding the organization, control and employment of Soviet forces, and chronicles key developments in each element of the Soviet armed forces.

The following excerpts are reprinted here as a reminder of the real threat facing the West and Air Defense Artillery.

Soviet Air Forces Assets

The Soviet air forces have as their combat and combat-support assets nearly 900 bomber aircraft, nearly 6,100 fighters and fighter-bombers and 600 transports.

Strategic aviation assets include some 170 Tu-95 Bear and M-4 Bison bombers and about 250 Tu-26 Backfire bombers. The Soviets also have 360 medium-range Tu-22 Blinder and Tu-16 Badger bombers; 450 short-range Su-24 Fencer strike aircraft; and 530 tanker, reconnaissance and electronic warfare aircraft. The intercontinental Bear and Bison bombers are available for maritime and Eurasian missions, and the Backfire can be used against the United States.

Air forces of military districts and groups of forces have about 5,300 fighters, interceptors, fighter-bombers, reconnaissance and electronic countermeasure aircraft deployed in nearly 140 regiments and squadrons. About 800 of these aircraft are assigned to strategic air armies.

The MiG-23 Flogger is the most numerous fighter, equipping around 40 regiments. Late-model MiG-21 Fishbeds make up more than 10 regiments, with additional regiments of Su-15 Flagons. Other, less numerous fighters include the MiG-25 Foxbat, Yak-28 Firebar, Tu-28 Fiddler and the new MiG-31 Foxhound and MiG-29 Fulcrum. The Flogger will likely remain in the force in large numbers for the next five years. The Fulcrum will replace the Fishbed, Flagon and some Floggers. The Foxhound and the Su-27 Flanker will probably replace Fishbed, Flogger, Flagon and other Foxbat aircraft.

The variable-geometry wing Su-17 Fitter, the most common aircraft in regiments of military districts and groups of forces, is devoted to ground attack. The next most numerous aircraft in this role is the MiG-27 Flogger. The best interdiction aircraft in the Soviet inventory is the Su-24 Fencer. Other regiments are comprised of MiG-23 Floggers, the new Su-25 Frogfoot, and older MiG-21 Fishbeds and Su-7 Fitter-A's.

Reconnaissance assets are composed of MiG-21 Fishbeds, Su-17 Fitters,

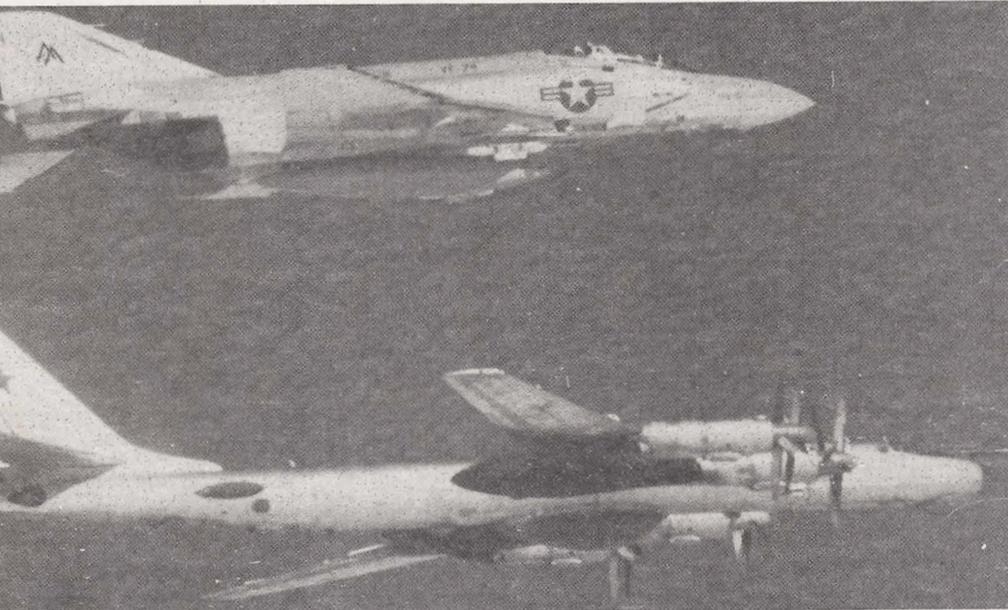
MiG-25 Foxbats and Yak-28 Brewers, although newer aircraft are beginning to replace the Brewer.

Bombers

The Soviets have taken recent steps that indicate greatly increased interest in their long-range strategic bomber force. An entirely new variant of the Tu-95 Bear bomber, the Bear-H, has been specifically configured to carry the new AS-15 long-range cruise missile. The AS-15, a small, air-launched, subsonic, low-altitude cruise missile, similar in design to the Tomahawk, reached initial operational capability with the Bear-H in 1984.



The Tu-95 Bear-H (above) is in production and is the carrier for the new AS-15 cruise missile. (DoD art)



U.S. Navy F-4 Phantom (left) intercepts a Tu-95 Bear-D 42 miles off the Virginia coast. The Bear, operating from Cuba, had penetrated the U.S. air defense zone. (DoD photo)

This is the first new production of a strike version of the Bear in more than 15 years. Older Bear aircraft are being reconfigured to carry the newer, supersonic AS-4 missile in place of the subsonic AS-3. Several of these reconfigurations, like the Bear-G, have been completed. With the Bear-H in series production, the decline in the inventory of Bear aircraft, characteristic of recent years, has been reversed. There are some 25 Bear-H bombers operational at this time.

The Tu-26 Backfire is the most modern operational Soviet bomber. First introduced in 1974, it is designed for long-range subsonic cruise, high-altitude supersonic dash and low-altitude, high-subsonic penetration. It can carry conventional or nuclear bombs internally or AS-4 missiles attached to its wings. Backfires are replacing Badgers and Blinders through attrition.

The Soviets are producing Backfires

at a rate of at least 30 per year; this production rate is likely to be maintained at least through the end of the decade.

The new Soviet long-range bomber, the Blackjack, is now in the flight-testing stage. The Blackjack is larger than the B-1B and probably will be faster and may have about the same combat radius. The Blackjack will be capable of carrying cruise missiles, bombs or a combination of both. It almost certainly will carry the AS-15 long-range cruise missile. Unlike the Bear-H stand-off launch platform for the AS-15, the Blackjack will probably be designed for low-altitude, high-subsonic penetration of air defenses.

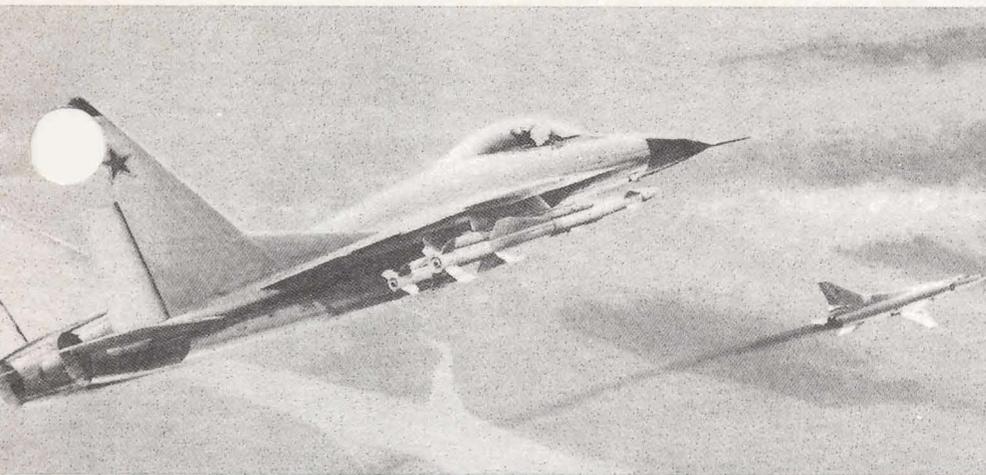
This new bomber could be operational by 1988 and will first replace the much less capable Bison bomber, then the Bear-A bomber. Bison airframes continue to be used as bombers and tankers but are being phased out of service and placed in storage.

Fighters/Interceptors

The Soviets have significantly enhanced the performance characteristics of their tactical combat aircraft during the past decade. Newer fighters and interceptors have the ability to conduct air intercepts at beyond-visual ranges. They can operate at great distances from their airfields, carry up to six air-to-air missiles and perform in all weather conditions. The newest generation of fighters—MiG-31 Foxhounds, MiG-29 Fulcrums and Su-27 Flankers—is assessed to have a true look-down/shoot-down capability that will enable them to engage low-flying aircraft or cruise missiles.

Some Su-24 Fencer strike aircraft are assigned to strategic aviation. The Fencer is a supersonic, variable-geometry wing, all-weather fighter-bomber that first reached operational status in 1974. Three variants have been developed, the most recent introduced in 1981. The aircraft is still in production, and the number assigned to strategic aviation is likely to increase over the next few years.

In tactical aviation, the Soviets have introduced the MiG-29 Fulcrum high-performance aircraft into their inventory. The Fulcrum has been designed as an all-weather, counterair fighter fitted with a true look-down/shoot-down radar integrated with the improved AA-10 missile. It is possible that the Fulcrum has a dual capability and might be configured for ground-attack missions. First deployments of the Fulcrum have begun and more than 30 are now operational.



A MiG-29 Fulcrum all-weather fighter (left), accompanying a Tupolev Backfire bomber (lower right in illustration), is among the newest of several modern tactical aircraft introduced by the Soviet Union over the past 10 years.

The An-400 Condor heavy-lift transport (below) will have triple the payload capacity of the Il-76 Candid.

For close air support missions, the Soviets have deployed the Su-25 Frogfoot. It is fitted with a 30mm gun and can carry a variety of air-to-ground ordnance, including bombs, unguided rockets and tactical air-to-surface missiles. The Soviets have been using the Frogfoot extensively in Afghanistan.

The SU-27 Flanker all-weather, air-superiority fighter, which is nearing deployment, has a true look-down/shoot-down system and beyond-visual-range AA-10 missiles.

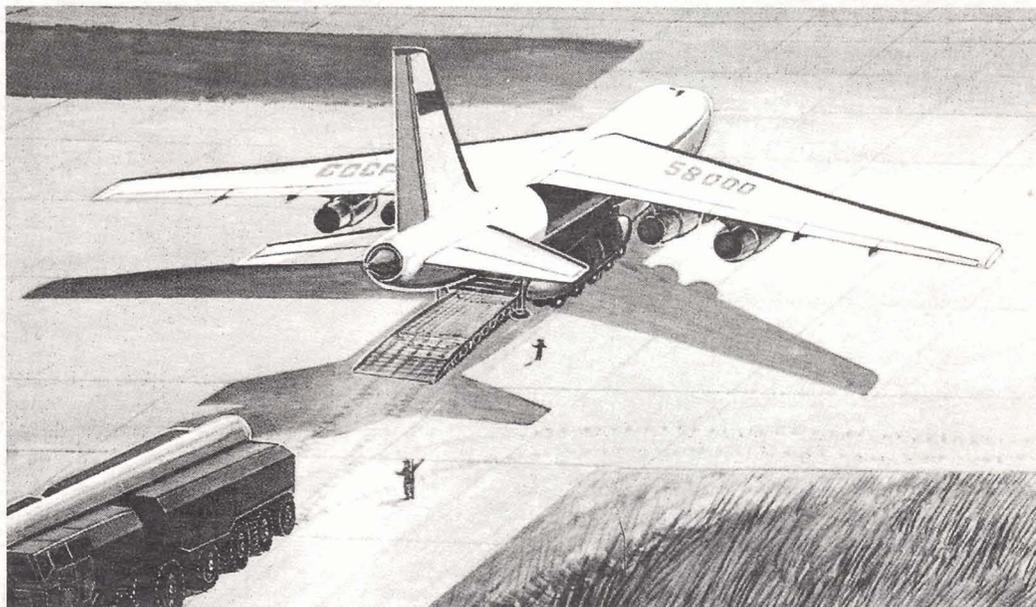
The deployment of the supersonic MiG-31 Foxhound interceptor, the first Soviet aircraft with a true look-down/shoot-down and multiple-target engagement capability, continued during 1984. The Foxhound, equipped with the new AA-9 missiles, is deployed at several locations from the Arkhangelsk area to the Far East Military District. More than 70 of these aircraft are operational.

The MiG-25 Foxbat-A/E is a high-altitude, high-speed interceptor that comprises approximately one-quarter of the strategic interceptor force. The upgrade program of the Foxbat-A to the newer Foxbat-E configuration provides a limited look-down radar capability. The remaining Foxbat-A aircraft are expected to be modified to the Foxbat-E configuration during 1985.

The MiG-23 Flogger-B/G fighter comprises approximately one-third of the total strategic interceptor forces. This variable-geometry wing fighter is equipped with a limited look-down radar. The remaining aircraft employed as interceptors (the older Flagon, Fiddler and Firebar) comprise less than one-third of the force.

Transporters

Soviet military transport aviation (VTA in Russian) consists of almost 600 medium- and long-range cargo



transports. Il-76 Candid long-range jet transports have been gradually replacing the older An-12 Cub medium-range turboprop transports at a rate of about 30 a year. The Candid can carry twice the maximum payload over three times as far as the Cub.

The new heavy-lift An-400 Condor transport, currently undergoing flight testing, is similar in many respects to the C-5A Galaxy in size and lift capability. The Condor probably has clamshell-type rear doors for outsized cargo entry and exit as well as a visor-type nose to facilitate rapid loading and unloading from either end. It is estimated that initial deployment of the Condor will occur during 1987 or 1988.

VTA also has about 55 An-22 Cock long-range turboprop transports, the only deployed Soviet transport able to carry outsized cargo such as tanks or large missiles.

AWACS

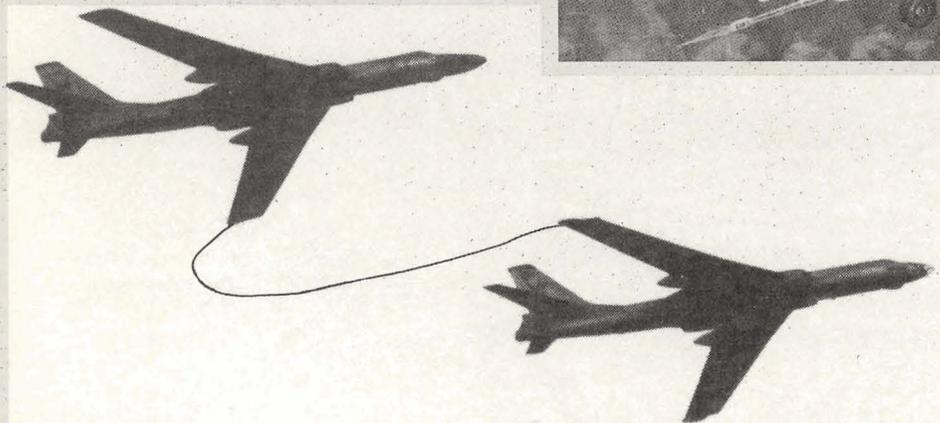
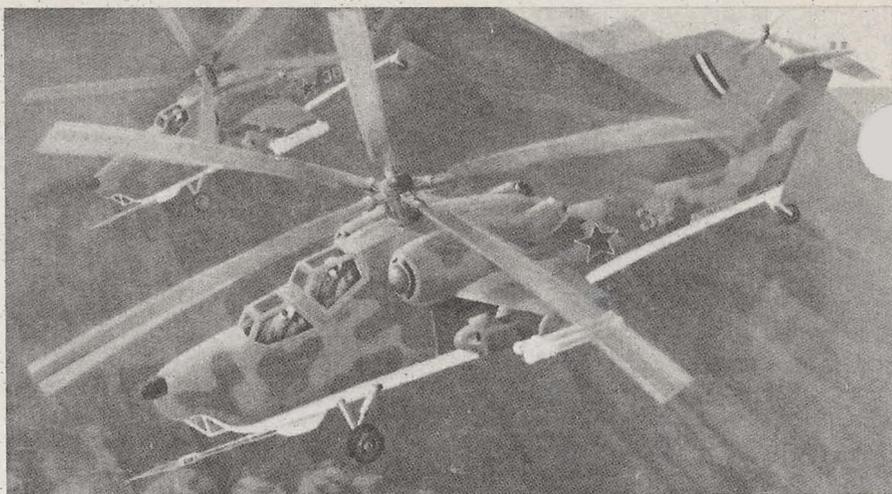
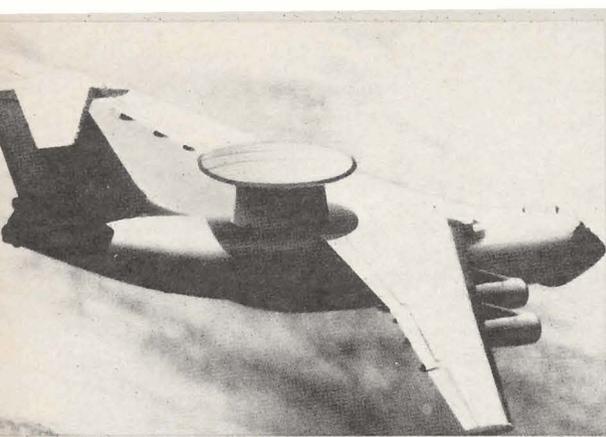
To complement the new bombers and

fighters, the Soviets are working on new airborne warning and control system (AWACS) aircraft using the Il-76 Candid airframe.

Test and evaluation of the Mainstay AWACS aircraft is underway. The Mainstay will substantially improve Soviet early warning and air-combat command control, especially against low-flying aircraft. The Mainstay will also provide Soviet air defenses with overland and overwater capabilities to detect aircraft and cruise missile targets flying at low altitudes. Additionally, the Mainstay could be used to help direct fighter operations over European and Asian battlefields. Mainstay production could be about five aircraft a year.

Tankers

A new aerial-refueling tanker aircraft, based on the Il-76 Candid, has been under development for several years. When deployed in the near future, the new tanker will support tactical and strategic aircraft and will



The new Il-76 Mainstay (top left) as configured for its airborne warning and control mission.

The Mi-28 Havoc attack helicopter (right) is expected to be deployed soon. This artist's concept reveals an unusual nose radome and a single-barrel gun. (DoD art)

A Tu-16 Badger (bottom left) being refueled by a Tu-16 tanker using the wing-tip to wing-tip system. This system was revealed by the Soviet press many years ago, but the exact procedure of connecting the wing tips by hose is still not clear. (JASDF photo)

significantly improve the ability of Soviet aircraft to conduct longer-range operations.

The Soviets have modified two airframes—the Bison and the Badger—for use as tankers. The Bison tanker, using the probe-and-drogue system, services Bison bombers and refuelable Bears and Blinders. About half of the Badger tankers use the wingtip-to-wingtip system for refueling other Badgers. The remainder use a probe-and-drogue system to refuel Blinders. All Bison strike-configured bombers and about one-half the Bears can be refueled in flight.

Although Backfires were originally deployed with aerial refueling probes, by July 1980 probes had been removed from all operational Backfire-B's. Removal of the probes was related to Soviet assurances in SALT II that the range of the Backfire would not be extended through in-flight refueling. Reinstallation of the probes on this aircraft could be accomplished in a short period of time assuming no internal changes were made to the aircraft. A similar refueling potential for the Backfire-C cannot be ruled out.

The unrefueled Backfire bombers can fly a variety of strike profiles against targets in Europe or China. Although Soviet spokesmen have stated that the Backfire does not have an intercontinental role, the aircraft has the capability to strike the United States on one-way intercontinental missions with forward recovery. Using Arctic staging bases and in-flight refueling, the Backfire could achieve similar target coverage on two-way missions.

The Blackjack bomber will most likely be configured for probe-and-drogue refueling. When operational, the new Blackjack bomber will have an estimated maximum unrefueled radius of 7,300 kilometers, giving it coverage capability similar to the Bear. Staging from the Arctic, the Blackjack will be able to strike almost any target in the United States on a high-altitude, unrefueled, two-way mission. The Blackjack will also have the capability to strike any target in the United States on a high-subsonic, low-level mission with forward recovery in non-hostile territory, such as Cuba.

Helicopters

The Soviets are upgrading and expanding their helicopter forces. At division level, helicopter detachments continue to expand to squadrons, and in some squadrons, the number of Mi-24 Hind helicopters has been increased. At army level, about 20 attack regiments have been formed, with up to 60 Mi-8 Hip and Hind helicopters in each.

Most attack helicopters are the heavily armed Mi-24 Hind-D/E and Mi-8 Hip-E. All three are armed with anti-tank guided missiles and 57mm unguided rockets. The missiles and rocket pods on the Hind can be replaced with a mix of up to 750 kilograms of chemical or conventional bombs on each wing. Other armament on the Hind-D/E includes a multibarrel 12.7mm turreted nose gun; the Hip-E has a single-barrel 12.7mm gun.

Soviet emphasis on a heavy-lift helicopter transport capability is reflected in the development and recent appearance of the Mi-26 Halo. It is the world's largest production helicopter, capable of carrying two airborne infantry combat vehicles or about 90 combat-loaded troops.

A new attack helicopter, the Mi-28 Havoc, similar to the Apache, is expected to be deployed in the near future. Another new helicopter, the Hokum, will give the Soviets a significant rotary-wing air superiority capability. The latter has no current Western counterpart.

The Soviets are now equipping their helicopters with infrared suppressors, infrared decoy dispensers and additional armor, thereby increasing the survivability—modifications that are probably the result of lessons learned in Afghanistan. The Soviets are also using helicopters as airborne command posts and electronic-jamming platforms.

Friend, Foe or Neutral



Archaic IFF system threatens to negate many of Air Defense Artillery's technological advances, but a joint service test force hopes to expand air defense artillery's engagement envelope to its technological limits

With predictions of 20 percent losses of friendly aircraft shot down by their own forces, the air war cannot be fought effectively unless the United States and NATO solve the problem of identifying friend and foe. The soldiers manning today's air defense artillery systems have no time for second opinions.

Effective performance of the active air defense mission requires a capability to correctly identify aircraft commensurate with the air defense system's ability to use its weapons. This requirement is particularly acute in the European theater where large numbers of friendly and enemy aircraft will be part of the tactical air environment and where surface-to-air and air-to-air weapon systems must operate in conditions or at ranges beyond which positive visual identification can be performed. The problem is aggravated when considering the modern electronic warfare threat, particularly that of the Warsaw Pact. Numerous studies have concluded that current electronic

identification means are generally too slow; cannot positively identify enemies and friends; have insufficient range; are subject to interference, electronic countermeasures and other environmental factors; and are easily compromised or deceived.

The NATO air chiefs paint a grim picture when discussing the air situation in the case of a potential threat of aggression in Central Europe. They expect the airspace to be saturated. Since the present identification system has been obsolete for more than a decade, the air defense forces rely on "airspace manipulation" and "safe lanes" for identification. To rely on these rigid procedures in our electronic age is archaic indeed, since solutions to the present dilemma can be found.

In 1974, the Defense Science Board and NATO conducted independent studies focused on aircraft identification problems in the NATO area. Among these studies was a concept study which led to the establishment, with the Air Force designated as the

lead service, of the Identification Friend, Foe, Neutral (IFFN) Joint Test Force at Kirtland Air Force Base, Albuquerque, N.M. (Although neutrals are not envisioned in a conventional conflict in Central Europe, the possibilities of a neutral must be considered. Neutrals may consist of negotiating teams flying in the vicinity of the battle area.) On July 12, 1979, the IFFN Joint Test Force received its charter to investigate the indirect sources of identification information for U.S. air defense (high-to-medium) systems operating in a NATO environment. The charter was approved by the Army, Air Force and Navy, although the Navy has since dropped out of the program. Shortly thereafter, the Joint Forward Area Air Defense Test force was established at Fort Bliss, Texas, to test and evaluate the identification problems associated with the short-range air defense systems.

The IFFN Joint Test and Evaluation Program will focus on the indirect identification portion of the air defense identification process, with testing being focused on examining late 1980s U.S. capabilities to use indirect identification. The test will examine a NATO execution-level air defense command and control (C²) structure (control and reporting center and below) corresponding to that of a NATO battle management area. The objective is to identify near-term solutions which will improve C² identification flow and optimize the use of beyond-visual-range weapons (5,000 feet and beyond). The test subject will be an integrated air defense system consisting of U.S. and NATO C² units and information sources. The representative systems that will execute the active air defense mission will be the Patriot, Hawk and F-15 Eagle aircraft.

Direct versus Indirect Identification

The Combat Identification System, a U.S. term used to describe the complete range of developments being carried out in the field of identification, is generally broken down into two broad categories: direct identification and indirect identification. The primary distinction between direct and indirect information is where the user is in the identification process. Thus, direct identification is the direct question-and-answer technique using organic IFF devices. Examples of this would be the Hawk fire unit using its IFF device

to receive direct information or, even more simply, the SHORAD gunner using his eyeball to visually identify the aircraft. Indirect identification is basically identification of friendlies and hostiles by a third party using all available data on a given air situation from a variety of sources. These include flight plans and radar tracks.

IFFN Test and Evaluation Program

The IFFN program will evaluate U.S. capabilities in identifying, allocating and acquiring targets. The operational test, which began in July 1985 and will extend to early 1989, is being conducted using real-time, man-in-the-loop simulations. There will be nine test series of which the first five will evaluate Patriot, Hawk and Army C² systems; series six and seven will evaluate the Air Force systems; and series eight and nine will combine all elements—Army and Air Force systems, and command and control (NATO E-3A AWACS and German Air Defense Ground Environment) systems.

The man-in-the-loop is the essential ingredient to successful testing of the IFFN testbed. Reactions of the "man" to various test scenarios will be measured and evaluated and will contribute realistic tactical displays and effects to the test. To use the "man," the test must be conducted in real time. The "man" will also give applicability of identification to prevent fratricide. Unlike in other studies, fratricide in this test is defined as the instance the operator makes the decision to engage a friendly, whether he misses or not.

After conducting a series of tests using the approved baseline, deficiencies in the performance of the IFFN functions will be identified. Once those deficiencies are noted, the test will define potential, near-time procedural changes and equipment modifications for further testing.

Measures of Effectiveness

For the joint test force's purposes, the measure of effectiveness (MOE) is a quantitative or qualitative measure of a system's performance which indicates the degree to which it performs a task under specified conditions. The MOEs of the identification functions will describe how the weapons and C² systems are able to identify airborne objects and assign them to appropriate identification categories.

The MOEs for the target allocation function of C² systems will relate information to allocation of weapons

against hostile aircraft and prevention of misallocation of weapons against friendly aircraft.

The MOEs for the target acquisition will provide the measure relating indirect identification information to the weapon systems portion of the air defense mission. As such, the interest is in target acquisition as a sub-function of the engagement control provided by the C² structure to the weapon system. For NATO, target acquisition means the actual engagement.

Test Scope

The scenario's primary area of interest is NATO Central Region, located in the area just south of 2nd and 4th Allied Tactical Air Force's boundary. This area of operation includes V Corps, 8th Infantry Division, 10th Air Defense Artillery Brigade, and 1st Battalion, 1st ADA (Hawk).

The scenario will involve the typical and often-used 14-day Warsaw Pact buildup with a 10-day NATO buildup, and the three-wave, corridor-busting approach involving approximately 500 hostile aircraft per wave.

The time frame is the late 1980s baseline using threat systems, as envisioned in the NATO Central Region, Europe. The nodes of interest will include U.S. beyond-visual-range weapon systems and U.S. and NATO C² and information systems.

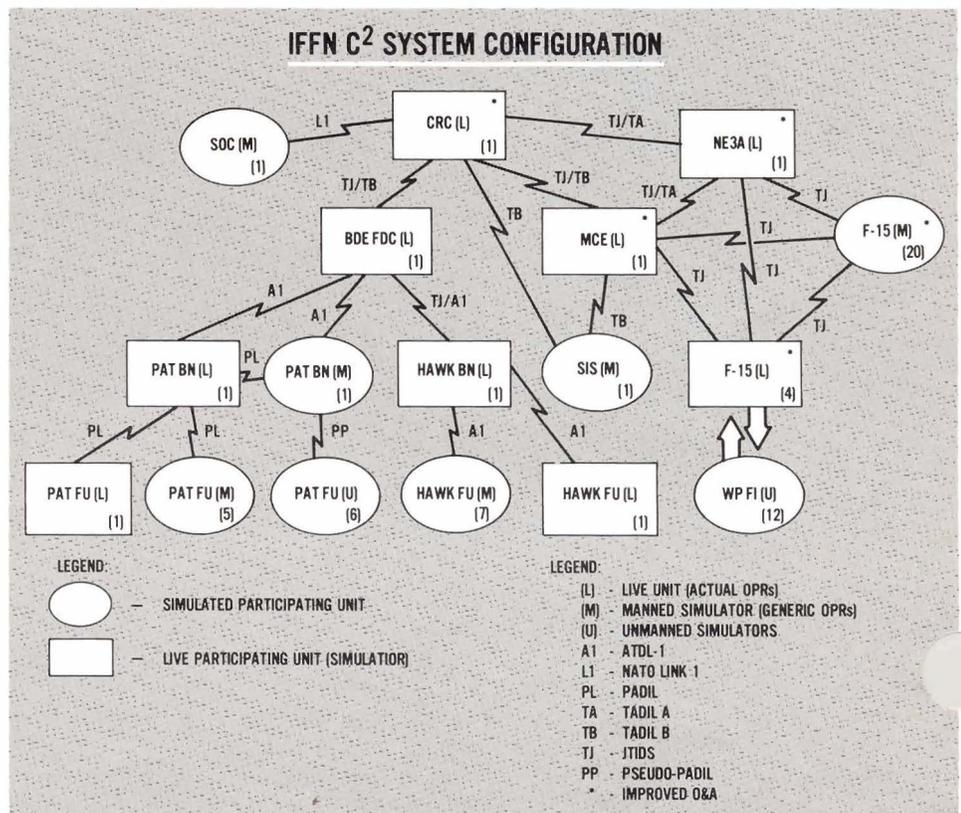
In order to have realistic loading of

C² nodes, manned and unmanned simulations will be used. For example, to have a fully realistic C² node for Patriot, six fire units are needed. To accomplish this, the IFFN test uses the Patriot Tactical Operational Simulator (PTOS) located at Fort Bliss, Texas. The remaining five fire units are manned simulators at Kirtland. At the next level, the mixed Hawk/Patriot brigade will have the PTOS at Fort Bliss acting as a battalion fire direction center, a manned Patriot battalion fire direction center simulator, a manned Hawk battalion fire direction center simulator, and a manned brigade fire direction center located at Kirtland. This concept continues up through each level of C², using appropriate data links, so that each level is properly loaded. All operators will be familiar with NATO procedures.

It is important to note that the testbed uses no live radar or aircraft. All tests will be conducted via computer-generated scenarios. These scenarios will use "interactive air truth," meaning that, as actions take place, the air truth immediately reflects those actions in real time.

Patriot Tactical Operation Simulator (PTOS)

The PTOS will give a real-time interactive simulation of Patriot with independent and interdependent battalion



and fire unit operations at four software reconfigurable consoles. Located at the Directorate of Combat Developments, Fort Bliss, it is the only geographically distributed element of the IFFN evaluation testbed. It is connected to Kirtland Air Force Base by AT&T telephone lines for test control communications and real-time air defense information flow.

Any of the four PTOS consoles may be configured to represent either a battalion console or a fire platoon console. They may also be combined to represent the dual console mode in either the battalion or fire unit configuration. The normal configuration while operational with the IFFN evaluation testbed will be the dual console mode.

The PTOS question-and-answer IFF model will be the MARK XII (TIP A) (black box) for direct interrogation. This Army IFF process directs its radar toward the target, interrogates it in the requested mode, evaluates the response and returns the reply to the

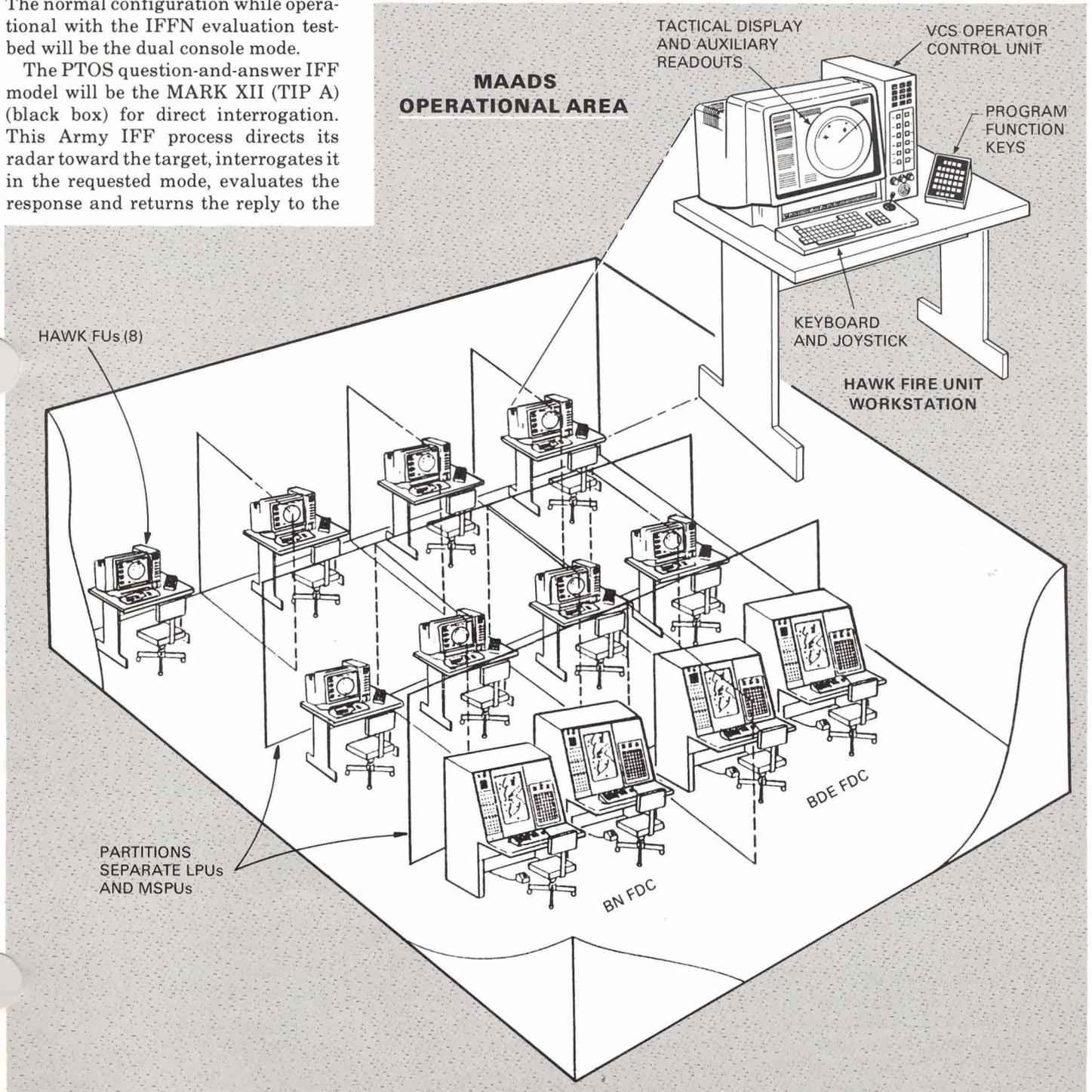
requesting source. (In addition to MARK XII, the Air Force will use its improved IFF system.) The interrogation can be initiated automatically, or through a Patriot battalion fire direction center, or by a fire unit operator request in any of the three modes (1, 3 and 4).

Multirole Army Air Defense Simulator (MAADS)

For purposes of the IFFN test and evaluation, the AN/TSQ-73 Missile Minder for the Hawk battalion fire direction center and the mixed Hawk-Patriot brigade fire direction center

will be represented as simulators at Kirtland. Communications used at the Hawk battalion and mixed brigade will be the Joint Tactical Information Distribution System (JTIDS) Tactical Digital Information Link (TADIL-J, a random access/discreet address technique).

The MAADS consists of 12 consoles which can act as Hawk fire units, a Hawk battalion fire direction center and a mixed Hawk/Patriot brigade fire direction center. Each console will be operated by system-qualified soldiers. The operators will be challenged by a multitude of tracks and will have to





Computers play an important role for the Identification Friend, Foe or Neutral Joint Test Force at Kirtland Air Force Base, Albuquerque, N.M. The test force received its charter to investigate the indirect sources of identification information for U.S. air defense systems operating in NATO.

make tremendous amounts of air defense decisions.

Multipurpose Fighter Facility (MPFF)

The Air Force MPFF is software reconfigurable simulators that can represent various types of aircraft. For IFFN test purposes, the F-15 interceptor will be represented. Actual F-15 pilots will operate the MPFF consoles, also located at Kirtland.

The advanced medium-range air-to-air missile (AMRAAM) and the Air Intercept Missile (AIM)-7/9 will represent the beyond-visual-range weapon systems on an F-15 weapons platform. The communications system will also be JTIDS, TADIL-J. The dual mode recognition non-cooperative aircraft identification system will be accommodated. The electronic warfare warning system, which senses that the aircraft is being tracked or electronically monitored, will be used to counter hostile electronic warfare.

Multirole Command and Control Simulator (MCCS)

The MCCS area will consist of 25 software reconfigurable consoles. A typical setup would be five consoles as an NE-3A AWACS; 12 consoles, with the Army manning three, as a

GEADGE-type control and reporting center in the Lauda battle management area; and eight consoles as a modular control equipment (MCE). The modular control equipment is the replacement for the Air Force 407L in the control and reporting post. This complete setup will be located at Kirtland.

Benefits

The selling point of the IFFN test and evaluation program is the high-activity air battle that can be presented with all the correct air routes with all the aircraft and jamming possible. This is better than any NATO exercise where it is difficult to replicate a real air battle.

The results of the IFFN test will enhance combat effectiveness by getting missiles on the right target to reduce fratricide and increase attrition of enemy aircraft, by acquiring early-on identification to improve survivability and by ensuring target engagement at the optimum maximize use of beyond-visual-range weapons.

The results will also provide data to help define the right mixture of Hawk, Patriot and F-15 force employment; the interoperability issues and problem areas in the mixed Hawk/Patriot bri-

gade; various airspace control and alternate rules of engagement procedures in a proven wartime simulation and scenario; and modular control equipment concepts of operation. They will also define what type and quantity of "green door" information should be given to air defense operators and decision-makers for the optimum use of information received from special information systems and where this information should go, such as directly to the control and reporting center, the brigade or the battalion.

The IFFN test is sensitive to ensuring that dynamic, user-defined data analysis by the testbed produces credible test data and results to answer the IFFN issues. The final result will be a more confident air defense soldier who will make those tough air defense decisions quickly with less chance of committing fratricide.

The Air Defense Artillery magazine wishes to acknowledge Air Force Col. David A. Archino, IFFN Joint Test director; Army Col. Emmitt D. Dewitt, Army deputy test director; Air Force Lt. Col. Frank A. Swartz, Test Operations Directorate director; and Army Maj. Michael W. Cupples, Army Test Operations Division chief, for their assistance in producing this article.

Patriot

Can It Deploy Rapidly?

by Bob Kewley

Skeptics outnumber believers. Most offhandedly assume Patriot can only be airlifted by C-5A. Strategists have unthinkingly ignored non-NATO roles for Patriot. But, for no more C-141B sorties than used for Hawk today, Air Defense Artillery's newest, most formidable weapon can greatly increase air defense potential in almost any contingency.

Almost everything written about Patriot seems to focus on the NATO mission. That's more than natural, for the importance of a viable 24-hour-a-day air defense in Europe is etched on the mind of every U.S. air defense artilleryman. Most have experienced firsthand the intensity of effort inherent in maintaining the constantly "cocked" peacetime deterrent and alert posture while training for the movements and tactics essential to optimum air-battle performance and survivability in war.

Further, it was NATO's forward defense mission that established the need for the Patriot system. Nearly everyone knows that Patriot is replacing the Nike Hercules system in Germany to bolster all-altitude, air defense protection in the rear defense zone. Patriot will also replace most of our Hawk missiles, taking its place in "The Belt" to toughen contiguous, all-altitude air defense protection in a forward missile engagement zone along the Allied political borders of Central Europe.

Without a doubt, Patriot's capability to provide extended range, altitude, target handling and high-firepower protection in intense electronic-countermeasure environments makes it the ideal weapon for the NATO mission.



But what about the contingency missions outside Europe? Shouldn't we consider Patriot for a major role in contingency force operations? Certainly we should. But inevitably, in the opening discussion about rapid deployments for Patriot, there is a skeptic who challenges, "Why bother? Isn't Patriot too big to airlift on anything but the C-5? If so, we can't get it there in time to help." That's the common misconception which stems from snap judgment without benefit of analysis. It's the same preconceived notion that existed when Hawk was first considered for speedy deployments. But, the 11th Air Defense Artillery Brigade, Fort Bliss, Texas, tackled that problem head-on and developed the "get light" program to tailor and pare the Hawk battalion for effective contingency operations and rapid deployment by air.

Yes, Patriot equipment is relatively large. But Patriot units can be down-

sized using a similar "get light" concept. Close examination shows that all Patriot equipment can be transported into the contingency area aboard C-141 aircraft. More remarkably, using no more C-141B sorties than are needed to move a Hawk force package, a Patriot force package could provide a sizable payoff in terms of defended airspace, missiles on launchers and target handling capability. The payoff indeed seems "worth the bother," and this article reports on the elements of that concept and on the work accomplished to date.

In 1974 then-Secretary of Defense James Schlesinger described the U.S. commitment to contingency operations as follows: "While Europe and Asia remain important for force-planning purposes, it is essential to maintain reserves centrally located in the Continental United States if forces are to be able to respond rapidly and effectively to any emergency or minor contingency as directed by the President and approved by the Congress."

The exact composition of a contingency force would depend on many factors and variables (mission, enemy situation, terrain and time sensitivity). However, initial guidance established a corps-size contingency force of three divisions, organized under an austere battle staff. It was to be prepared for short-notice deployment without mobilization and ready for commitment anywhere in the world.

Since then the forces have been identified, have planned for and are trained to execute contingency plans which are immediately responsive to the needs of our friends if military assistance is required.

The Rapid Deployment Joint Task Force (RDJTF) was established in March 1980, subsequent to the Soviet incursion into Afghanistan. It flashed a signal of U.S. preparedness to deter or oppose further Soviet aggression in Southwest Asia. Later, in January 1983, the RDJTF evolved into a unified command, the U.S. Central Command (USCENTCOM). Its mission is deterrence and the protection of Western interests in the Middle East through intelligence collection and contingency planning. Should the need arise, U.S. military power could be projected quickly into the region with rapid deployment forces from CONUS bases. Similarly, the U.S. Pacific Command and the U.S. European Command are strengthened by contingency planning for rapid response to regional crisis. Thus, the CONUS force must be sufficiently strong and trained to handle contingencies anywhere in the world.

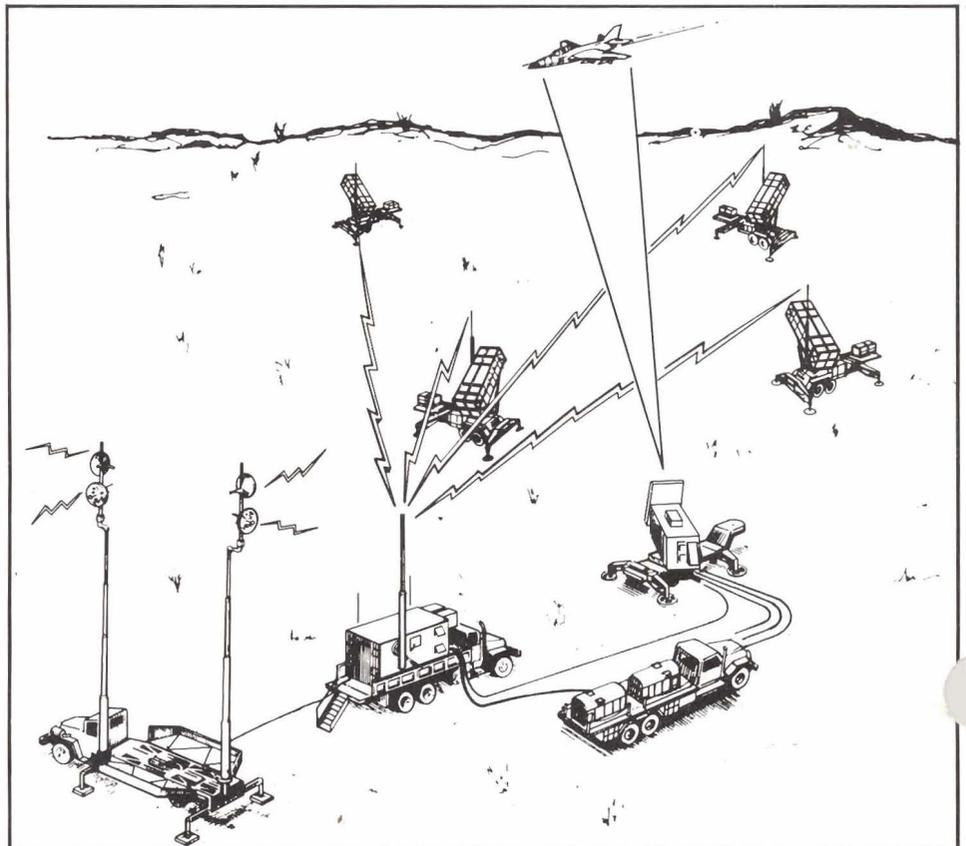
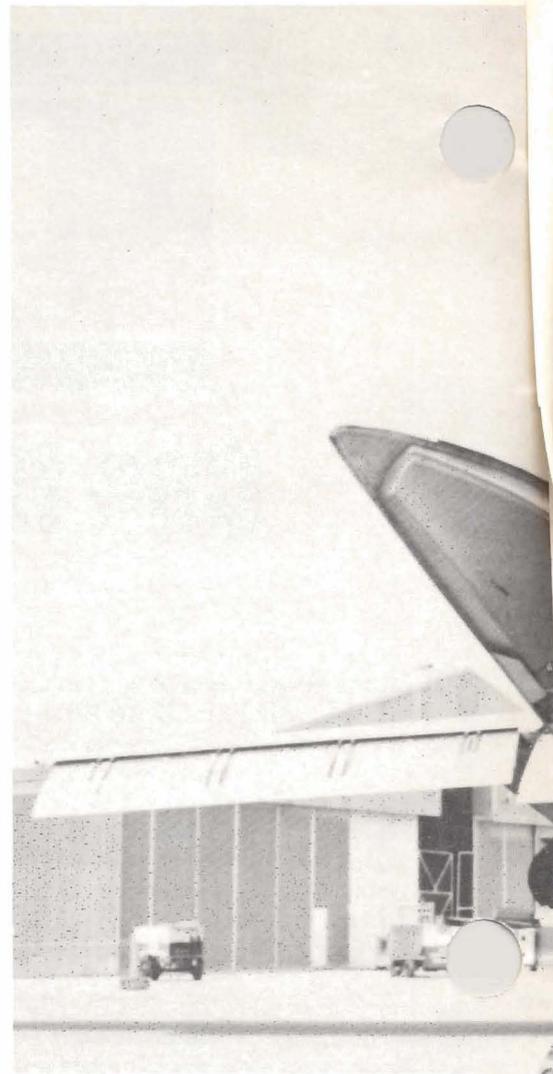
In any situation where a threatened country requests U.S. military support, and our national command authorities decide it is necessary to deploy combat forces, a contingency corps would most likely be inserted into the area of operations, placing heavy reliance on the Air Force and Navy for deployability, strategic lift and transport, initial air superiority and early fire support.

The success of any contingency operation is dependent upon the land, sea and air defense security provided to debarking forces. Each element initially debarking as a part of the assault force would be structured to fight its way in and expand the area of influence for the protection of subsequent landings from direct attack by enemy ground forces. But debarking forces are easy to detect, are restricted in mobility until fully off-loaded, are unfamiliar with the environment, and are initially concentrated and even containerized on the arrival airfield. As a result, they provide a lucrative target for enemy air attack. The speed with which an enemy could mount air attacks against vulnerable deploying forces makes it imperative to provide air defense protection and ensure local air superiority from the outset. Air Defense Artillery is a vital component required to attain local air superiority.

Programming the ADA Force Package

Ground-based air defense elements make up a purely defensive component of U.S. forces, and as such, they present a power projection option rarely discussed. As a situation develops which, if not quickly resolved, might require involvement of U.S. combat forces, air defense artillery forces might be inserted into the region to simultaneously show U.S. commitment and establish a precautionary precursor to later deployment of additional contingency forces. With such air defenses already in place, the risk of failure during the early stages of contingency operations would be greatly reduced. Of course, depending on the particular scenario, this predeployment option may not be feasible.

If the air defense artillery cannot be predeployed, the elements of the air defense force package must be phased into the arrival area like the contingency forces they must protect. Initially, the corps must depend solely on another service or host nation for air defense. However, it is extremely important that ADA force packages be programmed early in the airlift flow in sufficient quantities to provide a protective air defense over vulnerable debarking elements of the contingency force throughout all phases of the





A 1980 mobility test showed that the Patriot system could be transported by C-141 aircraft.

operation. Exact composition must, of necessity, be dependent on the nature of the expected air threat capabilities in the area of operations; but planning for the final ADA force package will include both high- to medium-altitude air defense (HIMAD) and short-range air defense (SHORAD) systems for integration with Air Force air defense elements. This integrated air defense package conserves resources and complicates threat-attack planning by denying the best clear-cut approach in terms of weapon loading, countermeasures and attack profiles.

Conceptually, the assault echelon going into each arrival airfield during the deployment phase should ensure insertion of its organic SHORAD to provide an initial level of ADA coverage for follow-on debarking forces. But with only Stinger and Vulcan organic to the airborne and light infantry divisions (the most probable assault forces of the contingency corps), it is urgent that non-divisional Chaparral and HIMAD elements deploy early. In addition to the SHORAD reinforcement from Chaparral, HIMAD elements provide area coverage which extends from very low- to high-altitude and are necessary to complete the integrated defense of arrival airfields and

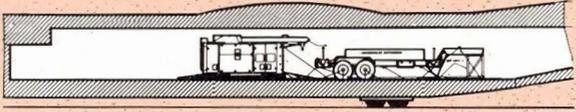
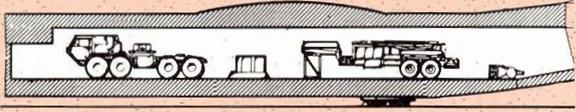
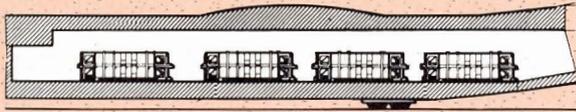
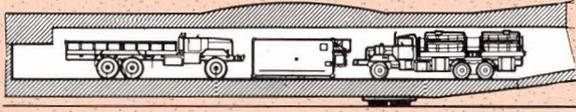
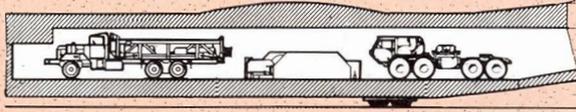
permit a portion of the combat air patrol aircraft to be released and re-rolled for other missions such as battlefield interdiction and close air support.

As conditions evolve into the lodgement and expansion phases of the operation, additional HIMAD-heavy ADA force packages should be inserted and employed around specified ports of debarkation to provide a secure area for follow-on sealift elements and continued airlift operations.

The current Hawk concept for the HIMAD force is well documented. Were it necessary to deploy the contingency force today, a Hawk force package could be inserted rapidly by a combination of air and sea. For example, one such package provides for airlifting five Hawk fire units (four assault fire units and a battery minus with pulse acquisition radar) and a proportional slice of the requisite support by C-141B aircraft. Thirty-five sorties are planned to transport Hawk equipment, including 15 launchers and 45 missiles, with another 15 sorties used to bring in the support necessary to sustain the force until sea lines of communications and support can be established. Against some enemy air threats, this five-eighths Hawk battalion would provide a formidable very low- to medium-altitude air defense for a lodgement or logistics area of operation today. However, we might augment or substitute with Patriot in the future.

Over the next few years we will see Patriot factored into the ADA force structure. As the Patriot buildup occurs in Europe and CONUS, there will be a significant reduction of CONUS-available Hawk in the active force to apply against the HIMAD needs of the contingency force. With Patriot's inherent firepower (in terms of both rate of fire and total missiles available), range, ECM resistance, increased target handling capability and all-altitude coverage, it can provide a robust HIMAD capability for rapid deployment, particularly at lodgement areas, without straining available airlift resources. Thus, it appears prudent to consider Patriot for rapid deployment missions and to begin planning for it now.

SINGLE PATRIOT FIRE UNIT LOADING ON C-141B AIRCRAFT

SORTIE NUMBER	LOAD WEIGHT	
1	43,980 LBS	
2, 3 7, 8, 9 11, 12, 13	65,499 LBS	
4, 10	60,000 LBS	
5	70,304 LBS	
6	64,380 LBS	

Airlifting Patriot

Contrary to commonly accepted belief, there are no major sizing problems associated with the movement of Patriot by air. The system is transportable by C-5A without alteration in a roll-on, roll-off configuration, and by C-141 with some equipment disassembly. This latter capability was, in fact, demonstrated during a 1980 mobility test conducted with the Air Force in which the Patriot system was loaded, transported and certified for airlift on C-141A aircraft (a smaller version of the C-141B).

For C-141B transport, the following disassembly is required. The radar set and outriggers must be removed from the trailer; the communications antenna mast group must be removed from its truck bed; the generator and outriggers must be removed from the launching station; and the engagement control shelter must be removed from its truck bed. None of the disassembly and reassembly operations are complicated, but a heavy-lift crane will be needed to handle the radar set at both the departure and arrival airfields. The heavy-lift crane should be available from prepositioned or early arriving Air Force or Army support operations in the lodgement area. Other reassembly operations require a lesser lifting capability, and the average single crew reassembly time is about 2.4 hours per item.

Load plans for today's C-141B aircraft show that a single Patriot fire unit, consisting of the radar set, engagement control station, electric power plant, antenna mast group, eight launching stations, 32 missiles and the assigned prime movers can be airlifted in 13 sorties.

Using C-5 aircraft, the same fire unit can be moved without disassembly in a roll-on, roll-off configuration in 6.5 sorties. Certainly there are scenarios in which force survivability benefits would accrue if Patriot were to be moved into a contingency area aboard C-5 aircraft. However, in view of the limited number of C-5s and the existing requirements for corps and divisional airlift, it's not likely that Patriot would receive dedicated C-5 transport. Note, however, that availability of just a few sorties could maximize the Patriot rapid deployment payoff. If necessary a priority allocation of two C-5 sorties

Table 1. PATRIOT FORCE PACKAGE OPTIONS - 50 C-141B SORTIES

FIRE UNITS		LAUNCHING STATIONS	MISSILES		SORTIES	
			READY	RELOAD	FIREPOWER	SUPPORT
3	x	4	48		27	23
3	x	5	60		30	20
3	x	4	48	48	33	(17)
3	x	6	72		34	(16)
4	x	4	64		34	(16)
3	x	5	60	60	37	13
3	x	7	84		38	12
4	x	5	80		39	11
3	x	8	96		42	8
3	x	6	72	72	42	8
4	x	4	64	64	42	8
5	x	4	80		43	7
4	x	6	96		44	6
3	x	7	84	84	46	4
4	x	5	80	80	48	2
INCLUDES:			ONE AMG PER ECS ONE AMG PER ICC ONE ICC PER FORCE PACKAGE			

Numbers in the firepower column indicate the C-141B sortie allocation required to transport the specified elements of Patriot firepower. Support sorties, indicated in the final column, can then be packaged to best support the selected option. Generally speaking, it appears that 15 or more sorties would provide adequate airlift for support elements. Ten or fewer sorties would probably be inadequate airlift for a self-sustaining Patriot force package. The table is divided into sections based on the number of sorties available for support.

in combination with 6.5 C-141B sorties, would obviate the need for major disassembly and assembly and could put the firepower of a Patriot fire unit to work within minutes of its arrival in the contingency area.

A minimum of three Patriot fire units would be required for a HIMAD-defended area or complex. Airlifting the firepower equivalent of one-half a Patriot battalion, including 24 launching stations and 96 ready missiles, would require 39 C-141B sorties. This compares favorably with 35 sorties planned for the firepower portion of the Hawk battalion minus. It seems appropriate, therefore, to pursue further the idea of using Patriot as an attractive and viable option for the rapid deployment mission.

Recognizing that 30 of the 39 sorties required to airlift the firepower of the half-battalion are used for launching stations and missiles, it is readily apparent that a Patriot force can be flexibly configured and easily tailored to the particular contingency force scenario. Trade-offs among the number of fire units in the force package, the number of launching stations per fire unit and the number of reload missiles allow any number of sortie utilization options to be formulated.

For example, if Patriot were restricted to the 50 C-141B sorties currently planned for Hawk, each combination of variables gives rise to a specific firepower sortie allocation and a remainder, which can be used for unit support requirements. Many options are available, and one such set of results is displayed in Table 1.

A table of this type serves as an excellent planning guide for the commander in mounting a rapid deployment Patriot force package to meet the needs of a particular contingency operation. For purposes of further discussion, three of the better force packaging options have been detailed in the supporting tables.

THREE BY FOUR. A three fire unit option with four launchers per fire unit, plus space given to a full missile reload, provides for 48 ready missiles, with another 48 missiles available for reload. Table 2 displays a summary of the firepower equipment carried in this option and provides an illustrative example of one of the many support increments which could be loaded on the 17 remaining sorties.

THREE BY SIX. Look further down

Table 2. PATRIOT 50 C-141B SORTIE OPTION #1

33 FIREPOWER SORTIES		3 FIRE UNIT BATTALION 4 LAUNCHING STATIONS PER FIRE UNIT 48 READY MISSILES — 48 RELOAD MISSILES	
THREE FIRE UNITS EACH WITH:			
	1 RADAR SET WITH HEMTT		3
	1 ENGAGEMENT CONTROL STATION WITH TRUCK		3
	1 ELECTRIC POWER PLANT WITH TRUCK		3
	1 ANTENNA MAST GROUP WITH TRUCK		3
	4 LAUNCHING STATIONS WITH HEMTT		12
	16 READY MISSILES		48
	16 RELOAD MISSILES		48
BATTALION COMMAND POST			
	1 INFORMATION CONTROL CENTRAL WITH TRUCK		1
	1 ANTENNA MAST GROUP WITH TRUCK		1
17 SUPPORT SORTIES			
6	FIRE UNIT SUPPLY TRUCKS, 2½ TON	CONSOLIDATED MAINTENANCE ACTIVITY	
1	BATTALION SUPPLY TRUCK, 2½ TON	5	MAINTENANCE/SUPPLY CENTERS
3	KITCHEN TRUCKS	1	LARGE REPAIR PARTS TRANSPORTER
4	WATER TRAILERS	2	SHOP VANS, 2½ TON
2	COMMO TRUCKS, 5/4 TON	2	MOTOR MAINTENANCE TRUCKS, ¾ TON
2	TRUCKS, ¾ TON	2	MOTOR MAINTENANCE TRUCKS, 2½ TON
4	FUEL TRUCKS, 10 TON	1	M819 WRECKER
2	FUEL TRAILERS		
1	BACK-UP RADAR SET WITHOUT HEMTT		
1	BACK-UP ENGAGEMENT CONTROL STATION		
1	BACK-UP ELECTRIC POWER PLANT		

Note that this support package is configured to carry a consolidated maintenance activity for the battalion and provides each fire unit with its own kitchen equipment and resupply transport using two supply trucks and a fuel truck. Further, it provides airlift for a back-up radar set, engagement control station and electric power plant.

Table 3. PATRIOT 50 C-141B SORTIE OPTION #2

34 FIREPOWER SORTIES		3 FIRE UNIT BATTALION 6 LAUNCHING STATIONS PER FIRE UNIT 72 READY MISSILES — NO RELOAD MISSILES	
THREE FIRE UNITS EACH WITH:			
	1 RADAR SET WITH HEMTT		3
	1 ENGAGEMENT CONTROL STATION WITH TRUCK		3
	1 ELECTRIC POWER PLANT WITH TRUCK		3
	1 ANTENNA MAST GROUP WITH TRUCK		3
	6 LAUNCHING STATIONS WITH HEMTT		18
	24 READY MISSILES		72
	0 RELOAD MISSILES		0
BATTALION COMMAND POST			
	1 INFORMATION CONTROL CENTRAL WITH TRUCK		1
	1 ANTENNA MAST GROUP WITH TRUCK		1
16 SUPPORT SORTIES			
6	FIRE UNIT SUPPLY TRUCKS, 2½ TON	CONSOLIDATED MAINTENANCE ACTIVITY	
1	BATTALION SUPPLY TRUCK, 2½ TON	5	MAINTENANCE/SUPPLY CENTERS
3	KITCHEN TRUCKS	1	LARGE REPAIR PARTS TRANSPORTER
4	WATER TRAILERS	2	SHOP VANS, 2½ TON
2	COMMO TRUCKS, 5/4 TON	2	MOTOR MAINTENANCE TRUCKS, ¾ TON
2	TRUCKS, ¾ TON	2	MOTOR MAINTENANCE TRUCKS, 2½ TON
4	FUEL TRUCKS, 10 TON	1	M819 WRECKER
2	FUEL TRAILERS		
1	BACK-UP RADAR SET WITHOUT HEMTT		

the table of options (Table 1) for a second three fire unit option, but this time with six launchers per fire unit and no missile reload. This example shows how the commander might opt for increased ready missile firepower at the expense of giving up his missile reload and one support sortie. It's an option which provides for 72 ready missiles, with 16 sorties remaining for the support increment.

Table 3 shows the results of this 50 sortie allocation. Should the commander decide to use the same battal-

ion support concept as in the first example, he would have to make support equipment decisions and load plan adjustments to accommodate the increase of six launching stations and the loss of one support sortie. For a net increase of 24 ready missiles, the choice might be to retain a back-up radar set, but to forego the back-up engagement control station and electric power plant.

Table 4. PATRIOT 50 C-141B SORTIE OPTION #3

34 FIREPOWER SORTIES	==	4 FIRE UNIT BATTALION 4 LAUNCHING STATIONS PER FIRE UNIT 64 READY MISSILES — NO RELOAD	
FOUR FIRE UNITS EACH WITH:			TOTALS
1	RADAR SET WITH HEMTT		4
1	ENGAGEMENT CONTROL STATION WITH TRUCK		4
1	ELECTRIC POWER PLANT WITH TRUCK		4
1	ANTENNA MAST GROUP WITH TRUCK		4
4	LAUNCHING STATIONS WITH HEMTT		16
16	READY MISSILES		64
0	RELOAD MISSILES		0
BATTALION COMMAND POST			
1	INFORMATION CONTROL CENTRAL WITH TRUCK		1
16 SUPPORT SORTIES			
8	FIRE UNIT SUPPLY TRUCKS, 2½ TON	CONSOLIDATED MAINTENANCE ACTIVITY	
1	BATTALION SUPPLY TRUCK, 2½ TON	5 MAINTENANCE/SUPPLY CENTERS	
4	KITCHEN TRUCKS	1 LARGE REPAIR PARTS TRANSPORTER	
5	WATER TRAILERS	2 SHOP VANS, 2½ TON	
2	COMMO TRUCKS, 5/4 TON	2 MOTOR MAINTENANCE TRUCKS, ¾ TON	
2	TRUCKS, ¾ TON	2 MOTOR MAINTENANCE TRUCKS, 2½ TON	
5	FUEL TRUCKS, 10 TON	1 M819 WRECKER	
2	FUEL TRAILERS		
1	BACK-UP RADAR SET WITHOUT HEMTT		

FOUR BY FOUR. If the commander wants to gain employment flexibility and increase battalion target handling capability, he would choose an option with more fire units instead of more launching stations. This third example treats a four fire unit battalion with four launching stations per fire unit and no missile reload. It's an option which provides for 64 ready missiles, with 16 sorties remaining for the support increment.

Table 4 displays the effects of the force packaging trade-offs. The firepower increment shows a net increase of one fire unit, four launchers and 16 ready missiles over option one. However, to maintain the same support concept, two additional supply trucks, a kitchen truck, water trailer and fuel truck would be required to support the fourth fire unit. When constrained to a total of 50 sorties, that support will certainly impact upon the remainder of the package. Thus, the commander might choose to airlift a back-up radar set, but leave behind the back-up engagement control station, back-up electric power plant and battalion antenna mast group.

There doesn't have to be a single Patriot solution which would apply to all contingency operations. As was displayed in the three examples, the commander has a great deal of flexibility within the matrices of workable Patriot firepower and support options.

By making the appropriate firepower, reload, military and support trade-offs, he should be able to structure the Patriot force package which best suits his estimate of the tactical situation. Thus, any number of viable Patriot force packages can be configured and moved in the same number of C-141B sorties currently allocated to Hawk.

Rapid deployment transportability

Of particular importance is the ability to deliver sufficient firepower to defeat large air attacks which attempt to saturate the defense. Patriot was designed with the capability to conduct multiple simultaneous engagement from the same fire unit anywhere within its engagement volume. The range at which that firepower is deliverable is another indicator of potential air-battle effectiveness. FM 44-15 reports, "The [Patriot] system is effective from near ground level up to altitudes in excess of 20 kilometers and ranges in excess of 80 kilometers." Such capabilities cover quite a large volume of airspace, 24 hours a day, in all weather conditions and against heavy electronic countermeasures.

In the most basic terms, the number of missiles that can engage attacking raids, together with the effectiveness of each, will determine the potential number of enemy aircraft which can be defeated by the defense.

Table 5 shows the quantity of Patriot missiles contained in three potential 50-sortie force packages. For the selected packages, quantities range from 96 missiles total, half of which are on launchers and ready to fire, to 64 missiles, all of which are on launchers

Table 5. 50 C-141B SORTIE FORCE PACKAGE EFFECTIVENESS POTENTIAL

	FUTURE PATRIOT OPTIONS		
	3 FU x 4 L	3 FU x 6 L	4 FU x 4 L
FIRE UNITS	3	3	4
LAUNCHERS	12	18	16
READY MISSILES	48	72	64
RELOAD MISSILES	48	0	0

is the key to the concept for Patriot in contingency operations. However, an equally important issue is how well the force package could perform the air defense mission.

Force Package Effectiveness

Effectiveness can be measured in terms of aircraft kills and surviving assets obtained from wargame analysis of comparative systems in a particular scenario. But such analysis quickly gets into detailed examination of threat capabilities and air defense operational characteristics with classification well beyond the scope of this article. However, Patriot system performance characteristics indicate that our expectation of operational effectiveness should be very high indeed.

and ready to fire. Today, when Hawk is inserted by using a similar 50 sorties, we get a total of 48 Hawk missiles into the defense. Hence, this represents a 33 percent to 100 percent increase in effectiveness potential even before Patriot's higher system kill probability is considered.

Patriot Payoff

In summary then, quite a number of sortie-constrained HIMAD force packages can be configured and employed in support of contingency operations. Both Hawk and Patriot are air transportable on C-141B aircraft, but



More to be Done

Clearly Patriot's rapid deployment role with the contingency force must be recognized and treated as an integral part of the Army Air Defense Master Plan. It is an option which will only be feasible when sufficient CONUS force structure is in place. But it is an option which needs to be planned for now.

We have barely scratched the surface in examining Patriot for contingency force application. There's still much more to be done, and a priority effort would ensure that the capabilities Patriot can provide are considered in contingency force planning.

"First cut tailoring" initiated in the formulation of this Patriot rapid deployment concept needs to be continued. Today's solution set can be used as a baseline for continued investigation, but a detailed Patriot tailoring analysis should be completed in conjunction with fielded Patriot units. Unit experience and expertise is essential to doing it well.

The Patriot rapid deployment operational concept needs to be further refined, tested and approved. Then tactics, techniques and procedures should be developed and published.

Additionally, air-loading procedures for the Patriot system should be embodied in the transportation series of field manuals. Those procedures must include the equipment disassembly and reassembly tasks, and they need to be incorporated into resident and unit training programs.

Further evaluation of sortie needs should be done in the light of evolving Air Force inventories of C-5, C-141B and the potential for a new C-17 transport aircraft. It should be determined what airlift capability will exist over time and how it will affect rapid deployment sortie allocations for ADA forces. Although uncertain in view of tightening defense budget constraints, current Air Force plans call for a 70 percent increase in the C-5 inventory over the next four years, and a follow-on program of C-17 production. The C-17 aircraft is being designed as a long-range, short-field, multipurpose transport which will carry loads currently considered to be "out-sized" and deployable only by C-5 aircraft or by sea. We can expect the new

aircraft to accommodate every piece of Patriot equipment without alteration or disassembly. If the programmed force of more than 200 C-17s becomes part of the inventory by 1998, the term "rapid deployment" will take on new meaning for all contingency forces. Rapid deployment for Patriot is doable on the C-141B. It would be greatly simplified on the C-17.

Several years will pass before the HIMAD force structure stabilizes. As Patriot units are activated, Hawk units will redeploy, and in some cases, deactivate. However, the current plans for transition and final CONUS force structure were prepared with no consideration given to Patriot for a role in contingency operations. Army planners may well want to reassess those requirements in view of the payoffs rapidly deployable Patriot can deliver in contingency operations.

Additionally, a decision needs to be rendered on Patriot and Hawk interoperability. The degree and level of implementation will definitely affect the manner in which the two systems could be deployed together in contingency operations. In that regard, an appropriate mix of Hawk and Patriot should be planned for and representative deployments evaluated in terms of air battle effectiveness, flexibility and sustainability. Only then can unit missions for the contingency forces be assigned and training conducted.

There is clearly an established requirement for Patriot in the NATO environment. There now needs to be a priority of effort to ensure that a concept for Patriot becomes an integral part of our contingency force planning as well.

(This article is an extension of a Patriot strategic transportability analysis performed within Bedford Laboratories, Missile Systems Division, Raytheon Co. In particular, the efforts of Mike Shannon, Pete McNeany and Bob Hynes of the Systems Requirements Department, Systems Design Lab, contributed significantly to development of the article.)

Bob Kewley, a graduate of the U.S. Military Academy and Stanford University, is a senior concepts and design engineer for advanced air defense programs, Raytheon Co. He is a former U.S. Army Air Defense Artillery School studies chief and assistant professor of mechanical engineering at the U.S. Military Academy.

neither without some disassembly before loading and reassembly on arrival. Today's 50-sortie Hawk force package would generally provide more self-sustaining fire units, but Patriot would provide for increase potential in air-battle effectiveness. Sortie for sortie, a Patriot force package delivers more missiles, provides more launcher-ready missiles, handles enemy saturation tactics and does so over the full range of attack altitudes and electronic countermeasure conditions.

Patriot payoff is impressive. However, there is no single solution. The commander would certainly consider both Hawk and Patriot when structuring an ADA force package for a particular contingency operation. All Hawk, all Patriot and a mix of the two are options which need to be evaluated. The choice would result from careful analysis of the merits of each system, unit readiness and availability, aircraft and sortie allocations, the known contingencies in the mission and a host of other factors impacting on the selection and deployment of the force. One wouldn't expect Patriot to be omitted and selected for every contingency operation, but it is hoped that the ideas professed in this article will arouse planning interest in Patriot and an ADA rapid deployment element.

TERRORISM

by Lt. Col. William F. Norris



Random Violence With a Nightmare's Purpose

Following his blueprint, he grabs a handful of shiny nails and holds them in his mouth. One by one he spits them out and, with calloused fingers, ricks them in the board until, striking heavy blow with his steel hammer, he slams each nail deeply into the yielding wood.

For terrorists, intent on driving home their point to the public, their victims are like the random nails driven into a piece of wood. Little concern is given to which nail is used or how many, just that the object is built. If one nail is clumsily bent, it's quickly cast aside and another is selected in its place.

Terrorism is the calculated use of violence or threat of violence to attain political, religious or ideological goals. This is accomplished through intimidation, coercion or instilling fear. The terrorists who make headlines with bombings, hijackings, assassinations and kidnappings share a common bond of violence; but their aims are as diverse as the nations and people they prey upon.

Some describe present-day terrorism as a derivative of 20th-century theories of guerrilla warfare. Mao Tse-Tung constructed a coherent doctrine from a set of diverse tactics traditionally employed by peasants who lacked armies. He recognized that his forces were numerically and technologically inferior to those of Chiang Kai-shek, so he substituted political power for conventional military power. Because of their superior political motivation, Mao reasoned, guerrillas could survive and outlast his opponent's military superiority, thus waging a protracted guerrilla campaign to wear down the opponent.

Mao's concept of a "people's war" freed strategists from thinking about warfare exclusively in terms of more soldiers and better armament. It allowed revolutionaries, or smaller political states that lacked conventional military power, to take on militarily superior forces with some hope of ultimately defeating them.

Terrorism may be viewed as a form of low-intensity warfare, which can be practiced in either an urban or a rural environment worldwide. Terrorism is a covert tactic, usually carried out by small, cellular groups employing strict secrecy. Terrorists do not wear uniforms and are disdainful of law. They take full advantage of their natural cover and operate in the cracks between organizations and missions, just beyond local law enforcement, just be-

yond national security, where intelligence gathering touches the limits of legality in Western democracies.

Terrorism is not new. It has been used throughout history, but has become worrisome recently because of its rapidly increasing frequency. Several causes have been identified for the increasing use of terrorist tactics.

Technological developments have made international terrorism possible. Modern jet travel provides worldwide mobility. Radio, television and communication satellites provide almost instantaneous access to a global audience. Weapons and explosives are widely available. Since the utility of terrorist tactics was demonstrated, terrorism has become an imitative mode of behavior, spreading throughout the world.

Terrorist operations are becoming bolder and bloodier.

Terrorism can be a means of less-powerful nations to project power (state-directed terrorism), or it can be a violent action conducted by dissidents or criminals not associated with any particular government (non-state-directed terrorism). State-directed terrorism is a natural outgrowth of the development of weapons of mass destruction, against which small countries cannot hope to compete.

According to recent estimates, roughly 70 attacks in 1983 alone can be traced to state-directed terrorism. The increase in terrorist attacks on the military services may be related to the easy identification of armed forces as representatives of their governments. State-sponsored terrorist groups, with access to their sponsor's manpower, finances, logistics and intelligence resources, constitute a significantly greater threat than do non-sponsored groups. In some cases, governments have even selected and provided operational guidance and vulnerability data on the prospective victim. Iran, Lybia, Syria and North Korea are the most blatant practitioners of this form of warfare. Other countries, such as the Soviet Union, Cuba and Nicaragua, pursue a dual-track policy. They take greater care to conceal their involvement with terrorism to afford themselves the element of plausible denial and, thereby, maintain maximum flexibility in the diplomatic arena.

Regardless of their size, affiliation or the expertise of their members, terrorist groups, by their very nature, have

numerous advantages over those charged with responsibility for countering their initiatives. Terrorists lack significant military resources so they rely on surprise. Terrorists can and do select their targets far in advance, plan attacks with great attention to detail based on extensive surveillance of the target, rehearse the attack to perfect the timing and execution, and then proceed to carry out the operation at a time and place favoring success.

Terrorist operations are becoming bolder and bloodier. Most terrorist attacks during the early 1970s were directed against property rather than people. By the 1980s, the balance had shifted with approximately half of all operations targeted against people. Since the 1970s, fatal incidents have increased by about 20 percent.

The Terrorist

Any classification of terrorists is bound to be arbitrary as overlaps are inevitable. Terrorists are often categorized by motivations, but a more successful method when considering ways to defeat them is by affiliation.

The Institute for the Study of Conflict classified, by motivation, the main terrorist groups on Page 26. Relatively few terrorist movements are entirely homegrown and self-sufficient, although it is important to note that they are unlikely to flourish regardless of the foreign support.

The typical terrorist is in his or her mid-20s and unmarried. Eighty-five percent are male, of urban middle-class origin and have a college or university education. While it cannot be seen or easily measured, the true common thread in terrorist profiles is motivation. Terrorists are as hard on themselves as they are on others. They feel that they alone matter and that, however small or obscure, they constitute the new reality—the seed of the future. They often possess a sense of hopeless isolation and yet complain of being bound by an alien society. They view the use of terrorist violence as the natural right of the people to bring about change. Many even claim that the government, social class or other authority they oppose is the real terrorist for some real or imagined slight of the terrorist's cause.

Terrorist groups today do not operate in isolation and in ignorance of one another. Cooperation among international groups provides enormous benefits for those who have paid their dues. It is a proven fact that there is a type of international terrorist club in existence—an "old boy" system. This system

offers benefits such as arms, money, intelligence, safe housing and, most importantly, training and experience. We should not, however, assume that any formal international network exists. A network implies some overall control.

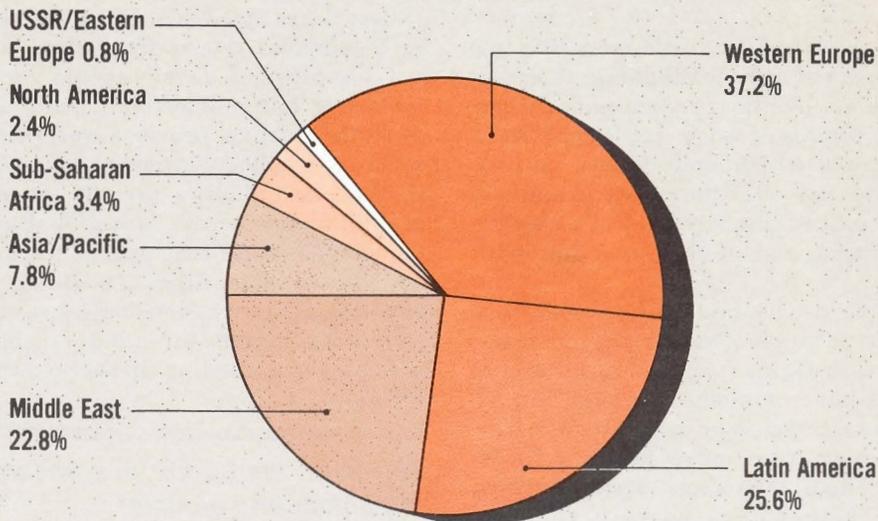
Terrorist groups will trade resources when it's to their mutual advantage, but the aims of terrorist groups are just too diverse to allow any overall control.

Terrorist groups have specific goals, just as military forces involved in combat have specific objectives. The ultimate goals are as numerous as the groups themselves; however, publicity is always a major objective of terrorists. They carry out acts of violence to impress those in whose interest they claim to be acting, to gain the attention of the authority against which the groups is targeted and, in many cases, to bring the group's cause before some portion or all of the international community.

The violent terrorist act is intended to gain attention and may be only vaguely related to the terrorist's stated goal. Terrorism has even been referred to by some authorities as "street theater." Violent and deadly, yes, but usually only a show to relate their varied messages: "Publish our demands." "Stop consorting with our enemies." "Release our prisoners." But always an underlying message is, "Notice us, reckon with us, and take our presence and our anger seriously."

Harassing and intimidating the establishment is another goal of terror-

Geographic Distribution of International Terrorist Incidents, 1983



Patterns of Global Terrorism: 1983; U.S. Department of State

ists. By forcing the established authorities to make concessions, the terrorists engage in a form of "coercive diplomacy." A third goal of terrorists, in many instances, is to polarize society by forcing the public to choose sides and the government to respond to acts of political violence with increased repression, thus destabilizing society and creating a political vacuum that they hope to fill. Beyond these goals,

terrorist groups may also use acts of violence to aggravate relationships between states to steer the course of political events in a direction more favorable to the terrorists' cause. Other goals include the releasing of prisoners or the securing of monetary ransoms while holding established authority up to ridicule for being helpless.

Terrorists seldom give away much information about their activities and

Terrorist Groups Classified by Motivation

Minority nationalist groups. These groups fight the majority of the community where the support base will depend on sympathy of ethnic, religious or linguistic minorities at odds with that majority community. An example is the Official and Provisional Irish Republican Army (IRA).

Marxist revolutionary groups. This terrorist movement is characterized by its possession of a coherent Marxist ideology (of any persuasion) and of a long-term strategy for bringing about a socialist revolution. The official wing of the IRA and the Italian Brigade Rosse are examples.

Anarchist groups. True anar-

chists are difficult to find since true anarchy brings lawlessness and disorder, conditions not acceptable as a natural state of existence for the human race. Those purporting to be anarchists include the Angry Brigade in England and the Red Army faction in Germany.

Pathological groups. Pathological violence appears to be a phenomenon of individuals such as Charles Manson, the Son of Sam and the Hillside Strangler, rather than of groups. Motivation normally has more to do with personal inadequacy, hatred of family or white, middle-class guilt feelings than with acquired ideology. The Symbionese Liber-

ation Group and the Weather Underground are placed in this group.

Neo-Fascist and extreme right-wing groups. The threat from right-wing groups is steadily rising in Europe. Neo-Nazis and neo-fascist groups are appearing to counter the activities of the left, and they pose just as serious a threat to security agencies as do the more traditional terrorist groups.

Ideological mercenaries. Western societies are now experiencing a new form of terrorism from men and women who, for the sake of a shared ideology and a common faith in a worldwide revolution

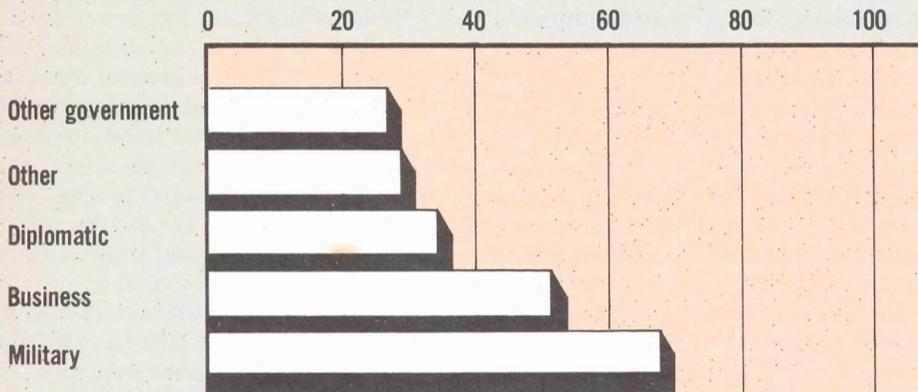
(rather than money), are ready to cross frontiers to pursue their cause. The Japanese Red Army is an example.

Crusaders, criminals and crazies. Within the motivational framework, another way to classify terrorists is as one of three types: crusaders, criminals or crazies. With the exception of the pathological groups and individuals, most fall into the crusader category—those who have a cause for which to fight. Although it is true that all terrorists must be classified as criminals in our society, the truly criminally motivated terrorists are few and far between. Crazies include pathological individuals such as Charles Manson.

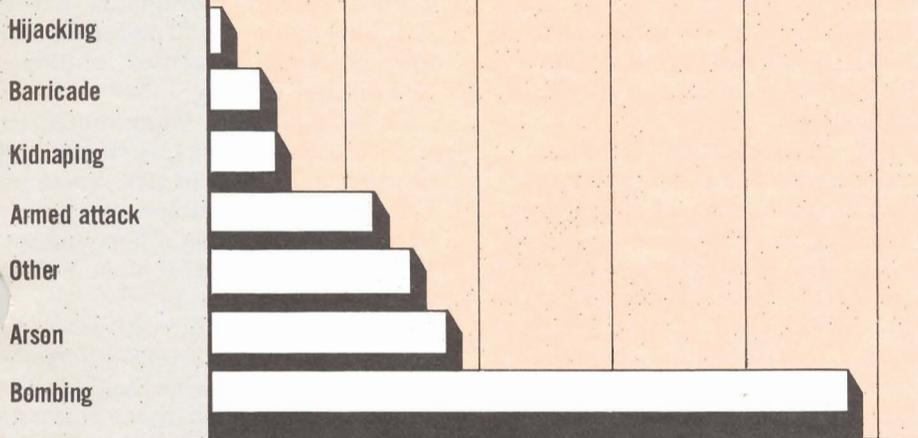
International Terrorist Attacks Against U.S. Citizens and Property, 1983

By Type of Target

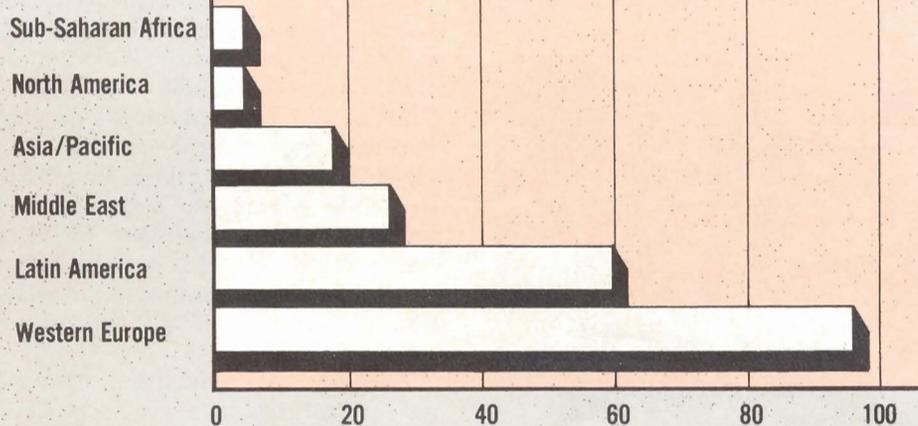
Number of Incidents



By Type of Event



By Region



Total incidents: 205

Patterns of Global Terrorism: 1983; U.S. Department of State

action people who carry out the orders. They are normally organized into small, active service units, each specializing in a particular tactic.

■ **Active supporters**—Those who provide the logistic support needed to sustain terrorist operations. These often come from the professional classes such as doctors, teachers and lawyers.

■ **Passive supporters**—People who are sympathetic to the cause, but who often will not stand up and be counted. This is the most difficult element to define and recognize. Also included in this group are innocent, well-meaning dupes, those who are ignorant of the real cause they are supporting.

More than 670 groups have claimed credit for at least one international attack since the United States began keeping statistics in 1968. This number is undoubtedly inflated as some of these are multiple names for organizations wishing to deny responsibility for a particular action. A recent trend in terrorist organizations is the dramatic increase of operations in the international environment. The organizations are based mainly in the Middle East and European capitals, and employ highly trained, professional bombers, murderers, kidnapers and hijackers. Another disturbing trend is the rapid growth of terrorist groups in the United States. These terrorists cover the whole spectrum from far-right reactionary groups (Posse Comitatus) through pathological and racist groups (Black Liberation Army and The Order) to left-leaning, Marxist-oriented and nationalist groups (Armenian Justice Commandos, FLAN).

Common Tactics

The common strategy of terrorists is to commit acts of violence that will draw attention of the world to their plight. The victim of terrorists is seldom the target. The real target is more often the public or business sector. By threatening or carrying out acts of extreme violence against a victim, terrorists are attempting to produce fear in the watching audience who can be manipulated as a result. Simultaneously, terrorists make actual or tacit demands on the government, which in turn, must react in some way to the terrorists, the target audience and the victim. The reaction gives the recognition and a form of legitimacy to the terrorists while causing uneasiness in the target audience and, if unsuccessful, a loss of confidence in the government.

The most common terrorist tactic is

structures. The structure of most groups is designed to prevent infiltration by intelligence sources. Secrecy is one of the key elements of success and can be maintained only through good organization, leadership and support.

Most groups consist of the following elements:

■ **Hardcore leadership**—Terrorist leaders who project a legitimate front but are often paranoid and fanatical.

■ **Active cadre**—The doers, the

bombing. Of all terrorist incidents recorded over the last decade, 67 percent is attributed to the terrorist bomb. The bomb is a popular weapon because it is cheap, easy to make, causes big attention-gaining incidents and is difficult to detect or trace after the incident. The popularity of the bomb is even more clear in terms of the terrorist's goal. Publicity, or "street theater," is the lifeblood of a terrorist campaign. Bombs can bring down entire buildings and are guaranteed to attract the attention of the media.

Hoaxes, arson, hijackings, kidnappings and assassinations are also tactics used by terrorist groups. Whatever terrorist tactics may be, they are certainly dramatic in their effects, hit-and-run by nature and designed for their impact on the public rather than on the victim.

The increase in terrorist attacks against U.S. military services may be due to the recent escalation of state-directed terrorism. Terrorists seek visible, symbolic targets that hold the world's attention because of extensive media coverage. As a superpower, the United States and its status symbols inherently have high propaganda value, and America's military installations and personnel are some of its most visible status symbols.

Analyses of terrorist targeting indicate an increase in premeditated attacks against U.S. military installations and individuals. The numerous terrorist attacks made on U.S. military installations and personnel since 1980

have prompted the military to undertake countermeasures. They are categorized as anti-terrorism and counterterrorism.

Anti-terrorism addresses those defensive measures taken to reduce vulnerability of personnel (including family members), facilities and equipment to terrorist attack. These measures include intelligence, threat analysis and preventive measures. The U.S. Army terrorism counteraction program places its emphasis on those proactive measures. For example, the terrorist situation and terrorism counteraction must now be addressed in all operations orders.

Counterterrorism includes those offensive measures taken in response to a terrorist act. Counterterrorism operations involve the employment of forces to resolve terrorist incidents in peace and war.

Four elements are considered critical for effective terrorism counteraction:

- credible, reliable and timely intelligence.
- proper education and training.
- modern tactics and techniques.
- up-to-date equipment and devices.

Training in defense against terrorism has been integrated into most service school curricula, including the U.S. Army Air Defense Artillery School's officer basic and advanced courses at Fort Bliss, Texas. Mobile training teams are being used to provide training to oversea commands, and personnel assigned to areas vulnerable to terrorist attack are receiving

specialized briefings on the threat and security precautions available to counter the threat. Standardized training provides the common method of operation, promotes efficiency and enhances safety of protective service detail members.

Perhaps the most dangerous threat to U.S. personnel is ourselves and our cavalier attitude and general disbelief that we are in any imminent danger of terrorist attack. Statistics show, however, that U.S. military personnel and their families are the targets of increasing terrorist attacks around the world, and studies have found that military installations and personnel within the continental United States are also in increasing danger of terrorist attacks.

In 1982, U.S. citizens were the primary targets of international actions. Of the total number of identified incidents involving individuals, nearly half were against U.S. nationals. Military personnel accounted for 31 percent of these victims.

Latest figures on international terrorist attacks against U.S. citizens and property show that in 1983 the target was most often military, the type of event was most often a bombing and the locations were most often in Western Europe.

A Congressional investigation following the Oct. 23, 1983, terrorist bombing of U.S. Marine Headquarters in Beirut published these findings: "The symbolic importance and vulnerability of many military installations make them targets for terrorists. A bomb exploded at the National War College at Fort McNair, Washington, D.C., on April 26, 1983. The Officers Club at the Washington Navy yard was damaged in a bomb explosion April 20, 1984. Other bases and facilities have prominent historical and symbolic importance. Our facilities and institutions will, unfortunately, continue to be the targets of terrorists and probably even state-sponsored terrorists."

Another report concluded: "We are naive if we believe that state-sponsored terrorism against the U.S. military forces and activities will be limited to areas outside of the North American continent. It is inevitable that some state-sponsored terrorist group will attempt to send a message to the American people by striking a blow within the United States."

The U.S. policy on terrorism is clear: All terrorist acts are criminal, and the U.S. government will make no concessions to terrorists. Ransom will not be



Rubble remains where the U.S. Marine headquarters stood until the terrorist bombing.

paid, and nations fostering terrorism will be identified and isolated. The United States and its allies are constantly improving their ability to identify specific terrorist threats and prevent attacks through increased cooperation and the sharing of sensitive intelligence data.

Intelligence is essential for implementing effective anti-terrorism and counterterrorism measures. Intelligence assets collect, process and disseminate information to provide the commander with the information needed to deter, neutralize or lessen the effects of terrorist activities. Information is collected on terrorist organizations by all legal means available.

With so much attention paid to terrorism and so much frustration over the seeming inability to stop it, it is difficult to recognize that those who practice terrorism do not have it all their own way. It is helpful to recognize that a successful terrorist action doesn't consist of bombing, hijacking or killing people, but rather in gaining attention and furthering some larger goal. By this measurement, contemporary terrorism has enjoyed relatively limited success, and the trend for these successes is down, not up.

According to Noel C. Kock, principal deputy, assistant secretary of defense for international security affairs, "In the nature of the present problem, terrorist acts are always well known, while our own successes are almost always silent. They will almost always

continue to be. But we have not defaulted, we are not helpless, and we have no doubt, as terrorists can have no doubt, of the outcome."

While total protection from acts of terrorism is impossible, basic precautions, such as knowing the degree and nature of the local threat; preventing terrorists access to needed information; eliminating predictable patterns of movement by route, modes of travel and schedules; making it difficult to penetrate facilities; and being prepared to react in case of attack, will significantly reduce the likelihood of suc-

cessful terrorist attacks on Department of Defense personnel.

As randomly as nails are selected to be pummeled into a piece of wood, the victims of terrorism are sometimes random or incidental. Victims do not die because the terrorist organization has any animosity toward them, but because they did not practice effective terrorism counteraction; and their deaths or the threat of their deaths alarm people and demonstrate to society at large that their murderers are deadly forces, however small their number.



A part of the Capitol building in Washington, D.C., is in shambles after a terrorist bomb exploded in an empty women's bathroom.

Protection Against Terrorist Acts

Individual security:

- Above all, avoid personal routines or setting a pattern of habitual behavior.
- Keep a "low profile" by avoiding outstanding dress or habits. Avoid wearing military uniforms when possible.
- Avoid high-risk areas and be cautious in crowds.
- Keep offices and families informed of itinerary.

Family security:

- Familiarize family with any local terrorist threat and protective measures.
- Post emergency numbers on telephone.
- Remind family members to report suspicious persons and not to give out personal information.
- Travel in groups as much as possible.

ble, and vary movements to avoid being predictable.

Residence security:

- Crime prevention techniques are equally applicable as security against terrorists or criminals.
- If feasible, have more than one access road.
- Avoid ground-floor apartments if possible, or lock all exterior doors and windows.
- Restrict the possession of house keys.
- Develop friendly relationships with neighbors.

Office security:

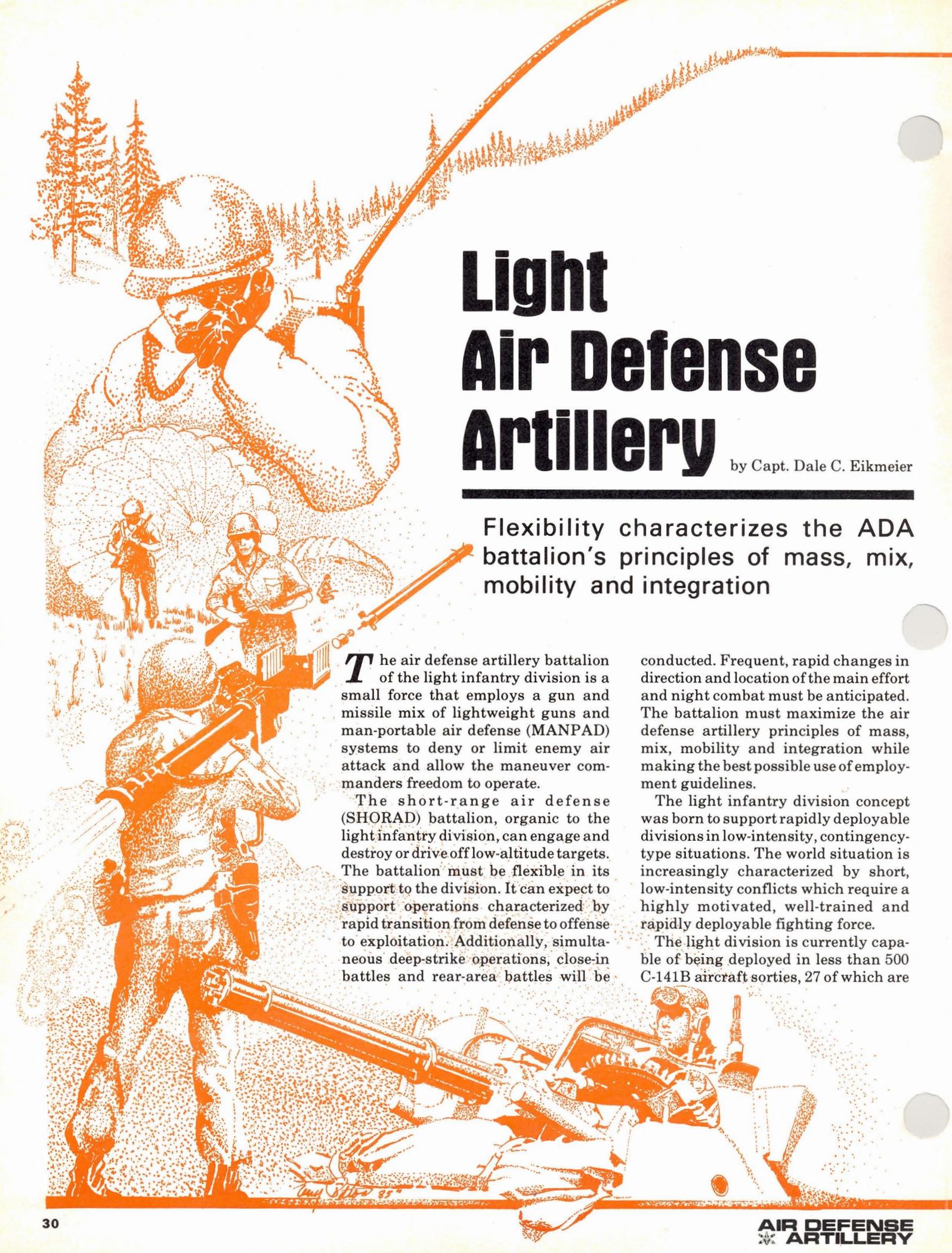
- Ensure the office attracts as little outside attention as possible.
- Control entry.
- Prepare personnel and building for emergencies.
- Protect the roof from access.

Transportation security:

- Guard against routine.
- Travel with companions when possible.
- Lock car doors at all times.
- Restrict access to travel plans to those who have a need to know.

This is an incomplete list of safeguards against terrorist acts; however, there are many sources for additional safeguard measures (Appendix G, Training Circular 19-16, Countering Terrorism on Army Installations), but, without doubt, the most important single safeguard is to not establish patterns in all areas of work and leisure.

Lt. Col. William F. Norris is chief of the Combined Arms Division, Tactics Department, U.S. Army Air Defense Artillery School, Fort Bliss, Texas. He is also the chief terrorism counteraction instructor at the school.



Light Air Defense Artillery

by Capt. Dale C. Eikmeier

Flexibility characterizes the ADA battalion's principles of mass, mix, mobility and integration

The air defense artillery battalion of the light infantry division is a small force that employs a gun and missile mix of lightweight guns and man-portable air defense (MANPAD) systems to deny or limit enemy air attack and allow the maneuver commanders freedom to operate.

The short-range air defense (SHORAD) battalion, organic to the light infantry division, can engage and destroy or drive off low-altitude targets. The battalion must be flexible in its support to the division. It can expect to support operations characterized by rapid transition from defense to offense to exploitation. Additionally, simultaneous deep-strike operations, close-in battles and rear-area battles will be

conducted. Frequent, rapid changes in direction and location of the main effort and night combat must be anticipated. The battalion must maximize the air defense artillery principles of mass, mix, mobility and integration while making the best possible use of employment guidelines.

The light infantry division concept was born to support rapidly deployable divisions in low-intensity, contingency-type situations. The world situation is increasingly characterized by short, low-intensity conflicts which require a highly motivated, well-trained and rapidly deployable fighting force.

The light division is currently capable of being deployed in less than 500 C-141B aircraft sorties, 27 of which are

allocated to the air defense battalion. Although the division is well suited for contingency operations, it must also have utility in a high-intensity environment.

Air defense artillery support to the light division in the NATO environment centers on providing sufficient air defense resources to counter the intense air threat that can be expected. The battalion must be able to quickly and efficiently accept augmentation to the corps.

When deployed in a contingency area, several considerations must be made. A secured airfield, port or beach must be available since the division does not have the capability to fight its way onto an airfield or a beach. Combat support and combat service support units lack redundancy and can only provide the minimum essential support. Of particular concern to the air defense artillery battalion is the air threat. A low-intensity conflict presumes limited enemy air activity. The characteristics of this type threat are:

- unsophisticated aircraft.
 - small numbers of enemy sorties.
 - unsophisticated ordnance (no smart bombs).
 - friendly local air superiority.
- The air defense artillery battalion

has been organized into two gun/Stinger batteries and a headquarters and headquarters battery. Each battery has nine product-improved Vulcan air defense systems (PIVADS) and 20 Stinger crews. Because of the small size of the battalion, the division has been given 52 non-dedicated MANPAD (Redeye) "shooters." They are spread throughout the division with

- 18 shooters in the military police company.
- two shooters in each howitzer battery for a total of 20.
- two shooters in the division headquarters and headquarters company (HHC).
- one shooter in each of the three brigade HHCs.
- one shooter in each of the nine infantry battalion heavy-mortar platoons.

These non-dedicated shooters are employed in a self-defense role only. They are not trained in aircraft recognition, are not serviced by the air defense command and control net and have no way of receiving early warning of air attack. They are to remain in a permanent "weapons hold" status.

A contingency operation is composed of three phases: deployment, lodgment and expansion. In the first phase, the

assault phase, SHORAD for the assault force is based on the expected air threat, geography and size of the airhead or beachhead. It is characterized by air attacks to gain air superiority. The strength and relative ratio of air defense of each side are critical in this phase.

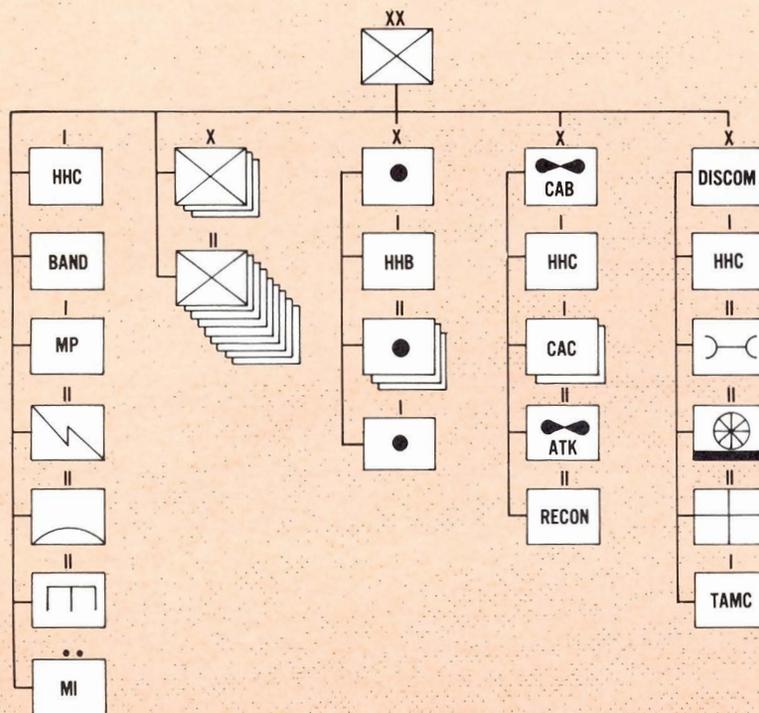
The second phase of the contingency operation is lodgment. The division should ensure that SHORAD assets arrive early to provide protection to priority targets within the lodgment area (airfields, ports, helicopter staging areas and maneuver forces). The enemy will concentrate on attacking and stopping our reinforcing follow-on forces. The easiest way for the enemy to do this is by causing problems at the lodgment area. Without these dedicated air defense resources on the ground, a majority of the division's capability can be quickly destroyed, causing irreparable damage which would doom the mission before it begins.

Phase three begins the expansion, where echelons above division must assume responsibility for the air defense mission of the lodgment area so that division air defense elements can maneuver with and support division combat elements. The enemy will concentrate on logistics bases and troop concentrations.

The contingency operation can be a fluid situation in which we must be prepared to change from support of defensive operations to offensive operations in a flash. At division level, the commander has inadequate air defense resources to defend his critical assets. All too frequently, supported commanders parcel out insufficient air defense artillery forces to each maneuver unit and to each critical asset so that the majority of the assets has only a small measure of protection. Such distribution of air defense artillery resources on the modern battlefield is not in line with current doctrine and virtually guarantees inadequate protection to those assets most critical to the success of the mission.

With these restraints in mind, the light division presents many challenges to air defenders. Major changes, from the current divisional Chaparral/Vulcan battalions, which consist of four line batteries, two Vulcan and two Chaparral, to the light battalion's two Vulcan/Stinger batteries, demand new approaches to the problem of providing

LIGHT INFANTRY DIVISION



effective air defense over the divisional area of operations. Employment principles and guidelines are being re-evaluated. Innovative approaches to training are being implemented, and new tactics and doctrine are being developed to fit the light division's mission.

In the light division, the problem of effective command and control will be complex. With only two batteries available to provide divisional SHORAD, batteries will be less likely to find themselves with a direct support mission to a maneuver brigade. The concept of habitual association with a brigade is no longer valid. Batteries will have more general support missions with their subordinate platoons being widely deployed across brigade boundaries. A battery commander may find himself responsible for providing air defense in the division support area and a brigade area simultaneously.

After task organizing, a typical scenario could have one battery providing air defense for three maneuver brigades while the other is responsible for the division rear. As a result of widely dispersed air defense units, platoon leaders' expertise must extend beyond the tactical employment of their platoons. They must become proficient in the full range of air defense operations. Platoon leaders will have greater responsibilities and will more often be expected to make decisions normally made by the battery commander. They must be able to act as air defense advisors to the brigade commanders, interpret intelligence for its impact on air defense operations, and make recommendations on priorities and passive air defense measures. These command and control challenges are being met through increased and expanded training of platoon, squad and section leaders. It is the tactical and technical expertise of its small unit leaders that is becoming the hallmark of the light division.

The unique organization and mission of the light division demand a close evaluation of how air defense priorities are established. When setting priorities, the factors of criticality, vulnerability, recuperability and the air threat must be thoroughly understood by all involved in air defense decisions.

The light division's TOE is austere. Only those elements essential to effec-

tive combat operations remain. There is little redundancy built into the organization. The division's logistical base is very small, but extremely critical to sustaining operations. The division artillery represents a significant combat multiplier, particularly the M-198, 155mm general support battery. To the light infantryman, the aviation brigade represents a means of resupply and mobility. It also possesses a significant intelligence gathering and anti-tank capability. Due to their critical missions and logistics base, any reduction in capabilities of DIVARTY and aviation would pose a significant loss to the division, and therefore, are prime targets for threat aircraft.

It is the tactical and technical expertise of its small-unit leaders that is becoming the hallmark of the light division.

On the other hand,⁶ the light infantry's mobility and its ability to literally hide will make it a poor target for threat aircraft. Therefore, the preponderance of air defense will go to support units rather than maneuver units. The air defender must have a thorough grasp of the situation, capabilities and missions of supported units, the threat and his own weapons' capabilities, and be aware that the allocation of critical air defense assets cannot be made hastily.

One of the most radical changes in organization, employment and doctrine is the establishment of the three-gun Vulcan platoon. This departure from the traditional four-gun platoon requires air defenders to take a second look at the abilities of the Vulcan system and the basic SHORAD employment guidelines. All SHORAD platoon leaders have wrestled with the guidelines of balanced fires, weighted coverage, early engagements, defense in depth, mutual support and overlapping fires. And all have found that, due to many different factors, it is seldom possible to follow all guidelines. The three-gun platoon will present additional challenges to the task of air defense design. Platoon leaders must take into account the relatively short range of the Vulcan system and the size and shape of the asset within the

context of only three available guns when deciding which guidelines can best be applied.

In order to provide, as a minimum overlapping fires, the three-gun platoon must have its guns placed closer to the asset than the four-gun platoon, thus trading off some early engagements for the overlapping fires. When considering balanced fires or weighted coverage, the three-gun platoon offers little flexibility. Air defense designs will have three points, and the best that a platoon leader can hope to do is to orient two guns to the most likely avenue of approach. Rather than simplifying things, the three-gun platoon will require a careful analysis of the situation and a thorough understanding of the air defense guidelines.

Stinger represents the backbone of air defense in the light division. Stinger's ability to go anywhere with the infantry and its effectiveness make it ideally suited to the mission of the new division. The employment guidelines and missions for Stinger remain unchanged in the light division. However, Stinger must be the focus of greater attention of air defenders in the light division. The air defense battalion is no longer a Chaparral/Vulcan battalion, but rather a gun/Stinger battalion. With the battalion's 40 Stinger crews versus 18 Vulcans, it is obvious where the concentration of air defense power lies. Therefore, all leaders need to be familiar with the Stinger system's abilities.

Being the primary air defense system of the light division presents challenges to the Stinger platoon and section leaders. With sections and crews spread widely throughout the division, area command and control will be more difficult. A platoon leader may find that he has a section in direct support of maneuver elements on the forward line of troops, another in the division rear at the airhead with others spread among trains, military supply routes and artillery sites. This expanded role as the division's primary air defense system demands increased self-reliance and expertise on the part of crew and section chiefs.

Stinger crews will find themselves participating with the infantry in dismounted, airmobile and amphibious operations. When operating dismounted, the crew can carry only two missiles, thus requiring coordination

for resupply and/or having the infantry carry additional missiles. Points to consider in dismounted Stinger operations include command and control, security of the prime mover and the individual load each crew member will carry.

The number of forward area alerting radars (FAAR) in the division has been reduced from eight to four. Two FAARs are located in each gun/Stinger battery headquarters. This reduction calls for a number of changes in the way FAARs are currently employed.

With four FAARs available, it will be impossible to provide full and overlapping coverage of the entire division area. So, as with any limited asset, priorities must be established for areas

of FAAR coverage. High priority division assets require coverage, as do likely avenues of approach. Air defenders will be required to put as much planning and thought into FAAR positioning as they do into weapon system positioning. The early warning provided by FAAR is a combat multiplier that must be used wisely and not taken lightly.

Considering the importance of FAAR and its relatively few numbers, survivability becomes critical. A close, critical analysis of employment techniques is now taking place. Questions of blinking, 24-hour coverage, electronic countermeasures and employment by pairs are being evaluated.

The major challenge the light divi-

sion has presented to all light fighters is to accomplish the mission with less fire power. To be successful at this requires combat proficiency by individuals and flawless planning and execution by leaders. In the light division, it is the quality of its soldiers that will make the difference, not the equipment.

Capt. Dale C. Eikmeier, commander, A Battery, 1st Battalion, 51st Air Defense Artillery, 7th Infantry Division (Light), is a distinguished military graduate of San Jose State University, San Jose, Calif. After attending Airborne School, he served as a Vulcan and Chaparral platoon leader.

Red Flag Challenges Light Air Defense

by 1st Lt. Gary Donaldson

The newly acquired Stinger platoon from A Battery, 1st Battalion, 51st Air Defense Artillery, fits handily into the 7th Infantry Division's light configuration, according to results from its recent deployment and participation in a joint air defense and air superiority exercise at Nellis Air Force Base, Nev.

Exercise Red Flag is conducted year-round and pits Blue Forces and Red Forces in mock air combat on Nellis' vast bombing and gunnery ranges.

The mission of the Red Flag staff is to maximize the combat readiness, capability and survivability of participating units by providing realistic training in a combined air and ground threat environment. The Red Force command and control organization realistically simulates a manually integrated air defense system in interaction with tactically emplaced air defense units throughout the ranges.

The Army's first short-range air de-



fense unit's participation in Red Flag began with a rapid deployment via a C-141 in strict accordance with tactical doctrine of the 7th Infantry Division, Fort Ord, Calif. This provided valuable feedback concerning the highly mobile, easily deployable and quick-striking Stinger platoon.

Upon arriving, the Stinger platoon was deployed in a major air corridor between the aircraft holding and refueling area and the bombing and gunnery ranges. Collocated with the Stinger platoon was a Marine Hawk battery, which was also participating in Red Flag.

The scope of the exercise, coupled with the joint participation with the Air Force and the Marine Corps, lent itself to being a unique training experience for the newly formed light division Stinger unit.

The firing teams took up positions on the range predetermined by the Air Force range control group. Tight secu-

rity measures accompanied the exercise, and strict adherence to position requirements had to be met. Once in position, the teams observed two range periods per day, lasting two hours each. The unit was exposed to approximately 80 to 100 sorties during each range period. There were approximately 25 different allied aircraft participating in the exercise, including Air Force F-15s and F-16s, Navy F-14s and F-18s, Marine AV-8s and French Jaguars.

The crews were equipped with tracking head trainers, video recording equipment and missile signature simulators. The mission, aside from unit training benefits, was to provide video feedback to the participating air crews. By using the video equipment, aircrews and firing teams were able to make on-the-spot corrections concerning tactical maneuvers and engagement procedures. This feedback provided a valuable training tool for both the Air Force and the Army.

The training opportunities provided by Red Flag are invaluable to air defenders and continuing participation in such an exercise would vastly improve combat readiness.

1st Lt. Gary R. Donaldson is the maintenance platoon leader, A Battery, 1st Battalion, 51st Air Defense Artillery, and is a 1983 graduate of the United States Military Academy. He has served as a Chaparral and Redeye platoon leader.

Light Fighter Training

by 2nd Lt. Steve Briggs

Air defense soldiers evolve through increasingly demanding programs as they come face-to-face with the fact that they are part of a unique fighting team



Light infantry forces are high-performance units, capable of bold, aggressive action under conditions of great hardship and risk. Training is the crucial catalyst in forming these units. Training is continuous, imaginative and vigorous. The result is “soldier power”—the synergistic combination of concerned, competent leaders and well-trained soldiers who work to make the light infantry forces uniquely effective. Air defense artillery soldiers, within the combined arms concept of the light division, must be motivated, physically fit and self-disciplined.

It takes a combination of leaders and soldiers to win battles, and the light infantry division training is designed to facilitate the bonding that occurs when leaders and soldiers share stress and hardships.

Leaders at every level are being trained to be masters of the profession of arms—experts at skilled reconnaissance, resourceful planning and violent execution. Leaders are establishing a challenging command climate while serving as role models for tactical and technical proficiency, physical fitness and ethical behavior.

Training in the light infantry division works to instill soldiers with confidence in their leaders, their equipment, their peers and in themselves. By

Maj. Gen. William H. Harrison (left) briefs air defense artillerymen on the importance of light-fighter skills. Airmobile operations (bottom left) make up a major portion of the Light Leader Course. Soldiers (below) refresh their nuclear, biological and chemical skills as part of the Light Fighter Course.



their performance in initial entry and subsequent training, they earn their positions in the units. They must exhibit the skill and the will to train hard and learn.

Training for each air defense artilleryman as a light infantry division fighter is based on a psychological transition through a series of increasingly demanding programs as the soldier comes face-to-face with the undeniable fact that he is a member of a unique team. This intense training fulfills two roles; individual confidence is gained and unit esprit de corps is created through operation within stressful contexts.

The training program for 1st Battalion, 51st Air Defense Artillery, Fort Ord, Calif., the air defense artillery battalion for the 7th Infantry Division (Light), consists of the Light Leader Course, Rites of Passage Course and the Light Fighter Course. Each phase focuses on psychological development, critical skills and endurance tasks.

The Light Leader Course, developed by the battalion's S-3 staff, re-establishes basic infantry and air defense skills in key leaders. Officers and non-commissioned officers are trained and evaluated in areas such as fieldcraft and communications, as well as operations and maintenance of short-range air defense weapon systems,

Hand-to-hand combat skills (below) are sharpened at the Light Leader Course. Rappelling (bottom right) is one of many light-fighter skills being taught to air defense artillerymen.

during the intensive eight-day program. The demands of this course establish a basis from which trainers may operate in the future. Along with a reinforcement of previously learned tasks, the complete chain of command is brought together to function as a team working toward the singular goal of certification.

The Rites of Passage Course, taught by Fort Ord's light fighter cadre, concentrates on the individual soldier as a team member. Psychological development is integrated by instruction on division history and tradition, the role of the light infantry division and military leadership classes. Critical skills, such as land navigation, weapons cross-training and first aid, are established and evaluated. Finally, the individual's stamina and endurance are tested through a series of obstacle, bayonet-assault and rappelling courses. Particular emphasis throughout the course is placed on the importance of the non-commissioned officer as the primary trainer for individual skills.

Approximately 20 percent of the Rites of Passage Course has been developed by the air defense artillery battalion to emphasize tasks significant to the air defense mission.

The culmination of the certification process is the Light Fighter Course. During this two-week course, the entire battalion operates under extremely stressful conditions. Not unlike ranger school, the soldier is pushed to his mental and physical limits while being

tasked with particular missions. During this course, the air defense soldiers are exposed to training not typically found in their training schedule, such as helicopter rappelling and hand-to-hand combat.

Outside of established course parameters, key leaders have ample opportunity to be creative in developing daily training cycles. Physical training still consists of four-to five-mile runs. However, training days dedicated to combatives, rappelling, survival training and land navigation help to ensure certification success as well as maintain motivation among the soldiers.

The light infantry division scheme allows air defense soldiers to be innovative while placing them at the forefront of a new Army force concept. Skills learned by the young NCO and officer through airborne, air assault and ranger schools are not abandoned in the light division. Division training capitalizes on this knowledge and works to establish similar skills at all levels and in all units of the division.

The air defense soldier must master basic infantry skills which work to make him part of an elite unit. The integration of these skills into the air defense training model results in a singularly well-qualified and unique soldier.

2nd Lt. Steven M. Briggs is a Stinger platoon leader in A Battery, 1st Battalion, 51st Air Defense Artillery. He is a graduate of Bucknell University, Lewisburg, Pa., and is also a graduate of Ranger School.



Light Configuration Changes Air Defense Methods

by 1st Lt. Frank Ignazzitto

The light division configuration of the air defense battalion brings about significant changes that will affect the way these units carry out their missions.

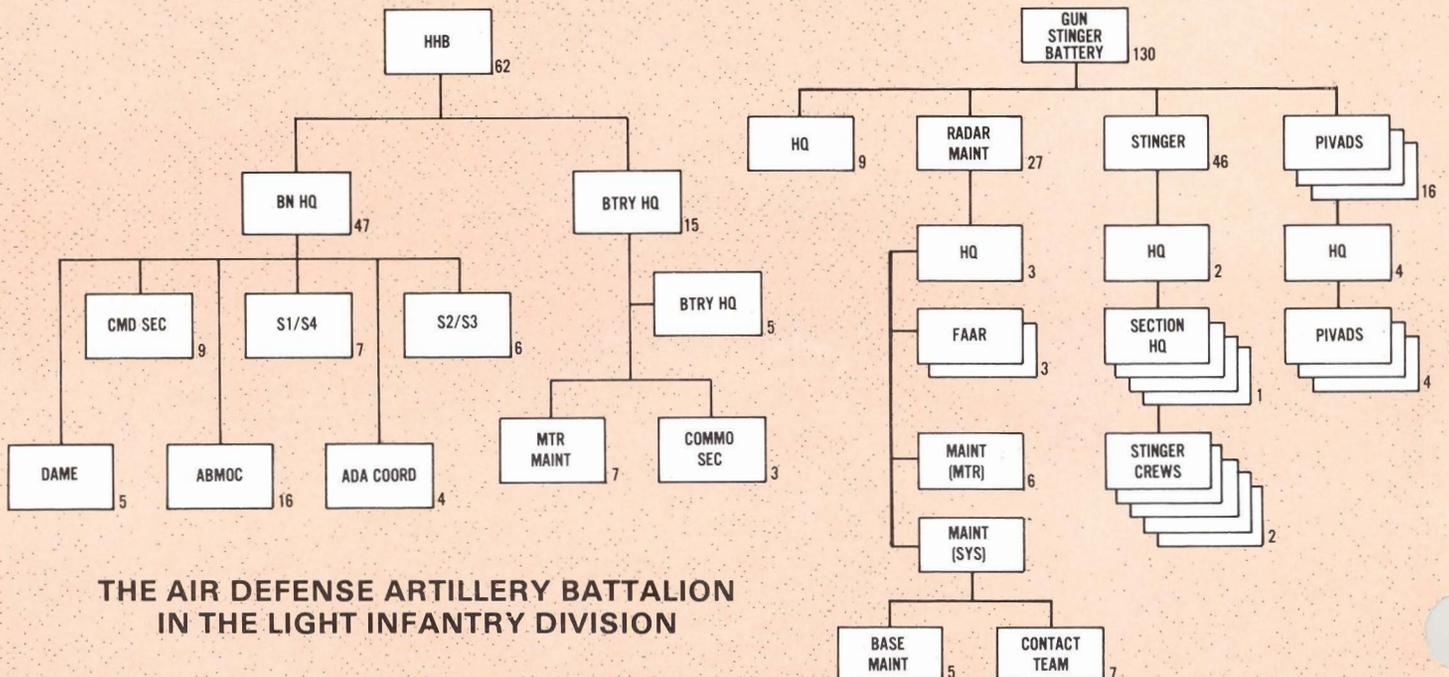
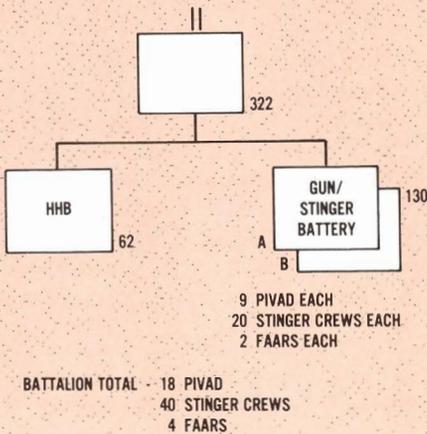
One major change is the addition of the air battle management operations center (ABMOC). The battalion operations officer is the officer in charge of the ABMOC, which operates out of an M-820 Expando Van. The primary purpose of the ABMOC is to collect and plot radar-detected target information from both a forward area alerting radar (FAAR) and a high- to medium-altitude air defense source, as well as to monitor the friendly aviation situation.

The line batteries undergo several changes that will affect their operations. Since the battery headquarters no longer has an organic mess section, the battery and its platoons will be required to coordinate with the supported unit for feeding their personnel. In fact, with subordinate air defense units dispersed over the battlefield, coordination for various types of support, such as maintenance and supplies, becomes a critical task for the platoon leader.

The addition of two FAAR sections to the line batteries has led to a change in the structure of the battery headquarters. The battery headquarters now consists of a separate radar maintenance platoon headquarters and three specified maintenance contact teams. Soldiers with the military occupational specialty 24MX7 were added to the system maintenance section for organizational level repairs of the FAARs.

The new structure and TOE of the air defense battalion in a light configuration are the result of extensive planning and consideration. However, this is an entirely new development, and the need for future changes or adjustments is bound to surface. The 1st Battalion, 51st Air Defense Artillery, 7th Infantry Division (Light), Fort Ord, Calif., will be studied as it trains so that organizational and operational problems can be resolved, and the unit can effectively accomplish its mission.

1st Lt. Frank A. Ignazzitto is the executive officer of A Battery, 1st Battalion, 51st Air Defense Artillery. He is a 1982 graduate of the United States Military Academy. He has been a Chaparral, Vulcan and Redeye platoon leader.



THE AIR DEFENSE ARTILLERY BATTALION IN THE LIGHT INFANTRY DIVISION

What? No Organic ADA in the Light Infantry Division!

by Capt. Ralph Merrill

Recent proposals have been made to eliminate the air defense artillery battalion from the light division to lighten it further. The light division's original requirement to be deployable in less than 500 sorties has been met. Now, the push is to deploy in 475. Perhaps it was felt that if 500 was good—then 475 has to be better. To justify this questionable idea, a study was done by the Combined Arms Combat Development Activity to determine the least needed and easiest way to reduce aircraft sorties. The air defense artillery battalion was what fell out from this study.

In the present high-threat environment, it is inconceivable that any commander would allow his division to be stripped of its air defense artillery assets and attempt to function without dedicated air defense coverage, no matter how small the predicted air threat. Non-dedicated, man-portable air defense shooters, incorporated into the light-division structure, are not a real defense. Their ability to successfully engage targets has not been proven, and I doubt they would ever be successful.

It's vital to recognize, but is somehow being overlooked, how easy it would be to destroy an entire division lodgment area unprotected by dedicated air defense resources. Picture a division coming into an airfield. During that very vulnerable period, helicopters are being assembled, defensive perimeters are being established, and troops and equipment are all over the airfield. Suddenly, out of the blue, two Cessna 150s, armed with rocket pods and bombs, destroy half of the division's assets. The follow-on division assets have to turn back because the runways have been damaged, not by high-speed, sophisticated aircraft armed with smart bombs, but by a couple of sympathetic farmers in their crop dusters.

The study concluded to eliminate the air defense artillery battalion on the basis of reduced air threat in contingency-type operations. I question how current the threat information was. If the threat is so minimal, why was the field artillery given a battery of 155mm howitzers to augment their three battalions of 105mm howitzers? Why was the military intelligence company increased to a battalion? I submit that if aircraft sorties take precedence over a capable fighting force, and we don't give the division the tools it may need to do the job, we will be condemning it to total destruction.

Removing the air defense artillery battalion from the light division has some serious drawbacks; deployability will be restricted to a zero air threat contingency, a situation which does not exist. In the low-intensity scenario, enemy aircraft are present and the air defense artillery battalion is a deterrent. An underdeveloped nation would hesitate to commit its scarce aircraft resources unless the chances of success outweigh the possible losses to be encountered. In addition, without air defense protection, the possibility of Cuban- or Soviet-equipped surrogate forces intervening would greatly increase the air threat.

Some of the more notable features of the air defense artillery battalion are consistently being overlooked. Those who must decide should not ask, "Why is ADA taking up to 27 aircraft sorties?" but, "How did we get so many air defense resources on only 27 aircraft sorties?" The capabilities of the air defense artillery battalion, although austere, are enormous and will continue to increase with the many improvements, like the light air defense artillery system (LADS), to follow. The battalion gives the division commander the choice he needs to be successful in today's ever-changing world situation.

If the battalion were to be removed from the division and placed at the corps level, the corps commander's concept of the operation may not coincide with the specific contingency under the control of a division commander. However, with an air defense artillery battalion organic to the division, the division commander would be able to commit his forces according to existing sortie requirements and air-threat intensity.

Losing the lethality of the Vulcan's firepower against lightly armored vehicles would be a serious loss. The Vulcan is the best gun in the division and would be invaluable in a low-intensity air threat.

The most critical period of any contingency operation is the initial days when friendly forces must arrive early and stop a confrontation before it escalates. Without the air defense artillery expertise located in the division, operational planning and tactical employment would not be integrated as an active element of the day-to-day training nor would there be the transition into a combat environment.

We should train the way we expect to fight. A corps air defense artillery asset cannot be thrown into a division and be expected to function effectively. And when the air defense artillery battalion is expected to deploy, should they be needed to protect an otherwise air-vulnerable division, they must be already integrated into the division and know its procedures; there will be no time to learn.

It's regrettable that the removal of the air defense artillery battalion from the light division is even being considered. How soon we forget. With the rows of history books in our libraries, why is it we fail to learn the lessons contained therein? Commanders must comprehend the risks of degrading their air defense artillery assets and be able to confidently say, "I accept that risk." But, that decision must remain at the division level in order for it to be timely.

Capt. Ralph Merrill is an instructor in the SHORAD Branch, Tactics Dept., U.S. Army Air Defense Artillery School, Fort Bliss, Texas. He has a bachelor's degree in computer engineering from the University of Florida, Gainesville, Fla.

During the last 10 years the Army has forged a force trained to fight outnumbered and win across the broad spectrum of conflict. This modernization program is making the force tougher, more resilient and more flexible. Recently, the Army accelerated the next step in this evolutionary process by adopting a new light infantry division structure.

Light infantry divisions will add a new dimension to the strategic mobility of Army forces. From bases in the United States, these divisions can rapidly reinforce forward-deployed U.S. forces in NATO, the Far East or

regions of the world that lack a developed support infrastructure.

Their rapid deployability will enable them to arrive in a crisis area before a conflict begins. By demonstrating U.S. resolve and capability, they may prevent the outbreak of war. To deter war, light infantry divisions must be able to fight anytime, anywhere and against any opponent.

This mission requires the highest degree of tactical excellence. Light infantry divisions will be offensively oriented units. Using initiative, stealth and surprise, they will be able to seek out and destroy the enemy on his terrain. Attacks by infiltration, air assault, ambush and raid will be the norm. Light infantry divisions will be "terrain-using" forces, expert in camouflage and skilled in countermobility techniques. The division's forte will be operating at night or under conditions of limited visibility. Even on defensive missions in close terrain or built-up areas, light infantry forces will habitually ambush, attack and counter-attack.

Division operations will be characterized by flexibility both in tactical deployment and organization for combat. Light infantry forces will more often operate as combined-arms teams with engineers, artillery, aviation and air defense artillery. When suitably augmented and task organized for the mission, they may operate independently at brigade, battalion and company levels.

In order to meet the conceptual requirements and achieve the desired level of strategic flexibility, some specific design criteria were identified:

- The light infantry division is designed to be employed at the lower end of the the conflict spectrum in a contingency mission and yet be able to operate successfully at higher conflict levels.

- Division strength will be about 10,000.

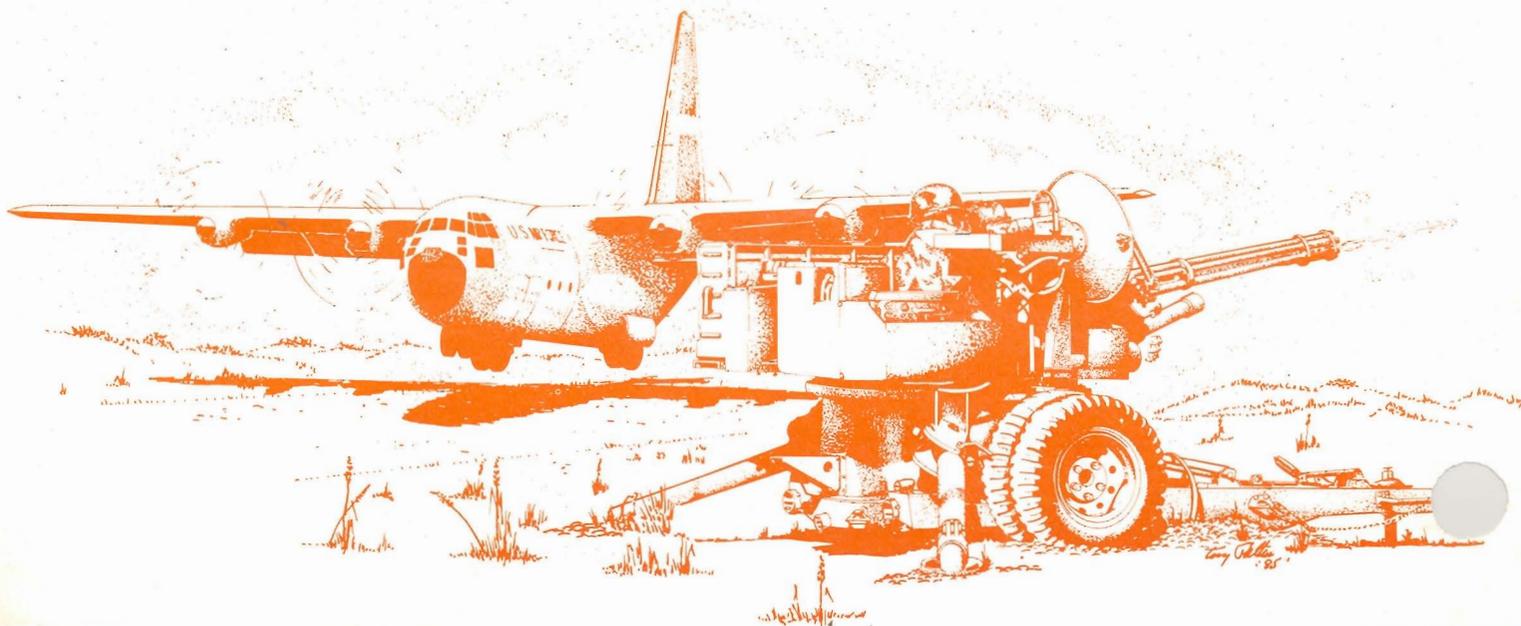
- The division must be deployable in 500, or less, aircraft sorties.

The 7th Infantry Division, Fort Ord, Calif., is the first of four divisions targeted to become light infantry divisions. These units are being formed without an increase in authorized active-Army total strength or an increase in weapon production beyond present schedules.

Nine infantry battalions constitute the nucleus of the light infantry division. Each battalion contains a headquarters and headquarters company (HHC) and three rifle companies. The battalions are light and, basically, foot mobile, each containing only 34 high-mobility, multipurpose wheeled vehicles (HMMWV). All of the HMMWVs

Light Infantry Division

With the right people in the right structure, possessing the right skills and equipment—the light infantry division will leave its boot print wherever the mission takes it



and 15 motorcycles are located in the battalion HHC. Each battalion features a high percentage of dismounted fighting strength, a small deployability profile, commonality in weapon calibers to minimize resupply requirements and a high leader-to-led ratio.

All mess and vehicle maintenance support is provided to the battalions by teams located in the parent-brigade HHC. In addition to the command and control element, the battalion HHC contains a large medical platoon, a communications section and scout, anti-armor and heavy mortar platoons.

The brigade HHCs consolidate maintenance and mess support for their infantry battalions to centrally manage the assets and to avoid placing larger vehicles in the infantry battalion. The mess teams also provide support to other divisional elements in the brigade area. The brigade HHCs contain liaison officers and a property accountability section to manage subordinate's property books.

The division has enough ground and aviation transportation assets to move the assault elements of one infantry battalion by either ground or air transportation. Most of the division's fighters have some form of night vision capability and will be trained for day and night combat operations.

The division's command, control, communications and intelligence (C³I) functions are performed by the division HHC, the three brigade HHCs, the military police company and the signal battalion. The HHCs contain the normal staff and all personnel-management features. The division has no adjutant general company, but the wartime adjutant general functions have been incorporated into a G1/AG section. The division HHC also has an organic military intelligence support element which provides intelligence analysis support.

The military police company is small and provides general support to the division with its three platoons. There are no direct support platoons specifically identified for each maneuver brigade.

The last major organization in the C³I area is the signal battalion. It, too, is small and relies on lightweight equipment. It provides support to the division HHC and subordinate headquarters on an area basis.

The engineer battalion also reflects

the nature of low-intensity conflict support requirements. There are three engineer companies with two platoons per company. One engineer company normally supports each brigade. There is no construction capability within the battalion. The emphasis is on mobility and countermobility operations with a limited capability to assist in survivability-type missions. The battalion has six armored combat earthmovers to provide rapid, heavy earthmoving. They are the only tracked vehicles in the division.

The primary fire support agency in the division, the DIVARTY, contains a headquarters and headquarters battery (HHB) and three field artillery battalions. One battalion is in direct support of each maneuver brigade. The field artillery battalions each contain an HHB and three howitzer batteries with six 105mm howitzers in each battery.

The combat aviation brigade (CAB) consolidates all division aviation under one command. Its primary missions are reconnaissance, battlefield mobility and destruction of enemy forces. The CAB contains an HHC, a reconnaissance squadron, an attack helicopter battalion (AHB) and two combat aviation companies.

The reconnaissance squadron has one ground reconnaissance troop with a mix of HMMWV-mounted TOW and 25mm chain-gun systems, and two air reconnaissance troops, with six scout and four attack helicopters per troop. The squadron also has a military intelligence company, which provides the division's electronic intelligence collection assets. A long-range surveillance

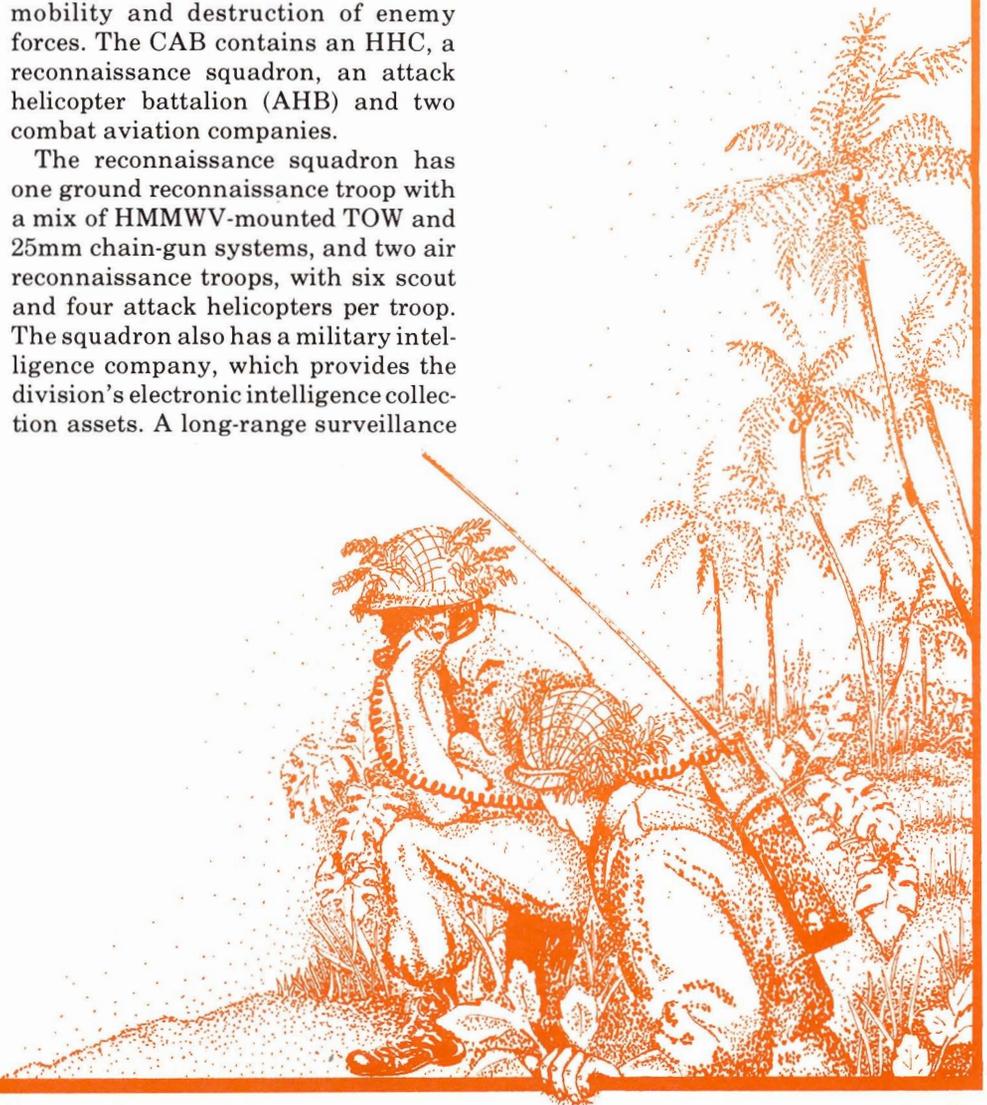
detachment is located in the squadron.

A potent, fast-moving maneuver force is provided by the AHB, which contains an HHC and three attack helicopter companies. Each attack company contains seven attack and four scout helicopters. The AHB constitutes the division's primary anti-armor force.

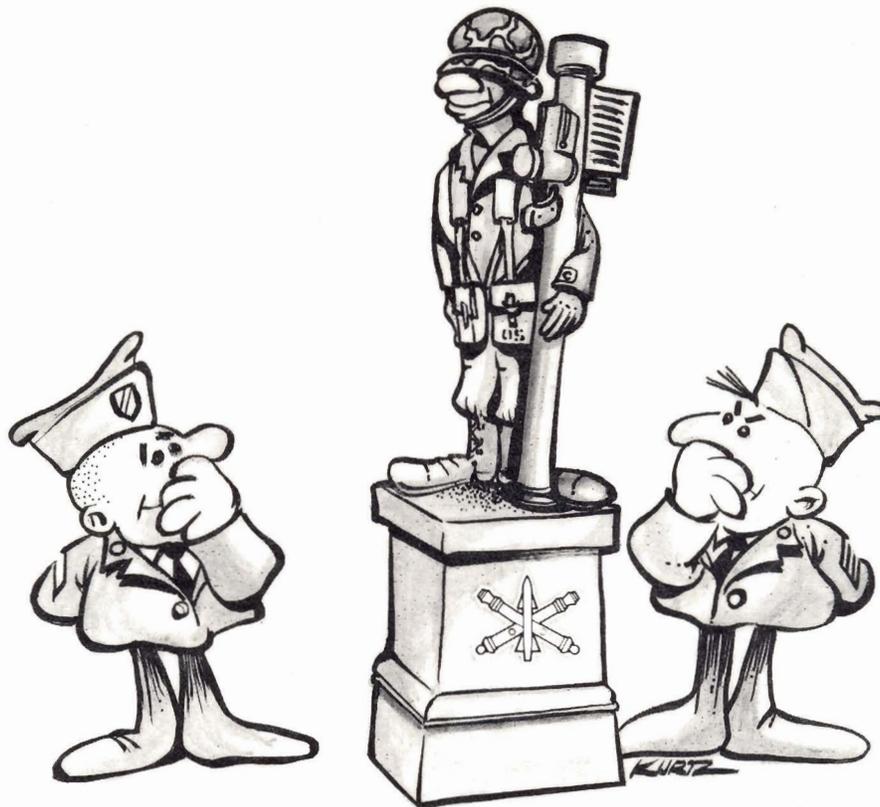
The two combat aviation companies make up the division's airlift assets. Together, they can transport the assault elements of one infantry battalion in one lift.

The air defense artillery function is performed primarily by the air defense artillery battalion, with a gun/Stinger mix. Additionally, there are non-dedicated gunners in non-ADA units in the division.

Many of the concepts of light infantry already are time proven. While change will occur during the evolution of the light infantry concept, it will be managed within the constraints of combat readiness.



THE END OF THE



APPRENTICE SOLDIER

by Col. Robert S. Hardy Jr.

A concept-based training development system promises to produce ADA soldiers ready to pull their weight the day they report to their units

Why do we need a concept about how to develop training?

One of the secrets to success is to have a vision. We can be certain that change will occur. If we do not manage it, it will manage us. If we have a clear concept of what we want the future to be, we can make day-to-day decisions with a consistent purpose. Without such a concept, we can only react to the current situation. Conceptualization must be a continuous process, and its goals must be continuously re-achieved.

As a training developer and as director of the U.S. Army Air Defense Artillery School's Directorate of Training and Doctrine, I am a partner to the combat developer. The combat developer envisages how the Army will fight future battles; I envision how the Army

will train to fight those battles. Without both processes, the end result will be unsatisfactory.

Because of my strong belief in a concept-based system, I have developed a concept for training developers. The concept-based system is not official U.S. Army policy, but it has been implemented at the U.S. Army Air Defense Artillery School, Fort Bliss, Texas, and is gaining support at higher levels. The results will be better-trained soldiers and better-trained units emerging from improved air defense artillery individual and collective training programs.

Here's the concept.

It is well recognized that armies fight as they train. Therefore, it is imperative that training strategies be complete and realistic.

Army doctrine is based upon the principle of performance orientation. Training resources are to be applied only to effect training of skills, knowledge, abilities and attitudes which are valid tasks embedded in required performance. At the same time, training strategies developed must be sufficient to produce units trained in all critical performance tasks.

Training related to any materiel system is an integral part of the total system. The development of the training system must parallel the development of the materiel system in that as the materiel concept is developed, so must the training concept be developed. The two development efforts should be merged throughout the acquisition process so that both the materiel system and the training system reach the soldier in a timely manner.

If training development begins too late, it will be driven by the characteristics of the materiel. Most certainly, the man-machine interfaces will be difficult. This is the situation that Army

training developers, caught far behind the developmental curve, have struggled with throughout the history of warfare. Putting the training developer in front of the developmental curve is an essential part of the concept-based training strategy.

Our training mission is to train units to fight the battle. The ultimate goal is to have an effective force on the ground, hardened by near-combat conditions, the day *before* the war starts.

Training occurs at two locations, the service school and the job site. The school's mission is to provide trained soldiers, training programs, training materials and training products, which commanders in the field must have to attain and maintain the highest standards of combat readiness for their units. The focus of all training efforts is centered on the unit, both active and reserve. Training must be supportive of the units now and in the future and must be realistically based on the amount of resources available. Our policies and programs must also provide for training before and after mobilization.

Individual Training

It is the task of the service schools to produce soldiers prepared to go to war the day after they arrive in their units. We haven't produced that type of soldier in the past; instead we've produced an apprentice soldier. Today, we are committed to producing a much more competent soldier, a soldier ready to pull his weight the day he arrives at his unit.

Conceptually, this means that all survival skills and knowledge must be taught and sustained in the institution during initial-entry training. In addition to all of the survival skills and expertise, a minimum of approximately 80 percent of the soldier's job tasks must be taught in the institution. This means that when a soldier reports to his unit he will have mastered 80 percent of the soldier's job skills and will be 100-percent proficient in survival skills.

The concept-based training system calls also for the creation of a complete, individual training system in-place at the unit. The operational chain of command will apply the individual training system to train and sustain soldiers at mastery level in all individual skills not taught in the institution. Our long-range goal is to teach all individual tasks in the institution. Once individual tasks are taught to mastery at the institution, sustain-

ment of those tasks becomes a unit responsibility.

Collective Training

Unlike individual training, which is a responsibility shared between the institution and the unit, collective training is conducted solely by the unit and is, therefore, the responsibility of the operational chain of command. Collective training will be conducted at every echelon from crew to battalion. Collective training takes place within the unit, but the concept-based training system will supply the training task list and standardized drills that serve as the foundation of collective training.

The task list includes all combat-essential team tasks for each type unit. Evolving from that list is a minimum-essential task list (METL) which includes those tasks deemed essential to the immediate accomplishment of the mission. In some instances, procedures will be performed in a standardized "by the numbers" manner. Procedures that are extremely critical and are employed directly against the enemy are termed drills.

Today, we are committed to producing a much more competent soldier . . .

It is the responsibility of the institution, with field input, to determine the tasks, which of those tasks are to be placed on the METL and which procedures are to become drills. The METL and drills are prescriptive to units and represent the minimum essential collective skills that all deployed or deployable units must be able to demonstrate. The remaining tasks and procedures represent the delta between minimal and fully combat-ready units. Operational commanders may add to METL, but they may not delete. Units will add and/or delete tasks (other than METL) in accordance with their particular circumstances.

Conceptually, the unit commander of a particular echelon to be trained will be given complete prescriptive documentation on *what* to train. He will also be given notional, descriptive documentation containing examples of *how* to train. It is the responsibility of the service schools to develop and provide this original documentation. It is the responsibility of the operational chain of command to adapt the documentation to the particular needs of the command.

Unit commanders at all echelons must be able to conduct collective training against an opposing force that emulates the threat in an operational environment. This includes weather, terrain, combat effects and friendly forces and is applied to both the ground battle and air battle. Unit commanders must also be able to subtract from the training environment. For example, in the full-up environment, a crew would operate in an electronic warfare, nuclear, biological and chemical environment. The capability must exist to train, initially, in a benign environment before progressing toward a complete combat environment.

Training Strategy Development

Achieving and maintaining readiness to fight the air-land battle is a complex enterprise involving increasingly sophisticated systems and rapidly escalating costs. In particular, the cost of buying and maintaining weapon systems has risen so steeply that using them as the training means to achieve and sustain readiness has become prohibitively costly. There are, however, potential solutions to this problem. The very technology that underlies sophisticated systems is also capable of producing, within economic constraints, a supporting architecture for cost-effective training. High-technology training approaches, such as simulation systems, feedback systems and training devices, can provide the means for both improving training and reducing costs. Conceptually, the Army will move from weapons-based training strategies to training-device-based strategies.

Under the concept-based training system, the training challenge for each materiel system is to be viewed as a continuum stretching from initial entry through total collective training. A training strategy is to be developed for each materiel system that overlays the entire continuum. There are to be no gaps and little overlap. No single method, medium or device will effectively and efficiently cover the entire continuum. What should emerge is a mix, or family, of trainers with one element beginning where the preceding element ends and with each element contributing significantly to training to fight the battle.

There exist numerous alternative training strategies to overlay on each training continuum. A studied approach must be taken to determine the optimum strategy for each materiel

system. The purpose of such studies is, first, to define, system by system, the training continuum in terms of tasks to be trained; second, to examine the technology base to discover and compare training alternatives; and, third, to emerge with a recommended plan for training the force. Each study must be a living document. Changes in materiel, organization, doctrine or training technologies require the study to be reviewed.

Training development is to begin concurrently with the combat development process; that is, during concept exploration. It must also be continuous throughout the entire materiel acquisition process. The goal is to field the materiel system and the complete supporting training subsystem simultaneously. While field input is absolutely essential, the primary responsibility for training-strategy development rests with the service schools.

The selection of strategies will be governed by cost and training-effectiveness factors. Solutions requiring large capital outlays that are not offset by savings or materiel cost avoidance in the near term are not to be viewed as viable.

There should be a phased product improvement program approach to training systems. Solutions, where possible, are to be evolutionary in nature rather than revolutionary.

An expansion of the training base is to be avoided. Solutions should work within current space constraints. Course lengths in the institution must remain within current direction. Lengthening courses is not to be viewed as a viable solution.

With this as the concept, four major goals emerge. What follows is an architecture for initiatives to achieve those goals.



■ All individual tasks are taught to mastery in the institution.

In order to accomplish this initiative, several things must happen. First, by making the equipment more reliable and maintainable and by improving man-machine interfaces, the actual number of tasks to be trained can be reduced. Second, by increasing the ability of the soldier to learn, more tasks can be taught in a shorter time. Initiatives into human motivational

learning can prove valuable. Techniques of job classification, i.e., putting the right man into the right job, will help make training occur faster and, therefore, provide an opportunity to train soldiers to perform more tasks. Last, and probably the solution with the potential to yield the greatest effect, is to obtain means to teach tasks to mastery faster and more efficiently. Initiatives in the areas of computer-based instruction, artificial intelligence, simulation and devices are to be pursued.



■ All individual tasks are to be sustained at the mastery level in the unit.

Three elements must come together in order to achieve this goal. First, the trainer must be able to perform the tasks to mastery and must be able to train others to perform the tasks. Second, the trainer and trainees must have the time available to sustain the tasks. Third, the equipment for training must be available. Once achieved, this goal will sustain itself. The problem is one of overcoming the initial situation. Initiatives to upgrade institutional professional courses, such as Officer Basic Course, Officer Advanced Course, Basic NCO Course and Advanced NCO Course, with hard-skill performance orientation will assist this effort. Techniques to help the trainer with extension training from the service school, using computer-assisted instruction, will increase available time and should be pursued. The extension training from the institution should be stand-alone, in terms of equipment, as much as possible. Cognitive skills can be sustained using teaching machines. Manual skills can be sustained using part-tasks trainers. Simulators can train teams and units in complete tasks, leaving practical equipment for force-on-force training.

■ All collective tasks are trained and sustained in the unit.



Commanders must, at a minimum, be system-proficient at their level. Training to accomplish this should occur at the institution and should be geared to complement the commander's field experience. Training management is complicated and needs to be automated. Standardized systems and computer models should be developed by the institution, then tailored by the commander according to his needs. From the battalion level up, automated systems should be developed for training management. Documentation, developed within the institution, should be present at each level of command where collective training takes place to show the commander a complete non-prescriptive road map to training readiness. Ultimately, we should have an automated, combined-arms, Army training and evaluation program in each unit.

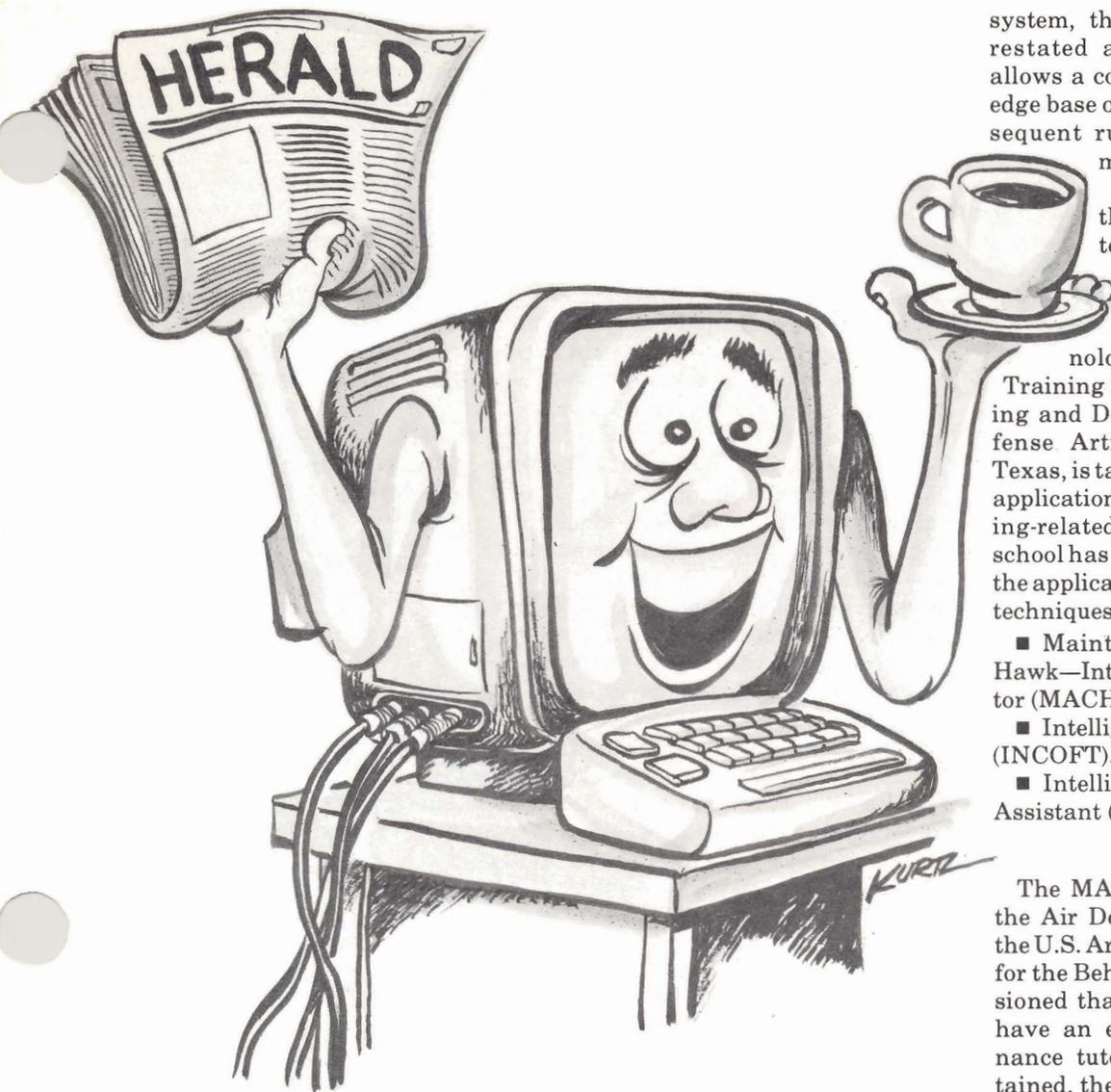


■ The collective training environment emulates the conditions of combat.

The key to movement toward this goal is battle simulation. Command post exercises, field-training exercises, live-fire exercises, air-battle exercises and situational-training exercises are invaluable collective training tools but are incomplete and expensive. These exercises should be augmented with battle-simulation techniques to increase realism and produce units with not only skills, knowledge and abilities but something akin to combat experience.

This, then, is the Air Defense Artillery's new training concept. It is not Army policy but has been successful in shaping numerous local decisions. Often, there are many training alternatives, but only one alternative that fits the concept. As stated in the first paragraph, without a vision change manages you. With this concept, our initiatives into training development begin to have focus.

Col. Robert S. Hardy Jr. is director of the Directorate of Training and Doctrine, U.S. Army Air Defense Artillery School, Fort Bliss, Texas. A 1983 graduate of the Army War College, he is a former commander of the 2nd Battalion, 2nd Air Defense Artillery (Hawk), 32nd Army Air Defense Command.



ARTIFICIAL INTELLIGENCE

Computerized trainers with high IQs may provide a solution to Air Defense Artillery's complex training problems

by Rex Jenkins

The U.S. Army Institute of Personnel and Resource Management's Reference Book 18-155 provides the following definitions of artificial intelligence:

— that field of computer science which deals with the automation of human skills.

— the study of ideas that enable computers to be intelligent.

— the ability of a machine to do things that would be described as "intelligent" if done by a human.

— machine emulation of human thinking and acting skills.

When applied to a computer-based

system, the four definitions can be restated as: artificial intelligence allows a computer to search a knowledge base of expert rules and infer subsequent rules. In other words, the machine becomes "smarter."

Artificial intelligence is at the cutting edge of computer technology, and it has tremendous, but largely unexplored, military applications. The Applied Technology Branch, New Systems Training Office, Directorate of Training and Doctrine, U.S. Army Air Defense Artillery School, Fort Bliss, Texas, is tasked with investigating the application of technology to solve training-related problems. Currently, the school has three projects which involve the application of artificial-intelligence techniques. They are the:

- Maintenance Aid Computer for Hawk—Intelligent Institutional Instructor (MACH-III).
- Intelligent Conduct of Fire Trainer (INCOFT).
- Intelligent Embedded Operator's Assistant (IEOA).

MACH-III

The MACH-III is a joint project of the Air Defense Artillery School and the U.S. Army Research Institute (ARI) for the Behavioral Sciences. It is envisioned that each Hawk end item will have an embedded "smart" maintenance tutor. As each item is maintained, the tutor will develop a unique profile reflective of the characteristics of that particular item. Ultimately, the tutor will provide, based on end-item characteristics and previous historical fault analysis, the recommended corrective actions for maintenance malfunction symptoms.

The system will use videodisc visuals, high-resolution computer graphics, simulations and gaming theory applications to an intelligent database. The MACH-III will teach soldiers electronic maintenance concepts by using an articulate expert system to demonstrate system performance. The system will guide them through problem-solving and troubleshooting steps and critique them, as an expert instructor would, in real time. It will incorporate applicable levels of voice synthesis and recognition with expert systems designed for both tutorial and on-line assessment of MOS skills and general maintenance techniques.

INCOFT

The INCOFT is a joint project involving the school, ARI and the Naval

Training Equipment Center. A three-year advanced developmental effort by the Navy resulted in a real-time, computer-based system for training radar intercept operators (TRIO). To capitalize on this research, ARI is attempting to apply artificial-intelligence techniques and tools developed for TRIO to INCOFT development.

The INCOFT will be a stand-alone, tabletop generic weapon system console operations trainer. It will incorporate an advanced training system interacting with the console operator to generate training situations which reflect the need for particular skills. Through the analysis of operator actions and reactions, the system will identify operator shortfalls and generate scripts which amplify errors while providing remediation and immediate positive feedback.

The artificial-intelligence techniques embedded in the INCOFT will provide a capability that does not exist in current conduct-of-fire trainers and will help operators develop the expert skills they need to efficiently operate today's complex weaponry. The existing artificial-intelligence capable software and hardware developed for TRIO, for example, can be exploited and modified to add artificial-intelligence techniques to the existing trainer for the Patriot missile system. Reductions in the amount of time and resources needed to field expert air defense artillery system operators are forecast as a result of the more effective and efficient training INCOFT will provide.

IEOA

The increased complexity of operating air defense weapon systems in a modern air battlefield environment has resulted in expanded use of technology for countering the threat. This has caused a significant increase in workloads for all levels of operations associated with the systems. The increased pressure to reduce manpower levels has further increased task loads at the organization level. Organizational workloads have been increased by the expanded amount of information available and the number of decisions required of the tactical control officer and radar, communications and maintenance operators. The resulting requirement for increased levels of performance has significantly increased the training requirements necessary to maintain minimum proficiency levels for mission accomplishment.

The IEOA is a joint project of the school and the U.S. Army Missile Command to apply artificial-intelligence methods and techniques to organizational level air defense missile system operations. It is similar to the INCOFT project in that it addresses operator functions, but, whereas the INCOFT is designed as a stand-alone operator trainer, the IEOA is designed to assist the operator in the tactical decision-making process. It will be embedded in the operator tactical console and will reduce the operator task load through the application of artificial-intelligence techniques.

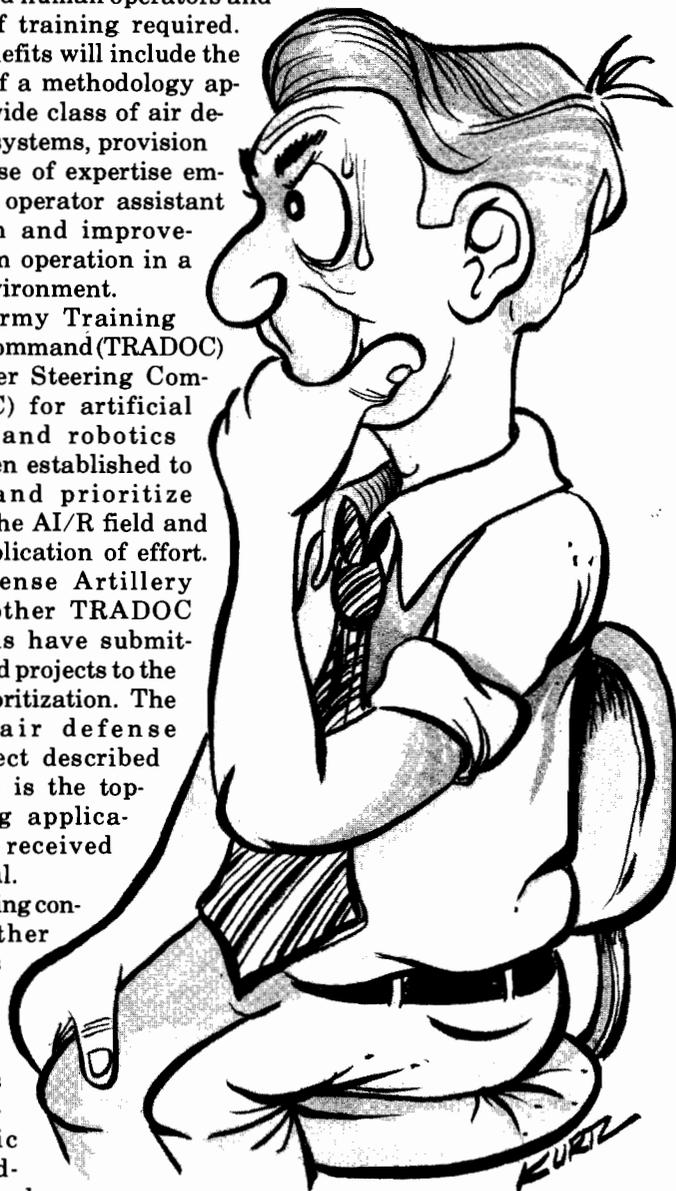
The IEOA project will use the Hawk Phase III configuration, hardware and related training devices as a testbed for concept development and demonstration. The thrust of the project is to develop and demonstrate an expert system performing as an operator assistant. This will reduce the workloads of selected human operators and the amount of training required. Additional benefits will include the development of a methodology applicable to a wide class of air defense weapon systems, provision of a stable base of expertise embedded in the operator assistant expert system and improvement of system operation in a high-stress environment.

The U.S. Army Training and Doctrine Command (TRADOC) General Officer Steering Committee (GOSC) for artificial intelligence and robotics (AI/R) has been established to coordinate and prioritize initiatives in the AI/R field and to prevent duplication of effort. The Air Defense Artillery School and other TRADOC service schools have submitted their desired projects to the GOSC for prioritization. The MACH-III air defense artillery project described in this article is the top-rated training application to have received GOSC approval.

Initiatives being considered by other combat arms include autonomous land vehicles, robotic materials handling equipment, robotic explosive ordnance disposal

equipment, robotic mortars and security sensors. These efforts, like the projects undertaken by the Air Defense Artillery School, are designed to investigate ways to reduce system operation and maintenance tasks while protecting the soldier from unreasonable exposure to hazardous environments. Artificial-intelligence techniques offer the promise of simplifying the soldier's job and reducing training cost while, at the same time, fielding the highly trained soldier necessary to accomplish the mission.

Rex Jenkins is a training specialist with the Applied Technology Branch, New Systems Training Office, Directorate of Training and Doctrine, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.



Doctrinal Literature Program Reshaped

New procedures for publishing field circulars speed interim or emerging doctrine to the field

by Brian R. Kilgallen

The U.S. Army Air Defense Artillery School, like other TRADOC service schools, is reshaping the way it produces doctrinal literature. These changes fall into two highly significant areas. First, the school will be disseminating field manual and training circular (crew drills) coordinating drafts field circulars. The other major development marks the transition from weapon-specific, employment-type field manuals to those that are echelon oriented. Both of these changes in policy to the Army Doctrinal Literature Program will have a profound impact on the intended audience.

The concept of producing field circulars is relatively new to the Army. Introduced in October 1983, field circulars originally were intended to replace special texts, reference books and field manuals (test editions only), and to selectively export school instructional material. Today, however, field circulars have become an expeditious way to get interim or emerging doctrine to the field. A logical next step is to use the field circular as a medium to disseminate field manual coordinating drafts of new or revised publications.

The Command and General Staff College, Fort Leavenworth, Kan., was among the first to produce a coordinating draft in a field circular format when it published FC 100-15, Corps Operations. Shortly after, the service

FIELD MANUALS

NUMBER	TITLE	STATUS
FM 44-1, Revision	Air Defense Artillery Employment	Est. DA Pinpoint Distribution Jun 86
FM 44-1A, Change 1	[SNF] Air Defense Artillery Operational Planning Data [U]	Est. DA Pinpoint Distribution Jun-Jul 86
FM 44-2, Revision	Air Defense Artillery Employment, M42 Duster	Est. DA Pinpoint Distribution Jan-Feb 87
FM 44-3, Change 1	Air Defense Artillery Employment, Chaparral/Vulcan/Stinger	Est. DA Pinpoint Distribution Jun-Jul 86
FM 44-4, Revision	Operations and Training, Chaparral	Est. DA Pinpoint Distribution Sep-Oct 88
FM 44-5, Revision	Operations and Training, Vulcan	Est. DA Pinpoint Distribution Mar-Apr 87
FM 44-6, Revision	Operations and Training, Forward Area Alerting Radar (FAAR)	Est. DA Pinpoint Distribution Jan-Feb 88
FM 44-8, Revision	Small Unit Self-Defense Against Air Attack	Est. DA Pinpoint Distribution Sep-Oct 87
FM 44-10, Change 1	Air Defense Artillery Employment, US Roland	Est. DA Pinpoint Distribution Jan-Feb 87
FM 44-15, Change 2	Patriot Battalion Operations	Est. DA Pinpoint Distribution Mar-Apr 86
FM 44-15-1, Change 1	Operations and Training, Patriot	Est. DA Pinpoint Distribution Jun-Jul 86
FM 44-16, New	SHORAD Platoon Combat Operations	Est. DA Pinpoint Distribution Jan-Feb 87
FM 44-18, Revision	Air Defense Artillery Employment, MANPAD Systems	Est. DA Pinpoint Distribution Jun-Jul 87
FM 44-25, New	Corps ADA Brigade Operations	Est. DA Pinpoint Distribution Sep-Oct 87
FM 44-30, Revision	Aircraft Recognition Training for Ground Observers	Est. DA Pinpoint Distribution Jan-Feb 87
FM 44-32, New	Army Air Defense Command Operations	Est. DA Pinpoint Distribution Oct-Nov 86
FM 44-61, Revision	Procedures and Drills for Twin 40-mm Self-Propelled Gun M42 and M42A1	Est. DA Pinpoint Distribution Jan-Feb 88
FM 44-62, Revision	Air Defense Artillery Automatic Weapon Gunnery	Est. DA Pinpoint Distribution Jan-Feb 88
FM 44-70, Change 1	Air Defense Artillery Command and Control System AN/TSQ-73 Missile Minder	Est. DA Pinpoint Distribution Jan-Feb 86
FM 44-90, Change 4	Air Defense Artillery Employment, Hawk	Est. DA Pinpoint Distribution Sep-Oct 86
FM 44-90-1, Revision	Hawk Firing Platoon Operations	Est. DA Pinpoint Distribution Jun-Jul 87

schools followed suit in accordance with specific, refined guidance from the TRADOC deputy chief of staff for doctrine.

There are some major differences between field circulars and field manuals of which users should be aware. It is important to note, for instance, that service schools publish and distribute field circulars on a highly selective, one-time Armywide basis. Because they are printed and disseminated by local means, they are not available through Department of Army channels or the U.S. Army Adjutant General Publications Center in Baltimore, Md.

Currently, all field circulars expire three years after the printing date that appears on the front cover or when

they are rescinded, whichever comes first. They are not intended as substitutes for doctrinal field manuals or training circulars, but rather will serve as interim guidance until the DA field manuals are published and distributed.

The most obvious advantage, then, of publishing coordinating drafts as field circulars is that users can implement the material immediately since it is school-approved, interim or emerging doctrine.

All field circulars produced by the U.S. Army Air Defense Artillery School will have green covers with the school logo in the center. With few exceptions, those used as coordinating drafts will carry the same numbers as the field manuals or training circulars they will

eventually become. For instance, the coordinating draft for FM 44-3, Air Defense Artillery Employment Chaparral/Vulcan/Stinger, will be 44-3.

In addition to producing field circulars, the school is gradually making the transition from weapon-specific, employment-type field manuals to manuals that are echelon based. The move in that direction will bring Air Defense Artillery into line with other combat arms that are also producing manuals in this format. For air defenders, it means that they will have field manuals tailored to their particular kinds of units. Eventually, the school plans to have employment manuals for each echelon, from platoon through Army air defense command. However, non-employment-type field manuals will retain the weapon-specific characteristic.

Echelon-oriented manuals already programmed include FM 44-16, SHORAD Platoon Combat Operations; FM 44-25, Corps ADA Brigade Operations; and FM 44-32, Army Air Defense Command Operations.

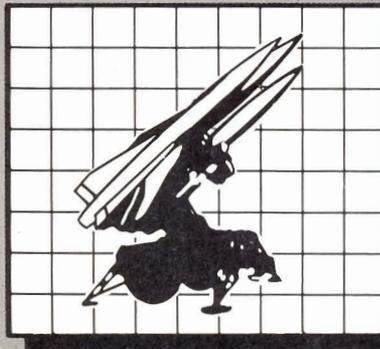
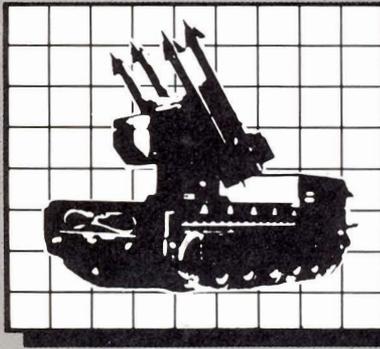
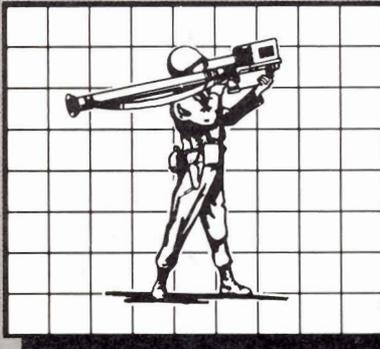
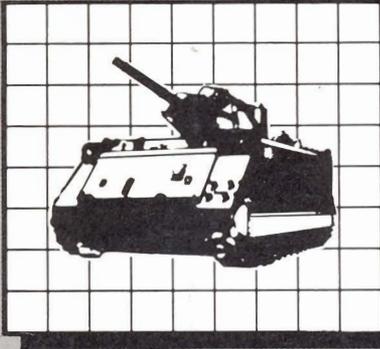
The U.S. Army Air Defense Artillery School cannot place enough emphasis on the importance of inputs from field in the development of its doctrinal literature. Comments, questions or recommendations on field manuals or field circulars should be sent on DA Form 2028 to Commandant, U.S. Army Air Defense Artillery School, ATTN: ATSA-DTM-MB, Fort Bliss, TX 79916-7090.

Brian R. Kilgallen is the doctrinal literature program manager for the Tactics Department, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

FIELD CIRCULARS

NUMBER	TITLE	STATUS
FC 44-1	Air Defense Artillery Employment	Est. Distribution Oct 87
FC 44-1A	(SNF) Air Defense Artillery Operational Planning Data (U)	Est. Distribution Oct 86
FC 44-2	Air Defense Artillery Employment, M42 Duster	Est. Distribution Jan 86
FC 44-3	Air Defense Artillery Employment, Chaparral/Vulcan/Stinger	Est. Distribution Oct 85
FC 44-4	Operations and Training, Chaparral	Est. Distribution Oct 87
FC 44-5	Operations and Training, Vulcan	Est. Distribution Apr 86
FC 44-6	Operations and Training, Forward Area Alerting Radar (FAAR)	Est. Distribution Jan 87
FC 44-8	Small Unit Self-Defense Against Air Attack	Est. Distribution Oct 86
FC 44-10	Air Defense Artillery Employment, US Roland	Est. Distribution Apr 86
FC 44-15	Patriot Battalion Operations	Est. Distribution Jul 86
FC 44-15-1	Operations and Training, Patriot	Distributed Oct 85
FC 44-16	SHORAD Platoon Combat Operations	Est. Distribution Apr 86
FC 44-17	Moving Target Simulator (MTS) Trainer's Guide	Distributed Dec 84
FC 44-18	Air Defense Artillery Employment, MANPAD Systems	Est. Distribution Jul 86
FC 44-18-1	Stinger Team Operations	Distributed Oct 85
FC 44-25	Corps ADA Brigade Operations	Est. Distribution Oct 86
FC 44-30	Aircraft Recognition Training for Ground Observers	Est. Distribution Jan 86
FC 44-32	Army Air Defense Command Operations	Distributed Mar 86
FC 44-61	Procedures and Drills for Twin 40-mm Self-Propelled Gun M42 and M42A1	Est. Distribution Jan 87
FC 44-62	Air Defense Artillery Automatic Weapon Gunnery	Est. Distribution Jan 87
FC 44-70	Air Defense Artillery Command and Control System AN/TSQ-73 Missile Minder	Est. Distribution Jul 85
FC 44-90	Air Defense Artillery Employment, Hawk	Est. Distribution Jan 86
FC 44-90-1	Hawk Firing Platoon Operations	Est. Distribution Jul 86

*Produced and distributed by the U.S. Army Air Defense Artillery School on a highly selective, one-time, Armywide basis. All field circulars expire three years after the printing date or until they are rescinded, whichever comes first. Publication dates are subject to change.



SHORAD Early Warning

An air defense battalion tries a doctrinal departure

by James L. Delary

The numerous and complex control measures, corridors, flight levels and zones used in applied airspace management and early warning at the short-range air defense (SHORAD) battalion level are difficult to coordinate and translate into the meaningful, simple instructions needed by squad leaders. This is not a new problem. However, it seems to have been aggravated by the onslaught of data processors, CRT displays and airspace management software in high-to medium-altitude air defense (HIMAD) systems.

HIMAD systems have no problem with this "electronic" approach to airspace management since radars, data links and identification, friend or foe (IFF) devices are commonly used. SHORAD battalions, without the benefit of electronic devices, are now capitalizing on these HIMAD resources to learn more about the air battle through the Hawk ADA liaison team.

The liaison team, armed with an AM radio and a multi-service communications systems grid overlay, gathers data from the nearest Hawk battery control center and relays early warning information to the SHORAD battalion command post.

The liaison team concept is sound and workable. But its success depends on the communications link between the liaison team and the SHORAD command post. One way to increase the link's reliability is to depart from liaison team doctrine, bringing Hawk to SHORAD by attaching the Hawk platoon command post to the SHORAD battalion. The 1st Battalion, 55th Air Defense Artillery (C/V), tried this arrangement during Reforger '84.

By bringing in the platoon command

post, the SHORAD battalion is better able to "tap into" HIMAD. In addition to its AM, secured FM and UHF capabilities, the platoon command post can show the SHORAD air picture, complete with tentative identification and threat sorting, to the SHORAD battalion; provide the latest air control order information; and be a command and control tool for the division air defense officer.

The 1/55 ADA was deployed with its parent unit, the 5th Infantry Division (Mech) from Fort Polk, La., to the Federal Republic of Germany to "lock horns" with the 3rd Armored Division in field training exercise Certain Fury. The 3rd Battalion, 7th ADA (Hawk), stationed in Schweinfurt and already a Reforger player unit, supported the arrangement from the beginning by detaching the platoon command post of the 1st Platoon, A Battery, to 1/55 ADA soon after the SHORAD battalion's arrival. Although the concept is not new (6th Battalion, 52nd Air Defense Artillery (Hawk) introduced it to the 3rd Infantry Division in 1982), it was the first time the arrangement had been attempted by the 1/55 ADA.

Reforger is a particularly good training vehicle for integration of air defense assets in the division area of operations. Reforger '84 saw 1/55 ADA; 3/7 ADA; and A Battery, 2nd Battalion, 59th ADA (C/V), working together to provide integrated ADA coverage to the 51st Division area of operations. The integration effort was enhanced by attaching the platoon command post, with its communications access to the HIMAD area, to the SHORAD battalion.

The coordinated effort to employ the platoon command post began during a

July 1984 terrain reconnaissance conducted by the division's unit commanders and S-3s. During that time, 1/55 ADA and 3/7 ADA met to review the operations concept, tentative unit locations, ADA coverage umbrellas and critical phases of the exercise to establish some basic ground rules.

The two units next met shortly after 1/55 ADA's arrival in West Germany during the tactical assembly area phase of the exercise, when a full-up ADA coordination session was conducted. The ADA operations concept, integration of the ADA units, potential movements and airspace management of the division area of operation were discussed. Although progress was made and the concept of the division air defense officer reinforced, it was apparent later that the coordination could have been much more detailed.

The platoon itself consisted of an M-109, 2½-ton truck manual control van; the M-880, 1¼-ton, truck-mounted TRC-145 UHF rig; the platoon command post trailer; a 60-kilowatt trailer-mounted generator; and one ¼-ton vehicle. With its UHF receiver tuned to the Hawk battalion fire direction center, the platoon command post was able to tap and display air picture data from the AN/TSQ-73 radar. The platoon command post scope used the division's multiservice communications systems grid overlay. The platoon command post operator simply keyed his FM radio and gave the early warning broadcast over the division net, eliminating the sometimes unreliable link between the Hawk liaison team and the SHORAD battalion S-2. Reducing the number of communications nodes significantly reduced the time needed to send early warning.

Ideally, the platoon command post should be collocated with the SHORAD battalion command post. However, if the platoon command post cannot obtain line-of-sight UHF communications with the Hawk battalion fire direction center, it will be unable to receive the air picture data off the fire direction center radar and, therefore, unable to provide early warning information. In a number of cases this is what happened to 1/55 ADA and the platoon command post during the exercise. During the July 1984 reconnaissance, the locations selected did not afford line-of-sight back to the fire direction center. As a result, the platoon command post displaced some 10 to 15 kilometers in order to find suitable terrain, re-emphasizing the need for extensive terrain and communica-

tions analysis and precoordination.

Although a displaced platoon command post was awkward, it did not prevent the early warning net's operation. The platoon command post merely transmitted directly onto the early warning net. In this way, the division was serviced with timely information, and the intermediate step at the 1/55 ADA command post was eliminated.

There was, as expected, some entry-level training needed for the Hawk platoon command post operators, who normally do not use the SHORAD multiservice communications systems track reporting procedures. The platoon command post uses only secure communications, and there was some difficulty in using the non-secured FM with the 1/55 ADA tactical operations center.

The array of communications gear in the platoon command post proved exceptionally helpful, though, and the problem was quickly overcome. The AN/GRC-106 radio was used in several critical applications. When the platoon command post was displaced, it became the backup communications link between the platoon command post and the 1/55 tactical operations center. The radio in the platoon command post also freed the SHORAD Hawk liaison officer and his radio for other missions. In this case, the Hawk liaison team, with some supplementation, became the 1/55 ADA jump/forward tactical operations center.

Since the 1/55 ADA's modified table of organization and equipment is not specifically configured to allow a jump/forward tactical operations center, the additional assets found in the Hawk liaison team were invaluable in operating two tactical operations centers. Further, use of the liaison team radio, with its long-range capability, virtually assured communications among the 1/55 ADA command post, the platoon command post and the jump/forward tactical operations center despite the great distance involved.

The platoon command post considerably enhanced SHORAD awareness of the overall air picture. Its ready-link back to the control and reporting center ensured the timely receipt of airspace management information. Normally, SHORAD battalions receive such information only from the division airspace management element (DAME) at division headquarters, which previously received the information from the corps airspace management element in the form of an air con-

trol order. With the help of the platoon command post, 1/55 ADA was able to establish two parallel, independent channels for receiving the air control order, thereby ensuring the timely application of low-level transit routing, transit corridors and restricted operations areas.

Having overcome the air control order problem at the battalion tactical operations center, the information must be sent to the user, the Chaparral/Vulcan squad. The problem was one of data reduction because the 1/55 ADA has no secured radios below battalion level. The 1/55 ADA approached the problem by recognizing that the squad leaders needed only "YES/NO" guidance on who to shoot and when, rather than involved, complex instructions. From the DAME down, each level of command stripped off data which could not be used by the next lower level. In this case, the DAME stripped the air control order of its HIMAD and Air Force-relevant data; the battalion tactical operations center stripped the air control order of its title, out-of-sector areas/corridors and combined terms of similar measures; and so on through the battery and platoon intermediate headquarters. Combined with the preplacement of airspace overlay and education of the user, the system came quite close to achieving its goal of providing "YES/NO" firing guidance to the SHORAD squad leader.

The 1/55 ADA ultimately met the objective of deriving timely and useful early warning and identification data from applied airspace management. Despite some problems, air defense of the 5th Infantry Division was improved significantly, and much was learned by air defense artillerymen at all levels in all units. Attachment of the Hawk platoon command post, air control order data reduction, early coordination among air defense units and determination to make airspace management work were the key ingredients. All SHORAD units should consider using these or similar techniques in applying airspace management in tactical operations.

Maj. James L. Delary has had numerous staff and command assignments within SHORAD battalions and is currently S-3 of the 1st Battalion, 55th ADA, Fort Polk, La. He is a 1971 graduate of Worcester Polytechnic Inst., Worcester, Mass., where he majored in engineering. He also holds a master's degree in engineering from the University of Texas at El Paso.

Scanning

Sparrow Hawk Hybrid Works



(Photos courtesy of Raytheon Co.)



In January 1985, the Sparrow Hawk experimental missile system, which mates Navy Sparrow missiles to an Army Hawk launcher and radar guidance system, was fired for the first time. Two firings of the hybrid weapon were successful, according to Army officials.

The tests were conducted at the Navy's China Lake, Calif., desert missile range before an audience of Army and Marine officials. Now, engineers of the Army Missile Laboratory, Missile Command, Redstone Arsenal, Ala., are studying videotapes of the firings and are liking more and more what they see.

The first shot, Jan. 18, was guided to a hit on the wing tank of a QF86 drone aircraft using Hawk's traditional "pencil-beam" target illumination radar. A second shot, Jan. 22, used new "floodlight" target illumination which gave the Sparrow Hawk and Hawk-alone systems the important new capability to engage aircraft simultaneously rather than singly. This time the Sparrow slammed into the aircraft almost head-on. This new "floodlight" target illumination principle is called LASHE (low-altitude simultaneous Hawk engagement).

Engineers envision a deployment concept that entails equipping assault fire platoons with both

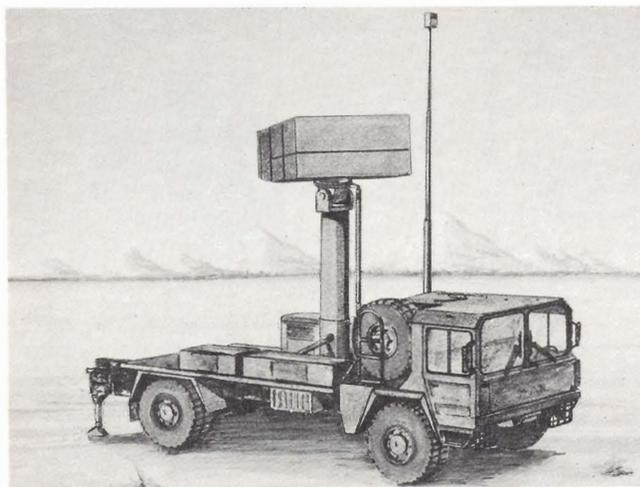
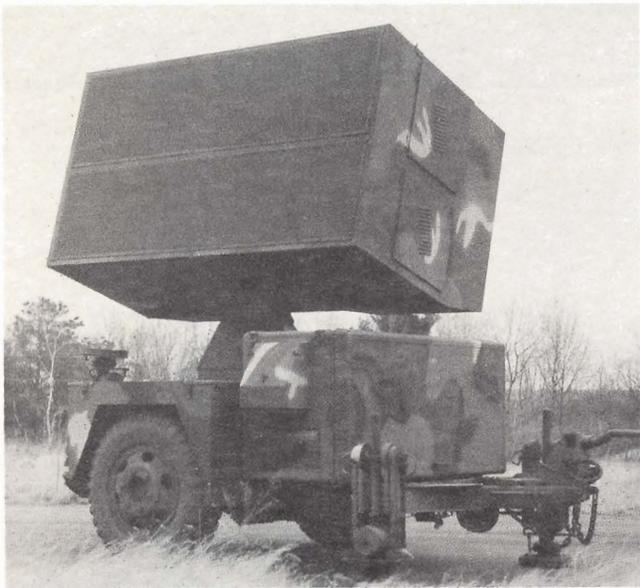
Sparrow Hawk and standard Hawk launchers. This would substantially increase the platoon's air defense firepower while leaving the larger Hawk missiles to handle targets beyond the Sparrow's capabilities.

The engineers will not discuss the missiles' performance characteristics, but say each has attributes the other does not, and that they complement each other when fielded together.

Sparrow Hawk is a product of the "technology demonstration" concept being pursued at the Army Missile Laboratory. Under this concept, missile engineers are trying to come up with new weapons to meet evolving threats without embarking on long, costly research and development programs. Instead, they are creating weapons in less time and at lower cost by "focusing" on existing technology and hardware. (*The Redstone Rocket*)

New Radar for Hawk Coming

Raytheon Missile Systems Division is developing the Agile Continuous Wave Acquisition Radar (ACWAR) for service in the 1990s and into the next century with current Hawk air defense missile systems. The new radar, intended to perform full 3-D target acquisition over a full 360-degree azimuth sector and large elevation angles, will



replace three existing radars in the Hawk system.

The ACWAR program was initiated to meet the increasingly severe tactical air defense requirements. An evolution of the current continuous wave acquisition radar, ACWAR combines an all solid-state exciter-transmitter, digital signal processing, digital radar control and data processing, with other high-tech features. The system can be mounted on existing Hawk trailers or mounted together with other fire-control equipment on a self-propelled vehicle.

New Office Oversees Air Defense Projects

A program manager office has been established by the U.S. Army Missile Command to oversee the air defense missile programs.

The new Air Defense Program Manager Office has assumed operational control of the Patriot, Hawk, Stinger, Roland and Chaparral missile projects, and of the Air Defense Command and

Control System. Also included is the provisional Joint Anti-tactical Missile Project.

Having the six air defense missile systems plus the anti-tactical missile program under one "super manager" will, according to reorganization documents, "provide the needed flexibility to assign personnel from one system to another . . . as systems move from development to production."

The reorganization also is expected to enhance management in "interoperability" which deals with making the most effective use of the air defense systems by ensuring that they communicate with and complement each other on the battlefield.

A Case of the Missing Form

Appendix B of STP 44-16S1-SM, MANPAD Crew Member, dated June 1985, makes mention of DA Form 5164-R, Hands-on Evaluation. Figures B-1 and B-2, which were to show the form, were inadvertently left out. However, the form is not required for use by the skill level 1 soldier.

Supervisors and other personnel who need a sample of the form may find it in Appendix D of STP 44-16S24-SM-TG.

Air Force Stingers on Duty

The Air Force has completed equipping two air bases in South Korea with Stinger missile systems as part of a plan to protect its Far Eastern installations.

The weapons, now in place at Osan and Kunsan, provide the Air Force with its first portable surface-to-air defense capability. The Stingers are operated by newly trained security police who are responsible for close-in air defense.

At one time, the Air Force planned a separate corps of air base defense specialists, equipped with tracked vehicles, guns and missiles, who could operate well outside the base perimeter. Instead, Army Chief of Staff Gen. John A. Wickham Jr., and Air Force Chief of Staff Gen. Charles A. Gabriel drew up a memorandum of agreement in May 1984 that limits the Air Force air defense effort to the confines of an air base. The Army continues to be responsible for the outside of Air Force installations.

Following the memorandum signing, the Air Force received \$12.9 million in FY 85 for 156 Stinger-POSTs. Osan and Kunsan now have 30 missiles apiece, with the remaining 96 to be delivered next year.

The Air Force has been receiving seven trained Stinger gunners per month from the U.S. Army Air Defense Artillery School, Fort Bliss, Texas, for its air base security force.

Career

Revised Promotion Worksheet Now Used

A revised promotion point worksheet (DA Form 3355) is now used for soldiers being recommended to E-5 and E-6 and those already on the E-5 and E-6 promotion lists.

The revised form emphasizes physical fitness, self-discipline, professional competence and a commitment to self-improvement and achievement. The form awards more points for the commander's evaluation, SQT scores and military education. Points are also being awarded in two new areas: weapon qualification and physical readiness test scores. They are no longer awarded for time-in-service, time-in-grade and high school completion.

Promotion points will now be recomputed annually instead of semi-annually, Military Personnel Center officials said. Points were computed in May and June 1985. The next recomputations will be in February 1986 for soldiers on an E-5 promotion list and May 1986 for those on an E-6 list. From 1986 on, points will be recomputed every February and May.

Soldiers will still be able to reappear before a promotion board earlier than the scheduled recomputation to add points for recent achievements. (MILPERCEN)

Board Selects 313 Lieutenants for CVI

A selection board has approved 313 out of 410 lieutenants' applications for Conditional Voluntary Indefinite (CVI) status. The board also approved the transfer of 20 of these lieutenants from overstrength to understrength branches.

The board, the first to meet under a new, centralized system, will convene each quarter at the Military Personnel Center to review the files of lieutenants with two and one-half years of service. The board determines which of these lieutenants will remain on active duty and which will be reassigned to the Reserve components when their active-duty obligations have been completed.

The board also determines which officers must be transferred from overstrength to understrength branches. Branch transfers will take effect when an officer is promoted to captain.

Under the new system, officers will apply for Voluntary Indefinite (VI) status after they have completed seven years of service. A board will again review their files to determine whether they should be retained, transferred to an understrength branch, or released from active duty.

Officers whose VI applications are approved are retained on active duty until they are integrated into the Regular Army on promotion to major. If their applications for VI are disapproved, they are released from active duty when their service obligation has been completed.

In the past, lieutenants were brought on active duty to meet captain requirements. Since there are more requirements for captains in the combat support and combat service support branches, this created a shortage of lieutenants in the combat arms branches.

Officers are now brought on active duty to meet requirements for lieutenants. This policy requires some realignment of the officer corps at the third year of service to meet branch requirements for captains. This realignment is done by transferring officers from the overstrength combat arms branches to the understrength combat support and combat service support branches. (MILPERCEN)

Aviation Technical Inspectors Needed

The Enlisted Aviation Branch needs soldiers with an MOS in the 67 series (aircraft maintenance) and MOS 68J (aircraft fire control repairer) to apply for the Aviation Technical Inspector Course at Fort Eustis, Va.

Applicants must:

- be in pay grade E-5 (applicants for the 66J course must be E-6 or promotable E-5).
- be eligible for re-enlistment.
- meet the prerequisites for an MOS in the 66 series, as outlined in AR 611-201 "Enlisted Career Management Fields and Military Occupational Specialties."

Graduates of the course will be awarded a new MOS in the 66 series and must fulfill one of the service obligations listed in AR 614-200, "Selection of Enlisted Soldiers for Training and Assignment."

Soldiers should send applications through their unit commander and Military Personnel Office to: Commander, MILPERCEN, ATTN: DAPC-EPT-F, 2461 Eisenhower Avenue, Alexandria, VA 22332-0400. DA Form 4187 (Personnel Actions Request) should be used for applications.

Training is funded by the Military Personnel Center. Soldiers can attend the course on a temporary duty and return basis or in conjunction with a permanent change-of-station move.

For more information, call MSgt. Walter Cole

or SFC Newman at AV 221-8322 or 221-8323.
(MILPERCEN)

Active Duty Service Obligations

According to the MILPERCEN, there continues to be confusion among the officer corps concerning active duty service obligations incurred as a result of schooling, promotion and/or a permanent change of station.

To help clear up some of the confusion, here are a number of situations with the required service obligation.

The regulation governing service obligations is AR 350-100, Officer Active Duty Service Obligations. Specific questions concerning this regulation may be addressed to the Personnel Actions Branch; MILPERCEN, AV 221-9421/0686.

Situation	Service Obligation
United States Military Academy	Five years from entry on active duty.
ROTC scholarship graduate	Four years from entry on active duty.
ROTC non-scholarship graduate	Three years from entry on active duty.
Officer Candidate School	Three years from date of appointment.
Commandant's Program, Officer Basic Course (OBC)	Three years from day completion of OBC.
PCS-overseas to CONUS	One year.
PCS-CONUS to overseas	Prescribed tour length.
Senior Service College	Two years from completion or termination of course.
Command and General Staff College	Two years from completion or termination of course.
Officer Advanced Course (OAC)	One year from day following completion or termination of OAC.
Promotion to major	Six months to retire in grade of major.
Promotion to lieutenant colonel or colonel	Three years to retire in grade of lieutenant colonel or colonel.
Funded/partially funded	Three times the length of schooling in days, but not more than six years. Officers who accept a fellowship, scholarship or grant to attend civil schooling under AR 621-7 may exceed the six-year active duty service obligation.
Conditional Voluntary Indefinite (CVI)	One year from day following completion of current service agreement.

Learning English Before Training

Beginning this fiscal year, soldiers coming into the Army who have difficulty speaking or understanding English will receive training at the Defense Language Institute, English Language Center. The English-as-a-second language (ESL) course will be taken before initial-entry training and will last up to 24 weeks. Soldiers requiring the course will be identified in the recruiting process and will have a mandatory training program written into their enlistment contracts. Depending upon the length of time spent at the course and the term of initial enlistment, some enlistments may be extended.

In the past, ESL was limited to a six-week course in the training base. A similar program was available at permanent duty station. Following implementation of the new pre-initial entry training ESL program, it is anticipated that ESL at permanent duty station gradually will be de-emphasized. Soldiers in the new program who do not achieve minimum ESL standards will be discharged while still at the institute. The program manager will be U.S. Army Training and Doctrine Command. (*CoS for Personnel*)

Army Looking for Shooters

The U.S. Army Marksmanship Unit is looking for soldiers E-6 and below who have competitive shooting experience in rifle, pistol or shotgun. Applicants should be highly motivated, have a winning spirit, a clean civilian and military record and have proper military appearance.

To apply, a resume of shooting experience, including scores from matches if available; a recent photo; and a copy of DA Forms 2 and 2-1 must be sent to: Commander, USAMU, Fort Benning, GA 31905.

Unit Peacetime Award

A new unit peacetime award called the Superior Unit Award was recently approved by the secretary of the Army. It is awarded to a unit (usually smaller than a battalion) for displaying outstanding service and superior performance of exceptionally difficult tasks that set it apart from and above other units with similar missions.

Units earning the new award receive a unit certificate, citation and streamer to attach to the unit flag. Soldiers participating in the actions which earned the award receive the ribbon, which is worn permanently. Soldiers later assigned to the unit are authorized to wear the ribbon, but only while serving with the unit. (*DCS for Personnel*)

Developments

Army Seeks 12-hour Bug Repellent

The U.S. Army Medical Research and Development Command has organized a high-priority program to develop a 12-hour insect and anthro-pod repellent for military use.

Protection from bug bites is critical because they can cause more casualties than enemy action. In Vietnam, for example, there were more than 80,000 U.S. casualties from malaria in spite of anti-malaria pills issued.

One study showed that the productivity of forest workers could be increased by 25 percent by giving them an effective insect repellent. In military terms this could be the equivalent of an extra regiment in every division.

A material known as diethyltoluamide, or "deet" for short, will remain the active ingredient of the new repellent. Deet was discovered in 1954 and has been the mainstay repellent of the Army ever since.

Deet repels most kinds of biting insects including mosquitoes, biting midges, biting flies and fleas, and arthropods such as ticks and chiggers. Generations of soldiers have sworn by the GI two-ounce olive drab bottle of deet. However, the current repellent provides only four hours of protection. (USAMRDC)

X-ray Laser Research Progressing

Sandia National Laboratories reports that its X-ray laser research is progressing so well that the project begun in 1982 on Sandia's Proto II accelerator might be transferred this year to the more powerful PBFA-1 (particle beam fusion accelerator) generator. At least a decision will have to be made in 1985 whether to move the research from the prototype machine to the giant PBFA, which is rated at 5 trillion watts in pulsed power.

An X-ray laser would have all kinds of applications in nuclear power research. It could also have defense applications. The Defense Nuclear Agency is looking into X-ray lasers specifically for a defense against solid-fuel ICBM boosters and post-boost vehicles.

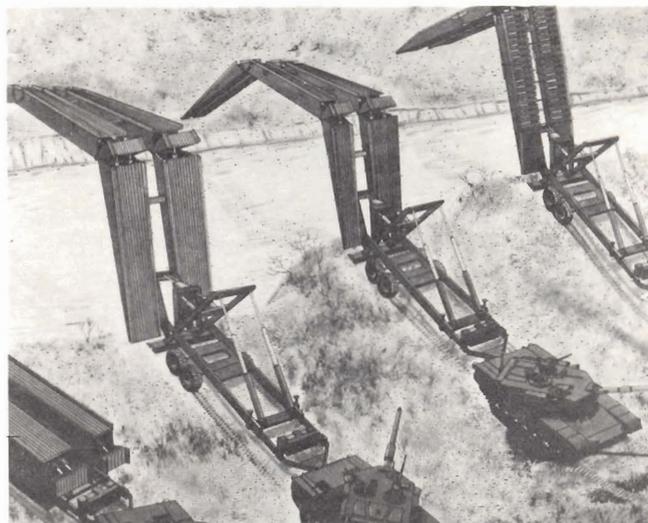
The long-sought X-ray laser would represent a considerable accomplishment even in the laboratory. Whereas visible light has wavelengths of 400 to 700 nanometers, X-ray wavelengths are less than 80 nanometers, making energy-input requirements for laser action go up enormously, not to mention other problems in physics.

Safe Laser Under Development

The U.S. Army Night Vision and Electro-Optics Laboratory has issued a contract to Hughes Aircraft Co. to develop a laser for rangefinders that won't cause blindness or other eye injuries.

The lightweight device, designated the AN/PVS-6 Mini Eyesafe Laser Infrared Observation Set, resembles a binocular case. Its neodymium yttrium aluminum garnet laser beam is sent through a chamber, or cell, filled with high-pressure methane gas. There the 1.06-micron wavelength is transformed into a wavelength of 1.54 microns. The new signal is safe because it never reaches the retina. Instead, it is absorbed in the vitreous humor, the white area of the eye between the retina and the lens.

New Bridges Undergoing Testing



This illustration shows three bridging systems being employed by a trailer-launcher towed by tanks. At right, an armored vehicle-bridge is being employed from an M-60A3 tank. Next to it, a trailer-launched bridge is being employed by an M-1 tank. Farther, to the left, the wider and longer heavy-assault bridge (HAB) is shown being launched. At far left is a trailer-launched bridge in its folded mode. (Illustration courtesy of U.S. Marine Corps)

The Combat Systems Test Activity, Aberdeen Proving Ground, Md., is testing a variety of new bridging systems to support modernization programs under way for the Army and Marine Corps during the next 18 months.

An Army heavy-assault bridge (HAB), an Army light assault bridge (LAB) and a trailer-launched bridge (TLB) for the Marine Corps will first be tested using static loads and, later, by driving vehicles across them.

According to Byron Hawley of the Test and Evaluation Command's Troop Support Division, the new bridging systems will enhance battlefield mobility, enabling commanders to overcome the "canalizing" effects of natural or man-made obstacles.

Both the HAB and TLB should be capable of supporting the heaviest tank in the Army inventory, currently the 63-ton M-1A1 Abrams. The LAB is intended for use by engineering units assigned to the new Army light divisions.

The HAB under consideration will be capable of spanning 100-foot obstacles. The bridge can be emplaced in five minutes while the crew remains protected in the carrying vehicle.

The TLB will have an effective span of up to 70 feet and also can be launched from within the towing vehicle. It can be emplaced in five minutes and recovered in 10.

The LAB is a double-fold scissors bridge with an effective span of about 75 feet and is designed to be transported and launched from a dedicated trailer. It is air transportable on C-130 and larger aircraft. It also can be emplaced in five minutes and recovered in 10. As with the heavier bridges, the LAB can be launched from within the enclosure of the towing vehicles. All necessary power to launch and recover the bridge is contained on the trailer-launcher.

Along with the bridging equipment, a tactical bridge access/egress system is also under development. This consists of an aluminum extrusion mat and dispenser. Once emplaced, the mat will provide access lanes for bridge-laying equipment, then will provide access and egress lanes for vehicles using the HAB and TLB. A single, four-meter-wide lane more than 150 meters long can be laid in 45 to 60 minutes using the system. (PAO, U.S. Army Test and Evaluation Command)

Hotlines Established

The Army's Natick Research and Development Center has established a user's hotline. The center is the Army's proponent for food, clothing, shelter and airdrop systems. Personnel of the Operational Forces Interface Group, Directorate for Engineering Programs Management, monitor the calls and send replies.

After Natick's duty hours, callers will reach a recorder. Callers are asked to identify themselves, the specific equipment in question and the nature of their problem. The call will be answered the next business day.

Army personnel are encouraged to use the hotline to report, discuss or resolve problems encountered with centrally procured and issued

food, clothing, individual equipment, aerial delivery equipment, tentage and rigid wall shelters. The phone number for the center's hotline is AV 256-5341.

* * *

Until recently, individuals were taking the time and effort to research price inequities. Now, people have access to an Army-developed system to report suspected overpriced items, have them researched and have corrected prices established as necessary.

The system, called the Management Information Research Assistance Center, is operated by the catalog data activity at New Cumberland Army Depot, Pa.

As a 24-hour hotline, the assistance center accepts call-ins of problems with spare parts pricing. The caller has to provide name, mailing address, telephone number, identity of current unit or duty station and as much information as possible about the part in question. The center also investigates letter inquiries. Ideally, the staff prefers to have the item's stock number, complete item description, cost and source of the price, plus date received. However, they'll take a part number or any other source that can identify the part.

The staff begins research within 24 hours of receipt of the report. Once the price source is verified, the report is sent to the item manager for review. Contract, quantity of buy, specifications and design are all reviewed if necessary. Anything that determines a price is checked. Within a few days, determination is made whether the price is correct or whether a new price is in order.

As of early May 1985, of the more than 3,100 inquiries that were made, 625 have resulted in a price change.

The hotline number to call if you spot an item that can be bought cheaper somewhere else is AV 977-7431.

Army to Develop New Airdrop System

The Natick Research and Development Center is developing a low-altitude drop system for use in C-130, C-141, C-5 and the new C-17 aircraft that will reduce the vulnerability of these aircraft flying missions into hostile areas.

The projected system would allow cargo carriers to airdrop their loads from altitudes as low as 300 feet while flying at airspeeds of 130 to 150 knots. Cargo normally is dropped from the 1,100-foot level while flying at the same airspeeds.

The low-altitude system would be capable of delivering supplies and equipment in three weight ranges: 2,500 to 20,000 pounds; 20,000 to 42,000 pounds; and 42,000 to 60,000 pounds. The system

is expected to use a combination of small, fast-opening parachutes, and retrorockets to orient and stabilize the cargo during initial descent and to decelerate it for a soft landing.

A four-year developmental program is contemplated, and a single contractor will be selected.

Night Device Under Development

A Hughes Aircraft Co. engineer conducts tests on a device that will give combat vehicle drivers a TV-like view through darkness, battlefield smoke and haze.

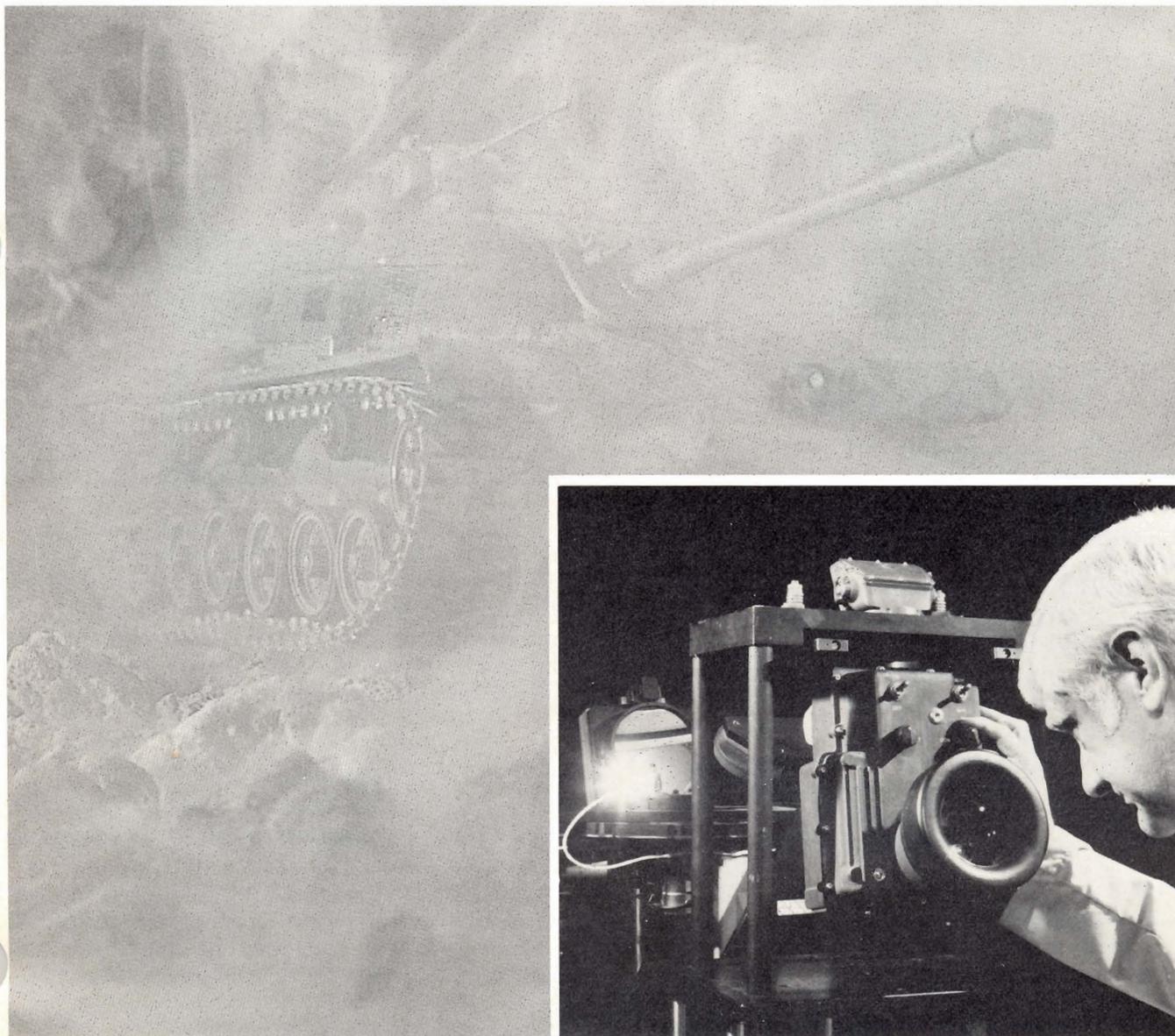
The Driver's Thermal Viewer (DTV), now in full-scale engineering development, is a thermal imaging system planned for use in the M-1 Abrams tanks, M-2/M-3 Bradley Fighting Vehicles and M-60A3 tanks. It is small and compact and can be installed in the driver's hatch of these vehicles

without modification to the vehicle's armor or driver station.

Hughes Aircraft Co. will build two proof-of-design and 18 engineering development models of the DTV under a recent contract awarded by the Army's Night Vision and Electro-Optical Laboratory. Deliveries are scheduled to begin in early 1986, with a production decision expected in late 1987. The Marine Corps will also consider including the DTV in M-60 tanks and light-armored vehicles.

Designated the AN-VAS-3, the DTV produces a TV-like image by sensing variations in temperature between objects and their backgrounds, and is not dependent on visible light for viewing. It will replace the currently used image intensifier device, which amplifies ambient light.

(Photos courtesy of Hughes Aircraft Co.)



Intelligence

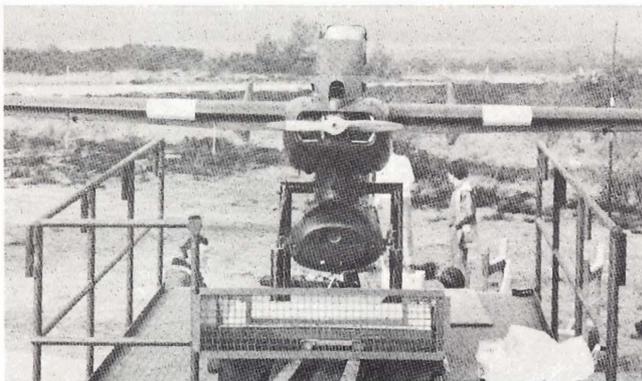
Japan Awards Patriot Contract

Mitsubishi Heavy Industries has been selected by the Japanese Defense Agency as the prime contractor for the licensed production of the Patriot missile system, which will replace Nike-J systems by 1991.

The first order for 10 launchers and about 40 missiles and related equipment is expected in March 1986. Two training units, missiles and equipment are scheduled for delivery by 1989.

Plans are to eventually have a total of 26 fire units (24 for air defense groups and two for training). Twenty launchers and 80 missiles will be procured yearly between 1986 and 1991 to form four fire units.

British Army Orders Phoenix RPV



The United Kingdom Ministry of Defence awarded a fixed-price contract to develop and produce the Phoenix remotely piloted vehicle (RPV) system. The RPV, deployed at corps level, will carry out local surveillance and acquire targets to be engaged with long-range artillery, particularly the MLRS rocket system.

The Phoenix system will include several hundred fixed-wing, parachute-recovered air vehicles, each carrying a thermal imager fitted with a zoom telescope. Video from the imager will be transmitted to mobile ground stations over a secure data link, with control signals passing in the opposite direction.

The Phoenix is due to enter service in 1989. (IDR)

NATO Consortium to Produce Stinger-POST

Dornier and Diehl companies of West Germany have chosen to lead a six-nation NATO consortium to build Stinger-POST missiles. The six nations—West Germany, Turkey, Italy, Belgium,

The Netherlands and Greece—will initially build about 10,000 missiles. West Germany and Turkey are expected to account for 3,000 missiles each; Belgium, The Netherlands and Italy around 1,200 each; and Greece supplying the remainder.

The government-to-government agreement to allow missile production in Europe was signed in the late-1970s. Technology transfer to Europe will be complete except for some electronic counter-countermeasure equipment which is to be supplied by the United States. The six partners, who are to share Stinger-POST production, will be able to export the missile to other NATO nations—except the United States.

The original aim of the six partners was to start production in 1987. However, full production may be postponed until early 1989. (*Jane's Defence Weekly*)

Finland to Get More MiGs



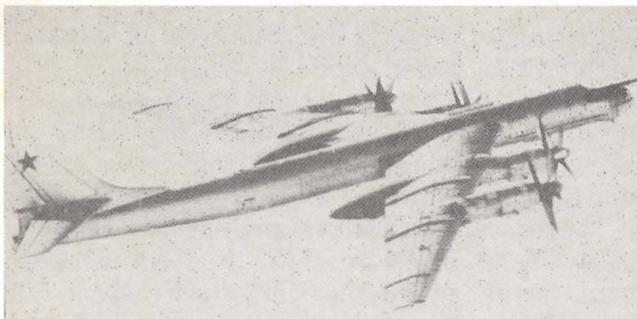
Late last December, the Finnish government authorized the purchase of an additional undisclosed number of MiG-21 Fishbed fighters from the Soviet Union. The new aircraft are to be assigned to the Karelia Air Wing's 31 Fighter Squadron, which already operates 27 MiG-21s (above) acquired between 1978 and 1980. (IDR)

Taiwan Develops Own Missile

Taiwan has successfully developed and test fired its first surface-to-air missile system and is developing other types of missiles.

The Sky Arrow-1 is similar to the Patriot system, but is designed for medium and low altitudes. It will replace the currently used Hawk system. Sky Arrow-2, designed to bring down high-altitude aircraft, is due for test firing in December 1988. (*Jane's Defence Weekly*)

Soviet Aircraft Sightings



The Tu-95 Bear H long-range strategic bomber (above) was photographed by members of the 331 Squadron of the Royal Norwegian Air Force over the Barents Sea.

Soviet Military Power 1985 published an artist's impression of a Bear H launching one of its four AS-15 cruise missiles. The four pylons for the missiles are hidden by the wing on this view of the

aircraft, but some interesting features are apparent.

Notable is the deep-faired nose radome (streamlined into the fuselage) quite unlike the separate radome of the Bear D version, which is under the fuselage. Running aft of this bulged nose are dark lines which terminate just forward of the wing root leading-edge. These may be the strakes which, under the Salt II agreement, identify a cruise missile-carrying aircraft.

The Bear H, says *Soviet Military Power*, is designed to stand-off while launching the AS-15, unlike the new Blackjack variable-wing bomber, which also will almost certainly carry the AS-15, but is designed for low-altitude, high-subsonic penetration of air defenses.

The first squadron of the Bear H began operational deployment at the end of 1984, according to the British.

* * *



This Il-20 Coot A electronic intelligence gathering aircraft was shadowing NATO naval forces taking part in Exercise Cold Winter near Norway. Intercepting is a British Sea Harrier fighter from the 801 Naval Air Squadron based on the carrier HMS *Invincible*.

The Coot A carries an underfuselage container pod believed to contain side-looking radar. Fairings on the side of the fuselage forward of the wing are believed to house cameras and other sensors. Note the extended radome in the nose.

* * *



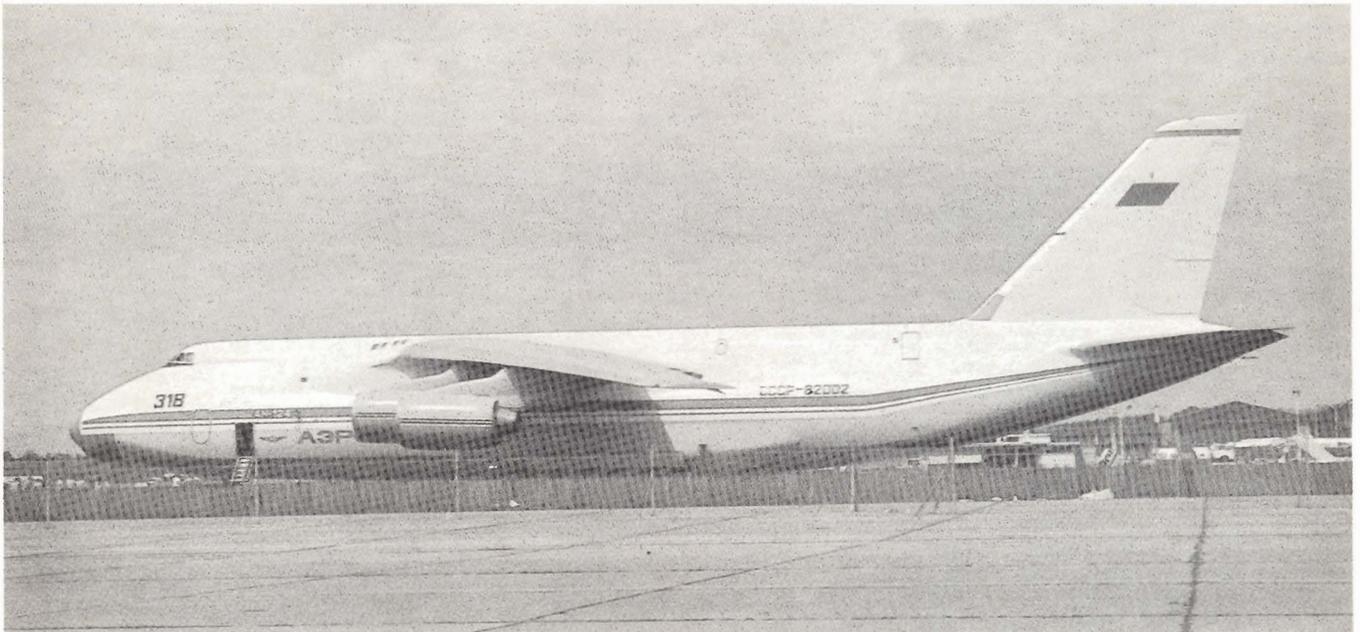
This Yak-28 Brewer D reconnaissance aircraft turned sharply left into a Japanese Air Self-

Defense Force F-15J fighter from the 203rd Squadron, 2nd Wing, after being photographed by the F-15J pilot during an intercept west of Okushiri Island in the Sea of Japan.

Squadron officials said it is the first time this aircraft has been seen in Japanese airspace, although it has been deployed for some time in the Far East.

The aircraft was carrying either a fuel tank or chaff/electronic countermeasure pod under each wing. It was camouflaged dark green and medium grey. This Brewer D has a nose configured for a navigator station. Later versions have radomes as nose cones.

Soviets Show Gargantuan Transport



The Soviet Union returned to the 1985 Paris Air Show with a huge airplane never before seen in the West.

Code-named Condor and known for two years as An-400 but now clearly designated An-124, it appeared in the markings of Aeroflot, the Soviet airline which also does certain military transport duties.

The Condor is similar to the C-5A Galaxy in appearance. Typical of Soviet design, the six-man flight deck emphasizes simple efficiency. Although it has no electronic flight displays, the An-124 has a 100-percent digital fly-by-wire control system, with quadruple redundancy.

The visor-type nose door was one of the unexpected features of the An-124, which was thought to be capable only of tail-loading. Its cargo hold

has a titanium floor and is designed for simultaneous nose and tail loading and unloading, with the assistance of four traveling frames in the roof. Opening the huge ramp doors, including deployment of the folding ramps, takes seven minutes and three minutes respectively. The landing gear is designed so that the aircraft can kneel toward the front or rear.

The aircraft is 230 feet long and has a wingspan of more than 240 feet. All fuel is in the wings and is sufficient for a range of 9,920 miles with maximum fuel, or 2,790 miles to 3,100 miles with a maximum 150-ton payload.

First test flight took place in December 1982. Production An-124s are expected to be in service by mid-1986.

Books

THE U.S. RAPID DEPLOYMENT FORCES

by Lt. Col. David Eshel (IDF, Ret.)
Arco Publishing Inc., New York, 1985. 208 pages. \$19.95.

This latest book by Lt. Col. David Eshel (IDF, Ret.) is fully packed with action photographs that tell the story of the U.S. rapid deployment forces. Author of *Elite Fighting Units* and *The Fighting Israeli Air Force*, Eshel describes the Army, Air Force, Marine Corps and Navy units that stand ready to deploy to any part of the globe at any given moment.

Eshel begins his book with a day-by-day, hour-by-hour scenario set in the Middle East. Explaining his scenario, Eshel says it "was not intended as a fortune-telling essay. It was prepared to enable the reader to properly understand the importance of each part of the rapid deployment force. As the reader makes his way through the scenario, he will appreciate the minute problems of rapid deployment and the importance of early warning and fast decision making based on real-time intelligence."

The evolution of the rapid deployment forces follows the scenario. The author then introduces the major units of the Central Command, their weapons and their training. Combat actions in Lebanon and Grenada are described in detail, as are large-scale training exercises such as "Bright Star" in the Middle East and "Gallant Eagle" in the United States.

ROOTS OF STRATEGY

Edited by Brig. Gen. Thomas R. Phillips
Stackpole Books, Harrisburg, Penn., 1985. 448 pages. Softcover, \$10.95.

Here finally are the five greatest military classics of all time, complete in one handy softcover volume. A classic for a quarter of a century in hardcover, it has been unavailable for more than 20 years. *Roots of Strategy* includes: Sun Tzu's "The Art of War," 500 B.C., the oldest military work in existence; Vegetius'

"Military Institutions of the Romans," 390 A.D., the bible of European soldiers for a thousand years; Marshal Maurice de Saxe's "My Reveries Upon the Art of War," 1732, a call for reform that paved the way for modern armies; "The Instructions of Frederick the Great for His Generals," 1747, the great soldier-king's theories of discipline, tactics and strategy; and "The Military Maxims of Napoleon," the distilled wisdom of the greatest warrior of the Western world.

Writing in 1940 for the first edition of *Roots of Strategy*, Brig. Gen. Thomas R. Phillips said, "Little as modern historians like to admit it, great nations have been built by war, and it has been by war that they have been overthrown. Much history has been stultified by the failure of civilian students to pay any attention to the modification of military ideas and the improvements in military possibilities."

AVRO VULCAN

by Robert Jackson
Sterling Publishing Co., Inc., New York, 1985. 184 pages. \$14.95.

Despite its dramatic farewell appearance in the Falklands and its new lease on life, which it received in its role as a tanker, the Vulcan is already a museum piece. This book looks at the history of this dynamic jet — its planning, testing and service record. Filled with personal reminiscences and inside information, this book will appeal to historians, modelers and everyone who admires fine aircraft. A 12-page appendix lists every model with its allocation, service and disposal details.

LITERATURE IN THE EDUCATION OF THE MILITARY PROFESSIONAL

Edited by Lt. Col. Donald Ahern and Cdr. Robert Shenk
U.S. Air Force Academy, Colo., 1982. 107 pages.

What education, training and background does a modern officer need? Do we need engineers, or do

we need liberal arts majors? Must the officer be a specialist, or should he be a generalist? The debate is an endless one, and the issue is by no means resolved.

Recently, the United Kingdom raised the issue as to whether an officer required a university education at all. In the United States, the emphasis has veered from one extreme to the other over the years, but has currently settled in favor of the technocrat. This little book is one of the latest contributions to an enduring argument, one that suggests something other than a mainstream opinion.

The foreword by Vice Admiral James Bond Stockdale, who spent years as a POW in Vietnam, sets the tone for the entire sequence of essays. "Imagination," he says, "is possibly the defining characteristic of the great military leader." And imagination is not so much taught as it is nurtured — a concept alien to a curriculum that stresses quantification. It is Stockdale's opinion that the development of the sixth sense of inspiration, imagination, or whatever one might want to call it, is the real business of educational institutions that produce officers. Facts can be memorized, technical skills taught, and the nuts and bolts of the profession drummed in by rote and repetition, but that intangible essence of good leadership demands another sort of mentoring.

In short, the various authors suggest that literature, ranging from the ancient classics to modern works, is the best way to teach nascent officers about imagination and its use in the profession of arms. Their goal is not to teach cadets things, but to teach them how to think. The sciences, stressing the analytical approach and the scientific method, while teaching a rational way to solve a problem, do not cover the same ground. Intuition cannot be taught, but reading literature can show it in use. With luck the example may be contagious. Admiral Stockdale and many other former POWs as well would add that the classics teach value, ethics and the

enduring principles of humanity that were the keys to their survival in captivity.

The authors and editors of the book do not suggest that military education should discard the technical subjects — warfare has become far too complex for that — but do insist that the well educated officer has studied not only the technical subjects but also has received a basic liberal arts education. Those who are familiar with the recent Bagnall study will recall that it advised the chief of staff to advocate general education as well as technical training in the field of precommissioning training.

The book takes a point of view that needs to be considered carefully by all of the armed services. Everyone who is charged with the task of educating young officers ought to read it, because it forces us to think critically about whether what we are doing is the best way to produce the sort of officer our country needs. The tragedy is that almost none of us are likely to do so.

—Maj. Charles Kirkpatrick

SOVIET MILITARY POWER 1985,
4th Edition

Government Publications Outlook,
U.S. Government Printing Office,
Washington, D.C., S/N 008-000-
00410-2, 1985. 143 pages. \$6.

This 1985 edition provides a detailed report on the structure of the Soviet military and examines the introduction of new nuclear and conventional Soviet military capabilities. Expanded from previous editions, the publication focuses on significant developments in the Soviet armed forces, such as the deployment of new ICBMs, the increased production of bombers and the major emphasis on military-related space systems.

The report documents the continuing Soviet buildup and the enhanced capability of the Soviet Union to conduct military operations worldwide. It not only draws on the 1984 NATO force comparisons study, but also provides comparative data on developments in U.S. forces. Color illustrations, maps and organization charts are included.

Intercept Point continued from Page 2

above all personal needs. Allowing others the freedom to fail (the subject of a future article). Knowing “zero defects” is an unrealistic and unachievable goal.

■ A total leader is one who takes the time to interact with soldiers. In this interaction, the leader:

—is honest, just and fair. He renders equal treatment to all and knows that every soldier who works for him can do at least one thing better than he can.

—treats soldiers as mature professionals. We ask them to risk their lives for their country, a supreme sacrifice which, by itself, merits adult treatment.

—takes a personal interest in soldiers as individuals. Everyone is someone, and his contribution is important.

—tells the reasons why. Understanding why a task is important ensures the best possible effort. The American way is to explain why, which helps foster individual initiative when the plan goes wrong. This one difference in the way we treat our soldiers, compared to the Soviet army's demand for blind obedience, is the biggest force multiplier we have!

Last, there are some time-honored truisms that build good units. Rules that never fail. Rules that will always result in success and create a unit that does all things excellently or better. Try this list:

■ Be statistics conscious. Look at what the numbers say. If your unit is far below other units in one area, such as re-enlistment rates, or far above in others, such as Article 15s and court martials, ask yourself why. Why can the other unit do it and we can't? Could it be a matter of leadership?

■ Ensure a sense of discipline. Without discipline, including discipline in small things, a military unit will collapse under stress. Discipline is the foundation upon which a good unit is built. Without discipline, excellence in all things is impossible.

■ Have a good soldier-focus. Spend 90 percent of your time helping good soldiers become all they can be. Spend 10 percent of your time convincing “fence walkers” to become good sol-

diers and kicking out bad soldiers. You are better off without bad soldiers, no matter how badly you need their MOS skills. They have no place in our Army. Get rid of them.

■ Create a good balance between work and play. Have a good physical training program, fun runs, unit parties, special suppers, prayer breakfasts and just plain time off for a job well done. Don't be bashful about asking for time off for your soldiers. If you don't ask, no one else will.

■ Never pass a wrong. Now there's an important rule. Go back and re-read it. The moment you pass a wrong, you become an accomplice. You are as guilty as the offender. A new standard has been set. One you don't want and won't like, but you'll be stuck with it unless you take corrective action.

■ Establish a ratio of 10 pats on the back to one kick in the tail. If the ratio in your unit is backward, you're in big trouble. Make sure that awards are given on time, in a formation of some sort, in front of associates who saw the soldier earn the award.

■ Establish a “We Care” environment from the barracks to the housing area to the dining facility to the motor pool. “Cleanliness is next to Godliness.” Keep things looking nice. Put everything in its proper place. There is absolutely no excuse for mail or pay being late. Establish an aggressive self-help program. Engineers can't do it all alone. You appreciate most what you do yourself.

The bottom line: soldiers—there isn't anything else. Our soldiers are the best. Take care of them. Do all in your power to make them happy, and they will train better. More importantly, if the time ever comes, they'll fight better, and you'll bring them home. Superior officers produce superior NCOs and vice versa. Superior officers and superior NCOs mold superior soldiers. All three together build superior units and will win wars, not by dying for their country, but by making the other guy die for his country.

Where do superior units come from? They come from units just like yours. Every unit has about the same amount of talent. The superior unit is that which has the lower half doing upper-half work.

Glad to be aboard. Be all you can. Ensure that your soldiers become all they can be. Our Army is a place, today, where true professionals meet.

'Pulsating Egos' a School Myth

by Capt. Joseph D. Farmer

I'm sure those of us who have cycled through the Officer Basic Course and the Officer Advanced Course have developed definite opinions about the course content and instructors in the various departments.

Some of these opinions are good ones. Like when we would encounter an instructor who seemed genuinely concerned about what the soldiers learned and who valued the students' counterpoints and opinions. On rare occasion, though, we came up against those who could only be classified as "pulsating egos." Instructors who felt they were sole possessors of fact and valid opinion; who would demonstrate through their actions that OBC and OAC students were merely sponges there to soak up information. And there were those who appeared lethargic and disinterested in their task at hand.

Unfortunately, we tend to remember the negative impressions, and these impressions have perpetuated some myths within the air defense community about instructor duty. Much has changed at the U.S. Army Air Defense Artillery School (USAADASCH) in the last couple of years, and the time has come to dispel these myths.

MYTH: Personnel assigned to instruct couldn't get out of the assignment or, because of past records, are not wanted by the line units.

FACT: Totally false. By and large, personnel coming to USAADASCH to instruct are coming here because they want to. They have something they want to share and a desire to change things for the better. As for qualifications, instructors must have had successful battery command, preferably be a CAS³ or U.S. Army Command and

General Staff College graduate, possess good recommendations from past commanders and undergo an interview to determine if they have the potential to serve as an instructor. In other words, they must have an excellent and proven track record in developing their subordinates in past assignments.

MYTH: An assignment to USAADASCH is not a "career enhancing" assignment.

FACT: This one is really dumb. Anyone who has been in since "yesterday," and is not a totally consumed ticket-puncher, knows that any assignment can be career enhancing if it is performed well and with 100 percent effort. The opportunity to develop and enhance the future of the branch, to be at the center of the community and to actively influence branch philosophy to work in sync with the Air-Land Battle Doctrine can't help but be career enhancing.

MYTH: An instructor's ability to influence change is not as great as that of a soldier serving in a line unit.

FACT: Again false. Granted, influencing change as a battalion commander, battery commander or primary staff officer is indeed more quickly measured in observable unit performance and statistics. While the influence of an instructor on the student is not as quickly observed, it is, none the less, potentially significant. Instructors at USAADASCH have the potential to improve and develop the tactical and leadership skills of approximately 500 OBC officers and 350 OAC officers each year. If done well, their work will ultimately affect the performance and status of Air Defense Artillery as a whole.

MYTH: They have been teaching the same material and lesson plans for years with only minor changes.

FACT: You guessed it, false. Both OBC and OAC materials have changed dramatically for the better.

With the advent of the new 20-week curriculum for OAC and the revised OBC programs, the lesson content has become doctrinally based, experiential or more "hands-on" and very dynamic in nature. In fact, the material is continually changing based on input from personnel in the field, students coming back from the field and new instructors with a firm grasp on reality cycling in from the field. It is hoped that the program's dynamic nature will respond not only to TRADOC requirements, but also to what junior officers need to know as they return to the field.

Granted, these myths and more have had some basis in fact in the past, but they definitely do not have merit now and won't in the future. All is still not perfect, but given the new philosophy of leadership, tactical excellence and warrior spirit permeating through the school's instructional departments, dramatic change has begun.

Instructors are working hard and are taking their mission very seriously. Through mentor relationships with OBC officers, encouraging open dialogue among OAC officers and, more importantly, encouraging open dialogue between student and instructor instead of force-feeding information, we seek to develop an air defense officer who is fully capable of performing the critical mission of air defense with the combined arms team and winning the air-land battle. Air Defense Artillery has a long and proud lineage and, with the continued efforts of instructors at all levels, officers and NCOs who cycle through these courses will successfully carry on that lineage.

Capt. Joseph D. Farmer is the chief of the Leadership and Ethics Branch, Tactics Department, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

Coming in the Winter Issue . . .
Trainees : The Future of Air Defense Artillery

