

ADAA AIR DEFENSE ARTILLERY

January/February 1990



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ADA AIR DEFENSE ARTILLERY

JANUARY-FEBRUARY 1990

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The recent dedication of the "First to Fire" statue is another step along Air Defense Artillery's road to ever-increasing branch pride. Your association is proud of the important part we are playing in this great rebirth. The success of *ADA Magazine* is another step. You can help make the magazine a success by subscribing.

Your association needs continued growth during the coming fiscal year.

Our new awards program in each battalion has been a great success. We plan to expand the program by recognizing top graduates of schools that allow our officers and NCOs to grow.

It's also time to consider a new home for our link to our proud past — a new building for the ADA Museum. The current building is antiquated and does not offer the space to display all the treasures we have amassed.

Let me publicly thank the association staff for their valued efforts. We are lucky to have the greatest "old colonels' " wives in the Army looking after and loving our association — "Happy Foote" and Edith Fanning.

First to Fire!

V. J. Tedesco Jr.

COL, AD

President, ADA Association

THE WINNING COMBINATION

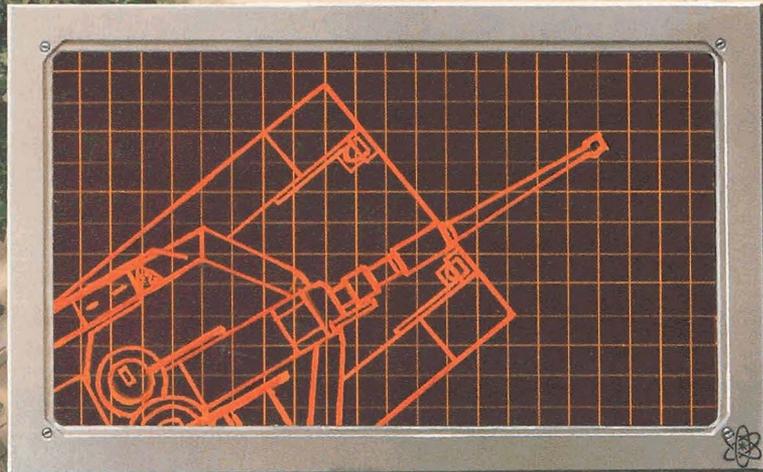
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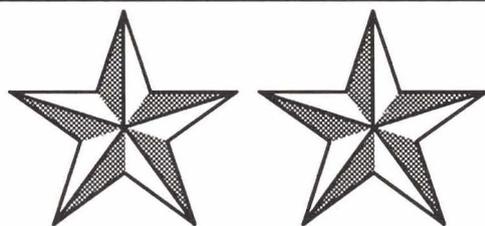
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INTERCEPT POINT



Dedicated to ADA Soldiers . . .

Air Defense Artillery at last honors its most precious component — our soldiers. Like the famous “Follow Me” statue at the U.S. Army Infantry School and Center, the heroic bronze depicted on the cover of this issue of *Air Defense Artillery* will come to symbolize the spirit of Air Defense Artillery.

The 15-foot bronze and granite structure was dedicated recently at Fort Bliss to honor “The ADA Soldier, Past, Present and Future.” Ceremonies on Dec. 1, 1989, supported by all ADA units at Fort Bliss, emphasized these philosophies. Moreover, in this, the year of the noncommissioned officer, CSM Bob Harman and I asked the Fort Bliss NCO and Soldier of the Year to help us unveil this new symbol of the pride of the “First to Fire” branch.

The “First to Fire” statue depicts a Stinger team leader and his gunner preparing to launch against a hostile threat. It represents elemental, fundamental air defense artillery at the soldier-noncommissioned officer level.

Gaze upon the focal point of this composition, the faces of brave bronze soldiers — reflecting the intensity of combat and the courage, competence and dedication typical of the young men and women who serve Air Defense Artillery today — and be filled with pride in our Army and our branch.

Now let’s rededicate ourselves to the soldiers this monument commemorates.

Our primary responsibility to our soldiers is to see that they are superbly trained. Good training builds self-esteem and branch pride. It is the foundation of the combat readiness of our units — a readiness which ultimately produces the deterrence that has guaranteed the peace for so long and which, I am convinced, precipitated the revolutionary change we are witnessing in the European communist bloc. Their ideology is disintegrating; their people are clamoring for representational government.

INTERCEPT POINT

The crumbling of the communist bloc, the emergence of governments headed by non-communists, the possibility of free elections and the creation of opposition parties has diminished the the likelihood of an all-out conflict between the United States and the Soviet Union. The thawing of the Cold War may permit us the dubious luxury of force reductions and defense budget cuts. But we must remain ever vigilant, for the world is still a pretty tough neighborhood. As long as Americans remain committed to the maintenance of a free world and democratic ideas, the American soldier — for the foreseeable future — must continue to serve as freedom's number one deterrence against tyranny. We cannot afford to relax training standards. Indeed, if we are to become a smaller force, we must, at the same time, become a better trained force.

Fortunately, the Army has been highly successful of late in recruiting soldiers of exceptional quality. The demographics of the 1980s pushed the last cohorts of the post-World War II baby boom into an overcrowded job market. The number of CAT IV soldiers (the lowest acceptable test category) continues to decline. However, competition for quality personnel will grow more intense as the demographic trends which created the "employer's market" of the 1990s reverse themselves during the new decade.

With fewer 17- to 21-year-olds (the Army's prime recruiting zone) entering the job market as the cohorts of the "baby bust" follow the cohorts of the baby boom, we shall find ourselves in a "job seeker's" market. To remain competitive during the people drought, we will have to make the Army a more rewarding place to serve — the type of institution the U.S. Army Recruiting Command portrays in its television commercials and advertising layouts. Unless we succeed in persuading quality ADA soldiers to re-enlist, the U.S. Army Recruiting Command will have to replace more and more of them with CAT IV soldiers, an unacceptable trend for a branch which prides itself on sophisticated technology.

Last year, the Army recruited 120,500 soldiers for the regular Army and 66,600 for the Army Reserve. Ninety percent were high school graduates, but the number of recruits whose test scores placed them in CAT IV crept up to seven percent, the highest since 1985. There were 39,501 first-term re-enlistments —

5,000 more than expected. In other words, the Army loses about 70 percent of recruits as their first enlistment expires. We've grown accustomed to such figures, but imagine what consternation such a high rate of attrition would create in the corporate world or, for that matter, on the battlefield. The answer to the 1960s protest song which asks, "Where have all the soldiers gone?" is not to graveyards but to civilian employment offices.

There's little any of us can do to affect demographic trends, but there's a lot ADA soldiers can do to keep the emerging manpower problem from becoming a manpower crisis. The best way to maintain soldier quality is by retaining the quality soldiers who already wear the crossed cannons and missile insignia.

"You should by all means encourage the soldiers to continue in the service," said Napoleon. "This you can easily do by testifying to great esteem for old soldiers." The job has grown more difficult since Napoleonic times, and unlike Bonaparte's *Grand Armee*, we can not rely on conscripts. Maintaining soldier quality, however, is a challenge that can and must be met.

The retention problem would be more easily solved if soldiers were made of the same stuff as the bronze Stinger gunners who now stand guard at Pershing Gate, but soldiers are made of flesh and blood and human expectations. The key to retaining quality soldiers is to challenge them with quality training that is demanding but not demeaning. The U.S. Army Air Defense Artillery School is dedicated to providing ADA commanders in the field with the best training strategies, the best training technology, the best training support, the best entry-level soldiers and the best trained ADA leaders. By working together and by rededicating ourselves to soldiers, we can produce truly superior operational ADA formations from Stinger sections to ADA brigades.

First to Fire!



— Maj. Gen. Donald M. Lionetti
Chief, Air Defense Artillery



Stinger in Afghanistan

by Maj. William McManaway

Earlier this year, the U.S. Army Air Defense Artillery School was given the unique opportunity to participate in an Afghanistan lessons learned fact-finding trip. The author was a member of a group of Army tacticians who traveled to the Hindu Kush to interview Mujahideen freedom fighters. The resulting article vividly points out the role Air Defense Artillery plays in sustaining the force and provides an excellent example of how Air Defense Artillery provides the commander the necessary freedom of action and tactical initiative.

When the Soviets entered Afghanistan in 1979, their aim was to stabilize the communist Republic of Afghanistan government until its military could defeat the *Mujahideen*. After a classical operational combined arms occupation, the Soviets garrisoned Afghan urban centers and transportation nodes. The strength of Soviet and Republic of Afghanistan defensive positions limited the *Mujahideen* to raids and ambushes along major road nets throughout most of the war. After the introduction of Stinger allowed the *Mujahideen* to gain control of the air, their reduced vulnerability to air attack allowed them to employ longer range direct- and indirect- fire weapons. With better weaponry, the *Mujahideen* first isolated, then systematically reduced, Republic of Afghanistan and Soviet garrisons and outposts.

The Country

Afghanistan is a landlocked mountainous country about the size of Texas. It is bordered on the north by the Soviet Union, on the east by Iran, on the south and west by Pakistan and on the northeast corner by China. More than 80 percent of its land is classified as

desert or semi-desert while only 20 percent is classified as arable. Its summers are hot and dry and its winters cold.

Running from the northeast corner to the southwest corner, the Pamir and the Hindu Kush mountain ranges dominate the terrain. They form a wedge-shaped terrain feature characterized by numerous plateaus, steppes and mountain plains, with many peaks reaching as high as 5,000 meters. This harsh terrain and climate have historically deterred foreign invaders.

Setting the Stage

In December 1979 the political situation in Afghanistan had become desperate for the Soviet Union. The Marxist government, the Democratic Republic of Afghanistan, was on the verge of collapse. Resistance had developed throughout the countryside. Armed insurgency had broken out in 18 of the country's 27 provinces. The So-

Stinger in Battle

Stinger is one of the stars of Tom Clancy's new novel, *The Cardinal of the Kremlin*. The following excerpt, which portrays a *Mujahideen* Stinger gunner, code name Archer in battle against Soviet aircraft, gives air defenders a chance to judge Clancy's reputation for technical accuracy.

The Stinger had come as a rude surprise to the Russians, and their air tactics were changing on a daily basis as they struggled to come to terms with this new threat. The valley was deep, but more narrow than

entered Afghanistan. As the new year began, 50,000 Soviet troops occupied the country. President Amin had been replaced by a pro-Soviet Afghan exile, Babrak Karmal, and the Soviet troops had completed their occupation with minor opposition. The Soviet Union seemed to have achieved its goals while limiting international criticism to what it believed to be manageable levels.

viets even distrusted the government's leader, President Jafizullah Amin. He, in return, had little faith in the Soviet Union.

In the words of a Soviet official, "the Afghan state was on the verge of disintegration . . . to leave the Afghan revolution without internationalist help and support would condemn it to inevitable destruction." After three assassination attempts failed to eliminate Amin, the Soviet Union decided that the time had come to "defend" its national interest.

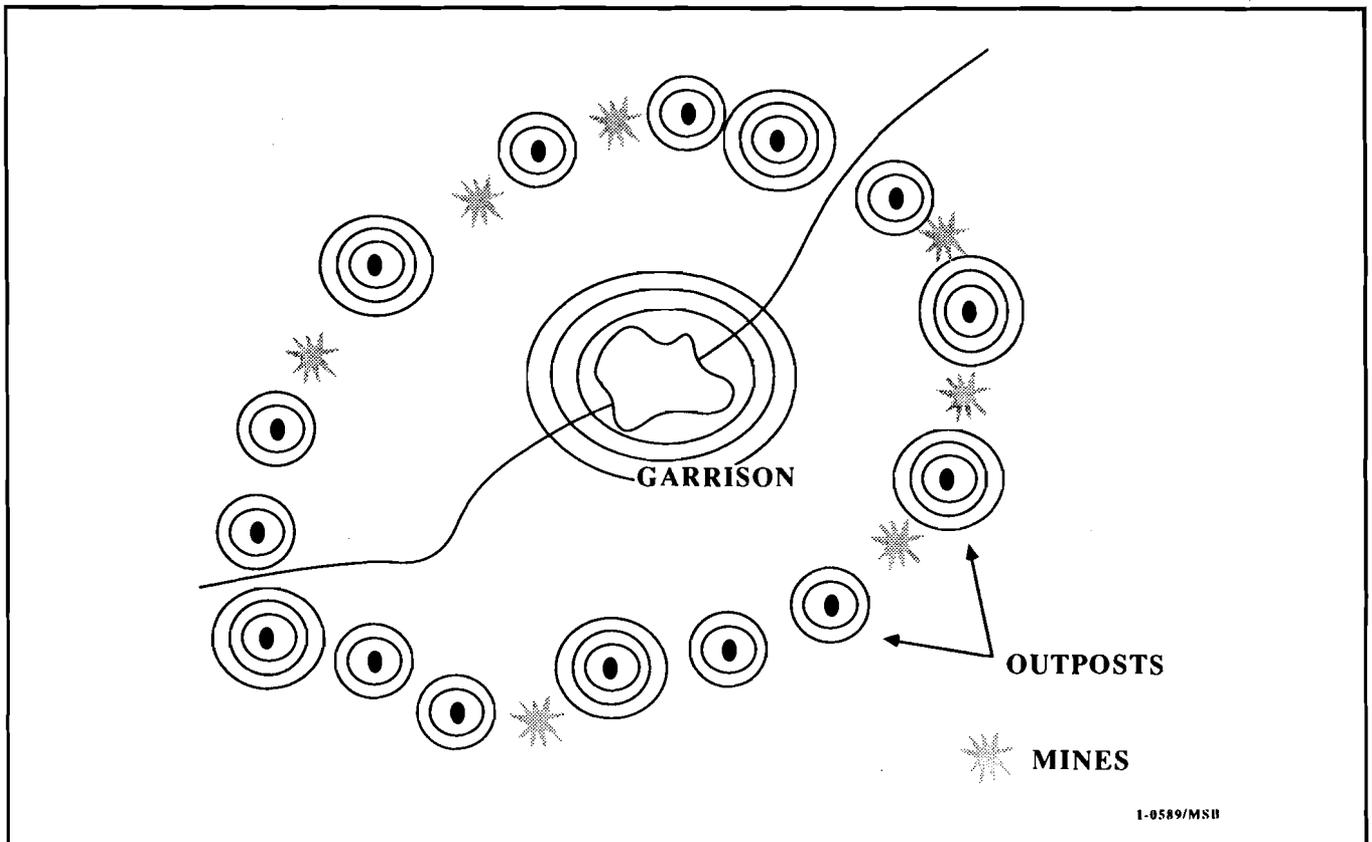
Opening Rounds

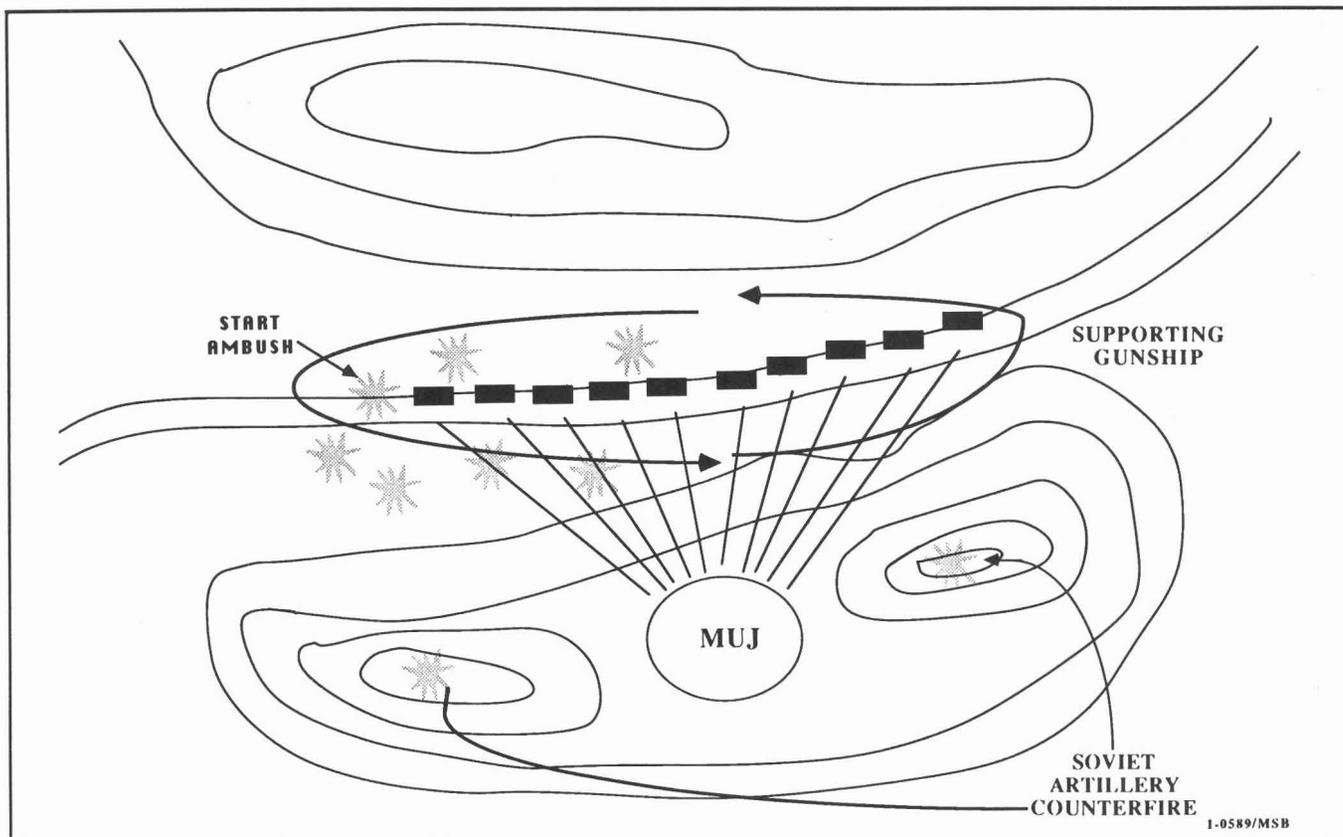
On Christmas Eve, 1979, the Soviet Union launched its invasion of Afghanistan. Elements of the 103rd and 105th Guards, Airborne Division, as well as *Spetsnaz* units, landed and seized Kabul airport. Airborne forces also seized Bagram Air Base near Kabul while ground forces moved overland to quickly seize Shindand and Kandahar Air Bases in the west and south.

By Dec. 27, 5,000 Soviet troops had been airlifted to Kabul. On Dec. 29, two motor rifle divisions

Mujahideen Combat Operations

Mujahideen, a term derived from the word *Jihad* and meaning holy warriors, is an extension of a many-centuries-old tradition of fierce independent tribal groups. The country's rugged terrain and harsh physical environment have isolated the population for centuries and has created small, clan-like ethnic groups. The protection of the tribe (the extended family) and its tribal lands is of paramount importance.





The Afghans are accomplished marksmen. Skill with a rifle is part of their social heritage. They understand direct-fire weapons and feel secure firing anything from the shoulder. They are less enthusiastic about indirect-fire weapons (mortars) whose effects are difficult to see.

Before Stinger was introduced, Soviet and Republic of Afghanistan aviation operated with nearly complete freedom. Aerial reconnaissance and fixed-wing interdiction were effective, limiting the *Mujahideen* to small unit (50 to 75 men) infiltrations. Small supply bases hidden in villages or in the mountains limited *Mujahideen* ability to sustain combat. Their offensive operations, supported by local partisan intelligence, were limited to raids and ambushes.

The lethality of Soviet and Republic of Afghanistan response from the air was such that the *Mujahideen* were unable to strike and

maintain contact without fear of annihilation by close support aviation. One *Mujahideen* commander called Soviet close support aviation attack "an automatic response" to any operation his force mounted.

To limit their vulnerability to air attack, the principal *Mujahideen* tactic was to attack by fire. Prior to September 1986, it was a 300- to 400-meter war. The *Mujahideen* weapons of effect were heavy machine guns (12.7mm and 14.5mm), RPG-2s and RPG-7s, and small

arms. Soviet superiority in weapons made closing with the Soviet to destroy him in close combat too costly. It was also dangerous to attack from a distance beyond 500 meters. If the *Mujahideen* fought close enough to Soviet columns, attacking aircraft fired only cannon and 57mm rocket rounds. If they were discovered in the open away from Soviet troop concentrations, they were attacked by napalm, iron bombs and other weapons of greater tactical effect.

the rule. For the pilot to hit the Archer's fellow guerrillas, he had to come straight down the rocky avenue. He'd stay high, at least a thousand meters over the rocky floor for fear that a Stinger team might be down there with the riflemen. The Archer watched the helicopter zigzag in flight as the pilot surveyed the land and chose his path.

Slowly, the Archer raised the launcher and trained its two-element sight on the approaching helicopter. His thumb went sideways and down on the activation switch, and he nestled his cheekbone on the conductance bar. He was instantly rewarded with the warbling screech of the launcher's seeker unit. The pilot had made his assessment, and his decision. He came down the far side of the valley, just beyond missile range, for his first firing run. The Hind's nose was down, and the

gunner, sitting in his seat in front of and slightly below the pilot, was training his sights on the area where the fighters were. Smoke appeared on the valley floor. The Soviets used mortar shells to indicate where their tormentors were, and the helicopter altered course slightly. It was almost time. Flames shot out of the helicopter's rocket pods, and the first salvo of ordnance streaked downward.

Then another smoke trail came up. The helicopter lurched left as the smoke raced into the sky, well clear of the Hind, but still a positive indication of danger ahead; or so the pilot thought. The Archer's hands tightened on the launcher. The helicopter was sideslipping right at him now, expanding around the inner ring of the sight. It was now in range.

Combat Operations

Soviet and Republic of Afghanistan combat operations, with the exception of the 1979 initial attack and occupation, were defensive in concept and purpose. The intent was clearly to control by occupation. The majority of combat took place between the *Mujahideen* and Republic of Afghanistan forces. The Soviets fought when ambushed, or in limited offensive operations to clear or secure their LOC. The Soviets established garrisons and mutually supporting out-

posts with elaborate, billeted defensive works. Both Soviet and Republic of Afghanistan forces used mines extensively, perhaps 30 million or more throughout the conflict. Fields of sensor, trip-wire, pressure and command-detonated mines encircled every permanently manned garrison and outpost. To deny *Mujahideen* maneuver, the Soviets dispensed scatterable mines by air, artillery, rocket, vehicle mounted pod and hand. Defensively, mines were decisive. No Soviet garrison or outpost was taken by

force. No Republic of Afghanistan garrison or outpost was taken that had not been compromised from within. Although Soviet and Republic of Afghanistan forces were physically segregated, most major operations were combined, with a Republic of Afghanistan first tactical echelon followed by a Soviet second tactical echelon. Soviet troops occupied the garrisons of greatest military importance. Republic of Afghanistan forces, although greater in number, were not trusted with important missions. Republic of Afghanistan defectors share the common belief that Soviets routinely fired on Republic of Afghanistan first echelon forces that failed to engage or follow the plan. As the war progressed, motorized and tank troops operated frequently with lighter airborne, air-mobile and *Spetznaz* troops. *Spetznaz* forces performed traditional light infantry operations, reconnaissance, heliborne insertions

Mujahideen Stinger Success Formula

The best *Mujahideen* fighters

underwent some of the war's best training

and emerged as dedicated and capable gunners who collectively turned the tide of battle.

Gunners were carefully selected based on intelligence, literacy, and dependability. They were proven "killers" with ambition and initiative.

The two-week, 14-hour per day training was intensive and focused. Engagement drills, featuring fire from right killing aspect and correct gunner actions, were top priority. Aircraft recognition was ignored since all aircraft were hostile. "If it flies, it's not *Mujahideen*."

Commanders were responsible for integrating Stinger into combat operations. The *Mujahideen* experimented with and employed innovative techniques.

Lessons Learned Summary

Stinger was the war's decisive weapon — it changed the nature of combat. Stinger directly attacked the Soviet military center of gravity — its airpower. The results demonstrated that control of the air environment is as vital in low-intensity conflicts as in higher intensity warfare.

Soviets were extremely flexible in organizing for combat. They employed mixes of heavy, light and aviation forces and integrated artillery sections into maneuver battalions and companies.

Soviet artillery in Afghanistan could not mass fires. They were heavily dependent on pre-planned fires, shooting rolling fire best and reacting slowly to targets of opportunity.

The Soviet logistic system worked poorly. "Push-packs" were often not what the troops needed. Tactical action forced the Soviets into air supply of low-cube, high-weight cargo, including ammunition and fuel.

Mines carried the day in Soviet defense operations. Mines caused more casualties on both sides than any other weapon.

Soviets reacted poorly when ambushed. Troops stayed in vehicles and took no aggressive action, or dismounted and returned fire from the kill zone.

Soviet motorized rifle and tank troops were not effective. Terrain prevented maneuver and prevented Soviets from making contact with the *Mujahideen*. Dismounted infantry and heliborne *Spetznaz* units operated with the most significant tactical effect.

Soviet operations were almost entirely defensive in nature. Although many offensive operations were undertaken, almost all had defensive purposes.

Stinger provided the rebels with increased endurance. Freedom to maneuver meant freedom to transport supplies and heavier weapons.

and patrolling, ranger-type raids and counter-infiltration ambushes in addition to U.S.-style standard special operations missions.

Spetznaz forces fought with greater effect than motorized and tank forces. Heavier Soviet forces were generally road-bound for reasons of trafficability. Lighter forces maneuvered with more freedom. The Soviets organized artillery in flexible and innovative ways throughout the war. Both Soviet and Republic of Afghanistan forces depended heavily on close support aviation when attacked. Convoys frequently moved with gunships in orbiting escort. Soviet artillery depended heavily on pre-planned and rolling fires.

Prior to the Stinger's arrival, Soviet fixed and rotary-wing aircraft won the day. The conduct of battle changed dramatically in late 1986.

Stinger in the Attack

Stinger immediately changed the

terms of combat. For a month after the first Stinger kills, Soviet and Republic of Afghanistan offensive flight operations stopped. When flying did resume, Stinger continued to kill despite flares and procedural countermeasures. The *Mujahideen* became innovative in employment techniques, ambushing transiting aircraft along known flight routes, shooting cargo aircraft landing or taking off at bases, and using ground ambushes to draw close support aircraft into Stinger's enve-

lope.

In response, Soviet and Republic of Afghanistan pilots began flying very low or very high. When flying interdiction or close support missions, Stinger forced them to deliver ordnance for high altitudes. After the *Mujahideen* gained control of the air environment by fire, their freedom to maneuver expanded exponentially. Because air interdiction became less effective, unrestricted movement of troops and supplies became the norm.

The Archer punched the forward button with his left thumb, "uncaging" the missile and giving the infrared seeker-head on the Stinger its first look at the heat radiating from the Mi-24's turboshaft engines. The sound carried through his cheekbone into his ear changed. The missile was now tracking the target. The Hind's pilot decided to hit the area from which the "missile" had been launched at him, bringing the aircraft farther left, and turning slightly. Unwittingly, he turned his jet exhaust almost right at the Archer as he warily surveyed the rocks from which the rocket had come.

The missile screamed its readiness at the Archer now, but still he was patient. He put his mind into that of his target, and judged that the pilot

Stinger Scorecard

Fired 340
Kills 269

79% Kill Rate

How?

90% Crossing
10% Incoming
Few Outgoing

In August 1986, the *Mujahideen* moved by foot, carrying weapons and supplies with pack animals. They now move over main roads in convoys of commercial trucks. Their logistical infrastructure became ten times what it was three years earlier. In August 1986, the *Mujahideen* conducted raids and ambushes, attacking by fire, until

close support aircraft forced them to break contact. In January 1989, they were systematically reducing Republic of Afghanistan garrisons and outposts by siege.

AirLand Battle Implications

Success on the battlefield will depend on the Army's ability to fight according to five basic tenets: initiative, agility, depth, synchronization and endurance. The *Mujahideen's* operations capitalized on these tenets and verified their importance for air defenders.

Initiative. Control of the air was critical in the *Mujahideen's* attempt to seize operational initiative. Early in the fighting, they were only able to obtain temporary tactical initiative. They were unable to close with the enemy, nor were they able to mass forces. Active air defense changed that. The employment of Stinger enabled the *Mujahideen* to seize the initiative and fight the war on their own terms.

Agility. In the opening stages of the war the Soviets possessed the necessary agility. Using air power as mobile artillery and as a primary method to quickly move troops and supplies, the Soviets could move and react faster than the *Mujahideen*. Stinger ended this. Stinger removed the Soviet's most agile force, its air power, from the battle-

field.

Depth. Depth provides the maneuver commander with the necessary space to effectively maneuver.

Before Stinger, the Soviets could exploit control of the air and move throughout the battlefield. Stinger ended that freedom of action. The *Mujahideen*, who controlled the countryside, now had the advantage of depth and could concentrate their forces at critical points and at will. Counterair depth proved to be as important as maneuver depth.

Synchronization. Prior to the introduction of Stinger, the Soviets were able to synchronize their air and ground operations to limit the effects of *Mujahideen* assaults. Stinger desynchronized Soviet air-ground synergy. Stinger eliminated the Soviet's air component as an effective member of their combined arms team. Stinger also provided the *Mujahideen* with the opportunity to synchronize their own actions, combining forces into ever-larger multi-party and tribal operations.

Endurance. With the air threat diminished, the *Mujahideen* were able to establish a logistical structure that could support large scale operations. They could now press the attack at will with an adequately supplied force. In contrast, the use of Stinger denied the Soviets their aerial fire support and their ability to resupply by air, thus reducing the Soviets' operational capability. Stinger was the key that allowed the *Mujahideen* to increase and maintain their operational tempo.

Stinger was the war's decisive weapon — it changed the nature of combat. Stinger directly attacked the Soviet military center of gravity — airpower — and demonstrated that control of the air environment is as vital in low-intensity conflict as in higher intensity warfare.

Maj. William McManaway is the XO; Directorate of Evaluation, Standardization, Concepts, Studies and Doctrine; USAADASCH; Fort Bliss, Texas.

would come closer still before his helicopter had the shot he wanted at the hated Afghans. And so he did. When the Hind was only a thousand meters off, the Archer took a deep breath, superelevated his sight, and whispered a brief prayer of vengeance. The trigger was pulled almost of its own accord.

The launcher bucked in his hands as the Stinger looped slightly upward before dropping down to home on its target. The Archer's eyes were sharp enough to see it despite the almost invisible smoke trail it left behind. The missile deployed its maneuvering fins, and these moved a few fractions of a millimeter in obedience to the orders generated by its computer brain — a microchip the size of a postage stamp. Aloft in the circling An-26, an observer saw a tiny puff of dust and began to reach for a microphone to relay a warning, but his hand had barely touched the plastic instrument before the missile struck.

— Tom Clancy
The Cardinal of the Kremlin

ADA and the light infantry battalion

The Towed Vulcan's Role

Throughout history air defense of the light infantry task force has been an organizational and equipment challenge. To defend light division logistics, artillery and maneuver units without overtaxing the division's already stressed support structure creates difficulties. Because of these difficulties, antiaircraft units were not organized in airborne divisions until 1944.

Maneuver battalions in light divisions represent a far tougher target for enemy air to detect. However, light division artillery units, TOW positions, brigade support areas (BSAs) and the division support area (DSA) are just as easy to detect. Their loss represents a far greater loss to the combat power of light divisions. Therefore, the air defense of rear area priorities must receive more air defense consideration than in heavy units.

At the Joint Readiness Training Center (JRTC), Fort Chaffee, Ark., ADA observer/controllers emphasize rear area air defense training objectives and convince brigade commanders to pull Vulcans and Stingers off the BSA, to get them in the task force fight. Most often, light infantry battalions get only Stinger protection as Vulcan ammo resupply forward would overstress the already meager divisional supply system. Additionally, the Vulcan's short range and its perceived ineffectiveness mitigate paying the costly logistical price.

Is there a role for the towed Vulcan in the light infantry battalion? If so, how can the ADA battalion

organize to ease ammo resupply?

Prioritization is critical for the ADA unit defending a light infantry battalion. The immediate tendency is to look to the rear of the battalion sector for static assets — trains, command posts, artillery — which are vulnerable to detection and air attack. This thinking is reinforced by the fact that one five-team Stinger section easily provides an area defense for the entire task force sector, which frequently measures 3 x 6 or 8 kilometers at the JRTC.

The fact that light units are best used in heavily wooded terrain prevents templating a Stinger section's coverage over the battalion sector. A thorough map terrain analysis must be done to select fire unit locations, followed by a ground reconnaissance to confirm the availability of fields of fire. Jungle or heavily wooded terrain may preclude employment of ADA in parts of the light battalion's area.

Another major consideration in positioning ADA is security, an execution task in FM 44-100, *ADA Operations*. Stinger and Vulcan positions, if not tied into an infantry defense, are most vulnerable to enemy scouts and dismounted infantry. All the more reason to employ them in the division rear.

Engineering activity and sometimes infantry units occupying key terrain are vulnerable to detection by scouts and thus subject to an interdiction. Given this need for forward defense (with its associated perils), how can light air defenders defend forward and survive?

One solution might be a Vulcan/

Stinger assault team consisting of two Vulcans and a Stinger team. Given the typically narrow light infantry battalion sector, the ADA assault team could defend a critical forward location and survive, and supply itself, using its mobility.

A typical team might consist of four vehicles. Two towed Vulcans, the Stinger team and a leader — the Vulcan platoon sergeant or platoon leader. The leader could do the necessary planning to extricate the team from the battlefield, if the situation dictated.

Use the leader's vehicle to haul or shuttle ammunition to the defensive position. Ammunition in the leader vehicle and the Vulcan and Stinger high-mobility multipurpose wheeled vehicles (HMMWV's) is sufficient to accommodate the initial air battle. If a sustained fight is expected, or if the Vulcans are intended for use in the ground role, pre-stock 20mm ammunition.

Form an ADA assault unit using a Stinger team from the Stinger section normally associated with the defended infantry battalion, or from battalion assets.

Advantages of an ADA assault unit seem obvious. It can protect a critical point on the battlefield and provide ground fire, if ammunition is available. It gets Vulcan into the forward light infantry battle, where its firepower can combine with Stinger to synchronize the ADA fight at a critical time and place. Its success depends on thorough intelligence preparation of the battlefield and the unit flexibility necessary to create the unit.

soldier, husband, father, artist

Matlick

Robin Matlick, in tribute to her father, said: "My father was but a mere 50 years old at the time of his death, but in those 50 years he truly lived what most of us could not in a century. Many of you know of his achievements. Somehow he managed to combine a fulfilled life as a superior soldier, countryman, father, husband, artist and humanitarian. Dad strived for excellence in all these areas and was blessed by the Lord to have the talent to achieve just that — excellence."

The Air Defense Artillery Association now offers a portfolio of cartoons created by one of ADA's own — Col. Robert R. Matlick. Although he died in 1985 when only 50 years old, he lives on in the memories of family and friends and through the bursts of humor he touched off through the end of a potent pen.

Matlick was a soldier who knew how to make people laugh. He once said, "If you can get a GI to laugh at some of his hardships, it makes things a little more bearable." Born with an "OD diaper" on, Matlick spent his life in the Army. His father, who retired a lieutenant colonel after 33 years of service, was his hero.

Torn between choosing a career in the military and a career in commercial art, he chose the military. After high school, Matlick studied commercial art for three years, completing his studies and joining the Army as a private in 1955.

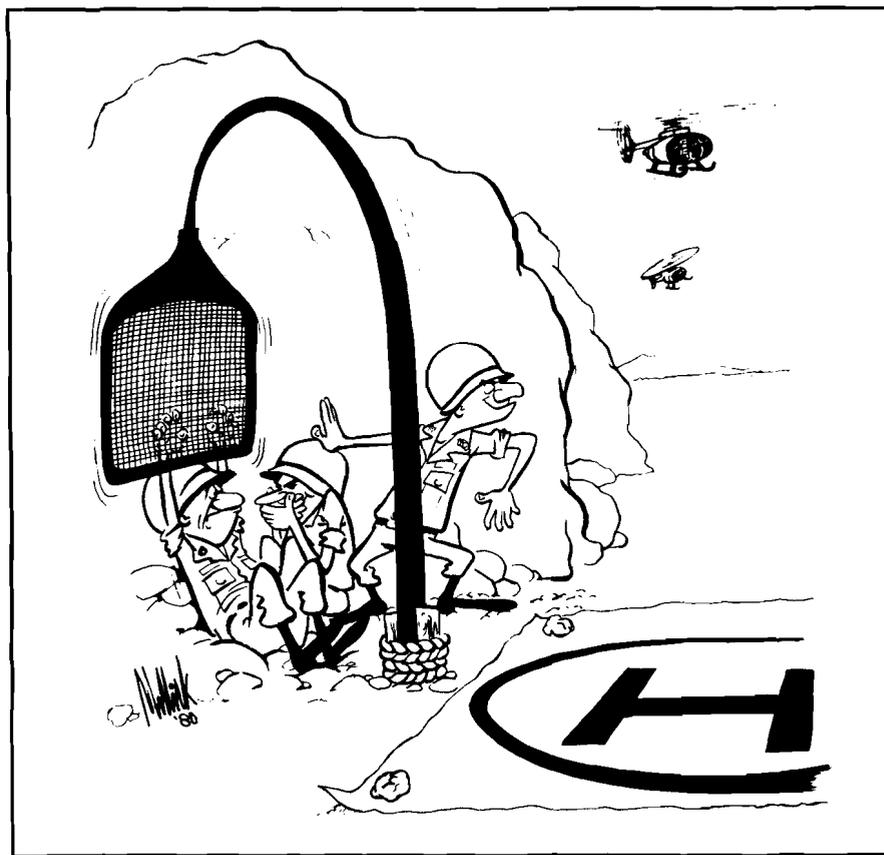
"I had no choice really," he said in a 1982 interview for *Air Defense*

Magazine. "I was born and raised a soldier. Art was a spinoff: something in me I didn't understand but had developed a need for. Art fed my soul, but the Army fed my other needs."

Although probably more widely known for his cartoons than his military accomplishments, he could deservedly take pride in a distinguished military career. For example, he survived two tours as an armed helicopter pilot in Vietnam with 1,200 combat missions to his credit. He had been awarded the

Distinguished Flying Cross, the Soldier's Medal, the Bronze Star and the Air Medal with V device and 32 clusters, to name a few. He had been a flight instructor, served on the Army General Staff with the Office of the Deputy Chief of Staff for Military Operations in Washington, D.C., and commanded both the Instructor Group of the 1st ADA Training Brigade and the Staff and Faculty Battalion of the School Brigade at Fort Bliss.

If it is possible to have the best of all possible worlds, Matlick suc-

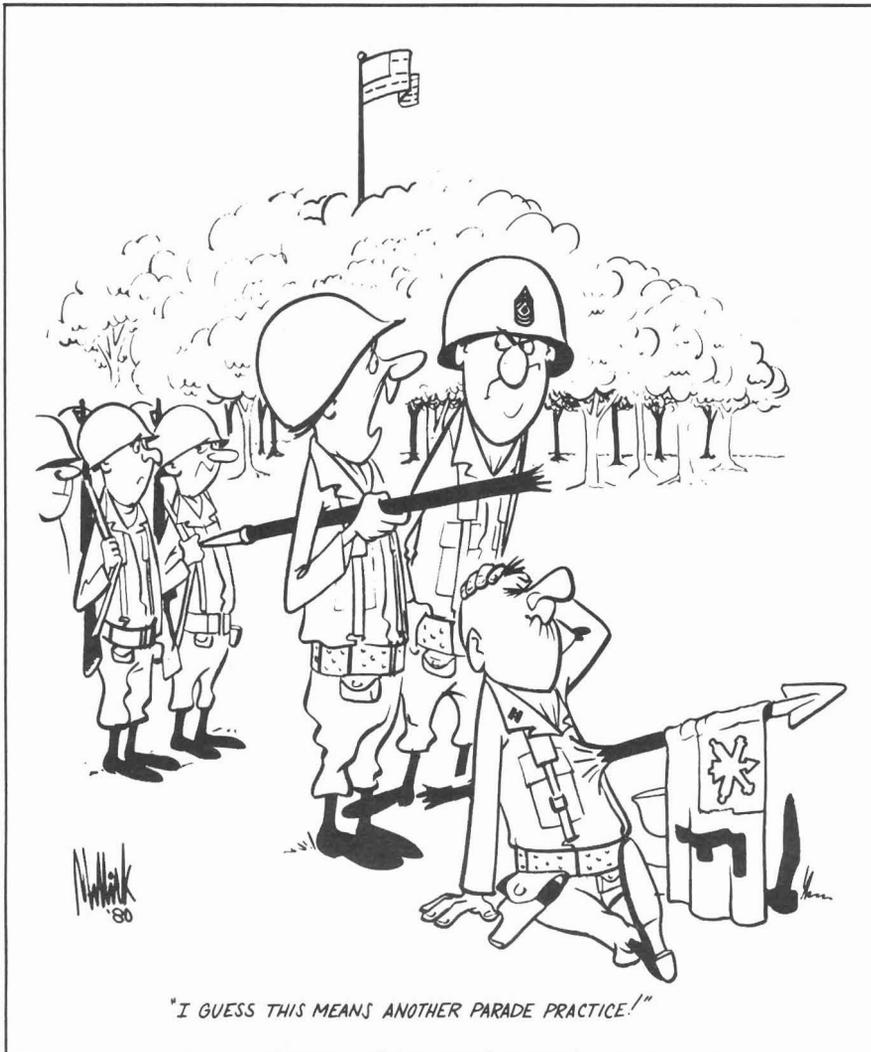


ceeded by combining the three things he loved most — his family, his career and his avocation. He was proud to serve as president of the Air Defense Artillery Association. He believed it was his mission to help develop in soldiers the *esprit de corps* and sense of history that is a necessary part of military life.

However, Matlick was known as a cartoonist in the Army from the very beginning. His ability to see the humor in sometimes humorless situations and to put those ideas on paper to share with others always set him apart. He gained increased notoriety with the release of his book, *The Best Year of Your Life*, a collection of cartoons chronicling life at the Command and General Staff

College, which was published in 1972. In 1983, the illustrated saga of U.S. Army War College attendees was presented in *Iucunde Repetitio Iuvat* (It's Good to Remember). Throughout his career, he generously drew for everyone — friends, retiring co-workers and commanders alike. To this day, some of his earliest drawings may still be found in battery operations centers wherever there are air defenders.

And now, ADA soldiers may purchase a portfolio of 16 selected cartoons, each measuring 10 3/4 by 13 3/4 inches and suitable for framing, for \$12.50 plus \$2.50 for shipping and handling. You may place an order by calling (915) 564-4331



(AV 978-5412) or writing U.S. ADA Association Gift Shop, P.O. Box 6101, Fort Bliss, Texas 79905.

"I am filled with grief at the passing of my father," said Robin, "but I cannot or will not feel he was cheated in the fulfillment of his life's goals. In the last letter I received . . . he expressed something that brings much solace to me at this time. He was writing to me after a recent visit to Washington and I would like to share this excerpt with all of his family and friends:

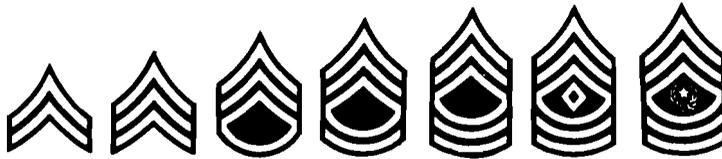
"I was thinking about my life during my plane trip from Washington and it occurred to me that I have had a very full and satisfying life. Unlike many, I have never had a desire to return to the past in search of the best thing in my life. To me, it always seems that the present is the best year of my life."

" . . . It is my understanding that my father was well received, liked and respected by his peers and subordinates, a following which I'm sure he achieved through his well-refined ability to communicate with people. When Dad rendered a speech on Sept. 3, 1980, accepting the colors from the Staff and Faculty Battalion, he used the words of a favorite soldier of his, Gen. George S. Patton:

"The badge of rank which an officer wears on his coat is really a symbol of servitude to his men."

"Although my father no longer lives in body, he will continue to live in spirit — through that little piece of himself which he gave to all of us who knew and loved him."





ADA FORUM

"ADA Forum" has replaced "NCO to NCO" as the communication vehicle for the Command Sergeant Major of Air Defense Artillery. Through these columns the sergeant major will answer questions from air defenders in the field that will benefit or interest all enlisted air defenders.

This is my first "ADA Forum" article and the first question comes from an air defender in Europe.

I am a staff sergeant stationed in Germany. I have been told that I must return TDY to Fort Bliss for Basic and Advanced Noncommissioned Officers Courses. Is this true?

Yes. Beginning Oct. 1, 1989, Air Defense Artillery's Basic Noncommissioned Officers Course (BNCOC) will be conducted only at Fort Bliss, Texas. Because of the amount of ADA systems required for the BNCOC equipment phase and the fact that these systems must come from ADA TOE mission units in Europe, the limited BNCOC school at Hohenfels, Federal Republic of Germany, was closed last summer.

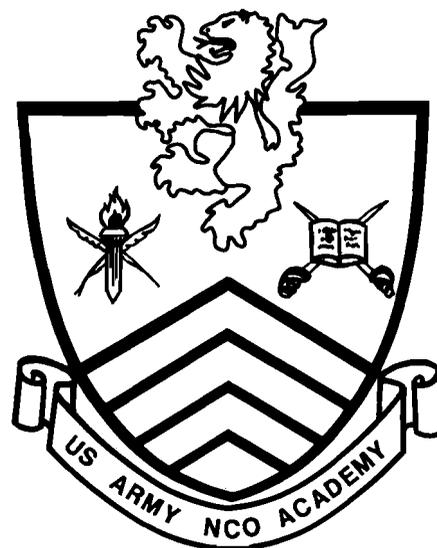
BNCOC is a five-week, two-day garrison-type course (you must stay in the barracks) conducted in the Logan Heights area of Fort Bliss for common core courses and at Fort Bliss proper for the tracking phase. BNCOC common core has six blocks: leadership, training management, communications, professional skills, resource management and military studies. It builds on leadership skills, introduces new doctrine and provides refresher training. A two-day field training exercise (FTX) culminates BNCOC (scheduled to increase to three days in FY 90). BNCOC teaches Skill Level 3 tasks to both male and female Active and Reserve Component air defenders.

The Department of the Army selects staff sergeants (E-6) and sergeants promotable (E-5(P)) in career management field (CMF) 23, combat support/combat

service support MOSs (24C30, 24G30, 24M30, 24N30, 24T30 and 25L30) for attendance at BNCOC.

CMF 16, combat arms MOSs (16D30, 16E30, 16J30, 16P30, 16R30, 16S30 and 16T30) soldiers are ranked on an order-of-merit list by priority (Priority 1 — E-5s(P)/E-6; Priority 2 — E-4(P)/E-5 in leadership positions). Battalion sergeants major maintain this list. Quotas for CMF 16 BNCOC/CA courses are determined by the number of Priority 1 soldiers assigned to the various training regions using a formula dictated by Headquarters TRADOC. Once a number of quotas are received by your unit, your sergeant major will select the most eligible candidates to attend these courses.

Beginning Oct. 1, 1990, graduation from BNCOC is required for promotion to sergeant first class (E-7). This means that competition for BNCOC classes will



ADA FORUM

increase. If you qualify for one of these BNCOC courses, contact your battalion or brigade schools NCO to ensure that your name is on the order-of-merit list.

The Advanced Noncommissioned Officers Course (ANCOC) is held at the Biggs Army Airfield area of Fort Bliss. Selection for ANCOC is accomplished by a centralized board at DA level. Completion of ANCOC is a requirement for promotion to E-8.

The seven-week, two-day ANCOC also couples a common block of leadership and tactical training with advanced skill training. ANCOC common core has six blocks: leadership, operations and tactics, professional skills, effective communications, resource management and military studies. The course prepares staff sergeants for duties as sergeants first class. Students learn the latest leadership doctrine and practice the two critical areas of communication: speaking and writing. They study the basic concepts applicable to the management of people, logistics and maintenance. Most of all, the training emphasizes the role of the platoon sergeant and section sergeant on the battlefield in both offensive and defensive tactical field operations. ANCOC also concludes with an FTX.

How can I prepare for these courses?

Unless you are stationed at Fort Bliss, the NCO Academy will provide the necessary TA-50 equipment and study materials for BNCOC and ANCOC. However, it is important that you have your complete basic issue uniform items with you.

Take the Tests of Adult Basic Education Edition A (TABE-A) as early as possible. NCOs should be rated with a 10th grade reading comprehension level. Take it now, so if you need remedial training you can work on it before attending BNCOC. A low reading comprehension level will not stop you from attending BNCOC. But according to CSM Jackie Ward, commandant of the NCO Academy, there is a direct relationship between those who do not satisfactorily complete the course and those who have a low reading comprehension level.

If you are not in the best physical shape, or if you do not meet the height and weight standards under AR 600-9, get to work. You must have passed the Army physical fitness test within the past six months. If you must be taped make sure it is done right. If you were borderline when you left your unit you will be re-taped

when you arrive. Overweight soldiers are not accepted in BNCOC or ANCOC and will be returned to their units without credit. Being eligible for re-enlistment is also a prerequisite.

Reading comprehension and physical training tests are conducted after you arrive at Fort Bliss; however, the short duration of these courses does not allow enough time to correct shortcomings. If you are not presently working on your weapon system, either do so or get a review through Army correspondence courses. You must be trained (initialed off) on 70 percent of all MOS tasks in your individual soldier's job book within the past six months. Also, you should have passed your SQT within the last 12 months.

I cannot overemphasize the need for self-improvement. You need to help the Army help you by preparing yourself for these professional development courses.

Your battalion or brigade S-3 schools NCO has a copy of DA Pamphlet 351-4 containing the necessary information on what is required for attendance at these courses.

How much "out-of-pocket" money does it take to attend BNCOC or ANCOC?

This depends on you. Do you still have all your basic issue uniform items? Do they fit? Do you have the correct insignia? Does your footwear meet inspection standards? Do you have the correct physical training uniform? If your basic issue uniform items have been kept in shape and up to date you don't have any worry. If, however, your uniforms no longer fit, are incomplete or are in need of repair or replacing, it could cost you what you call out-of-pocket money.

— CSM Robert W. Harman
U.S. Army Air Defense Artillery School

If you have a question you would like to have answered through this column, address your question to CSM Harman through the magazine or to:

CSM Robert W. Harman
USAADACENFB
ATZC-CGC
Fort Bliss, TX 79916-5000

DOCTRINE

&

LICs

Can the gap be bridged?

by Maj. Gary J. Tocchet

Does a void exist between current air defense doctrine and the demands engendered by low-intensity conflict and limited war? Maj. Tocchet offers an answer to this question by developing a construct for air defense through theoretical and historical analysis and then comparing this construct to current air defense doctrine. A summary of basic guidelines for a tactical theory of air defense in the lower end of the conflict spectrum, an estimate of where we are today and some recommendations for future study conclude his article.

Air defense emerged to fulfill a tactical role on the high intensity battlefield. Since 1945, however, "low-intensity conflicts (LICs)" and "limited wars" have increased in frequency. These occurrences led to a maturation of thinking about conflict involving military action. They convinced political and military thinkers that

such conflicts consist of a spectrum of intensity characterized by different activities and requiring different responses.

Developing a spectrum model and analyzing its use became the basis of a small separate industry in academic circles. Arguments over definitions and the characteristics of certain types of conflicts produced little consensus. Yet I will establish a preliminary concept of conflict to develop a later analysis of air defense doctrine in the lower end of the conflict spectrum, using a recent model developed by Sam C. Sarkesian¹.

Sarkesian developed a model of conflict spanning military activity from non-combat military operations to "major" nuclear war. The diagram on the next page graphically portrays Sarkesian's conflict spectrum.

Under the rubric of "unconventional conflict," Sarkesian sees "special operations" as primarily

highly precise small-unit operations with roots resting in conventional doctrine, planning, training and operations. Special operations are usually of short duration and include surgical strikes, hit-and-run raids, counterterrorism, some drug interdiction operations and hostage rescue. Sarkesian argues that LIC is primarily revolution, counterrevolution and terrorism evolving from such conflicts. These conflicts are usually long-term and focus on the political-social milieu of indigenous systems.

With this model in mind, one must understand that a debate now rages over the perceived shortcomings in the U.S. Army's current warfighting doctrine — AirLand Battle. Some writers, such as Col. Richard M. Swain², describe it as a "doctrine of traditional warfare between continental armies" and, thus, not directly applicable to LIC. In all fairness, the Army's AirLand Battle FM 100-5, *Operations*, does

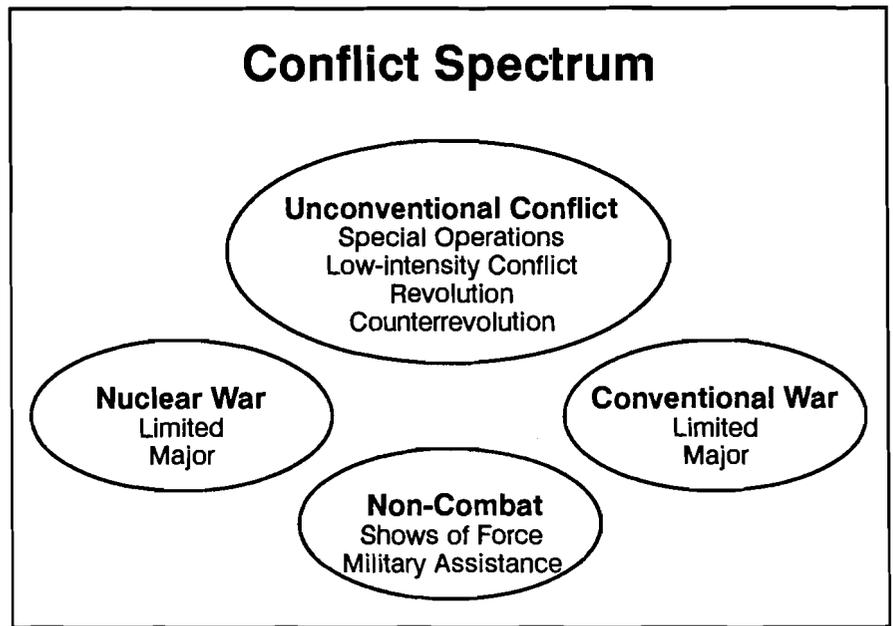
not ignore LIC or "mid-intensity" conflicts. However, the recently completed FM 100-20, *Military Operations in Low-Intensity Conflicts*, indicates that the Army must wrestle with the articulation of two separate doctrines.

This debate deserves consideration in the development of U.S. Army air defense doctrine. All of the Army's combat and support branches are developing their specific operational concepts, "how to" procedures and supplementary publications with FM 100-5 as their warfighting standard. U.S. Army air defense doctrine is no exception. If doubts and confusion exist about U.S. doctrine in the range of conflicts short of major or general conventional war, then there is cause for doubt about current tactical air defense doctrine and its applicability to those types of conflict.

The development of a tactical doctrine for air defense in the LIC and limited war portions of the conflict spectrum is significant for several reasons. First, air defense is one of the seven battle operating systems (the others are intelligence/electronic warfare, maneuver, combat service support, mobility/survivability, fire support and command and control). It is important to determine if the peculiarities of LIC and limited war affect the function of air defense systems and operations. Second, modern nations and particularly many third world nations, where these types of conflicts are more likely to occur, have modernized and increased the potential air threat in these scenarios. Finally, one discerns from recent history a growth in the importance of air defense in these conflicts.

Tactical Theory and Air Defense

"The airspace of a theater," according to FM 100-5, "is as important a dimension of ground operations as the terrain itself." This



airspace's purposes include maneuver, reconnaissance, transportation, delivery of fires and command and control. Joint Chiefs of Staff (JCS) Publication 26 states, "... counterair operations are those operations conducted to attain and maintain a desired degree of air superiority by the destruction or neutralization of enemy forces. U.S. doctrine currently sees counterair operations as joint operations which include offensive and defensive measures taken against the enemy air threat. Air defense is the term for the ground forces' contributions to joint counterair operations."

FM 44-100, *U.S. Army Air Defense Operations*, states that, "... at the tactical level of war... air defense artillery protects the force and preserves freedom to maneuver." The ground force is capable of conducting various active and passive counterair operations that assist air defense units in this mission. Passive defensive counterair operations include dispersal, hardening, camouflage, cover, concealment and signature reduction. In addition to air defense weapons' fires, active defen-

sive counterair operations include rotary-wing air-to-air combat; combined arms fires from tanks, artillery and fighting vehicles; and small arms for air defense. Ground forces can also conduct offensive counterair operations with ground raids and by directing fire support and electronic warfare assets against threat airfields, arming and refueling points, and command and control nodes. Finally, ground forces can contribute assets to suppress enemy air defenses in a counterair operation.

Air defense is most often seen as an important component of the battle function of protection. J. F. C. Fuller³, between the two World Wars, first integrated this protection function into modern tactical theory. Fuller argued that five tactical functions provided the framework for tactics, organizational structure and equipment design: "To discover, to hold, to hit, to protect and to smash." The purpose of protection was to shield one's forces from enemy blows. Fuller believed that one of the main factors that influences protective measures is command of the air. Fuller believed that along with advances in

aircraft technology, antiaircraft appliances and artillery would grow so effective as to make it highly dangerous for aircraft to attack a strongly protected area. For Fuller, armies would never really be outside of aircraft striking distance, and this fact vastly increased the importance of the protection problem.

The U.S. Army's current doctrine identifies maneuver, firepower, protection and leadership as the four elements of combat power. A commander needs to protect his resources so he can apply them at the decisive time and place. Since an enemy can use air means to destroy one's combat power, protection of the force must include operations to counter the enemy's air power. Given this general understanding of U.S. counterair theory, I will now establish some theoretical air defense considerations in LIC and in limited wars.

Tactical Theory

FM 100-20 defines LIC as "a politico-military confrontation between contending states or groups below conventional war and above the routine peaceful competition among states." FM 100-1, *The Army*, defines LIC as "... a limited politico-military struggle to achieve political, social, economic or psychological objectives. It is often protracted and ranges from diplomatic, economic and psychosocial pressures through terrorism and insurgency. Low-intensity conflict is generally confined to a geographic area and is often characterized by constraints on the weaponry, tactics, and the level of violence."

Such definitions do little to ease conceptualization of LIC. LIC takes place somewhere in the ambiguous environment between peace and war. Often in LIC, the U.S. will operate under peacetime parameters in a war-like environment. Although current doctrine

recognizes the primacy of the political struggle and the political solution in LIC, it also acknowledges the use of military force as a means in that struggle. FM 100-20 echoes the President's National Security Strategy Document when it contends that the principle U.S. military instrument in LIC is security assistance. However, there will be times when the United States may engage in more direct military operations when it cannot protect its vital national interests by other means.

According to FM 100-20, direct U.S. military operations in LIC fall into four categories: insurgency/counterinsurgency, combating terrorism, peacekeeping operations and peacetime contingency operations. In insurgency or counterinsurgency operations, U.S. security interests may lie with an incumbent government or with the insurgents. U.S. assistance to the *Contras* in Nicaragua and the *Mujahideen* in Afghanistan are examples of insurgency support. U.S. activity against the Viet Cong in Vietnam and the FMLN in El Salvador are examples of counterinsurgency support. Combating terrorism includes both antiterrorism and counterterrorism actions throughout the entire spectrum of conflict. Seizure of the hijackers of the *Achille Lauro* was a counterterrorist action. Peacekeeping operations are military operations which maintain peace already obtained through diplomatic efforts. U.S. operations in Lebanon and in the Sinai have served this purpose. Finally, peacetime contingency operations include such varied activities as emergency evacuations, disaster relief, certain drug interdiction operations and selective use of military force in demonstrations or strikes. Grenada and the U.S. air strike against Libya are illustrations of peacetime contingencies.

As noted earlier, Sarkesian takes

more pains to delineate these activities than FM 100-20 does. For example, Sarkesian argues that many of the operations that FM 100-20 categorizes as LIC contingency operations are not LIC at all but are better understood by terming them special operations. Regardless of these differences both sources agree that LIC is often a misnomer. Sarkesian contends that these conflicts be categorized as LICs primarily for policy purposes, not because of the character of the conflict on the ground. For the indigenous groups involved, such conflicts cannot be seen as a conflict short of war for it may in fact be total war for them. In many cases, FM 100-20 argues, these military actions are distinguishable from those in conventional war often in objective and more by differences in kind, than by degree of intensity.

Similar to the differences in definitions and categories of LIC are the problems presented by LIC's conflict neighbor, limited war. FM 100-1 defines limited war as "armed conflict between two or more nations, at an intensity below that of general war, where means and/or ends are constrained." This differs from general war or, as Sarkesian terms it, major war. General war is seen as armed conflict between major powers, in which the total resources of the belligerents are employed and the national survival of a major belligerent may be in jeopardy.

Once again, intensity level is often an inadequate measuring device. Wars in Korea and Vietnam, labeled limited wars from the U.S. perspective, were not limited from the Vietnamese and Korean perspectives. Sarkesian argues that in advanced phases of LIC, U.S. light infantry forces could take part in active combat. Retired Gen. Paul F. Gorman⁴ presented a different view when he separated LIC from mid-intensity or limited war, arguing

trenchantly that when U.S. combat forces are introduced in a LIC scenario, the conflict ceases to be LIC. U.S. fire and maneuver and America's cultural baggage transform and escalate the conflict.

Confusion and gray areas exist in trying to define levels of conflict. More definitions or new philosophical concepts of what does or does not constitute war or a distinctive level of conflict are beyond the scope and purpose of my article. The military doctrine writer needs an understanding of the given conditions within which he must perform so that he can discriminate between categories of military action. I will attempt to do that for air defense.

Much of our categorization and thinking about conflict is filtered through a lens of past military perceptions and Western culture. This is shortsighted. The character of conflict constantly changes. We need to understand that most future conflicts will be wars of subversion in some form. They will range between what I (in this paper) loosely term LIC and limited war — taken together, the lower end of the conflict spectrum.

What "kind" of battlefield peculiarities will the lower end of the spectrum engender? More often than not the battlefield will be located in a country that lacks a national infrastructure that can easily support modernized forces. The battlefield will usually have a non-linear character and will require unique aspects of intelligence gathering and preparation, a focus on politico-military objectives and a tailoring of forces.

The operational context is often a

Third World culture. In LIC operations particularly, the resources used and the strategy, doctrine and tactics must be congruent to the indigenous system. Success in LIC is not measured by merely winning battles and military campaigns, because political objectives cannot be met with the use of military power



Mujahideen air defenses yearly were shooting down \$2.5 billion in Soviet aircraft at a cost of \$6 million.



alone. Finally, although a "primitive" LIC foe does not automatically nullify technological advantage as some would have us believe, mere possession of advanced technology does not bring one closer to victory. One must use technology judiciously and appropriately in LIC.

Technological advances impact on the entire spectrum of conflict, but have had dramatic effects in LIC and in limited war. The vulnerability of developed societies increases at the same time that more advanced weapons become available to potential enemies. Nowhere is the technological impact more pronounced than in the technological advances in aircraft. Aircraft have become the weapons of choice for power projection. They provide firepower, transportation, reconnaissance and rapid insertion of ground forces.

Transfer of these advances to Third World air forces poses a growing threat. Between 1972 and

1982, the developing world bought 6,630 supersonic jets and 2,070 subsonic attack fighters. Fifty-six percent of these transfers were from the Soviet bloc and beyond Western control. This proliferation threatens a major power's ability to unilaterally project military power into many areas, and the cost of such projection is rising sharply.

Countering advances in aircraft technology, there have been similar technological advances and proliferation of air defense systems. This is not without its own set of implications. During the same 10-year period referred to above, developing world nations acquired 35,735 surface-to-air missiles and well over 6,000

antiaircraft guns. Not only is it highly possible that both sides will have aircraft in some scenarios, but it is just as likely that both will have air defense systems. Depending on the individual conflict, the vertical dimension of the battlefield in LIC may, for periods of time, harbor a mid- to high-intensity conflict environment.

The preceding discussion provides some important guidelines for air defense in the lower end of the conflict spectrum. Although it would be difficult in the scope of this article to develop a specific tactical doctrine for every scenario and every weapon system, it is possible to suggest a framework upon which theoretical, general and tactical doctrine can be built. Several important guidelines need to be considered (see next page).

The guidelines or principles discussed hold implications for U.S. air defense doctrine as well as technology, command and control and

Guidelines

In planning for such operations, a detailed IPB must include considerations of the air and air defense threats. The ground commander must realize that LIC or a limited war does not always equate to a low-intensity air threat. Similarly, the air component commander must assess the air defense threat in the area of potential air operations.

A second guideline consists of factors that deserve consideration when advanced air defense technology is offered to a belligerent engaged in LIC. If such technology is transferred, it should create an economical countermeasure against devices that provide undue leverage to the adversary. Air defense systems are very expensive and may preclude other more useful aid. Yet, in relative terms, these air defense systems are much less expensive than the aircraft they can destroy. Additionally, the supplier should appraise the average user's skill and the operational environment. The supplier and recipient should carefully consider training requirements, employment possibilities, maintenance requirements and operation simplicity.

Risks exist in sending air defense weapons and technology to one of the antagonists. As with other weapon systems, the supply of air defense systems may escalate the conflict. Is this desirable? Also, if the weapons travel through intermediaries and indirect channels, are the recipient and supplier able to tolerate "losing" a percentage of the weapons en route? How will this affect the recipient's plans? Can the supplier afford the risk of having his technology fall into other hands — terrorists, unfriendly nations, hard-to-control allies or weapons competitors?

A third guideline emerges from the political com-

plexity of these conflicts. Political decisions may affect aircraft targeting, flight paths, air defense weapon locations and ROE. These parameters may profoundly affect air defense planning and design.

Air defense weapons, as a fourth consideration, can provide LIC insurgents with the important elements of surprise and buoyed morale. These weapons reduce the feelings of fear and frustration that the ground insurgent often experiences when facing hostile aircraft. These weapons are also excellent propaganda purposes in LIC and in limited wars because they are seen by sympathetic non-combatants as defensive weapons, are indicators of formidability and serve as a source of belligerent pride.

Finally, there should be no slavish acceptance of high-intensity conventional doctrine for the lower end of the conflict spectrum. Current U.S. air defense doctrine stresses the universality of the air defense employment principles of mass, mix, mobility and integration. Mass refers to the concentration of air defense combat power. Mix is the employment of a combination of weapon systems to protect the force from the air threat. Mobility is the capability to move from place to place while retaining the ability to perform the air defense mission and maintaining survivability. Integration refers to the coordination of air defense operations with the supported commander's concept of the operation. In LIC, perhaps more than in conventional conflicts, the operational reality may preclude compliance with these principles. At other times these principles may be adhered to in novel ways. This may also hold true for specific weapon employment guidelines.

security assistance. How well do these implications face the task of history and how well does our current doctrine consider them?

A Historical Perspective

Military operations in Vietnam, Afghanistan, the Falklands and Lebanon provide us with a series of historical examples of the planning and execution of air defense in the LIC-limited war range. I use these historical illustrations to test the validity of the theoretical guidelines previously presented.

Vietnam. The surprise of massed Vietminh artillery and the poor tactical location of the French base at Dien Bien Phu in 1954 are often cited as the causes of the French defeat there. Less known, however, are the Vietminh's preparation and execution of a counterair campaign that contributed substantially to the defeat of the French.

At the beginning of the siege, French intelligence located 170 enemy antiaircraft positions. By the time the French garrison surrendered, 740 had been located. So-

viet and Chinese 12.7mm, 37mm and 20mm antiaircraft guns, artillery fire and a raid against the Cat Bi air base which destroyed 18 transport aircraft on the ground contributed immeasurably to the stranglehold on Dien Bien Phu. Dien Bien Phu was connected to French resupply and air support by an ALOC of 100 transport aircraft and 75 combat aircraft. During the siege, 48 French aircraft were shot down, 14 were destroyed on the ground at Dien Bien Phu and 167, at some time during the siege, re-

ported flak damage. The Vietminh massed their air defense weapons on the major air approach pattern to Dien Bien Phu and around their deadly artillery.

At Dien Bien Phu, air defense weapons were used to isolate the besieged force, nullify interdiction and provide the attackers with freedom of maneuver.

The French underestimated the threat Vietminh air defense posed to their air support of the French garrison. The Vietminh conducted a thorough and effective intelligence preparation of the battlefield (IPB). At the lowest tactical level, Vietminh anti-aircraft systems were as well-camouflaged as their artillery emplacements. At

times, they sacrificed early engagement and mutual support between weapons to maintain concealment until final commitment. Dien Bien Phu stands as an impressive example of air defense supporting an offensive operation.

The deployment of U.S. Air Force fighter and bomber squadrons, in a limited war scenario, to Southeast Asia in 1965 represented the largest gathering of American airpower since the Korean War. While the United States amassed this air armada, the North Vietnamese were building a defense system which reached densities never before seen or experienced in air warfare. It consisted of Russian MiGs (first MiG-17s, then MiG-21s), anti-aircraft guns, SA-2 surface-to-air missiles (SAMs), and radar sites. As the contest over North Vietnamese bridges, troop areas and logistic targets wore on, it elicited more sophisticated U.S. offensive weapons and evasive tactics.

Approximately 850 USAF craft were destroyed in Vietnam from 1965 through 1972. Two-thirds of that number were lost as a direct result of enemy action. With the appearance of the Soviet SA-7 Strella (a shoulder-fired SAM) in 1972, most of the air defense weapons that were to gain such wide notori-

missions and provided a morale boost to the North's population.

The North used an impressive mix of air defense systems. They combined their older anti-aircraft guns with 85mm and 100mm guns and SA-2 missiles. Attempts to defeat the missiles by low-altitude ingress brought aircraft into the gun envelope. The SA-2 was designed as a point defense weapon against single mid-to high-altitude bombers. It gave off a dramatic signature and had limited maneuverability. By using camouflage, reducing radar emissions and constructing multiple launch sites, the North turned the SA-2 into an integrated area defense weapon employed in an operational environment far different from that which its Soviet designers originally intended.

The Lam Son 719 operation in Laos typifies what may be encountered when a large rotary-wing assault force conducts a deep strike.

Lam Son was a 45-day operation that began in February 1971. Supporting ARVN ground forces, the U.S. committed more air and artillery to this single battle than at any other time during the war. More helicopters received combat damage or were shot down during Lam Son than at any other comparable time in the war. Of the 659 Army helicopters committed, 68 percent received combat damage and 14 percent were destroyed. As Lam Son unfolded, combat air assaults were planned primarily on intelligence pertaining to crew-served anti-aircraft gun locations rather than enemy troop concentrations.

Lam Son offers two important tactical lessons. First, although not

The Falklands campaign highlights the import and difficulty of integrated counterair operations.

ety during the 1973 Arab-Israeli War were already deployed in Southeast Asia.

We can glean some important lessons from the North Vietnamese air defense:

Political considerations established ROE that created sanctuaries for the North's missile and anti-aircraft gun sites. This imposed a high level of predictability on air operations and assisted the North in air defense planning.

The North's air defense effectiveness cannot be measured simply by the SAM's average success rate of only one kill in every 50 launches. Contrary to the exaggerated claims of the North, this was a poor kill ratio. However, the SAM threat did dictate U.S. entry and approach tactics, required the diversion of effort and development of expensive force packaging with new munitions, caused reflown missions because of jettisoned ordnance and missed targets, disrupted

officially sanctioned at the time, many U.S. pilots felt they had to change tactics and use nap-of-the-earth (NOE) flying techniques. Those skilled enough to use them believed these tactics enhanced aircraft survivability in what became a mid-intensity, high antiaircraft threat environment. Second, North Vietnamese antiaircraft engagement discipline created a formidable challenge to aerial and ground artillery air defense suppression. Communist guerrilla and regular forces often practiced "hugging" tactics when engaging U.S. or U.S.-supported ground forces. Enemy forces would try to engage U.S. ground forces at close range to negate superior U.S. indirect and standoff firepower. These hugging tactics, plus a large dispersion of high troop concentrations which massed small arms and heavier anti-aircraft weapons, made suppression difficult. The majority of aircraft losses occurred in, or in close proximity to, landing zones.

Afghanistan. The experience of the *Mujahideen* in Afghanistan offers an excellent case study of the potential implications of providing air defense weapons to an insurgent or rebel group.

Although no hard evidence, at this time, shows that air defense weapons altered the essential stalemate, no one seriously doubts that advanced air defense technology caused Moscow considerable discomfort. Before 1986 and the *Mujahideen's* receiving shoulder-fired, manportable British Blowpipe and U.S. Stinger missiles, the Soviets were annually losing approximately 100 aircraft to operational attrition and 20 aircraft to rebel air defense. Rebel air defense consisted of small-arms fire, 12.7mm and 14.5mm guns, 20mm Swiss Oerlikon guns and a few Chinese and Egyptian SA-7 clones. The most conservative estimates now place Soviet aircraft losses at .8 a day.

With a conservative 33-percent kill probability attributed to the new missiles and continued operational attrition, the Soviets were losing 390 to 510 aircraft a year when they began their withdrawal.

The supply of applied air defense technology to the rebels made LIC more expensive for the counterinsurgents. The British and American 1986 decisions to supply missiles were deliberate decisions to escalate the war and force the Kabul and Soviet governments to pay a higher penalty for their actions. The Soviets have repeatedly protested these transfers. The missiles became an economical countermeasure to advanced Soviet air technology. Rebels were shooting down at least \$2.5 billion a year in Soviet aircraft. Total rebel missile supply costs approximated \$60 million a year, creating a 35-to-1 cost ratio. Before 1986 the Soviets used the skies over Afghanistan with relative impunity. After 1986 direct Soviet air support dwindled dramatically. Recent reports from Afghanistan indicate that this was a severely demoralizing factor for Soviet and Afghan Army troops.

For the *Mujahideen*, the technology appeared appropriate and the U.S. Stinger became the weapon of choice. Introductory training on the easy-to-operate Stinger was accomplished in Pakistan. Unlike the Blowpipe, the Stinger is a fire-and-forget weapon. (The rebels were not concerned with identifying friendly aircraft that could be mistakenly engaged — there *were* no friendly aircraft.) Stinger gunners did not expose themselves by attempting to steer the missile to the target on a hot battlefield. The Stinger is more reliable than the SA-7 and less bulky and expensive than the Blowpipe. In the then-present environment of the war, the Stinger made great tactical sense:

• It is difficult to achieve a "mix" or "mass" of air defense fires.

• Small arms and antiaircraft guns and cannons were relatively ineffective because of the difficulty of concentrating them to maximize their hitting power.

• Although useful for defending permanent bases or for operations in constricting mountain passes, antiaircraft guns and cannons do not provide the mobility and surprise of the Stinger.

This proliferation of air defense technology, however, impacts on Western society. The Soviets are studying captured Stingers and are making changes to reduce aircraft exhaust and to enact suppressive countermeasures. They have experimented with tactical innovations to include evasive maneuver, safer altitudes and more secure approach patterns. These adaptations will make the Soviets, and possibly their surrogates, more formidable opponents when they next face Western technology. Of equal concern are the estimates that from 25 to 50 percent of the missiles never reached the hands of the rebels. No doubt Pakistan siphoned off a percentage of these weapons. This may or may not be covertly sanctioned by the United States. Some of these missiles may be diverted to the black market where they could become popular items with terrorists or other insurgent groups.

The Falklands. Usually cited as a vindication for light infantry and specially trained elite units, the Falklands campaign of 1982 also stands as an unplanned contingency in air defense. As the British task force moved to its advanced base on Ascension Island in the South Atlantic, most officers of all ranks admitted later that, at this stage, they gravely underrated the power of Argentina's air force. As the campaign progressed, more and more operational decisions were made with the air threat as the major planning factor. At the conclusion of the Falklands conflict,

the British had lost six ships to air attack. They also lost five fixed-wing aircraft to Argentine air defense weapons and small-arms fire and four helicopters to a mixture of air attack and air defense fires. Argentina placed the 601st Antiaircraft Battalion in the Falklands. This unit had one Roland and three Tigercat missile systems, numerous twin-barrelled 35mm Swiss Oerlikon guns and German-made 20mm guns and a handful of British Blowpipes. Although sources differ on the exact numbers, Argentina lost approximately three ships to air attack and 109 aircraft to various causes. Thirty aircraft were destroyed or captured on the ground and another 30 were destroyed by a mixture of naval and ground force air defense fires.

One glaring lesson from this contingency operation is the threat posed by the transfer of advanced technology to Third World military forces. Argentine pilots were a well-trained, highly motivated foe. The combined defenses provided by all the British services forced the Argentine pilots to fly in ways that negated much of their outdated time-fused ordnance. The long flight distances from air bases in Argentina did not give Argentine pilots time to dogfight or take additional target runs in the Falklands, or British losses could have been much greater.

A second area worth noting is the difficulty of coordinating air defense over the initial lodgment and bridgehead areas in a contingency operation. Air defense was organized in three belts. The first belt consisted of approximately 40 Brit-

ish Harrier aircraft which received limited early warning from naval horizon radar and a makeshift series of observation posts near the coast of Argentina. The second belt consisted of naval ships in three rings. The first ring consisted of combat ships equipped with high-altitude medium- and long-range air

the Harriers often engaged enemy aircraft after they had released their munitions.

The high-altitude naval missiles were not effective against the threat's low-level attacks, and the low-altitude Sea Wolf performed poorly. The air attack at Fitzroy, which led to the sinking of the British *Galahad* and to serious casualties in the 5th Brigade, is a sad illustration of the difficulties encountered in coordinating a beachhead operation. The success of the five Argentine A-4 Skyhawks in this attack was largely due to British mistakes and risks. The British decided to discharge equipment and ammunition before personnel during daylight hours.

There was no Harrier CAP and no advanced warning of the attack. The British

failed to line the decks with observers and machine gun crews. Finally, although some air defense coverage came from Rapier systems ashore, a delay in getting the systems ashore and positioned and then the added time required to get them operationally ready after an 8,000-mile sea voyage did not permit any ground-based coverage during the attack.

If anything, the Falklands campaign underscores the importance and difficulty of integrated counter-air operations. In addition to the mix of weapon systems, the British conducted a raid on Pebble Island where they destroyed 11 Argentine aircraft. In the Falklands, the Blowpipe's performance disappointed the British. Its 47-pound configuration made it difficult for gunners to carry and to keep up with support units. Gunners had to expose them-

The Israeli anti-SAM offensive capitalized on Syrian mistakes rather than any inherent weakness in air defense.

defense missiles. The second ring consisted of two ships outfitted with Sea Wolf short-range air defense missiles. The third ring consisted of ships with a handful of old antiaircraft guns, heavy machine guns and a limited number of Blowpipes. The final belt was comprised of 12 Rapier systems and 12 Blowpipes supplemented with small arms for air defense. At times, this defense design was hard pressed to resist air attack. The British white paper on the "Lessons of the Campaign" stated that the absence of an airborne early warning system was a severe handicap against Argentine air attacks mounted at very low level. The British faced a serious problem in locating aircraft with sufficient speed and in disseminating warning information to firing units. The Harriers could not provide constant and simultaneous combat air patrols (CAPs) over the fleet, the landing areas and the advancing ground forces. As a result,

selves to enemy fire to properly engage aircraft and track the missile. This early version of the weapon system used a rather slow missile and had little success against high speed crossing targets. It did prove useful against the slower Pucara, (the Argentine ground attack aircraft) and was credited with destroying eight of them. The British were pleased with their Rapier system although it took 24 hours to get some of them operational once they were put ashore and it took helicopter lift assets to reposition them. Some sources credit this system with 14 kills.

The biggest surprise to the British in their counterair effort was the effect massed gun fire had on Argentine pilots. Robert Fox has written that selected gunners were directed to increase the amount of tracer rounds because machine gun fire "was to prove as effective as any other weapon; the pilots could see the streams of tracer coming at them . . . and it intimidated them."

Lebanon. On June 9, 1982, the Israeli air force destroyed 17 of the 19 Syrian air defense batteries deployed in Lebanon's Bekaa Valley. The Israeli anti-SAM offensive took advantage of Syrian mistakes rather than of any inherent weakness in air defense. This historical example holds some important air defense lessons and, in particular, lessons for LIC strike missions.

For more than a year before the attack the Israelis sent remotely piloted vehicles with electro-optical sensors over the valley to gather intelligence information. One of the crucial elements of information learned by the Israelis was "that the Syrian SAM batteries had, for the most part, remained static for many months." This tactical blunder permitted the Israeli air force to launch a multiphase operation against the Syrian defense complex consisting of a mix of SA-2, SA-3 and SA-6

batteries. The phases were electronic warfare, deception, SAM attack and counterair.

First, a variety of electronic airborne platforms identified missile site radars and performed real-time analyses. The jammers disrupted Syrian communications nets and long-range radars. Next, the Israelis launched waves of decoy drones and rocket-dispensed chaff to simulate an air strike. The Syrians reacted by turning on their radars and engaging the drones with their ready-to-fire missiles. In many instances, once the radars were turned on, missile sites continued to radiate long after target data was obtained. This phase was then followed by the actual attack.

Fighter-bombers armed with anti-radiation missiles first attacked each battery. After the radars were destroyed, other attack aircraft used cluster munitions and bombs to destroy the sites. In this same phase, airborne early warning systems and with airborne jamming platforms and fighter aircraft were able to intercept or disrupt Syrian MiGs sent toward the Bekaa Valley.

Although this large but successful strike package took painstaking and detailed preparation, the Syrians could have avoided the magnitude of this debacle if they had adhered to some simple tactical considerations. First, the Syrians clearly violated the principle of mobility by failing to periodically relocate many of their highly mobile SAM batteries to enhance survivability. Second, the Syrians failed to employ radar emission control. Only a minimum of selected radars should have radiated for acquisition. Coordinated engagement ranges should have minimized tracking radar emissions. Third, the Syrians made no attempt to construct dummy sites or to mix anti-aircraft guns into the defense to protect sites and create flak traps along approach routes.

Historical Summary

Conflicts in Vietnam, Afghanistan, the Falklands and Lebanon demonstrate the importance and reality of air defense in the lower end of the conflict spectrum. In short, history suggests that air defense planning and execution, although not always applicable to every scenario, have grown in importance. Regardless of what role a belligerent plays, if his enemy poses an air threat then he must determine a way to nullify it. Based upon the threat and the assets at his own disposal he may choose passive or active measures or some combination of both.

A proper IPB that integrates the air and counterair threat is fundamental. The Vietminh in 1954 and the Israelis in 1982 owe a great deal of their success to their detailed and accurate IPBs. The French, the Syrians and the British owe some of their difficulties to inadequate IPBs.

Advanced technology has had varying degrees of success in the Third World. Argentine aircraft were an underestimated threat in the Falklands. The *Mujahideen* in Afghanistan and the North Vietnamese used foreign technology well. Training and tactical adaptations enhanced weapon survivability and effectiveness. In both cases, the technology escalated the conflict and made it more costly to the counterinsurgent. The Syrians in the Bekaa, however, offer an example of poor tactical integration of advanced technology.

Political factors inherent in these conflicts appear to affect air defense too. They shaped bombing campaigns for the United States and assisted the North Vietnamese in air defense planning. Air bases in Argentina were off limits to British strikes. For the Vietnamese and *Mujahideen*, air defense weapons were political symbols that buoyed morale and were a source of insurgent pride. Who from the Vietnam

era can forget Jane Fonda and the "flak" created when she posed with a North Vietnamese antiaircraft gun?

Finally, the air defense principles of mix, mass, mobility and integration may not be applicable or suitable to certain scenarios because of the operational environment and availability of resources. Their environment and lack of command and control equipment limited the *Mujahideen's* practice of mix or mass in their operations. The British had more counterair means at their disposal, but discovered the difficulty of complying with these principles in a joint service contingency operation thousands of miles from home turf and the doctrine writers. Some LIC scenarios have underscored the importance of antiaircraft gun systems and small-arms fire in countering an air threat. The North Vietnamese in the Lam Son 719 operation — and the British to a lesser extent in the Falklands — developed tactics in an operational environment that could take advantage of these types of weapons.

Current Doctrine and Air Defense in LIC

Presently, U.S. LIC doctrine states that the tenets provided in Army FM 100-5 and in Air Force 1- and 2-series manuals characterize successful conventional military operations and apply at the appropriate level in LIC. FM 100-20 differs from most of the currently published doctrinal literature. The latter group focuses upon conventional war and appears more slavish to a professed compatibility with AirLand Battle. FM 100-20 argues

that in LIC unique imperatives — political dominance, legitimacy, unity of effort, adaptability and patience — shape, guide and add dimensions to AirLand Battle. This manual also establishes itself as a capstone publication for military operations in LIC. It prescribes doctrine and tactics, techniques

A gap exists between current doctrine and the range of air defense demands that can be treated in LICs.

and procedures common to Army and Air Force units operating at the lower end of the conflict spectrum. Furthermore, it provides direction for other related publications. FM 100-5 discusses air defense and counterair throughout, albeit almost exclusively in the conventional war reference frame. FM 100-20 mentions air defense once in 246 pages.

That one reference to air defense is found in a thoughtful discussion of force composition for a peace-keeping organization. The manual suggests that if the use of airspace by disputing parties in an area or corridor threatens to renew violence, air defense units may be required. The ROE for such a mission would be restrictive. But if a unit were given such a mission it could profit from a study of the Bekaa Valley operation. The U.S. Navy's recent experiences in the Persian Gulf clearly illustrate the challenges and risks of using current air defense systems in a police action.

Remarkably, no reference to air defense or counterair is made in discussions of border and area denial operations, of force and site protection, of insurgent and terrorist tactics, or of planning parameters in LIC air operations. It is no surprise then that no mention is made of the growing air component of LIC. Bits and pieces of doctrinal literature attempt to discuss air defense in the lower end of the conflict spectrum. FM 90-8, *Counter-guerrilla Operations*, devotes two short paragraphs to the subject. It states that an insurgency does not equate to a low-intensity air threat — even a minimal air attack could destroy friendly counterinsurgency forces. The

The remainder of the section is shaped by the assumption that there will be a minimal air threat in LIC. The manual then discusses at length the risks and use of air defense personnel as additional security forces for the operational support base (OSB). Air defense personnel cannot be above local security on the nonlinear LIC battlefield. Yet, even in South Vietnam where air defense assets were deployed against an air threat that did not appear, gun units had active ground support missions in convoys and in combat unit perimeters outside the OSB.

Air defense doctrinal literature handles operations at the lower end of the conflict spectrum somewhat better, but we still have an incomplete and cursory overview of air defense in these scenarios. FM 44-100 characterizes the air threat in LIC as low numbers of unsophisticated systems usually employed with a lack of operational sophisti-

cation. After the Falklands the British would raise some eyebrows at this general appraisal, as would the North Vietnamese, the Syrians and the *Mujahideen*, albeit from a different perspective. The manual does stress that a few aircraft at this level of conflict may have effects far greater than the same number of systems employed in other levels of conflict. These aircraft are capable of conducting operations that will have more of a psychological than tactical impact, according to FM 44-100. The concern is that if they are successful in destroying a key target or of giving the impression that they are able to operate at will in the air, the effect could be devastating to the opposing force. To its credit, FM 44-100 stresses that the IPB process must incorporate the vertical dimension and it must consider the fact that "... the fastest means for an external force to intervene in a conflict with minimum risk is through air power." Although their decision was ridiculed by some analysts, the Soviets may have wanted some LIC insurance when they deployed an SA-4 brigade with their forces in Afghanistan.

FM 44-100, FM 44-3, *Air Defense Employment: Chaparral/Vulcan/Stinger*, and FM 44-90, *Air Defense Artillery Deployment: Hawk*, blend LIC into discussions of air defense in non-mature theaters and in contingency missions. The positive side to this is that U.S. planners are attempting to integrate air defense into the phases of a contingency mission, especially in the development of, protection of and expansion beyond the lodgment area. During Operation Urgent Fury in Grenada in 1983, four Stinger teams and a headquarters element accompanied the initial elements of the 82nd Airborne Division's assault force. They protected the Port Salines airhead and two collocated field artillery batteries. By Oct. 30, 27 Stinger teams

defended the airfield, DISCOM, Division Headquarters and Pearls Airfield. The March 1988 deployment of elements of the 82nd Airborne and 7th Infantry Divisions to Honduras also included Stinger missile teams in the initial airlift to protect the force from Nicaraguan air strikes.

Forces in these operations faced some of the same mobility and sustainment problems the British did on the Falklands. The Stinger is somewhat lighter and less bulky than the Blowpipe. However, often equipped with a PRC-77 radio and some minimal personal gear, an air defender with one Stinger missile carries a load of 120 pounds in dismounted operations. A serious resupply problem exists with the paucity of vehicles in the assault phase or later in areas inaccessible by vehicle. In the Falklands, many Blowpipe gunners marched unencumbered with their units at night and had Blowpipes flown out to them near daybreak.

Another common problem highlighted by the Falklands was the lack of a dedicated early warning system for air defense units, especially the ones ashore. An ineffective system concedes surprise to the enemy and makes air defense systems less effective. The Argentine forces tried to piecemeal a system around Port Stanley, but equipment failures and poor positioning made their system relatively ineffective. For the British, Fitzroy was the result of no early warning. Similarly, British soldiers had been told for so long that they were under air defense warning "red" that they became lackadaisical about air defense caution until the 3rd Brigade Headquarters was hit by an air attack without warning. Current JCS doctrine states that early warning of enemy attack is vital if in-depth defense is to be maintained.

Doctrine gives few clues to the services how early warning is to be

accomplished. U.S. Army doctrine sees early warning passed from the airborne warning and control system (AWACS) or other Air Force radars through a data link to a control and reporting center (CRC) by means of the tactical air control system (TACS) to a Hawk battalion where a liaison team from short-range air defense (SHORAD) units can broadcast to maneuver units and air defense units. However, as FM 44-90 explained: "Early in contingency operations, when there is no established CRC or no Hawk battalion deployed, the joint task force commander has no procedure available to provide early warning to SHORAD battalions or other maneuver units."

The long-term solution for a direct data link between AWACS and Army ADA units requires the development of new hardware. In the meantime, a limited voice link (if AWACS is not already saturated) can be established directly to a Hawk battalion or a brigade or division headquarters. From there information must be passed to maneuver units and air defense fire units. This temporary fix was tried in Grenada with some limited success.

Although not fathomless, a gap does exist between current air defense doctrine and the range of air defense demands that can be treated in the lower end of the conflict spectrum. Part of this problem rests with the current doctrine's overwhelming focus on high-intensity conventional warfighting. Part of the problem also rests in our LIC doctrine, which has not clearly acknowledged the important role air defense can play in LIC. More often than not, the applicability of AirLand Battle tactics and air defense principles to LIC are assumed and not analyzed by our current tactical doctrine. There is recognition of air defense in LIC and in limited wars, especially in contin-

gency operations, but our current doctrine does not emphasize its importance in relation to the growing air threat across numerous scenarios. As a result it does not provide sufficient tactical guidelines.

Conclusions

An air defense doctrinal void exists between current doctrine and the demands engendered by LIC and limited war.

That void is not a bottomless pit, but a comparison of theoretical and historical air defense considerations with current doctrine indicates that we are not where we should be. To provide a basis for the development of tactics and for more specific study, I propose a series of tactical guidelines with which air defense tactical doctrine can be created. Such a doctrine should incorporate the following guidelines:

- Always prepare an IPB that integrates the growing air and counterair threats.
- When offering military assistance in the form of air defense, consider: Does it create an economical countermeasure? What is the operational environment and the average user's skill? What risks concerning escalation and "lost" technology are acceptable?
- The political complexity of conflicts in this portion of the conflict spectrum affects air defense.
- Air defense systems will often have special effects in these scenarios.
- Do not slavishly apply conventional doctrine to the lower end of the conflict spectrum.

Where are we today and in what direction do we go tomorrow? We

have a serious void between doctrine and the demands of the lower end of the conflict spectrum. We have made some progress in our integration of air defense in contingency operations. However, we still have problems with early warning, mobility and sustainment in the early phases of such an operation.

Problems continue with mobility, early warning and sustainment in early phases of contingency operations.

These problems occur in varying degrees in conventional warfighting in high-intensity conflict, but they deserve some careful attention in LIC and in limited war because of the higher likelihood of such scenarios in the near future. We made a good beginning with the incorporation of the vertical dimension in the IPB, but our doctrine needs to better acknowledge the growing air and counterair threats.

Now that we find ourselves supporting insurgents we must re-examine air defense from that perspective. In so doing we must refrain from forcing traditional tactical principles on unique LIC operational environments. We need to develop flexibility with air defense doctrine and tactics to best meet the insurgent's need and the level of conflict while also serving U.S. interests. In some of these scenarios it may be more advantageous to reduce the role of air defense as an exclusively protective asset and de-

velop more of an offensive-attrition weapon.

The air defense community needs to evaluate separate weapons and acquisition means to assess their applicability to the different categories of military operations. The guidelines I've presented in this article should help us to learn and understand current LIC requirements enough to anticipate future developments.

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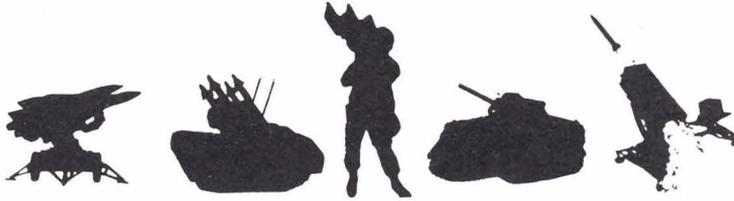
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³J. F. C. Fuller is an English author of many books on tactics and warfare.

⁴Gen. Paul F. Gorman (Ret.), an expert on special operations, testified before a Congressional panel on limited war vs. low-intensity conflicts.



VAPOR TRAILS

Patriot Showoff

Soldiers from the 11th Air Defense Artillery Brigade's 2nd Battalion, 7th Air Defense Artillery, Fort Bliss, Texas, recently returned from Fort Lewis, Wash., where they participated in a weapons display for area Reserve Officer Training Corps cadets.

Major components of the Patriot system traveled to the Pacific Northwest Army post from Biggs Army Airfield by rail. Thirteen soldiers flew to Fort Lewis where they off-loaded the equipment for emplacement on a Fort Lewis parade field alongside other air defense weapons systems.

Later, a C-5 and a KC-10 provided by the Air Force took an additional launching station, an antenna mast group and 16 more soldiers to put the finishing touches on the display. WO 1 Gerald Roberts, 1st Lt. Jeb Stewart and SFC Ronald Gould planned and coordinated the air and rail movements.

"The purpose of the display was to show approximately 3,000 ROTC cadets today's Army air defense and to encourage future officers to choose Air Defense Artillery as their branch," said Capt. Michael Regan, B Battery commander.

In addition to the Patriot equipment, the air defense equipment display featured Hawk, Stinger and Chaparral



missile systems, a 20mm Vulcan gun, a forward area alerting radar and a video on future air defense weapons systems.

The display included equipment and weapons from all branches of the Army as part of the ROTC advanced camp conducted at Fort Lewis every summer, Regan said.

"But," he added, "this was the first year Patriot participated. It was also the first time Patriot was



deployed by air to another installation in the continental United States. The event served as an excellent training opportunity for the participants and Patriot units in general."

Soldiers who participated in the display said Patriot was a favorite among the cadets.

— 1st Lt. Jim Conner

3-2nd ADA Hosts Display

The 3rd Battalion, 2nd Air Defense Artillery, of Fort Lewis, Wash., hosted the Air Defense Artillery portion of the ROTC branch display held at Fort Lewis last summer.

For many cadets, this was a welcome break in the rigorous training of their six-week camp. Most of the 3,500 cadets realized that this was virtually the only

VAPOR TRAILS

opportunity they would have to observe all the branches the Army has to offer before filling out their accession packets.

Cadets received an in-briefing from an air defense officer and were then escorted to display stations. Each station was a different air defense weapon system: Chaparral, Hawk, towed and self-propelled Chaparral, towed and self-propelled Vulcan, Stinger, FAAR and Patriot. One site featured a video on future ADA weapon systems.

At each station, briefers and crews familiarized cadets with their weapons systems. Cadets heard firsthand from platoon leaders what their futures could be like as air defenders. Cadets were then free to examine the weapons systems and ask the crew technical questions. Cadets received the opportunity to examine each weapon system in the Air Defense Artillery area.

The video shown to the cadets explained the capabilities and characteristics of the future weapons systems as part of the FAAD program: the Pedestal-Mounted Stinger, ADATS and FOG-M. Cadets also received Air Defense Artillery handout packets containing ADA bumper stickers, posters and an ADA newsletter written especially for them.

Cadets were particularly impressed with the Air Defense Artillery display. Many had questions about the Officer Basic Course, possible assignments and ADA's future.

Some of the cadets who attended had already decided their branch preferences; however, most of them started the day with an open mind. The ADA display opened the eyes of many of these cadets to the excel-



lent opportunities available to them as air defense officers.

— 1st Lt. Leigh M. Bandy

Streaker Killers

Soldiers of the 1st Battalion, 3rd Air Defense Artillery, Fort Carson, Colo., recently completed one of their most important and competitive Vulcan weapon qualifications of the year.

The Vulcan weapon system delivers a 20mm round at both ground and aerial targets at the rate of 1,000 to 3,000 rounds per minute. It is a division ADA system.

Battalion crew members competed for "bragging rights" in their annual battle against Streaker target drones on the post's range 119A.

The Streaker was "flown" by representatives from a civilian corporation from White Sands Missile Range, N.M. The missile flies from 200 to 250 knots and has a range of more than one kilometer, explained 1st Lt. Kevin Krieger, range OIC.

By the end of each firing cycle the Streakers were falling on almost every rotation. The soldiers' morale began to skyrocket. "I sure hope we win this competition," said Sgt. Randy Smith, C Battery squad leader. "We have been practicing for months trying to become perfect in all areas."

Vulcan crews must successfully complete a standardized crew drill, conduct an ammunition upload, as well as fire on and hit the Streaker to pass their qualification test. The drills are also timed for speed and accuracy.

In addition to qualification firing at the Streaker range, soldiers completed concurrent training including air defense during convoy procedures, crossing contaminated areas, engaging aerial targets while in MOPP 4 gear and night firing.

"We make the range qualification and concurrent training as difficult as possible," said Capt. Tony Buck, battalion S-3. "The soldiers like a challenge and we do our best to make it just that."

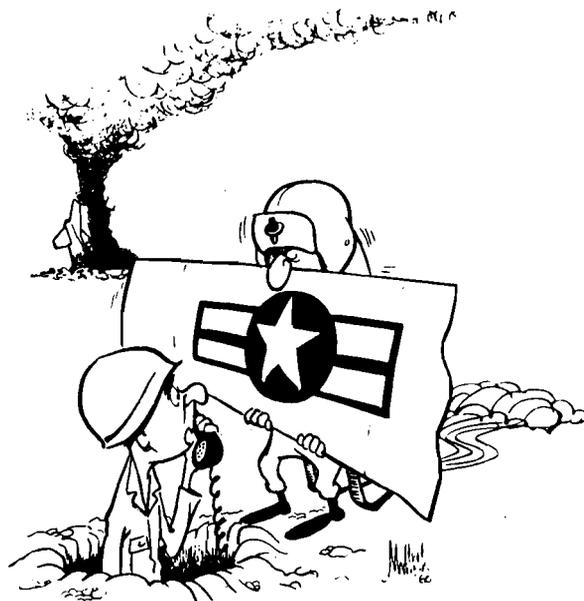
Sgt. Andrew Foster went to the range with his mind made up: "B Battery won the last competition. We're going to win this time."

This year's firing on the Streaker range was a huge success, according to 1-3rd ADA officials. Every squad qualified on the weapon and gained a great deal of additional experience.

— Capt. Scott Shifrin

Green Flag

Joint engagement zone testbed targets fratricide problem



"I'D LIKE TO MAKE A CORRECTION ON MY LAST AIRCRAFT IDENTIFICATION."

by Maj. Tom Ruiz

■ It was a dark and stormy night, and he would have preferred to be reading the familiar beginning in a "Peanuts" color panel to his child as was his customary habit. Beginning morning nautical twilight was less than half an hour away, and on this Sunday morning he had much more serious thoughts to concentrate on. Air speed was just over 600 knots at 120 feet of altitude; the targets were just minutes away. A quick check of systems showed all indicators reading nominal; the ride smooth as a baby's bottom. Strangely, all was quiet in his headphones. He'd expected a symphony of chirping from his threat receiver responding to search radars. Maintaining radio silence, Maj. Bill Morton looked out the right side of the canopy of his streaking F-15E Eagle to check his wing rider.

1st Lt. Larry "Ziggy" Belcher had his fighter precisely on line with Gold Leader, Morton's call sign, despite the overwhelming anxiety building in his veins. Never before had he flown in combat, and he was wrestling with his impatience.

"Target," called Gold Leader. A pair of bridges, 15 meters wide and more than 400 meters long, were less than two miles away and, if his targeting systems were right, both were covered with Soviet T-80 tanks. Suddenly his earphones filled with noise. SAM batteries in the hills to the north frantically searched for the intruder.

Belcher eased back to follow his senior and marveled at the intensity of the flash indicating a successful hit. He gently pressed the red button to release his own bombs and pulled left and rear on the stick. Over his shoulder he caught a glimpse of

yet another bright flash, and he reeled with delight at what he imagined was his success. The high-pitched shrill in his earphones displaced the joy. Two heat-seeking SAMs were streaking toward him. Air filled the pressure suit around him in response to the force six times the pull of gravity. Instinctively he reached for the lever that would release the anti-missile flares. The first SAM locked onto a flare and detonated 300 meters behind him. Nearing blackout, Belcher saw the second SAM pass by at 4 o'clock. Luck was on his side; now to find Gold Leader and head for home.

Relieved that the danger was behind them, Gold Leader called rendezvous instructions to his wing. "Come to heading 245 and stand on it." Ten minutes later they were crossing the FLOT and began to relax. Hardly had his pulse started to slow down when Gold Leader heard another tone in his ear. There was something unsettling about the tone — it seemed all too familiar, but not in a negative sort of way. Suddenly he realized that he was in the midst of a hard right turn in response to lessons learned during a dozen or so training flights where he'd heard that sound before.

"Ziggy! Pull right!" he screamed too late. Below left he saw the explosion and knew that Belcher was hit. "Damn those Hawks!" he yelled into his mike, recalling the sound he'd laughed at so many times in joint training exercises. His team had flown 80 miles into enemy airspace, successfully delivered their ordnance and avoided heat-seeking missiles, only to be hit by "friendly" SAMs.

■ *The haunting, pain-filled screams of teenaged youths pierced the din of rockets and bombs exploding in Gen. Jack Stone's head, denying him the sleep he so desperately needed. A reluctant glance at his watch told him what his body already knew. It was 4:37 a.m.; three-and-a-half hours rest would have to be enough. The ride to HQ, USAREUR, would take 45 minutes and Jack didn't want to keep the CINC waiting. Gen. Arthur Brown, renowned for his matter-of-fact leadership style, was an old friend, but he wouldn't be in a friendly mood this morning and Jack knew it.*

Sgt. Larry Reed's knock broke the silence promptly at 5 o'clock. Jack tied his bootlace and moved to the door. Outside the cold air still held the stench of gunpowder and burning flesh. It seemed as though the ride had hardly begun before it was over, and Jack searched for the answers to questions the CINC was sure to ask. How would he explain the loss of so many USAF planes? But the USAF commander had some questions of his own.

"Our losses have been murderous," Jack blurted, sidestepping even the most trivial of greetings.

"Tell that to our troops," Brown responded coldly. "We've got to have air cover if we are to regain the offensive. What's

your problem?"

"Look, Art," Stone sighed, hoping the words would come. "The enemy's surveillance aircraft aren't that easy to hit — they are too well protected. With their airborne radar, they can vector their fighters against ours to launch their missile attacks from beyond visual range. When our pilots learn they're being tracked, they take evasive action. Often they ditch their ordnance to outmaneuver their attackers. When they do manage to reach the battle zone, they are frequently shot at by friendly missile units who don't take the time to distinguish between friend and foe. You know, it's the old shoot 'em down, sort 'em on the ground bullsh--."

"Are you telling me they have control of the airspace?" the CINC asked indignantly.

"No, they do not! Neither side does. Our surface-to-air missiles deny them the ability to control the air over the battle line. But their fighters, helped by their SAMS — and ours — deny it to us. The skies are just too damn crowded and our Eagles don't have enough room to maneuver without crossing into missile engagement zones. Until we get better command and control of the airspace, we just can't provide the support your troops need. Who started this damn war anyway?"

The preceding scenario is fictitious. The airspace control problem, however, is real. Real enough that we must find ways to ensure as best we can that our fighters and surface-to-air missiles (SAMs) can fight in the same airspace without risk of fratricide and without needless expenditure of limited missile resources. The need to solve the shared airspace problem has given rise to a joint engagement zone (JEZ) concept.

The 4th Allied Tactical Air Force proposed the new air defense concept to employ air defense forces in a JEZ and enjoined the services of the USAF Tactical Air Warfare Center and the U.S. Army Air Defense Artillery School. The concept rules had to be kept simple. SAMs and fighters would conduct air defense operations in a shared airspace. Fighters had to be tagged friendly as they entered the JEZ and then be free to maneuver as desired within Patriot and Hawk line of sight. The idea gave rise to a number of questions. Can aircraft and SAMs share airspace? What conditions lead to fratricide? Can

Patriot enhance Hawk employment? Do electronic countermeasures degrade Patriot identification capability? Is simultaneous engagement significant?

After developing an initial set of procedures, JEZ proponents set out to identify a testbed. One very important criterion was that the location had to allow the concept to be investigated in an electronic combat (EC) environment. The testbed selected to try out this new concept was USAF Exercise Green Flag.

Exercise Green Flag is part of the USAF's "flag" series of training exercises. Sponsored by the Tactical Air Command and planned by the Tactical Air Warfare Center, these exercises provide aircrews training in simulated combat environments. Flag exercises are dynamic and unscripted, and they take place on and over the Nellis Air Force Base, Nev., range complex. Green Flag differs from Red Flag in levels of EC intensity. Green Flag emphasizes joint suppression of enemy air defense (J-SEAD); command, control and communications countermeasures (C³CM); electronic support

measures (ESM); and electronic counter-countermeasures (ECCM) training under intense communications, radar and IFF jamming conditions. Green Flag also provides planning staff experience for senior Air Force officers.

In the first test of the JEZ concept, Patriot and Hawk participated in Green Flag '88-3 as a non-interference add-on to aircrew training. Crews applied rudimentary JEZ procedures. Patriot units used post deployment build (PDB) 1 software. Variables included IFF off/on and with/without communication above the battalion.

The exercise provided some highly useful lessons learned. The most interesting were the results of having no communications above the battalion and no IFF capability. The Army learned that JEZ airborne participants risk high fratricide. Also, while offensive air operations are protected by current airspace control measures (ACM), aircraft egressing enemy territory are highly vulnerable if not complying with the ACM. Finally, airspace control areas large enough to pro-

tect support aircraft likewise protect Red air. The end result of the exercise was the recommendation to do it again and to assess new procedures, identification technologies and command and control (C²) elements. The next opportunity to retest the concept came during Exercise Green Flag '89-4.

Exercise Green Flag '89-4 initiatives included the integration of Patriot and Hawk into the Red Flag measurement and debriefing system (RFMDS) and continued evaluation of the JEZ concept. The Army plans for Green Flag '89-4 incorporated Green Flag '88-3 lessons learned and received super support from and coordination with the Air Force. Units employed improved joint air defense operations (JADO) and JEZ procedures using Patriot PDB-2+ software with and without modified JEZ features. (The plus (+) indicates that this software version contained some "fixes" for problems found in the original PDB-2 software.) Modifications made to Patriot software especially for JEZ included improvements to the live air trainer (LAT), such as schedule guidance actions to represent more realistic radar resource utilization and to emit guidance waveform. Improvements also provided LAT with TADIL-B, thus permitting hookup with the Air Force airborne warning and control system (AWACS). Another software change created a JEZ volume to assign special tracking priority for "JEZ friends." A test-peculiar change allowed periodic Mode 3 IFF interrogation to obtain a true aircraft identification for use in post mission analysis. Each aircraft had a unique Mode 3 code that the RFMDS used to track position location. The air defense procurement executive office provided equipment and procedures for data collection for a number of technological experiments as well as Patriot/Hawk interface with RFMDS.

Green Flag '89-4 consisted of two two-week periods based on player participation. Pilots from the USAF Tactical Air Command flew the first two-week period, which served as a spin-up for the JEZ demonstration conducted during the second two-week period with pilots from USAFE. Each of the two daily mission periods lasted about two hours and consisted of two "pushes" with no more than 45 combat aircraft, including Red air, within range airspace at one time. Blue forces consisted of fully instrumented fighters, surface attack and SEAD aircraft. USAF F-15s flew combat air patrol while F-4G and F-16 Wild Weasels conducted SEAD and chaff-laying operations. Non-instrumented EA-6Bs and EF-111s conducted stand-off jammer (SOJ) and EC operations. Army air defense was provided by four Patriot batteries from Fort Bliss, Texas, and two Hawk assault fire units (one from Fort Bliss and one from the New Mexico National Guard) under the control of the Patriot battalion's fire direction center, the information coordination central (ICC). An adaptable surface interface terminal (ASIT) provided the primary link to AWACS. A newly-created air defense coordination (ADCOORD) cell provided liaison to the Air Force planning staff. Red forces consisted of fully instrumented F-4 and F-16 fighters and non-instrumented EF-111 aircraft conducting SOJ and EC operations.

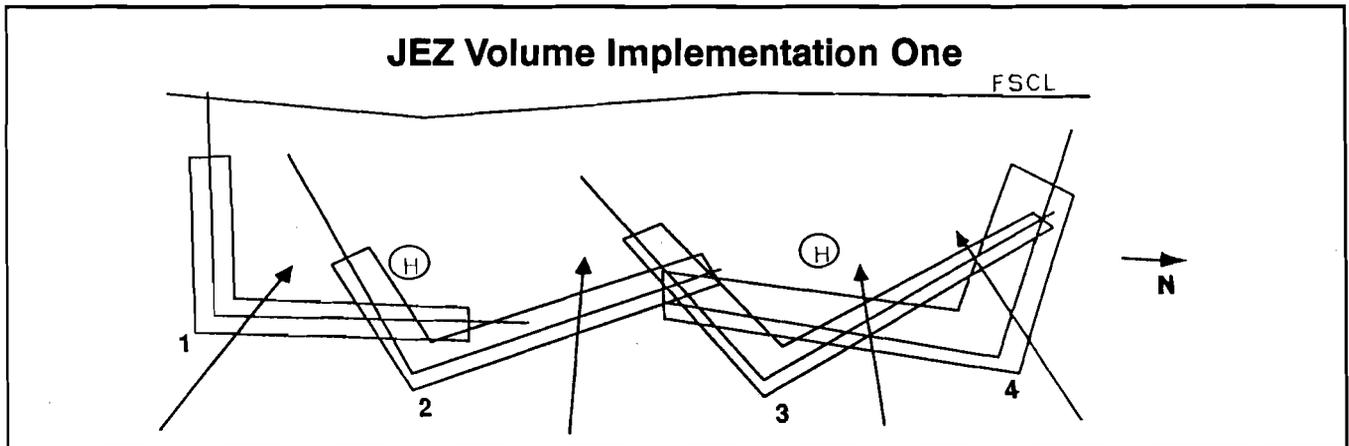
Former USAADASCH commandant, Maj. Gen. Donald R. Infante, established the Army's primary objective for Green Flag to be the pursuit of target identification technologies. Noting that forward area air defense has four identification systems, the recently retired chief of ADA said that it was unacceptable that the most sophisticated and powerful air defense system in the world should still use the old standby of IFF as its sole means of aiding

identification. Additionally, he told the participating units that their highest priority was to train.

With the aforementioned in mind, the Army developed its training objectives. First, the Army set out to integrate positive identification capability into ADA force planning and operations, incorporating a number of candidate technological developments into the units' equipment and testing them during the exercise. Second, the units trained to fight effectively in an intense EC environment. This meant conducting detection, identification and engagement training for Patriot and Hawk crews while ensuring friendly protection of Blue air. Additionally, the Army wanted to execute integrated air defense operations with Army National Guard and Air Force troops. The aim was to totally integrate air defense into Blue force mission planning and to establish and maintain interconnectivity between ADA and the Air Force's AWACS. Lastly, the Army wanted to enhance effectiveness of joint interoperability and training by integrating ADA into RFMDS.

RFMDS, a computerized network of transponders, relay stations and receivers, provides real-time, three-dimensional position location of instrumented aircraft. Position information is then relayed to display terminals located at Red Flag Operations, Nellis AFB. Displayed information is used to monitor an exercise or is recorded for playback at a later date to debrief aircrews. Prior to the exercise, only Hawk data was displayed. Objectives for Green Flag '89-4 included providing a real-time data link to show Patriot and Hawk engagement activity on the RFMDS display and to provide data to automate and facilitate the follow-on analysis process. A new application would show Patriot fire units as either participating or inactive. Patriot missile flyouts

JEZ Volume Implementation One



AWACS, a Patriot tactical director (TD) flew on each mission. During half of the exercise missions the TDs worked with Air Force crews, providing early warning information to ground units and advising AWACS weapons control officers (WCOs) which targets could best be engaged by ADA.

Another initiative tested at Green Flag might be considered a reciprocal of the TD on AWACS. A WCO was put in the ICC to assist the TD in target correlation. This was accomplished by having the WCO communicate with the AWACS via the ASIT and with F-15s and AWACS over the HAVE QUICK radios. The WCO used information from pilots to locate friendly aircraft on the TD's display console, identify them to the TD and point out where fighters were already conducting intercept missions.

JEZ planners developed two different volumes for implementation and testing during the exercise. In both implementations, volume boundaries were established by "fences" defined at the edge of each Patriot unit's primary search sector. A wide heading constraint of 170 to 350 degrees (true) provided a JEZ volume correlation to all friendly tracks entering from the rear of the task force. The JEZ fences were labeled one to four from south to north to create another control mechanism. If a fence went down (i.e., a radar became

non-operational), the WCO at the ICC could notify approaching Blue air via the HAVE QUICK radio. Pilots could then enter the JEZ through another fence to receive a "JEZ friend" designation.

In JEZ Volume Implementation One, Blue defensive counterair entered the JEZ by crossing search radar boundaries within heading constraints. Pilots could fly at any altitude. No other constraints (restrictions) applied. Once in the JEZ, they had complete freedom of maneuver to engage the enemy.

JEZ Volume Implementation Two incorporated a second volume whose bounds covered the entire task force area and included a choice of two smaller heading constraints. One alternative had a magnetic north heading (0 to 30 degrees true); the other had a magnetic south heading (180 to 210 degrees true). Defensive counterair pilots attempted to remain above a previously determined minimum descent altitude (MDA), the lowest altitude still within the task force's coverage. If the interceptors flew below the MDA, pilots could once again gain JEZ friend credit by flying within the heading constraints when re-ascending above the MDA. If this was not possible because of the tactical situation, the pilots had to rely on IFF and other means; e.g., calling out their position relative to a bull's-eye point, ACM compliance, or contacting

AWACS or some other authority for assistance.

In both volumes, heading and altitude constraints could be refined or changed for later missions to accommodate any lessons learned in earlier missions. Additionally, all Blue aircraft other than defensive counterair complied with normal ACM to be assured correct identification.

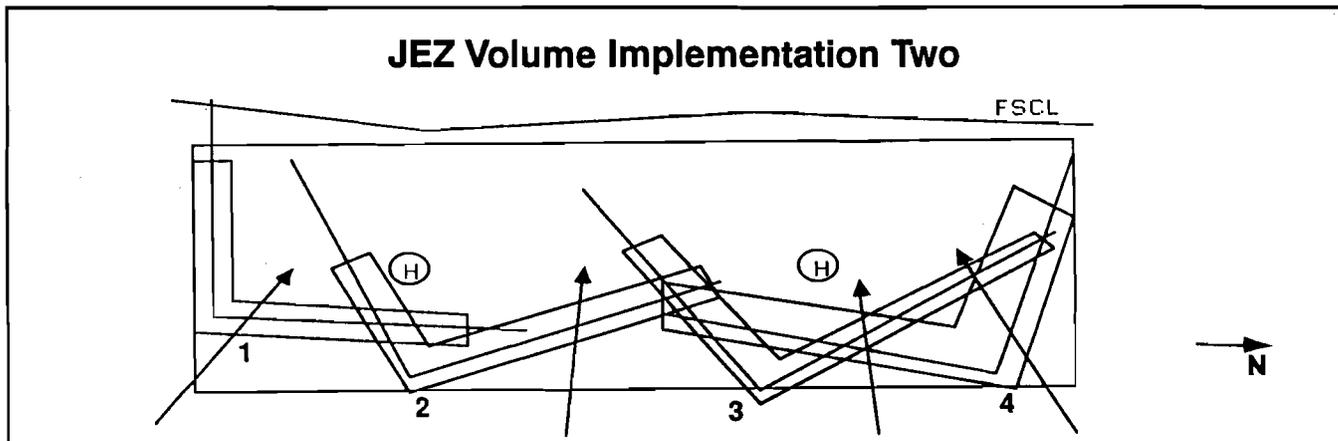
IFF was used as a variable during Green Flag to determine its contribution to the revised JEZ procedures. Analysts wanted to gather information on the relative importance of non-cooperative target recognition (NCTR) devices with and without the support of IFF.

In response to directives, a number of candidate technological experiments were integrated into the exercise. Several different aspects of airframe signature were investigated. This preliminary evaluation received strong support from both Army and Air Force agencies.

Despite Army participation, Green Flag is not recognized as a joint program. It is not funded by JCS; consequently, funds for Army participation were scrounged. Air Force support for JEZ and Army NCTR programs served as a catalyst for their financial assistance but did not cover the entire cost.

Analysis of data collected during the exercise was not complete as of the time this article was written. One concern about the information

JEZ Volume Implementation Two



is that data may have been confounded by the fact that similar aircraft flew as both Red and Blue. While this should not impact on the ability of any of the NCTR devices to identify specific airframes, any conclusion drawn about its contribution to engagement results should be guarded.

While the EC environment simulated an expected battle in Europe, the scenario did not. Red air never outnumbered Blue air. Red air did have superior, more experienced pilots who early on discovered they could not defeat the accuracy of Patriot. Often and early in each air battle, Red air had to roll back to escape the effects of Patriot.

We should not jump to any conclusions about this very confined battlespace result. Range restrictions imposed on player units and aircraft defined a specific playground for all air battles, especially since ADA units remained in fixed locations for the entire exercise. To avoid early detection by Patriot, Red air flew low level and masked behind mountains on the southernmost border of the playground. Further, a number of threat aspects were not played.

The goal of the exercise was to engage only with positive hostile identification, somewhat of a departure from the standard of engaging all targets not positively identified as friendly. The aim was to discard ACM, to not rely on IFF

and to discard the Patriot assessment algorithm. Above all, there was to be no fratricide. Each of these factors impacted on the Blue force planning staff as they developed each day's airspace control order and on the JEZ control team as they planned each day's matrix of variables to assess.

Without the benefit of any analytical data, Green Flag '89-4 appears an outstanding success and — with some good planning — could well become, as former TRADOC commander Gen. Maxwell R. Thurman has suggested, a national training center for Patriot. It is certainly a prime opportunity to test developments in technology and doctrine. Lessons learned should be documented and substantiated for further testing and refinement. Most importantly, Army ADA participation should be funded for many more years to come.

Additional recommendations for future Green Flag participation include a good deal of cross-over training. For example, Patriot TDs had only two days of training with the AWACS while the AWACS crews had none with the PCP or ICC. The contribution of the TD on board the AWACS is the direct result of the outstanding efforts made by the TDs to actively participate as a member of the aircrew. The aircrews did not know how to use the TD and as a result sometimes put the TD in a position of

little benefit to either the aircrew or ADA. Nevertheless, this concept shows a great deal of promise and deserves to be revisited before any doctrinal or tactical conclusions are made. On the other side of the idea, putting the WCO in the ICC was much better received. Once again, the outstanding performance of the participants made the effort a tremendous success. The aid provided in identifying friendly aircraft contributed to a fratricide rate that approached zero.

Preliminary analysis shows that the NCTR approaches are indeed promising and that continued development and investigation are necessary and right. We should guard against any immediate conclusions but make available adequate funding to support continued efforts. While the JEZ concept does not promise to give a final solution, it has provided some good indicators and will likely yield some near-term solution possibilities. Certainly all Army and Air Force participants are on board to make the JEZ concept work. Our challenge is to build on the success of Green Flag '89-4 at every opportunity and make the skies a safe and cost-effective joint environment.

Maj. Tom Ruiz is the chief of the Organizational Integration Division, Office, Chief of Air Defense Artillery, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

Swedish Lasers

by Capt. Henry Bengtsson

Swedish air defense units have unique operational requirements that require high levels of training readiness. An aggressor is likely to use surprise as the most effective method of attack. The most effective method to launch a surprise conventional attack is an airborne force for vertical assault and support of ground operations.

Because of this surprise airborne attack threat, the readiness of air defense forces exhibited in peacetime and during normal training is the key to displaying and exerting the national will to defend Swedish territory in peacetime and during times of rising tension. The training of air defense units is a very important part of the credibility of the Swedish defense forces in countering any aggressive intentions from another nation.

This high level of unit readiness, however, must be accomplished under a manpower system that relies heavily on short-term universal conscription and yearly reserve training cycles. Training must be conducted in the most realistic and effective manner possible to achieve and

maintain high readiness in the shortest period of time.

Some other training constraints are of a more universal nature — the high cost of modern air defense ammunition and missiles and difficulty of scheduling limited range areas.

The Gotland Island Anti-Aircraft (AA) Battalion provides a good ex-

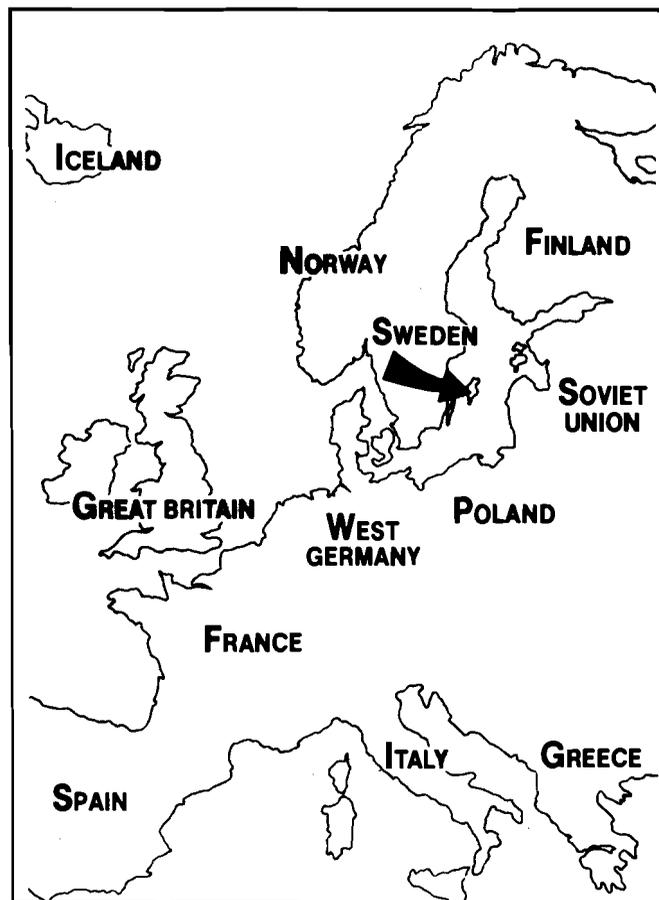
ample of the type of training and equipment used to achieve a high state of operational readiness. Gotland, a large, narrow island with an area of 2,300 square miles, lies off the east coast of Sweden in the Baltic Sea and has been called Sweden's only "aircraft carrier." Gotland has a heavy concentration of aircraft, armor, coastal artillery

and air defense units. This article, based on my experience as a training officer in the Gotland AA Battalion, describes the general methods of training air defense units with live fire and simulators. My specific thrust is on the introduction of laser simulators into the training cycle to supplement live gunnery and missile firings.

Training Program

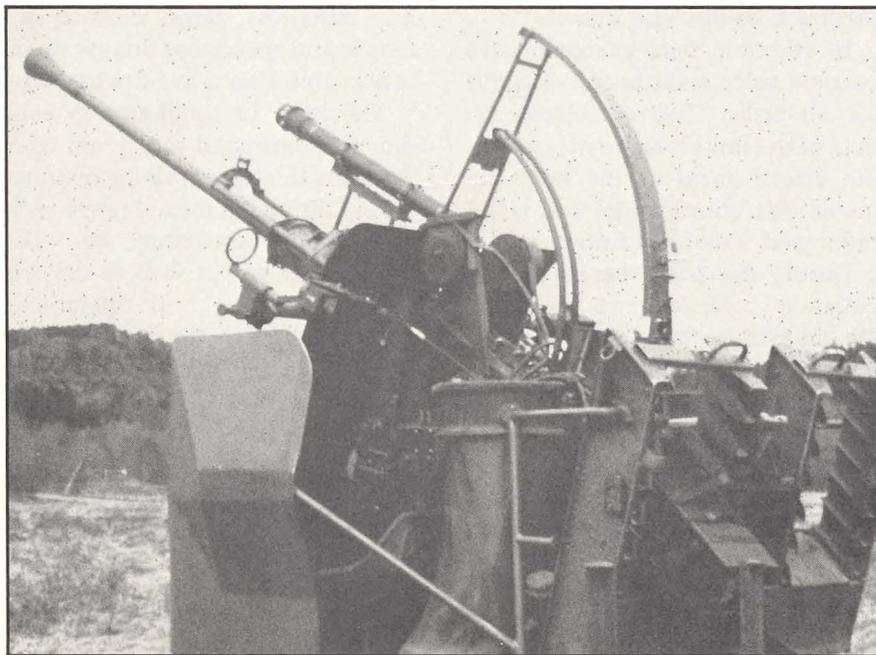
The Gotland AA Battalion conducts its training in four phases:

- Basic part task training with visual simulators.
- Gunnery training with towed targets using live fire or laser simulators against real aircraft targets.
- Field exercises using laser simulators as required.
- Participation in the regiment's annual Swedish





Swedes train with RBS-70 laser-guided missiles (left) and 40mm Bofors guns.



Antiaircraft Challenge Cup Competition.

The initial stages of training for new troops, noncommissioned officers and officer candidates combine basic military training with the basics of gunnery on the actual weapon systems. A visual simulator is available for training on the RBS-70 laser-guided missile. The

simulator generates an artificial target which changes realistically according to its course and distance. As gunnery skills improve, we increase the difficulty of the tracking exercises. We schedule simulator exercises along with general military training.

To teach the proper engagement sequence and fire coordination, we

rely heavily on firing at real targets. As the Swedish air defense section consists of both 40mm Bofors guns and RBS-70 missiles, it is important to train the gunners to be effective on both weapons. This is achieved by mounting the strap-on BT-53 simulator developed by Saab Training Systems to the missile stand or one of the guns. This arrangement allows us to open fire with —

- a gun using live ammunition against a target sleeve,
- a gun with the laser simulator against the towing aircraft which has a retroreflector mounted, or
- the missile as a simulated laser round against the towing aircraft with retroreflector.

Another advantage of having the retroreflector mounted on the towing aircraft is that a gunner can fire live at the target sleeve or simulate laser fire against the aircraft. If he misses by a wide margin during the live gunnery fire target run, he can rapidly change to the gun with the laser simulator to receive hit-miss data that will evaluate his errors and correct his aim point. He can then return to live gunnery fire for a reinforcement of the new gunnery procedures taught by the simulator.

Gunners quickly become proficient against the slow, target-towing propeller aircraft and are further challenged by maneuvering aircraft. Jet aircraft flying training missions in the area provide realistic, fast-moving and highly maneuverable targets for the crews using the BT-53 laser simulator in the gun or missile modes.

The simulator provides immediate training feedback in the form of visual cues in the sight or hit results which appear on a display screen mounted at the gunner's position. This feedback is important because it allows the gunner to rapidly im-

prove his accuracy and response time without the requirement for a training noncommissioned officer.

Field exercises consist mainly of practical exercises where all the subunits of the battalion are brought together and trained to function as one fighting unit. During these exercises all the fire units use BT-53 simulators to provide continuous evaluation of the companies' performance in engagements with air targets. The crews are highly motivated during these exercises because their hits contribute directly and accurately to the total number of aircraft downed by the company.

If the gunner misses an aircraft during the exercises, the simulator provides immediate feedback as to the cause of the miss. This enables the crews to steadily improve their gunnery skills during the exercise without waiting for a post exercise critique. We teach and evaluate the coordination and control of all functions required by the entire unit during the field exercises. These exercises require the commanders and the individual gunners to master the control and completion of the following tasks:

- Tactical movement.
- Site selection and preparation.
- Command and control.
- Target acquisition.
- Identification of friend or foe.
- Target priority assignment.
- Target engagement.
- Fire adjustment.
- Adjacent unit coordination.

It is rewarding for the operational and training staff to see the motivation and improvement of the crews using this method of training against very difficult yet realistic targets. Other skills, such as field movement and communications, are also practiced by the units during these field exercises.

The soldiers' eight-month anti-aircraft training cycle culminates in the Swedish Antiaircraft Challenge Cup Competition, which involves units

from all over the country. The competition includes both live firing and simulation firing on the actual weapons. The standardized competition increases the motivation of the soldiers undergoing training, helps test or develop new operational and training doctrine and provides a means for the senior staff to evaluate unit training from all training sites on an equal basis.

The use of the BT-53 anti-aircraft simulator has provided us with invaluable lessons learned. Individual gunnery skills have improved using the realistic, accurate and self-contained strap-on simulator. Crew performance has improved because the simulator requires the correct steps from all crew members. Training motivation has increased greatly with the immediate and accurate feedback of hits and misses.

In addition, field exercises have become more realistic and effective for all tasks. The cumulative hit data of the units is also a measure of the effectiveness of the emplacements, fire coordination and target radar and visual acquisition.

During the past year, we have manually collected and processed the data from the simulator printouts for individual and unit gunnery evaluations. We also compared the unit engagements with the plots of the target aircraft courses to determine if the tactical emplacements and fire coordination were satisfactory. We are currently evaluating a radio data collection system to automate the individual gunnery and unit operational evaluations. We have also recently added a video tracking unit to the simulator package to record, for post-exercise critique, the gunner's sight picture and target motions.

With a faster method of evaluating entire units, we intend to exercise more frequently the tactical capabilities of the company commanders to position and control their weapons, give realistic threat

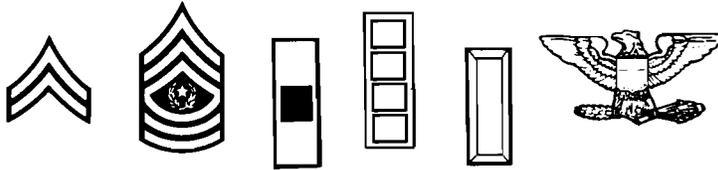
tactics and the actual terrain that must be defended. The use of the strap-on simulator permits the weapons to be positioned according to our doctrine while the small reflector prisms do not restrict the attacking aircraft from maneuvering realistically from any direction and orientation.

I would never argue that a training simulator can completely replace live fire gunnery training. There is nothing more necessary and satisfying in a gunner's training than to see, hear and smell live ammunition being fired. However, the simulator does increase the opportunities to train when live fire gunnery is not available due to budget, safety or range constraints. The training system also provides and saves training data such as hit and miss distances, target crossing distances and speed that are not readily available after a live-fire exercise.

The issue of simulators to each unit has permitted individual commanders to create training opportunities outside the formal range exercises. The simulator has also allowed the senior staff to develop uniform training and operational doctrine through the repeated and realistic weapon employments with data recording of the results.

Finally, and most importantly from a training officer's perspective, the simulator gives the individual gunner, crew member and unit leader the opportunity to excel in his job with realistic anti-aircraft combat training. And from a professional officer's perspective, this training ensures that our Swedish defense forces are constantly prepared to counter any aggressive intentions against our nation.

Capt. Henry Bengtsson, a regular officer in the Swedish Defense Forces, is a graduate of the Swedish Military Academy's Advanced Officer Course.



CAREER NEWS

Distinct pleasures and rewards come from serving in the military service, from getting the assignment you want, to getting promoted on time or before your peers, to patriotism in serving your country. The Army offers and provides enlisted soldiers the opportunity to make a career of the military service provided they meet the standards. This edition of Career News answers some of your more frequent questions about careers in Air Defense Artillery.

Who Manages My Career?

The Army manages you, the enlisted soldier, using the Enlisted Personnel Management System (EPMS). EPMS promotes career progression and professionalism throughout all enlisted ranks. EPMS has eight major components:

- Personnel classification.
- Training (military and civilian).
- Personnel utilization.
- Promotion.
- Evaluation.
- Reduction.
- Qualitative management.
- Separation.

EPMS' objectives are to provide a logical career pattern from private to sergeant major or command sergeant major by the most direct route, provide continued training throughout the soldier's career, eliminate career progression bottlenecks, afford equal advancement opportunity to all enlisted personnel of the same grade, and provide performance-oriented evaluation for all soldiers.

Your professional development is a partnership based on a triad of the proponent, the commander and the soldier. The U.S. Army Military Personnel Command (PERSCOM) coordinates this triad.

The chief of Air Defense Artillery has the primary responsibility for providing logical career development for air defenders. He institutes changes to enhance professional development and makes recommenda-

tions to the Department of the Army concerning development of, and changes to, personnel management functions that affect the total Army.

The second part of the triad, the commander, must efficiently use soldiers to accomplish the mission. The commander applies personnel management policies that provide soldiers the opportunity to grow in their MOSs and places soldiers in jobs which require the skills, knowledge and abilities of their military occupational specialties (MOSs).

You, the most important part of the triad, must maintain proficiency in all aspects of your MOS. You must also maintain your records and take a strong interest in your career development by using EPMS to obtain duty assignments and training. Motivate yourself to meet those requirements that will show interest in your career and place you above your peers. Be aggressive — you are your best career manager.

As coordinator of the triad, PERSCOM puts the right soldier in the right job at the right time. Professional development NCOs in PERSCOM's Enlisted Personnel Management Directorate use career management files, the enlisted master file and various other reports to fulfill this mission. Communicate with your professional development NCO — he plays a vital role in your career.

Being an ADA soldier, you belong to either career management field (CMF) 16 or 23. The CMF provides visible and logical patterns for career progression from the time you enter basic training up to grade E-9. Your CMF identifies MOS and skill level progression, the Army Service School Program and the types of duties you will encounter as you progress through the ranks. Remember, you may be assigned in either your primary or secondary MOS.

Your skill level specifies your level of proficiency in your MOS and the abilities you need to successfully perform at that grade within the MOS. The comparable grades and skill levels are as follows:

- Skill Level 1 — E-1 through E-4.

CAREER NEWS

proficiency, low SQT results, loss of bonus and, ultimately, loss of promotion. When possible, do not allow this to happen. Let your chain of command know your concerns immediately. Try to get yourself into a position to progress.

There are, of course, some authorized exceptions available to the commander to balance any conflict of interest. They are as follows:

- Assignments under actual combat conditions.
- Assignments to meet urgent military requirements for a special temporary duty. (This assignment has a 90-day limit, after which you must return to your assigned position for at least 120 days.)
- Assignments to qualify you for a shortage MOS.
- Assignments in support of reserve summer training.

Proper utilization ensures that the Army receives an adequate return on its training investment. If you think you are misassigned or utilized improperly, discuss it with your first sergeant, unit commander or supervisor.

Do not confuse additional duties with misassignments. Additional duties, a time-honored tradition, are sometimes the only method a unit has to get everything done. Some additional duties help troop morale and others meet the requirements of higher headquarters. Take these duties in stride. Some will fulfill you personally while you provide a service to your fellow soldiers. These additional duties include safety officer, voting officer, equal opportunity officer, training NCO, NBC NCO and re-enlistment NCO.

What Training Will I Get?

Training is the bedrock by which the Army becomes fit to win. The Army's system of education, training and experience provides each enlisted soldier with the skills necessary to develop from trainee to sergeant major.

Initial entry training, commonly called basic training, is where you enter the Army and receive your introduction to Skill Level 1 common tasks. This training develops your awareness of teamwork and teaches you combat-related skills.

Advanced individual training, which follows basic training, prepares you as a beginner. Your first assignment after AIT should provide the necessary experience to fine-tune your technical skills and clarify the need to continue your military training.

You become a part of the Noncommissioned Officer Education System (NCOES) after you gain a clear understanding of your job at Skill Level 1. NCOES currently includes the Primary Leadership Development Course (PLDC), the Basic and Advanced Noncommissioned Officer Courses (BNCOC and ANCO) and the Sergeants Major Course.

The first step in NCOES is the PLDC. This leadership and tactical training is aimed at soldiers about to pin on sergeant's stripes.

PLDC consists of six major blocks: leadership, communications, resource management, training management, professional skills and military studies. This 28-day course is taught at 27 locations worldwide.

The second step is BNCOC. This consists of a core block of leadership and tactical training with advanced skill training. The BNCOC common core is taught at 19 service schools to sergeants and staff sergeants. Attendees are selected by promotion points (E-5(P)) or date of rank (E-6). BNCOC will soon be a prerequisite for promotion to E-6.

The third step, ANCO, prepares staff sergeants for duties as sergeants first class and will soon be a prerequisite for promotion to E-7. The training emphasizes the role of the platoon sergeant and section sergeant on the battlefield in both offensive and defensive tactical field operations.

ANCO, like BNCOC, couples a common block of leadership and tactical training with advanced skill training. Eighteen service schools teach ANCO worldwide. A Department of the Army selection board picks the attendees.

The capstone of NCOES is the Sergeants Major Course, taught at the Sergeants Major Academy, Biggs Army Air Field, Fort Bliss, Texas. This, the oldest senior NCO course in the Department of Defense, trains master sergeants and sergeants major for positions of greater responsibility. There are two classes each year.

The Academy runs a non-resident version of the Sergeants Major Course that must be completed in two years, with the final two weeks spent at Fort Bliss. Graduates of the resident and non-resident versions receive equal weight in personnel management actions.

Specialized training is available for those soldiers who wish to expand their careers and move on to jobs that require unique or highly technical skills. Some

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MOSs have career development programs which train soldiers for assignment to key positions throughout the Army.

The Army Correspondence Course Program offers courses and subcourses in continued leadership and technical proficiency that prepare you for assignments of greater responsibility. These courses may give you the extra bit of know-how to qualify for a special job, or they can give you extra points for promotion. You should always seek self-improvement. Check DA Pamphlet 351-20 and take some subcourses.

May I Go to College?

Higher education is a favorable indication of self-improvement. Although job demands often preclude off-duty college education, you should strive to meet this goal. Civilian education receives special emphasis in other-than-troop assignments. Continuing civilian education has several personal and career advantages:

- Improves general knowledge and self-confidence.
- Increases promotion opportunities.
- Improves job performance.
- Becomes a positive tool for efficiency reports.

The Army provides the Army Continuing Education System to help you obtain higher levels of civilian education. This free service consists of concerned and professional academic counseling, career advisement and testing. College and university programs enable career military personnel to attain the educational goals established by DA and to obtain a head start in preparing for productive careers as civilians.

Degree completion programs assist you in obtaining a higher educational degree. Education centers can put you in touch with colleges and universities that offer credit for the training you obtain in military service. These service member opportunity colleges award credits for CLEP tests, MOS training, OJT experience and some correspondence courses.

You may also apply for a two- or three-year ROTC scholarship which allows you to complete a baccalaureate degree as a full-time student and obtain an ROTC commission after graduation. See your education center if this is your goal.

How Do I Get Promoted?

Promotion is the fourth component of the EPMS. The enlisted promotion system (EPS) selects and pro-

DA Educational Goals

Grade	Goal
E-1 to E-4	<ol style="list-style-type: none">1. Master basic education skills needed to perform military duties.2. Earn a high school diploma or state-issued high school equivalency certificate by the end of the first enlistment.
E-5 to E-9	<ol style="list-style-type: none">1. Obtain a high school diploma or a general education development (GED) equivalency certificate and a general technical aptitude area (GT) score of 100 or above before promotion to E-6.2. Earn an associate degree or complete 2 years of college study related to their military specialty before the 15th year of service.

motes those soldiers who demonstrate the abilities and skills required to assume the responsibilities of the next higher grade.

To understand how you get promoted, you must first understand when you are *not* eligible for promotion. If you do not meet the time-in-grade and time-in-service requirements (the basic requirements for advancement to a higher grade), yours is a "non-promotable status." The other easily understood causes for not being promotable are —

- commander's recommendation based upon your chain of command,
- absent without leave,
- pending court-martial charges,
- in confinement (military/civilian),
- serving court-martial conviction sentence, or
- injured (not in the line of duty).

The EPS consists of the decentralized, semicentralized and centralized subsystems. The decentralized promotion system, used by commanders at battery, company, troop and separate detachment levels, covers advancement and promotions through grade E-4. The promotion authority rests with these commanders, because they are in the position to best evaluate your

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performance and potential. (If you received a re-enlistment bonus or selective re-enlistment bonus, you may be promoted only in your bonus MOS or in an MOS within your normal career progression pattern.)

Promotion to E-2 is automatic (through PERSCOM) when you complete six months of active federal service. Your commander is the promotion authority: he can prevent your promotion based on his evaluation of your performance and potential or by recommendation of your chain of command, or he can accelerate your promotion by two months if he thinks your potential and performance exceed that of your peers.

Your unit commander can approve promotion to E-3 (based on allocations) when you complete 12 months time in service and four months time in grade. Again, your commander can accelerate your advancement.

Promotion to E-4 (based on allocations) requires 24 months time in service and six months time in grade. HQDA controls promotion to this grade on a percentage of E-4s allowed within a unit. Your commander can only promote the number of personnel up to his unit's percentage level. Half of the time in grade and time in service may be waived if you demonstrate outstanding performance.

The semicentralized promotion system includes promotion to grades E-5 and E-6. Promotion to these grades, based on eligibility criteria and cutoff scores, is delegated to field grade commanders. HQDA determines how many soldiers will be promoted based on the needs of the Army by grade and MOS through the use of promotion point cutoff scores.

Three major elements characterize the semicentralized system: recommendation for promotion, promotion points and promotion board.

The recommendation is the starting point. Your supervisor prepares the recommendation and the chain of command endorses it. The recommendation points out your demonstrated performance and potential for performance and responsibility at the next level.

Promotion points, obtained from your military personnel records jacket, place you in the order or rank with the other soldiers within your MOS and help to establish promotion cutoff points worldwide.

E-5 and E-6 promotion boards convene once a month unless no soldiers are recommended for promotion. The board consists of enlisted or a mixture of enlisted and officers. The board president is normally a

field grade officer, who usually selects the command sergeant major to handle the board. All board members (except the recorder) must be senior to the soldiers appearing before the board. The board gives its report to the promotion authority and the recommendation list is made, approved and published. (If discrepancies exist the promotion authority may call a new board.)

You can increase your number of promotion points through re-evaluation and recomputation. If you maintain recommended list status for three months and remain eligible for promotion, you may request re-evaluation every three months. You must make your request in writing and appear before another selection board. The requested board's re-evaluation becomes your official score whether you gain or lose points.

Twice a year, soldiers on the promotion standing lists have their promotion points recomputed. This automatic process does not require the soldier to appear before a board. Recomputation is based on any changes in a soldier's records that would change the soldier's promotion points. Some examples are awards, decorations and SQT scores. Keeping your records up to date will surely increase your promotion points.

AR 600-200 explains the specific eligibility and selection criteria for advancing to E-5 and E-6.

The centralized promotion system, in effect since January 1969, includes promotion from grade E-7 through E-9 and appointment to command sergeant major.

Consideration for E-7 through E-9 is based on date of rank (DOR). HQDA announces the criteria for each zone (primary and secondary) of consideration prior to each grade's annual board. This criteria may change with each board.

The primary zone, established as one cutoff date, includes all soldiers having a DOR prior to that date. The secondary zone, established starting from the day after the primary zone cutoff date for a specific number of months, includes those soldiers with a DOR between those dates.

The centralized board consists of at least five members, including commissioned officers, warrant officers and senior NCOs. A general officer is the president of the board. You may write to the president of the board, but your letter should be in positive terms and not in a complaining form.

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The promotion board uses three basic documents or records to evaluate your potential for promotion: a microfiche copy of your official military personnel file, your personnel qualification record (PQR) and your Noncommissioned Officer Evaluation Report (NCO-ER). These documents provide a picture of your entire career and your potential at the next higher grade.

How do you prepare for a DA selection board? First, make sure you know when you will be in the zone of consideration, and prepare your records in advance.

Request a copy of your microfiche (see the sample below). If you are ever in the area of Fort Benjamin Harrison, Ind., you can stop in and review your file in person.

**Commander
USA Enl Rec & Eval Cen
ATTN: PCRE-RF-I
Fort Benjamin Harrison, IN 46259**

1. Request that I be provided a microfiche of my OMPF, with "P", "S" and "R" fiche as applicable. Date _____

2. The following information is submitted as required.

Name _____

Rank _____ SN _____

Mailing Address _____

Signature _____

Check your file for missing NCO-ERs. If you have a copy of a missing NCO-ER take it to your military personnel office (MILPO). They can authenticate it and send it to be put into your file. Do not attempt to send in an NCO-ER on your own; only your MILPO may forward an NCO-ER. Contact your rater, if possible, and have another NCO-ER reconstructed.

Make sure your file includes all of your letters of commendation and appreciation, awards and decorations, article 15s, courts martial, etc. If any are missing check with your MILPO NCOIC to see if they should be filed on your fiche.

Also be sure your file contains a current DA photo. Since you cannot bodily appear before the selection board, your official photograph portrays you. If you want to look good and remain competitive, ensure that your uniform complies with AR 670-1 and that your photograph complies with AR 640-30. Though you only need to update your DA photo once every three years after your initial photo upon promotion to staff sergeant, take a picture each year in which you fall into a zone of consideration for promotion.

Review your PQR to ensure —

- no inconsistencies exist between your DA Forms 2A and 2-1;
- all applicable blanks are filled in;
- assignments are correct;
- awards, decorations, military and civilian education and date of last physical are recorded; and
- current height and weight is correct.

The standardized EPS offers opportunities for advancement to every qualified soldier who will accept assignments Armywide. Promotion cutoff scores and requirements for E-5 and above satisfy the needs of each MOS. This makes promotion competitive — only the best qualified get the opportunity for promotions.

Who Evaluates Me?

The Army has designed an enlisted evaluation system to measure your MOS skill and duty performance. A skill qualification test (SQT) evaluates your MOS skill and NCO-ERs evaluate your duty performance. Both of these measurements have a large effect upon your career.

The SQT is a performance-oriented test that evaluates your ability to do the critical tasks required for your primary MOS and skill level.

The NCO-ER gives recognition to your performance of duty and provides a counseling tool for your rater on your career development. To ensure sound career management decisions are made and your potential is fully developed, NCO-ERs must be accurate and complete. Each report must be a brief, thoughtful and fair evaluation of your abilities, weaknesses and potential.

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The NCO-ER supports the Army's personnel management programs and the career development of individual soldiers. It influences your career objectives, measures the quality of the NCO Corps and largely determines the senior enlisted leadership of the Army. NCO-ERs are prepared for soldiers in grades E-5 and above on DA Form 2166-7.

You, as the rated soldier, have the greatest responsibility in the rating process. You are the most knowledgeable individual about your duties and responsibilities. When assigned to a unit, you are given a primary duty to perform. This duty breaks down into a mission, tasks and objectives. Your responsibility is to ensure that you carry out your duties to the best of your ability. Check your performance from time to time and frequently consult with your rater for advice and counseling.

The rater must be your first-line supervisor and must have worked directly with you for 90 days. The rater must also be your senior either by grade or date of rank. The commander may appoint a civilian rater, GS-6 or above, when no military supervisors are available.

The endorser must have a supervisory relationship with you for at least 90 rated days. The endorser must be senior to the rater and to you by grade or date of rank. The endorser may also be a civilian GS-6 or above.

The reviewer must be a commissioned officer, warrant officer, command sergeant major or sergeant major in the direct line of supervision and senior in grade or date of rank to both the rater and the endorser. No minimum time period is required for reviewer qualification. In a case where both the rater and the endorser are other than uniformed Army rating officials, and no uniformed Army reviewer is available, an officer at your MILPO will review your NCO-ER.

Where Can I Get More Information?

These few pages of Career News cannot possibly cover all of the information you'll need during your enlisted military career. When you have specific questions, consider the many types of personnel support at your disposal:

- NCO support chain.
- Personnel administration center (PAC).
- Education center.

- Local NCOES administrators.
- Army reference materials (see below).
- SQT study guides.
- Chain of command.
- MILPO.
- PERSCOM.

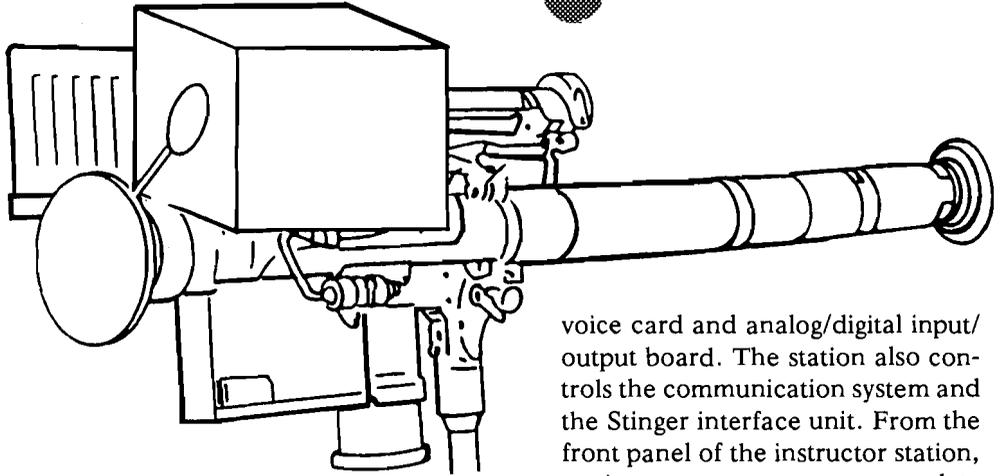
Take advantage of the Army's personnel support. Get answers to all of your questions. The information you lack may cost you a timely promotion.

Army References

(not all-inclusive)

AR 27-10	Legal Service (Military Justice)
AR 135-100	Appointment of Commissioned and Warrant Officers
AR 350-15	The Army Physical Fitness Program
AR 350-17	The Noncommissioned Officer Professional Development Program
AR 350-20	The Army Correspondence Program
AR 351-1	Individual Military Education Program
AR 600-20	The Army Command Procedures
AR 600-200	Enlisted Personnel Management System
AR 601-280	Reenlistment Procedures
AR 611-201	Enlisted Career Management Field and Military Occupational Specialty
AR 614-200	Selection of Enlisted Soldiers for Training and Assignments
AR 623-205	Enlisted Evaluation Reporting System
AR 640-10	Individual Military Personnel Records
AR 640-30	Photographs for Military Personnel Files
AR 670-1	Wear and Appearance of the Military Uniforms and Insignia
FM 22-200-20	Duties, Responsibilities and Authority of Noncommissioned Officers

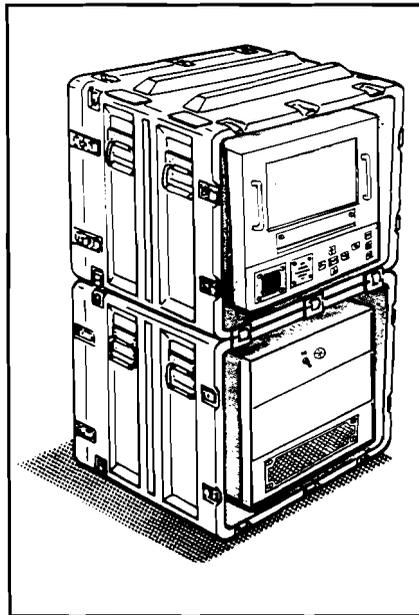
Stinger Troop



Video wizardry brings new realism to Stinger training

Air defense units should begin receiving the latest video arcade-type air defense training wizardry — Kollsman's new Stinger troop proficiency trainer (STPT) — this spring. The STPT, which features single and multiple moving targets within a battlefield scenario, is a real-time interactive training system that incorporates high resolution visual, aural and tactile cues to provide realistic troop training without the expenditure of live missiles.

The STPT gunner station consists of a Stinger with an attached sight unit which houses a video display system. As the gunner looks through the sight, a computer-generated image (CGI) appears on the video display. The display consists of a simulated background view overlaid with a CGI simulated target and front sight reticle. This display produces a realistic aerial engagement scenario selected by the instructor. The image is updated dynamically as the gunner moves the weapon, so that the image seen accurately reflects the gunner's motions. Aural and tactile cues are transmitted to the gunner via the



Stinger weapon speaker and bone vibrator to enhance the sensation of realism. During the target engagement task, the computer automatically monitors and evaluates the gunner's actions during the tracking and firing sequence and determines if a hit was scored.

The instructor station permits an instructor to control the training environment. It consists of the computer system, CRT monitor, front panel keyboard, printer interface, graphics card, sound and

voice card and analog/digital input/output board. The station also controls the communication system and the Stinger interface unit. From the front panel of the instructor station, an instructor manages a complete training session. This includes selecting scenarios from a library of pre-generated scenarios; initiating and running a session; monitoring the gunner's actions in real time; evaluating the gunner's performance; replaying a video of the gunner's performance; displaying performance curves representing tracking errors, time on target and scoring; and performing built-in system calibration and diagnostic tests.

The STPT computer is an IBM PC compatible, 80286-based system. The computer provides the processing power for controlling all aspects of the training system simulation. The hard disk drive of the computer contains all of the associated software and data files required for the simulator.

The scenario authoring device generates data for the creation of new training scenarios. The system consists of a computer, monitor, hard and floppy disk drives, printer, scanner and mouse. Scripts for the generation of new scenarios are prepared on the scenario authoring device and transferred for distribution to the instructor station via floppy disk.

The instructor can include additional performance grading and

Proficiency Trainer

STPT Targets

A-10 Thunderbolt II	MI-24 Hind A/D/E
AH-1 Cobra	MIG-21 Fishbed J
AH-64 Apache	MIG-27 Flogger D
AV-8B Harrier	OH-58 Kiowa
F-111	Su-7 Fitter
MI-4 Hound	Su-7/20 Fitter
MI-6 Hook	Su-24 Fencer
MI-8 Hlp	UH-1 Iroquois
UH-60 Blackhawk	

STPT Characteristics

- Self-paced or instructor-guided training
- Flexible, realistic battlefield scenarios
- Realistic aural and visual cues
- Environmentally rugged
- Indoor/outdoor system
- Thorough evaluation

compile and store the gunner scenario performances in the instructor station data base.

The STPT uses digitized pictures of actual terrain for providing backgrounds, creating a data base that reflects a variety of possible environments that the trainee might encounter. Terrain selections include desert, mountain, and hilly, wooded areas.

The background images for the STPT are digitized using picture scanning technology. A scanner passes over the terrain picture from top to bottom and left to right. The scanner breaks the picture into pixels (smallest addressable display element) which correspond to the pixels of the display screen. At each pixel, the scanner registers the gray scale (black and white) or color value at the point. A full color scanner will allow the generation of over 16 million possible colors. A gray scale scanner will allow the generation of 256 possible gray scale levels. The resulting data is then adjusted to the displayable resolution of the display device (monitor).

Once generated, the terrain image and the resulting data are "tagged" with a three-dimensional representation. This representation

allows the various points and elevations of the terrain to be graphically defined and three-dimensional processing of the image. In this respect, a target can be made to hide from view as it moves throughout the background scene. This technique permits easy creation of popup scenarios in which the target can "pop up" from behind one hill while flying in front of others. Tagging is also used to identify the IR profile of the background scene.

A custom algorithm dynamically wraps a scene with a limited field of view (FOV) around the full 360-degree FOV. In this way a scene with a larger FOV than was actually digitized can be created and displayed without degrading the scene quality or gunner's perception of the enlarged scene (the wraparound is optimized to remain seamless to the viewer).

Targets used on the STPT are three-dimensional representations of actual aircraft. The system can support multiple targets within a single scenario.

All targets are stored in true three-dimensional perspective to allow the target to fly through a background scene and still maintain proper viewing perspective from

any viewing angle. The flight path for a target throughout a particular scene along with the target's perspective is generated off-line during the scenario generation process. Target position and perspective throughout a background scene is stored along with the scenario rather than computer real-time. This technique allows the math-intensive three-dimensional computations to be performed off-line and yield a fast and smooth real-time display.

The simulated Stinger sight reticle is graphically generated and functionally replaces the front sight reticle of the Stinger weapon. The simulated reticle is overlaid upon the final graphic scene after the scene has been updated for target movement and viewing perspective (the reticle does not move; rather, the scene moves behind the reticle).

Text and special effects for the STPT are generated and overlaid upon the final graphic scene in real time. The special effects include weapon firing effects, target hit effects and IRCM flares. Haze, bright sun, dusk, dawn and low visibility effects are created by modifying the gray scale or color tables to reproduce reduced visibility conditions



Brig. Gen. Jay M. Garner, assistant commandant, USAADASCH, takes aim with Kollsman's STPT.

accurately and consistently over the entire scene content. Clouds and cloud cover effects are supported and generated during the scenario generation process. Textual information consists of data available to the instructor to allow monitoring and control of the scenario within an exercise. Text displays contain the various menus and screen controls, real- and scenario-time clocks, and gunner performance displays.

The display of scene data is optimized into two viewing perspectives. The gunner display projects a 23-degree FOV resolution through the simulated sight. This display can be dynamically panned throughout the 180-degree FOV of the entire scene. The instructor also receives this view to allow exact monitoring of the gunner as he moves throughout the scene. A special wide view window on the instructor's station display yields a full 180-degree representation of the scene content. The window allows the instructor to monitor target activity and the relative position of the gunner's sight

throughout the entire scene.

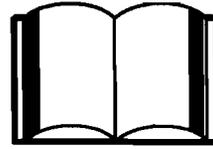
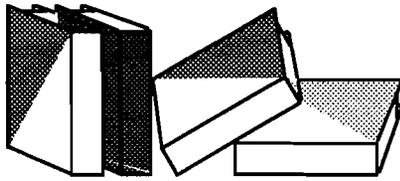
Optimum resolution of the STPT display area allows accurate target identification to occur while maintaining faithful reproduction of the target and its perspective. The resolution of the screen display is 800 pixels by 600 pixels with 16 levels of gray scale for the black and white display and 640 pixels by 480 pixels with 256 color levels for a color display. This resolution allows a highly realistic image to be displayed to the instructor and gunner.

The audio path consists of an optional headset intercom system which allows verbal interaction between the instructor, an observer and the student gunner. The path also includes an aural cueing system that permits accurate and realistic reproduction of the sound effects found in the training environment. The entire audio path is under computer control.

The sound board consists of an audio board which reproduces digitally recorded sounds. The computer triggers the playback of the appropriate sound when desired and controls the output of the sound with respect to length and amplitude. The sounds consist of actual

Stinger sounds and tones that have been recorded, processed and sampled into the memory of the computer. Each of the samples consists of a small segment of sound data that has been optimized for the memory requirements of the computer. This allows for a sustained sound to be reproduced by looping a small segment of that sound for the desired length of time. The sound board is fed data at 10 millisecond increments for as long as the sound is playing.

The STPT — a safe, portable, rugged, indoor-outdoor system — increases the availability of weapon training time while reducing range time and costs required with live missile launching. The system affords a positive training environment by providing realistic battlefield scenarios and realistic aural and visual cues. It allows trainees to acquire and engage targets without firing live missiles. The STPT offers either self-paced or instructor-guided training on an easy-to-learn and easy-to-use system and provides a challenging and thorough evaluation of a soldier's ability to engage and shoot down fixed- and rotary-wing aircraft.



ADA LIBRARY

Air Defense Artillery's new book review feature, similar to those seen in other branch professional journals, will encourage professional reading and study and inform air defenders of recently published books of interest. I want participation from a variety of air defenders to promote a wide spectrum of opinions from across the branch. I also want non-air defenders' input to bring about further discussion and thought.

Air Defense Artillery's book review specifications are as follows:

- Reviews not to exceed 500 words.
- Style and format similar to that found in the *New York Times*.
- Review books from the established list or approved by the magazine's editorial staff.

- Review books factual, historical, geo-political or military in nature and, based on editorial approval, selected novels of unusual military interest.

- Reviews typed or handwritten (neatly, please).

- Books supplied free of charge from publishers through 1st Lt. James Starling, who is acting as book review coordinator.

- Reviewers keep each book reviewed.

- No formal deadlines. (Editorial requirements determine what is published and when.)

Personnel interested in taking part in this new magazine feature, getting published and receiving free books should contact Starling at duty number AV 978-5285/2578, home number (915) 779-7859.

James A. Collins
Editor-in-Chief



1. *Weapons and Tactics of the Soviet Army*
2. *French Military Adventures in Alabama, 1818-1828*
3. *The Warrior Queens*
4. *The Soviet Union and National Liberation Movements in the Third World*
5. *Britain and the Falklands War*
6. *Cardinal of the Kremlin*
7. *Chariots of the Deserts: The Story of the Israeli Armored Corps*
8. *U.S. Army Reserves: Rhetoric, Realities and Risks*
9. *Eminent Victorian Soldiers: Seekers of Glory*
10. *The Chinese Army After Mao*
11. *Bright Shining Lie: John Paul Vann and America in Vietnam*
12. *Air Warfare and Air Base Air Defense*
13. *Armed Forces on a Northern Frontier: The Military in Alaska's History, 1867-1987*
14. *Arms and the Enlisted Woman*
15. *Pen and the Sword*
16. *Kingdom in the Morning Mist: Mayrena in the Highlands of Vietnam*
17. *Best Laid Plans: America's War Against Terrorism*
18. *Swordpoint*
19. *China's Nuclear Weapons Strategy: Tradition Within Evolution*
20. *Unit Reconstitution: A Historical Perspective*
21. *Enter the Dragon: China's Undeclared War Against the United States in Korea*
22. *The Military and the Media: Vietnam*
23. *Defense of Hill 781*
24. *Red Banner: The Soviet Military System in Peace and War*
25. *Team Yankee*
26. *The Bridge at Dong Ha*
27. *The Use of Federal Troops in Civil Disturbances: 1789-1878*
28. *Deception Operations*

A BRIGHT SHINING LIE: John Paul Vann and America in Vietnam by Neil Sheehan. 861 pages. Random House, New York. 1988. \$24.95.

New York Times journalist and author Neil Sheehan uses the biography of retired Lt. Col. John Paul Vann to assist in recounting the history of American involvement in Vietnam from the 1940s until Vann's death in 1972. Sheehan intertwines the events of Vann's life with the history of Vietnam and the machinations of the various powers that have controlled Vietnam in the 20th century. In doing so, Sheehan points out policy contradictions and duplicities of these countries, most notably the United States, while also pointing out the flaws and duplicities of John Paul Vann.

As portrayed by Sheehan, Vann felt that most senior American officials, military and civilian, had no natural understanding of the mechanics of combat or the conditions under which it was joined in Vietnam; America's senior soldiers had a 1940s conventional war mindset inappropriate for a 1960s guerrilla conflict. This is exacerbated by the Vietnamese tendency to report falsely and to exaggerate their combat exploits.

A Bright Shining Lie portrays Gen. William Westmoreland (American commander in Vietnam, 1964-1968) as an adept manager who focused more on building the logistical infrastructure for a "war of attrition" rather than on winning the support of the population away from the Viet Cong.

Despite Sheehan's prodigious and generally thorough research, the book contains a number of small, but irritating, factual flaws. It also lacks detailed footnotes or chapter endnotes. *A Bright Shining Lie* does contain source notes at the end of the book; however, there are no attributions noted.

Sheehan has a clear, easily read writing style that allows the reader to go through this large book fairly quickly. He introduces a wide range of personalities that includes reporters, Vietnamese and American government officials, and Vietnamese and American military officers. His organization and interweaving of events and people's lives is excellent and evidence of his considerable skill.

A Bright Shining Lie is well written and thought-provoking; however, it tries to cover too much territory and tends to digress (e.g., Sheehan's discussion of the

Korean War adds nothing to the book). The author's liberal bias is evident as he portrays reporters and opposers of the war in a better light than those in favor of it.

Although *A Bright Shining Lie* has its shortcomings, military professionals should spend an evening going through it to gain another perspective on one of our most controversial wars. Military professionals may also find the lessons learned from Vann's and America's experiences in Vietnam useful in the future.

— 1st Lt. James Starling

THE DEFENSE OF HILL 781: An Allegory of Modern Mechanized Combat by James R. McKonough. 202 pages. Presidio Press, Novato, Calif. 1988. \$15.95.

The Defense of Hill 781, by James R. McKonough, is an allegory describing the ordeal of Lt. Col. A. Tack Always at the National Training Center, better known as Purgatory. Always assumes command of a mechanized infantry battalion with two attached tank companies which poses a very difficult task for a commander with experience in only airborne and other light infantry units.

McKonough takes the reader through Always' adventures at the NTC in the style of *The Defense of Duffer's Drift*. The reader finds himself led through some of the most common "lessons learned" at the NTC while also seeing the results of applying those lessons to following engagements.

Eventually, McKonough brings the story full circle. Always accumulates the knowledge and experience to successfully engage and defeat the dreaded OPFOR with his task force. The book offers a sound representation and an interesting form to garner the valuable tactical and leadership lessons brought to light during every rotation at the NTC.

The Defense of Hill 781 is a must for every professional soldier's reading list. It shows the rewards that can be gained through careful planning and rehearsals which can be applied anywhere in the Army. The graphic description of men in combat gives the reader a close look at the difficulties encountered. Overall, *The Defense of Hill 781* is a valuable tool and well worth reading!

— 1st Lt. Timothy P. Williams



Stinger.

Proven, adaptable air defense.

Stinger, a lightweight, accurate, fire-and-forget air defense system, has already demonstrated its ability to protect today's soldiers.

GENERAL DYNAMICS
A Strong Company For A Strong Country

Soldiers in Bronze



by Maj. Robert Clark, XO, 4-56th ADA

Years from now, soldiers assigned to the U.S. Air Defense Artillery Center and Fort Bliss, Texas, may wonder if the recently unveiled "First to Fire" statue was modeled after real people or if it sprang from an artist's imagination.

Sometime in the summer of 1988 our battalion, 4-56th Air Defense Artillery, received a tasking to provide a Stinger team to pose for some pictures. The request stated that the two soldiers should be an NCO and a specialist or lower grade. It also specified that one be white, the other black. A Battery, 4-56th ADA, teaches AIT for SHORAD and MANPAD operators and gunners so they naturally got the call to provide the soldiers.

There was no problem in selecting one of the 16S instructors as the NCO and SSG Alfred A. Jackson, a 29-year-old hailing from Baltimore, Md., got the call. Finding a lower-ranking enlisted soldier for the gunner was only slightly more complicated. A Battery didn't have any gunners, but it had plenty of students. Spec. Gregory A. Bowman, a Illinois National Guard soldier transitioning into 16S assigned to A Battery, 1-202nd ADA, was selected.

The two soldiers accompanied photographer Michael D. Pike of the Fort Bliss photo lab to the Hueco mountains east of El Paso. Using a Stinger tracking head trainer, Jackson and Bowman performed search and scan detection procedures while Pike went to work with his camera, using a roll of film in the process. He mentioned that the photos would be used for a book or a statue. Little did they know that they would become a permanent part of Air Defense history.

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