Field Artillery Journal

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Stalking the Threat

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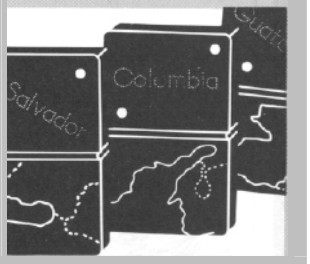

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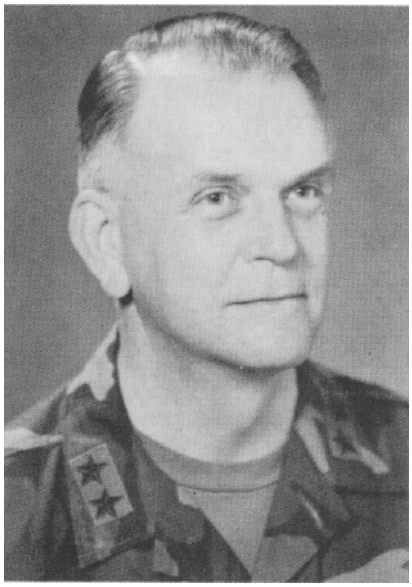
On the Move

Ripping off the Blindfold

MG EUGENE S. KORPAL



"To lack intelligence is to be in the ring blindfolded."

General D.M. Shoup, USMC

The greatest threat facing the United States in the foreseeable future results from the tremendous potential of Soviet military power. Soviet and Warsaw Pact forces as well as those of their client states have in many instances attained or surpassed technological parity with US and allied forces. This dynamic "correlation of forces" presents the United States with a major challenge. Our doctrine to counter the growing Soviet threat has changed dramatically over the last decade. The NATO-focused "active defense" doctrine of 1976 gave way in 1982 to the more comprehensive AirLand Battle guidelines. In the process, our emphasis shifted from firepower and force ratios to a doctrine that champions:

- The initiative.
- A maneuver-firepower balance.
- The human dimensions of combat.
- The necessity of dealing with the entire spectrum of conflict.
- The operational level of war.

Our new doctrine is unequivocal in suggesting that all US forces must be ready to fight in virtually every part of the world and at any level on the spectrum of conflict. In fact, FM 100-5, *Operations*—our capstone manual—clearly states that low intensity warfare involving guerrillas or terrorist forces looms large as the most probable contingency facing our combined arms team.

Regardless of the level of conflict, however, AirLand Battle doctrine makes multiservice cooperation imperative. Only by fighting as a joint team can we expect to draw upon the full potential of the four tenets of our superb doctrine—initiative, agility, depth, and synchronization.

Sound, well-understood operational and tactical guidelines are vital elements in successful military operations. Our AirLand Battle doctrine provides a solid core of principles from which we can devise appropriate tactics, techniques, procedures, organizations, support structures, equipment, and training. And that is exactly what the Fire Support Community is doing. Specifically, we are:

- Revising the 6-series of field manuals and circulars to develop the tactics and techniques necessary to support deep, close, and rear operations.
- Redesigning Field Artillery organizations such as the corps headquarters and headquarters battery as well as our Lance and MLRS battalions to enhance their operational level capabilities.
- Participating in the development of new material such as the advanced Field Artillery tactical data system (AFATDS), the Army tactical missile system (ATACMS), the elevated target acquisition system (ETAS), the joint surveillance and target attack radar system (JSTARS), and the remotely piloted vehicle (RPV).
- Emphasizing combined arms training both at Fort Sill's School of Fire Support and elsewhere throughout Army.
- For our forces to be successful on the next battlefield, we must develop sound, flexible doctrine applicable to the full range of likely belligerents and hostilities. That is, we must know our enemies and prepare to defeat them.

We Redlegs simply cannot afford to be blind to the steady progress the Soviets and their proxies are making. To be victorious we must rip off our blindfolds, constantly update our doctrine, and train to demanding standards. Through our uncompromising efforts, we must mold a combat-ready combined arms team manned by professionals and equipped with sufficient, quality material to deal with any enemy bold and presumptuous enough to enter the ring and fight us.

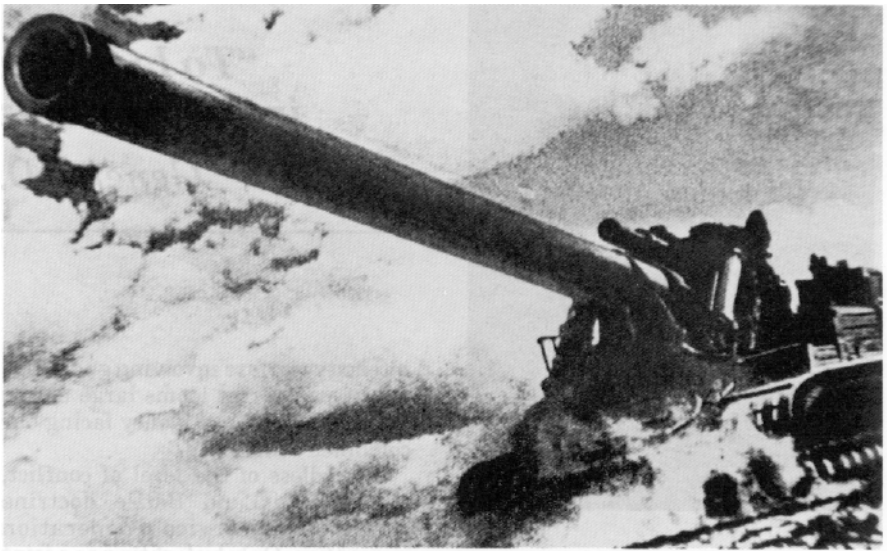
Incoming

LETTERS TO THE EDITOR

Red God

Soviet 406-mm Self-Propelled Howitzer

Appearing in the 1985 edition of General of the Army Pavlovski's *Ground Forces of the Soviet Union* and in the *Soviet Military Encyclopedia*, and accompanied by a caption identifying the featured weapon as a "Great Power" artillery piece, this photograph shows the Soviet 406-mm self-propelled gun. Experts believe that this system entered the Soviet inventory in the early 1950s, but has been rarely seen because a large number were destroyed in the early 1960s at the urging of Nikita Khrushchev. Only powerful opposition from military leaders prevented the 406-mm's complete elimination.



Weapons of this size are normally assigned to the Artillery Reserve of the Supreme Command (ARVGK) which consists of artillery units of various sizes. In wartime, the Supreme Command distributes these holdings to provide qualitative and quantitative strengthening of artillery along major operational axes. The ARVGK includes various types of artillery including rocket launchers, antitank, antiaircraft, heavy caliber, and super-destructive units. During the Second World War, the ARVGK created 32 artillery breakthrough divisions as well as many regiments and battalions. This organization carried out large-scale artillery operations and concentrated tremendous numbers of weapons on narrow breakthrough sectors.

According to several Soviet sources, heavy caliber and superdestructive artillery—also referred to as "Great Power" and "Special Power" artillery—includes guns, howitzers, and mortars ranging from 152-mms to 305-mms in diameter. Such battalions receive assignments to destroy especially solid structures, as well as to suppress and eliminate important objectives located deep in the enemy's defenses. The Soviets believe weapons of this size are important for 3 reasons.

- First, they are nuclear capable and thus complement Soviet nuclear missile systems.
- Second, they can destroy heavily fortified and urbanized targets.
- Third, they can assist in breaking a deadlock should NATO forces manage to holdup a breakthrough operation.

According to Victor Suvorov, a former Soviet tanker and member of the Main Intelligence Directorate of the Soviet Ministry of Defense, there are currently 16 "Great Power" artillery brigades and an unknown number of independent "Special Power" artillery battalions in the Supreme Commanders Strategic Reserve. Because all artillery formations in the Soviet Union use a "second formation" mobilization system, these numbers would double in the opening phase of a war.

Although not technically fitting the definition of either "Great Power" or "Special Power," the 406-mm gun is a "Special Power" artillery piece. According to the official newspaper of the Soviet defense establishment, *Krasnagh Zvezk*, the Soviets initially developed the 406-mm gun for use aboard the Sovetskii Soyuz class battleships, which were to have a displacement of 64,000 tons. Two of these ships were laid down at the Severodvinsk Shipyard in 1940, but work on them ceased in October of 1942. They were never finished. The guns became shore defense weapons. On 23 August 1941, one 406-mm fired a projectile round weighing 1,108 kilograms. It traveled 45.5 kilometers. The gun could fire 2 rounds every minute.

The 406-mm self-propelled gun uses a World War II vintage Iossef Stalin tank chassis. Its appearance in General Pavlovskii's book and in the *Soviet Military Encyclopedia* is powerful evidence that these weapons remain in active service and still have an important role to play on the modern battlefield.

Gilberto Villahermosa
CPT, FA
Fort Bragg, NC

Achieving Artillery Superiority

Today's artillery threat now, more than ever before, poses the greatest challenge to American maneuver commanders. Without a doubt, reputation as the greatest killer in changes in tactics resulting from modernization have transformed our enemy's Field Artillery into the greatest killer on the battlefield. Of course, American Field Artillerymen are also more than ready to reinforce their any future conventional war; however, our potential Warsaw Pact adversaries have also modernized their massive artillery forces to an even greater extent than we.

Contemporary maneuver commanders must never forget that

enemy Field Artillery cannons can rain destruction 24 hours a day in all weather; are well trained in shoot-and-scoot tactics; possess a variety of lethal, high-tech ammunition; and have increased range capabilities. Soon, our adversary's cannon batteries will, like our own, diversify into almost totally independent platoons and guns capable of operating miles from each other.

One American—an armored division commander—who recognized the increasing and potentially fatal effects of the modernizing Field Artillery threats, recently directed that the primary mission of his division artillery was to destroy the enemy's Field Artillery. He went too far. Despite the awesome threat of high-tech artillery, counterfire missions must never replace the primary mission of Field Artillery to support the ground gaining arms by close and accurate fires. Any maneuver force involved in a conventional war would be ineffective and beatable without close artillery support. But now they need more. They need a modernized artillery force that can achieve artillery superiority by emphasizing division counterfire plans.

Today it would be difficult, if not impossible, to find any form of a counterbattery or counterfire plan in most division or their subordinate artillery headquarters. Such plans are simply not priority tasks. This fact of life is most unfortunate not only because of the burgeoning Threat but also because of the tremendous, unrealized capabilities of our Firefinder radar systems. Too often, we find division-level fire planning emphasizing key terrain, road junctions, and unsubstantiated intelligence reports as the source of targets for the Field Artillery. We are not taking full advantage of the technology of the Firefinder and TACFIRE systems.

A good counterfire plan must include specific procedures on the interaction of the Firefinder systems, TACFIRE, and battery computer system (BCS); and it should be developed in accordance with the tenets of AirLand Battle doctrine. Such a plan can support the rear, close and deep battles. It can be particularly important in that latter category. In fact, a counterfire plan aimed at the destruction of the enemy's artillery could constitute major portions of a commander's deep attack.

Support for rear, close, and deep battles can be achieved by division-level counterfire plans in which Firefinder is integrated with TACFIRE and BCS.

Division commanders must give their counterfire plan the same analysis and time they devote to the division's counterattack plans. The counterfire plan is not just an "artillery task." Manuever commanders must recognize that the counterfire plan is essential to accomplishing the mission. In his role as the division fire support coordinator, the artillery commander should continue to prepare the counterfire plan. But he should receive the commander's specific guidance and the help of virtually the entire division staff.

One essential change required for an effective counterfire plan is the addition of other weapons systems in the plan. Currently, counterfire missions typically employ artillery against artillery. Occasionally, plans will call for Air Force sorties to attack enemy Field Artillery units, but this is far from typical.

Attack helicopters provide a tremendous, unrealized counterfire capability. The Apache attack helicopter is particularly well-suited as an artillery killer. Unlike the Air Force's close support fighter, the Apache can penetrate across the forward battle area without detection and engage soft targets from a good stand of distance. Its all-weather, nap-of-the-earth flying capabilities and armaments give it outstanding survivability.

A company forward observer or battalion fire support officer could easily relay real-time artillery locations detected by Firefinder radars or other sources to Apache attack helicopters in a pre-strike pattern. One Apache with its 16 Hellfire missiles could cross the line of contact, fly 1 to 5 kilometers to the approximate location of enemy artillery, and quickly destroy several platoons or batteries of artillery before returning to friendly areas. The use of the Apache attack helicopter, cannon artillery, and Air Force fighters could rapidly give the maneuver commander artillery superiority over the enemy's close support weapons. Multiple launcher rocket system (MLRS) fires could be planned against missile and cannon batteries located beyond 6 kilometers of the line of contact.

History has shown that enemy artillery is difficult to neutralize without massing friendly artillery. The employment of Apache and Field Artillery's laser-guided Copperhead weapon against enemy artillery promises to save an enormous amount of our scarce ammunition. That's why a maneuver commander facing 5 to 1 odds, or less, in tanks or BMPs should consider diverting Apaches from the mission of killing tanks to killing artillery. The effectiveness of the enemy's tanks and BMPs will be seriously degraded without their massive artillery

support and the relative effect at the forward line of own troops will be most favorable.

The maneuver commander who remembers that artillery pieces, not tanks, are the greatest killers on the battlefield; that it operates in a safer environment behind the lines of contact; requires a minimum of fuel; resupplies quickly; can mass fires; and is extremely accurate, effective, and successful, will realize the importance of a combined arms counterfire plan. The days of parochial counter-fire are over. Today's battle plan must be a total force effort.

Having said all that, I must reiterate that the primary objective of the counterfire plan must be artillery superiority. This objective is essential especially when the enemy has air superiority—a likely situation in a conventional European war. Few tacticians, including air defenders, will debate the position that our air defense umbrella today is full of gaps. If our adversary is going to have air superiority, we must achieve artillery superiority over an anticipated overwhelming artillery force. The potential for success exists in Europe today. There are more US artillery weapons in the forces of US Army Europe today than there are tanks. The addition of Apache and Air Force weapons systems to existing counterfire assets can help assure artillery superiority in a conventional war.

A counterfire plan which achieves artillery superiority will deny the enemy's ground gaining arms the close artillery support they need. A maneuver commander without air or artillery support cannot hold key terrain. The enemy's ability to deny the best avenues of approach, halt a river crossing operation, deliver mines or nuclear weapons, illuminate the battlefield, soften a target prior to an attack, blunt the nose of a penetration or defend a perimeter will all quickly wane with the destruction of its Field Artillery. In the words of Napoleon,

A counterfire plan which achieves artillery superiority will deny the enemy's ground gaining arms the close artillery support they need.

> *The better the infantry, the more it should be economized and supported by good batteries. Good infantry is without a doubt the sinews of an Army, but if it has to fight a long time against very superior artillery, it will become demoralized and will be destroyed.*

The Warsaw Pact artillery forces have always considered "counterbattery bombardment" a top priority in battle planning. An article published in a 1973 issue of the Russian magazine, *Voennyi Vestnik*, asserts that "each officer-artilleryman must master the art of combating enemy self-propelled artillery...The methods of counter-battery bombardment have become complex with the change in artillery tactics, survey, radars, and computers." The article discusses in detail the reconnaissance, movement, firing, and communications procedures of US self-propelled units.

We must begin to re-emphasize counterbattery and counterfire plans. A well-planned and integrated counterfire plan that includes a combined arms effort can mean the difference between success and failure against overwhelming odds. And artillery superiority is the weight which can shift the balance of combat power in a conventional European battle.

Robert H. Kimball
LTC, FA
APO, New York

Soviet Artillery Organization and Firepower

Today, it's axiomatic that we must know our enemy if we are to defeat him. And an eminently likely enemy for us may be the Soviet Union. No wonder there has been so much study of Soviet armor and aircraft. But amazingly, Western experts have often forgotten the Soviet artillery which may be the key to victory.

In the USSR, artillery falls under the Rocket Troops and Artillery Branch which is responsible for surface-to-surface guided missiles, free flight rockets as well as field and antitank artillery. Unlike the US Army, the Red Army makes artillery units organic to maneuver elements. The only exceptions to this are tank battalions which have no organic artillery or mortar units.

Soviet gunners use command and organizational structures designed to ensure flexibility in concentrating fires. The principal attribute of this approach is the creation of temporary mission-oriented groupings. By organizing their artillery into army, divisional, and regimental groups, the Soviets not only provide the maneuver commanders with the artillery they need but also establishs strong centralized control over all fire support assets. Known as army artillery groups (AAG), division artillery groups (DAG), and regimental artillery groups (RAG), these organizations vary dramatically according to the mission undertaken and the battlefield upon which the operate.

The army commander receives artillery for his AAG from *front* artillery assets. The number and type of units are commensurate with the importance of his army's mission. The division commander receives yet other units and may allocate them within his DAGs and subordinate RAGs. Depending on its mission, the division may even have more than one DAG. And depending on its situation, a RAG may be reinforced by artillery units from nondivisional artillery battalions.

The command and control of Soviet artillery varies with the level at which the unit operates. At the regimental level and above, an artillery officer who plans and coordinates artillery fires serves on the staff of the maneuver unit commander. At regimental levels he is called the chief of artillery; at division and higher levels he is called the chief of rocket troops and artillery (CRTA). The chief of artillery or the CRTA is responsible for controlling artillery units organic to or attached to his maneuver unit, but he does not command them. At levels below regiment the commander of the artillery unit organic to a maneuver unit is directly responsible for the performance of his artillery unit.

During combat, artillery groups are the basic framework from which commanders control artillery fires and all decisions concerning the use of artillery are made on a centralized basis.

Using the recommendations from his CRTA, the division commander not only controls all organic and allocated artillery within the division but also determines the organization for combat and the priorities for artillery fire. At the regimental level, the chief of artillery reports directly to the regimental commander while maintaining contact with the division CRTA. Artillery battery and battalion commanders keep their maneuver commanders informed and report to their controlling artillery headquarters. At all times the Soviets emphasize face-to-face coordination throughout the artillery command and control processes.

The Soviet fire planning process derives from the scheme of maneuver, the location and nature of enemy targets, the required and desired level of damage, and the fire support assets available. The Soviets coordinate and approve fire plans at the highest level of participating units but they draw and use input from all subordinate units. Soviet fire planners consider all available combat support, including nuclear and chemical assets, and integrate them into a single coordinated fire plan. The focus of fire support planning is fire superiority over the enemy. The Soviets seek the ability to execute fire missions while also suppressing any significant counterfire. They feel this can be achieved by obtaining both qualitative and quantitative advantages in fire support and by opening fire first with surprise, accuracy, effectiveness, and mass. Western warriors should never forget what Lenin said: "Quantity has a quality all of its own."

Emmerico T. Nepomuceno
CPT, FA
Fort Sill, OK

Leadership

Overcoming Cliches—The Reality of Soviet Leadership

Let's drop that old cliche that Soviet leadership is simply a series of reflex actions. That old saw is pure poppycock. The Soviets believe a leader must display personal qualities such as a businesslike approach, strong will, decisiveness, and bravery. They also value strongly developed intuition and imagination. In fact, the Soviets seek the same leadership qualities desired by any army.

The difference between armies is how they go about developing intuition and imagination. The Soviet leader is exposed to hundreds of historical, theoretical, and tactical military situations requiring him to make the most scientifically correct decision. In other words, he learns and practices in school the efficacy of M.V. Frunze's theoretical contention that Soviet military education "cannot provide the commander with any standard decision, it can only serve as the guiding principle." The Soviets believe that by using past experiences and the guiding principles of military

theory, a commander can make sound decisions quickly. For them, this is the basic measure of the operational-tactical maturity of the commander. "Success in combat is brought about by will combined with professional skill, the commander's sense of great personal responsibility for the accomplishment of the mission, his demonstration of creativity, reasonable risk, and persistent search for the methods that lead to victory."

Of course, Soviet leaders cannot maximize all the traits listed above when they are part of a centralized system. So, since World War II they have been attempting to eliminate the problem of overcentralized control. On 18 May 1943, the Soviet Supreme High Command published a special directive to the troops "forbidding senior officers to intervene unnecessarily in the functions of the subordinate commanders or to control the troops through their heads." Today, the Soviets constantly stress that "in the majority of cases, the subordinate should be free to select the methods for carrying out the tactical mission...." A Soviet commander "deprived of the authority to exercise initiative, gradually loses his store of energy, becomes apathetic, and begins to work out of fear rather than because of conscientiousness."

In a system that recognizes the superiority of leadership initiative and decentralized control, how can the rote battle drill at battalion and below exist? Initiative at this level is simply confined to the limits of the battle drill, just as a basketball team's initiative is restricted to prerehearsed plays. In the confusion of the modern battlefield the commander must know where his units are and what to expect in any given tactical situation. This battle drill enables the unit to act speedily and decisively while allowing the commander the initiative required when confronted by various situations. The tactical limitations imposed at regimental commander and higher levels gradually lessen, and these commanders enjoy an increasing latitude and flexibility.

Soviet officers lead through the use of past experience and military principles. And they are expected to make the difficult, time-sensitive decisions required on the modern battlefield. Moreover, their ability to rely on their subordinates to employ rote battle drills frees the more senior commanders to make those tough military decisions.

Soviet decisions are not always dictated by a higher level. Rather they derive from a synthesis of information and the logical and scientific application of reasonable, validated principles. In fact they sometimes look remarkably like our own actions.

Brnnen G. Hahn
CPT, MI
Fort Sill, OK

New Thoughts

A Red Perspective

First Lieutenant Richard A. Lechowich's article, "The Soviet Showdown: A Doctrinal Lesson We Can't Ignore" (September-October 1986 *Journal*) suffers from 1 critical limitation. It views Soviet military developments and Soviet military history from only the US perspective. Although this is an understandable shortcoming for any non-Soviet writer, it remains a serious flaw. If we fail to realize that the Soviets have long-term goals in the world and continually modify their military apparatus accordingly, we may incorrectly assess their capabilities and intentions.

The Soviets initated their development of the deep attack doctrine well before the Second World War, and their fire support doctrine shares that lengthy history. The problems that arose in their operations were not the result of significant doctrinal shortcomings, but were rather temporary failures of operation which had to be overcome. Just as the purges of 1937-1938 caused serious operational problems for the Soviet Army, so too did the Winter War with Finland. But neither instance necessitated any change in Soviet military thought. In fact, the real impact of the Winter War was Stalin's renewed commitment to the truism that the Soviet military had to be quantitatively *and* qualitatively superior to any potential adversary.

Just as Stalin's aims for military development didn't really change, his ideas about overall military strategy remained fixed. Unlike the picture portrayed by Lieutenant Lechowich, Stalin in 1941 was very much aware of the impending German attack. He knew that war between the 2 countries was inevitable, and he was developing sufficient forces for his own attack. Rather than being tied to a defensive doctrine, Stalin decided to avoid provoking Hitler with large Soviet military buildups near the border. He simply did not want to give Hitler an excuse to attack.

Just as Stalin was not committed to a defensive doctrine in 1941, today's Soviet leaders do not believe in a fixed doctrine for the defense. In fact, the most significant doctrinal impact, "The Great Patriotic War," is the renewed impetus for an offensive mentality.

The Soviet desire to conduct extraterritorial, offensive actions to the exclusion of almost all other forms of combat war may derive largely from the horrific losses suffered during World War II. Considering only those killed, the Soviets lost 20 million men, women, and children. By way of comparison, that is twice the number of the *entire* US military force at the height of World War II! The Soviets have sworn that it *will never happen again*! Their commitment to an offensive doctrine is simply stronger, not new.

Just as Soviet fire support operations improved during the war, they continue to improve now. Soviet Field Artillery responsiveness has taken some significant strides forward through developments in command and control, weapons systems, ammunition lethality, target acquisition, and even survivability.

On the balance, Lieutenant Lechowich's conclusions are valid, but he arrived at them for the wrong reasons. We must remember that their motivations and doctrine run back to Czarist times; and that if they seem similar to US artillery, they are not. The Soviets are different than us, and we forget that fact at the hazard of our own well-being.

George T. Norris
FSTC
Charlottesville, VA

Reply to "And Then Came JAAT"

Mr. Bob Rosenburgh's article "And Then Came JAAT" was an interesting and thought-provoking piece which does an excellent job of exposing the uninitiated to the Joint Air Attack Team. However, as a Field Artillery Officer Advanced Course tactics instructor, I feel the need to amplify on the basic sketch he presented.

My first observation concerns Mr. Rosenburgh's comment that the JAAT has 4 major components—the A10s, Army Aviation, Field Artillery, and ground maneuver elements. It is true that the JAAT may operate as an integrated combined arms team in support of a maneuver force, but it is equally true that it may operate independently such as in an attack against enemy second echelon forces several kilometers forward of the forward line of own troops (FLOT). In that case, the ground maneuver force is not necessarily a component of a JAAT.

My second concern is that Mr. Rosenburgh undersold the key figure in the JAAT—the airbattle captain (ABC). Recent changes in aviation doctrine upgraded this position from a temporary title used only for the duration of the JAAT to an actual Army Aviation commander who commands and controls his full combat unit. Hence the old ABC is now called the aviation commander. The new doctrine also drove Army Aviation to cut down the size of their units. Under the new "Army of Excellence" (AOE) TOE, an attack helicopter company contains only 7 attack helicopters as opposed to 21 under the old "H"-series TOE (or 21 for an "AOE" battalion as opposed to in excess of 80 for an "H"-series battalion). This reduction in strength reduces the commander's span of control and allows him to employ his unit as a single entity with maximum efficiency. He needs not split up his organization, nor does he need an *ad hoc* commander to pick up slack.

The aviation commander not only controls the JAAT, he is also the key planner and coordinator on the team. An aviation commander normally organizes a JAAT in 3 phases:

- He plans and coordinates with the forward air controller (FAC), the fire support officer (FSO), and if the JAAT is used in conjunction with the maneuver, the maneuver S3.
- He executes the plan, coordinating the A10s, attack helicopters, and artillery.
- He reports on the effects he has achieved.

The use of Field Artillery is yet another important issue which Mr. Rosenburgh treats too lightly. He states that the artillery is used to "soften-up and button-up the enemy vehicles." While this is a by-product of any artillery fire, the main job for the Field Artillery is to suppress the enemy air defenses which are traveling along with the enemy force being attacked. If the artillery is successful in this mission, the attack helicopters can concentrate on using their outstanding tank killing capability instead of having to suppress the enemy air defenses.

The principle is to let each weapon system do the job it was developed to do. The Field Artillery has only limited capability to kill armored vehicles, but it is an outstanding area suppression system. Conversely, the attack helicopters and A10s are superb tank killers and are most effective when used as such.

The artillery has several other roles in the JAAT. The Field Artillery family of scatterable mines (FASCAM) can canalize the enemy force into appropriate kill zones. The aviation commander could use his supporting artillery on targets of opportunity as opposed to just firing on planned targets. Finally, the artillery can fire white phosphorus marking rounds, in coordination with the aviation commander, to mark the last round of a volley and let the A10s know the area is clear of artillery rounds.

Mr. Rosenburgh has done a great job in bringing us an eyewitness account of an impressive concept. However, as professional Field Artillerymen, we owe it to the other branches who we support to keep ourselves current in all areas of emerging and changing doctrine. We must know our trade in depth.

Roger A. Andrews
CPT, FA
Fort Sill, OK

Tailoring the Force

Deep attack yes, but tailor the force for the mission. Major Steven G. Starner's division attack force (DAF) described in his *Journal* article ("Deep Attack—We Can Do It Now!" May-June 1986) is more an *artillery* than a maneuver force. One battery of artillery per battalion task force would certainly be enough to support the attack and not be enough to become a liability to the task force commander. Remember, howitzers that have to engage in direct fire are extremely vulnerable to infantry, infantry fighting vehicles, and tanks.

Deep attacking leaders should, therefore, schedule close air support to cover the attack as it travels beyond the range of the division's artillery and use attack helicopters to hit any force that will destroy the division attack force.

The howitzer battery is not designed to advance as fast as the maneuver elements. We should put them on the road and increase their speed. Nor is the armor protection on the M548 and M109 designed for defense against antiarmor rounds and missiles. We ought not expose them to enemy direct fire. What's more, the attack force artillery shouldn't worry about counterfire missions. Rather it should concentrate on mobility as its best defense.

Major Starner's ideas are interesting but probably need more war gaming. *What is the battery commander doing with the firing battery? Why drag the battery operations center along? Why have a restrictive fire area covering the attack force?* But even with these outstanding questions, I have to say, "Thanks for the thoughts!"

William E. Dungey
MSG, FA
APO San Francisco

Afghanistan—The Threat of Soviet Artillery

by Mr. David C. Isby

No Russian Army of any era would do battle without its artillery. When the Soviet Army invaded Afghanistan in December 1979, it naturally brought along a wide range of artillery which has been in action throughout the subsequent war. Like all other branches of the Soviet Army, the artillery—trained and equipped for conventional combat—has had a difficult time adapting to counterguerrilla warfare in the tortuous Afghan terrain.

The Soviet divisions and separate brigades committed to action in Afghanistan brought with them their standard weapons. This reflects not only what was in their mobilization stocks, but also the Soviet's intention that the invasion force be able to defeat the Democratic Republic of Afghanistan (DRA) Army if these Communist forces should decide to resist the "fraternal embrace" of the Soviet Army.

But in the first months of the war, Moscow realized that it was fighting the vast majority of the Afghan people themselves. It faced neither a conventional army nor a traditional rebellion. Rather, it confronted a people in arms. So, the Soviets have had to rethink their tactics for all arms including the artillery.

Tailoring for the Fight

Modern armies have found it difficult to employ artillery in counterinsurgency conflicts. But by 1985 the Soviets developed an overall approach to using artillery in Afghanistan. That scheme minimized their weakness and gave consistency to the overall Soviet operational approach. For example, the Soviets increasingly began to use battalion-sized enveloping forces with their own independent artillery in 1985. Such a practice is innovative but still consistent with Soviet tactical writings.

Artillery has been a vital component in the practical Soviet tactical evolution in Afghanistan. Specifically, the Soviets have tried to get away from their early tendency to push a single road-bound mechanized force inexorably forward only to have the guerrillas attack their night positions or ambush their resupply convoys. Today,

they emphasize the use of reinforced battalion-sized forces, either inserted by helicopter or moving in armored vehicles on independent axes of advance.

Although the heliborne forces are limited in the artillery they can bring with them, the other independent forces bring their own artillery. Self-propelled howitzers or towed 122-mm howitzers are the most common, but the Soviets have also employed 122-mm BM21s, multiple rocket launchers, and 130-mm M46 field guns. In fact, decentralizing firepower is one technique designed to counter the tactical rigidity that has marked the Soviet's early tactics in Afghanistan.

Would the Soviets use such tactics in action against even more "conventional" opponents in South Asia? Probably so. In this remote arena, the Soviets are unlikely to be able to achieve anything near the density of forces envisioned for a conflict in Europe. Nor would the terrain or logistics network permit the use of standard tactics. So the tactics of Soviet artillery in Afghanistan are of great significance for any potential regional conflict.

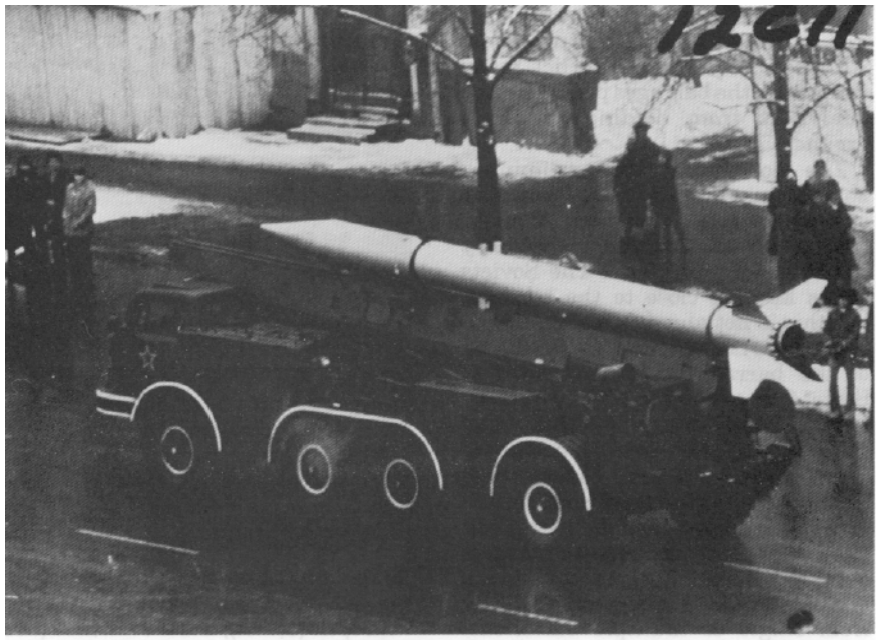
Thus, the evolution in overall Soviet tactics in Afghanistan has been mirrored by changes in artillery tactics. Nevertheless, their artillery has stayed close to conventional war structures. This has the advantage of keeping the divisions in Afghanistan up to full conventional war-fighting capability—certainly a political message to Pakistan and Iran.

The M30 122-mm towed howitzer (top left), 130-mm M46 (top right), and the BM21 are all components of decentralized Soviet firepower.

Barrages and Fire Strikes

From 1980 through 1983 Soviet artillery units concentrated largely on the support of the ground forces. In 1980 when the Soviet forces deployed in large-scale ground operations, they required large scale fire support including preliminary bombardments which have become a hallmark of Soviet artillery use throughout the war. With modifications, this pattern continued over the next 3 years.

Starting in 1984, the Soviets put even more stress on the use of artillery in Afghanistan, especially the use of heavy artillery against the rural agricultural infrastructure and guerrilla strongholds. From 1984 through 1985, the Soviets used long-range tube artillery (130-mm M46, and 152-mm weapons); 240-mm self-propelled mortars; BM27 220-mm multiple rocket launchers, and conventional FROG-7s. These weapons used both high-explosive and submunition rounds.



The FROG 7, capable of using both high explosive and submunition rounds, is highly effective against guerrilla strongholds and groups.

Soviet offensive operations in Afghanistan have been preceded by extensive preliminary barrages by tube and multiple rocket launcher artillery. These attacks supplement strikes by fighter-bombers and attack helicopters.

Soviet battalion and regiment-sized forces in Afghanistan often go into action with a battery or even a battalion of artillery. And since 1984 these artillery units have included composite organizations of towed and self-propelled howitzers, multiple rocket launchers, and heavy artillery.

If a Soviet unit is to advance into a valley, for example, the artillery will be deployed in a fire base outside the valley and then fire preplanned fires in front of the Soviet advance. Such preparations covering a battalion-level advance may last 20 minutes.

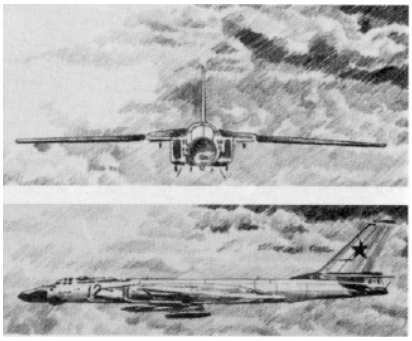
The Soviet artillery barrages that precede Soviet offensives in Afghanistan and which continue throughout subsequent attacks can be far more extensive. In the Panjsher VII offensive of 1984, the abortive relief of Khost in the summer of 1985, and the drive on Zhawar in early 1986, the Soviets put down extensive artillery barrages. In 1984 such barrages were coordinated with fixed-wing strikes by *Fencer* and *Badger* bombers airplanes, which in 1986 have been replaced by *Frogfoots* and *Fitters*. Such barrages can last 3 to 5 hours, can be repeated on successive days, and are reportedly quite intense. Those fired in the 1985 Khost and 1986 Zhawar offensives—air and artillery combined—interdicted guerrilla movements and kept the *mujaheden* pinned down or in caves. Although they did not inflict many casualties, the barrages prevented the guerrillas from holding the high ground.

The Soviets' use of preliminary bombardments coordinated with air strikes extends to convoys. A major convoy will follow behind an artillery barrage along its route. The Soviets stress keeping close to the barrage, but this is not always possible. Inevitably there is a gap between the lifting of the barrage and the arrival of Soviet forces. And the Afghan guerrillas take advantage of this brief reprieve to take up ambush positions.

The more traditional barrage-type fires seem to be the most common use of Soviet artillery in Afghanistan, but guerrillas have also been the targets of "fire strikes"—shorter, more intense concentrations of artillery from single or multiple battalions. The Soviets apparently use fire strikes most frequently against villages and areas reported to house resistance forces. Multiple rocket launchers are frequently used for such attacks. The foremost guerrilla commander in the Koh-i-Safi area, Maulavi Shafiuallah, died as the result of such a strike in the spring of 1985.

Target Acquisition

The Soviet's most significant firepower shortfall in Afghanistan has not been in the number of delivery units, but rather in their inability to apply available firepower effectively. That's why the Soviets have made the development of an effective network of *razvedka* (which can be translated as both intelligence and reconnaissance) one of their most important priorities.



The SU 19 Fencer (top) and TU 16 Badger have been used in combination with extensive artillery barrages by the Soviets in Afghanistan.

Soviet reconnaissance aircraft such as the MIG 21R Fishbed (top), the Mi 8 Hip helicopter (center), and the Antonov (bottom) provide over-the-hill surveillance for the Soviets in Afghanistan.

Since 1984, they have sought to compensate for poor target acquisition and intelligence by using artillery delivered steel to carry the burden of the campaign against the rural agricultural infrastructure. Afghan villages and areas suspected of harboring or supporting guerrillas are now the targets of long-range Soviet artillery. This can be done in reprisal for guerrilla activities or as part of the longer-term goal of creating depopulated areas around objectives that the Soviets value. Thus, artillery is not only compensating for poor intelligence but also is playing a major part in draining the "sea" in which the guerrilla "fish" must swim.

Although the Soviets have minimized the need for target acquisition, they have, nevertheless, made extensive investments in developing a systematic gathering of intelligence and target acquisition data. This includes radio direction finding and human intelligence. The network of KHAD—the DRA Secret Police—informers has become more widespread and effective in recent years and is the intelligence means most feared by the *mujaheden*.

The Soviets have also deployed a large range of artillery-related target acquisition equipment like their *Big Fred* radars in Afghanistan. Yet, they usually limit their actual response to preplanned targets. Resistance mortar and rocket launcher attacks that should have logically triggered accurate and intense counterbattery fire, yield nothing. In fact, helicopters are more likely to respond than artillery to Resistance attacks. This state of affairs is surprising in view of the emphasis the Soviets give *counterfire* in their literature. Whether this represents a weakness in Soviet counter-battery capabilities remains uncertain. It may well be the result of a deliberate decision made as part of the process of adapting Soviet tactics to the conditions of Afghanistan.

The Soviet artillery in Afghanistan does not usually engage in the harassing and interdicting fires that characterized much of the US artillery's use in Vietnam. However, the fire strikes against villages as part of the campaign against the rural agricultural infrastructure fulfills many of the same functions.

Afghan Artillery

As the British discovered in the Second Afghan War in 1880, Afghan artillery can be quite effective. The Soviet operational approach in Afghanistan has included trying to

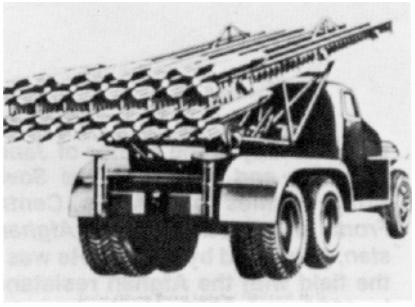
rebuild a combat-capable DRA Army artillery. Before the war, the DRA Army was equipped largely with Soviet weapons, and its officers trained on Soviet-style gunnery. In the bloodshed of 1978 through 1980, the Afghan artillery—like the rest of the Army—saw its numbers dwindle as many of its trained personnel were lost in action, purged, or went over to the Resistance.

The Soviet-sponsored rebuilding commenced in 1980. In the artillery, it apparently included the delivery of more 122-mm M30s, newer D30 howitzers, and several types of multiple rocket launchers. However, the resulting DRA artillery has experienced the same lack of success that has marked most DRA Army operations throughout the war.

To those on the receiving end, it is difficult to distinguish between Soviet and DRA artillery attacks. The DRA artillery uses some older weapons such as the BM13 multiple rocket launcher mounted on a ZIL-151 truck, the 76.2-mm M1942 mountain gun, and the 76.2-mm ZIS-3 field gun. Its weapons over 122-mm are generally Soviet in origin. And the DRA does have a heavy artillery brigade.

DRA artillery seems to fire mainly in support of DRA maneuver forces, especially those in the border areas and in static defensive positions. In either event, the guns normally deploy in battery-sized units in an attempt to stiffen forces. Defeats of DRA forces have led to artillery batteries falling into Resistance hands. This occurred when a D30 battery of the 38th Commando Brigade was destroyed in Paktia in 1983 and when a battery of DRA 76.2-mm guns fell to the *mujaheden* at Rokha in Panjsher in 1985.

In reality, the DRA military has never committed itself to meaningful, long-term offensive action against the Resistance. Specific units have fought well; and in 1986, the Soviets tried once again an "Afghanization" of the ground war. This move marked a significant



Soviet 132-mm rocket launcher (16-round) BM13.

Pedestrians look on curiously as a 122-mm D30 passes by during a parade of Soviet military hardware.

change from the policies of the 1982-1985 era, during which Soviet ground forces had taken over more and more of the intense ground fighting not only in the interior but also, by 1985, in the peripheries for which the DRA military was still officially responsible.

The changes have also been manifest in artillery tactics. Before 1984, Soviet and DRA artillery were reluctant to engage Resistance targets of opportunity in the border areas. Resistance trucks even moved in daylight within sight of DRA-manned observation posts. But with the increased emphasis on interdiction of Resistance supply lines in 1984 through 1986, Soviet and Afghan forces are taking a more aggressive attitude about engaging such targets.

Artillery Weapons in Afghanistan

Multiple Rocket Launchers

Multiple rocket launchers have been used throughout the war. The DRA artillery makes use of BM13s mounted on ZIL157 trucks. The Soviets use both the 36-tube Grad-1 version of the BM21 122-mm multiple rocket launcher mounted on a ZIL131 truck and the standard 40-tube BM-21 mounted on a URAL-375 truck. They employ these weapons to defend key objectives such as airfields. The 40th Airfield Defense Battalion at the Kabul Airport, for example, has BM21s for defending against Resistance attacks.

But the widest use of the multiple rocket launcher is in offensive combat. Starting in 1984, it became a primary weapon used to destroy villages as part of the campaign against the rural agricultural infrastructure.

Multiple rocket launchers have also played an extensive role in combined arms offensives. Several 122-mm multiple rocket launcher units participated in 1986 offensives in Zhawor and Herat. They took part in preliminary barrages and delivered fire strikes against positions located during the course of an operation. What's more, the Soviets frequently deploy battery or even platoon-sized units under the command of motorized rifle or tank battalions during offensives.

The 122-mm multiple rocket launchers have also been used with incendiary submunitions. Called "fire sticks" by the Afghans, these appear to be phosphorous weapons that allow a battery or battalion volley to start fires over a large area.

The BM27 220-mm multiple rocket launcher entered combat by early 1984. Experienced guerrilla fighters, who could tell the difference between a "13" and a "21" incoming by their sound, now heard a louder noise and saw a bigger explosion. The evidence of the BM27's deployment soon presented itself in the form of submunition carrier rounds. These have delivered high-explosive bomblets and 2 different types of mines—the standard "butterfly" PFM-1 and a larger wedge-shaped version. BM27s saw extensive use in the 1985 Khost offensive.

Reports of multiple rocket launcher use in Afghanistan are widespread. This situation may suggest that both divisions and regiments in Afghanistan have organic multiple rocket launcher batteries. Viktor Suvorov has identified the light truck mounted Grad-1 as a regimental weapon, and it is possible that it may also equip some of the division-level

battalions in Afghanistan. Since 1984, there has probably also been an independent, army-level multiple rocket launcher regiment in Afghanistan. It may well include 1 or more battalions of both BM27s and BM21s.

M30 122-mm M1938 Howitzer

The M30 has seen extensive combat in Afghanistan. In fact, it has been the standard DRA field howitzer throughout the war. When the Soviets invaded at least 1 of the motorized rifle divisions involved—the 360th "Nevel-Polotsk" Motorized Rifle Division—used the M30s as its standard 122-mm howitzer. Ironically, this happened a full 16 years after the D30 was introduced! This use of M30s in Afghanistan perfectly illustrates the Soviet practice of retaining old systems.

D30 122-mm M1963 Howitzer

The D30 has been the standard Soviet regimental and divisional support howitzer in the Afghan war. The DRA also obtained a number of D30s, and some of these have since fallen into the hands of the Resistance.

M46 130-mm M1954 Field Gun

The M46 first entered combat in Afghanistan in the 40th Army Heavy Artillery Brigade during the initial invasion. Some may have remained when the brigade was withdrawn in 1980. Certainly by 1984 there were substantial numbers of this piece in Afghanistan. The Soviets sometimes deploy their M46s in decentralized batteries or even platoons apparently under the operational command of motorized rifle battalions.

2S3 152-mm M1973 SO152 Self-Propelled Howitzer

2S3s have seen combat in Afghanistan since soon after the Soviet invasion. The divisional 152-mm battalions of some, if not all, of the Soviet motorized rifle divisions in Afghanistan have been equipped with these weapons. Since 1984, the 2S3 has been the long-range weapon of choice for the destruction of Afghan villages and the rural agricultural infrastructure.

The 2S3's most common use has been as accompanying artillery. Batteries and battalions go into the field in direct support of Soviet combined-arms mechanized battalions. As with most Soviet artillery the self-propelled howitzer participates not only in preliminary barrages but also fire support as the ground troops advance. They maneuver with tanks and Soviet armored personnel carriers but the relatively heavy weight of the piece has been a limitation.

In 1985, 2S3s accompanied a battalion-sized combined arms force that was used as enveloping detachment during the attempted relief of Khost. At least 1 was lost when ambushed near Sekunderkhel in Paktia while fording a stream. It bogged down while trying to leave the kill zone.

The direct convoy route from Kabul to the Soviet Union runs through the Salong Pass Tunnel, and convoys are frequently ambushed from the surrounding high crests. By 1984, the Soviets had started to use 2S3s as convoy escorts on this route. Initially, the guerrillas misidentified them as main battle tanks which they knew to have limited main gun elevation and so engaged them from positions on the forward slope of the crests. Rapid fire with flechette rounds delivered at high elevations soon corrected the Afghan's error.

This was not the first use of flechette rounds by Soviet artillery in Afghanistan. Although the Soviet Army has never faced the sort of massed infantry attacks that led the US Army in Vietnam to adopt the beehive round, they have still learned the utility of such munitions. 152-mm howitzers are the only artillery weapon confirmed to be using flechette ammunition in Afghanistan. But reports have circulated that such ammunition is available for a broad range of weapons as small as the 30-mm AGS-17 automatic grenade launcher.

2S1 122-mm M1974 SO122 Self-Propelled Howitzer

The 2S1 was apparently introduced in Afghanistan during the course of the war as a replacement for towed regimental and possibly division-level artillery. The Soviets reportedly used the 2S1 in the 3 tank and motorized rifle regiments the Soviets claim to have withdrawn from Afghanistan in October 1986. However, when the regiments paraded to go home, they did so with towed artillery. This indicated that the actual units extracted were regiments from Soviet-based divisions sent into Afghanistan to make an impressive withdrawal.

Soviet artillerymen load 122-mm shells into a 2S1 self-propelled howitzer in Afghanistan.

240-mm M1975 Self-Propelled Mortar

This weapon was first reported in action in 1985 and has been associated primarily with actions in the interior of Afghanistan. M1975 high-explosive rounds have reportedly created extremely deep craters. They have also reportedly delivered submunition rounds. One or 2 battalions represents the maximum probable force level for these systems.

SS21 Surface-to-Surface Missile

Reports of the use of SS21 surface-to-surface missiles using conventional submunition warheads first appeared in 1985. Although their use has apparently been relative limited, they have been used mainly against villages. Because no open-source photographs have emerged of these systems in use, the Afghan reports may actually refer to FROG-7s.

Chemical Weapons Delivery

Most of the chemical weapons used in Afghanistan have been delivered by helicopters or fixed-wing aircraft. However, there have been reported instances of Soviet artillery using chemical munitions. A prisoner from the divisional artillery of the 103d Guards Airborne Division, Junior Sergeant Sakharov, described to the Resistance that his unit was trained and equipped to use a variety of lethal and nonlethal chemical munitions.

David C. Isby is the author of *Jane's Weapons and Tactics of the Soviet Army, Armies of NATO's Central Front,* and *Russia's War in Afghanistan,* published by Osprey. He was in the field with the Afghan resistance in 1984 and 1985. He is based in Washington, D.C., as an attorney and national security analyst.

The Asian Artillery Threat

by Captain Scott R. Gourley, USAR

Most Western Field Artillerymen have some familiarity with the Soviet and Warsaw Pact artillery forces. In fact, the emphasis that these communist nations place on artillery support virtually necessitates a working knowledge of Soviet fire support systems, capabilities, and doctrine. However, with some exceptions, our Redlegs tend to know little about the potential artillery threat in geographic regions outside of Europe.

This article responds to that knowledge gap. It looks at the artillery systems of 3 particularly intriguing Asian nations:

- The Democratic People's Republic of Korea (DPRK).
- The Socialist Republic of Vietnam (SRV).
- The People's Republic of China (PRC).

The artilleries of these 3 countries present a remarkable blend of:

- Relatively new systems manufactured in the United States.
- Soviet exports spanning more than 3 decades.
- Direct copies of Soviet equipment.
- Indigenous equipment.

Although I will touch only briefly on both the DPRK and SRV artillery systems, I will elaborate on the emerging body of information pertaining to PRC artillery systems and capabilities.

North Korea

One of the best examinations of North Korean artillery background, capabilities, and tactics appeared in 2 issues of the *Field Artillery Journal*. In a 2-part series which appeared in the May-June and July-August 1978 numbers of the *Journal*, Captain J.D. Schnabel provided an excellent overview which complements the information available in a School of Fire Support Reference Note, "North Korean Artillery," dated September 1977. Because of the thorough coverage provided by these existing works, this article will simply offer an update on the artillery threat posed by the North Korean People's Army (NKPA).

North Korean artillery inventories contain a wide variety of Soviet designed artillery systems. Open sources credit the DPRK with a total of more than 17,000 artillery systems. This total reflects:

- A wide variety of mortars, including 82-mm, 120-mm, 160-mm, and 240-mm.
- A mixed towed artillery inventory including 76-mm (M1942), 85-mm, 100-mm, and 122-mm (A19) guns; 122-mm (M30) howitzers; and 130-mm (M46), 152-mm (D20), 152-mm (ML20), 180-mm S23 gun howitzers.
- Self-propelled systems including SU-76, SU-100, 122-mm, and 152-mm weapons.
- Multiple rocket launchers in 107-mm, 122-mm, 140-mm, 200-mm, and 240-mm.
- Surface-to-surface missiles.

Although the Soviets have provided some of these systems, many are domestically produced. Moreover, some of the older designs are of new manufacture. For example, open sources note that the DPRK produces the M1942 76-mm gun at "ordnance factory number 26" while the 82-mm and 120-mm mortars come from "ordnance factories number 65 and 82."

Traditionally, NKPA howitzer, gun, and mortar batteries have 4 to 9 weapon systems—depending upon mission and caliber—and are organized into 2 to 3 firing platoons. Three firing batteries make up an artillery battalion, and 3 battalions are organic to an artillery regiment.

Higher level mixed artillery organizations include regimental artillery elements (RAE), division artillery commands (DAC), and corps artillery commands (CAC). RAEs normally have one mortar battalion, one towed multiple rocket launcher (MRL) battalion, and one antitank battery. DACs usually include one towed artillery regiment and one mortar regiment. They may also have an MRL battalion. CACs habitually contain 3 artillery regiments of guns or gun-howitzers, along with one truck-mounted MRL regiment.

Since the release of the previously mentioned references, experts have noted several significant changes within the North Korean artillery structure. Chief among these is a massive increase in the number of surface-to-surface missiles. Although earlier sources reported the existence of about a dozen FROG-5 rocket launchers, some sources now indicate up to 54 FROG systems including a significant percentage of eminently

useful FROG-7s. This greater quantity reflects a general trend in increased numbers of artillery across the board.

Another recent trend has been the introduction of modern 122-mm and 152-mm self-propelled artillery, providing increased firepower and mobility for mechanized DPRK ground forces.

These trends mirror the general direction of modernization within the NKPA. As a whole, the Korean's modernization initiatives in doctrine and equipment reflect "an effort to improve the coordination [and] mobility of fires and fire control techniques that insure [sic] maximum artillery use."

Vietnam

As Western gunners would expect, the artillery inventory of the Socialist Republic of Vietnam (SRV) contains a bewildering array of Soviet, Chinese, and American systems. This arsenal reflects gifts and war booty from almost 30 years of conflict. To support their Army of nearly a million men, the North Vietnamese have organized their artillery into 5 Field Artillery divisions.

The Vietnamese artillery inventory includes:

- Mortars of 60-mm, 81-mm, 82-mm, 107-mm, 120-mm, and 160-mm.
- Cannons including 75-mm pack, 76-mm, 85-mm, 100-mm, 105-mm (M101/102), 122-mm, 130-mm (M46), 152-mm, 155-mm (M114 and M109 self-propelled), 175-mm (M107) and 8" (M110).
- Assault guns such as the SU-76, SU-100, and ISU-122.
- Multiple rocket launchers including 107-mm (Type 63), 122-mm (BM21), and 140-mm (BM14).

Some historical examples may help to explain this diverse artillery arsenal. The first large influx of Chinese equipment into North Vietnam occurred in 1963 with Ho Chi Minh's refusal to sign the nuclear defense treaty. His refusal pushed him away from the Soviet camp and drew his country much closer to China. The resulting flow of new Chinese weapons allowed Ho to provide cast-offs to the Viet Cong (VC) in the south. Shortly thereafter, light artillery including 61-mm and 82-mm mortars became favorite VC weapons. In fact, 82-mm mortars inflicted considerable damage during the February 1965 attack on the US airfield at Pleiku.

The late 60s and early 70s brought a thaw in relations between North Vietnam and the Soviet Union, and Soviet military aid began to flow once more. New Soviet equipment became a surprise component in the North Vietnamese offensives in March-May 1972. In addition to Soviet 122-mm rockets, the North Vietnamese artillery was able to employ 130-mm field guns and 152-mm howitzers. Another symbol of the increased military aid from Moscow was the amount of Soviet armor that often accompanied the offensives during this period. Captured tank crewmen admitted graduating from the Russian Armor School in Odessa in late 1971.

Almost 30 years of conflict has resulted in a North Vietnamese artillery arsenal which contains Soviet, Chinese, and American systems. The photos above display several types of American guns now in use by the North Vietnamese Army.

Soviet aid continued to increase even after the collapse of South Vietnam in 1975, when the Vietnamese People's Army acquired massive quantities of US manufactured artillery hardware. Last year's 10th Anniversary Victory Parade provided graphic evidence of the resulting bizarre mix of systems. For example, the parade featured Soviet 130-mm (M46) field guns towed by Chinese ATS-59 heavy artillery tractors and American 155-mm (M114) cannons towed by ZIL-131 6x6 trucks. The possible equipment combinations are a logistician's nightmare.

People's Republic of China (PRC)

The artillery available to the ground component of the PRC People's Liberation Army (PLA) represents a mix of old Soviet military gifts, direct Chinese copies of Soviet hardware, modifications of those Soviet systems, and new Chinese weapon designs. Although not as sophisticated as some new Soviet and Western equipment, recent Chinese designs suggest a great leap forward in PLA artillery technology.

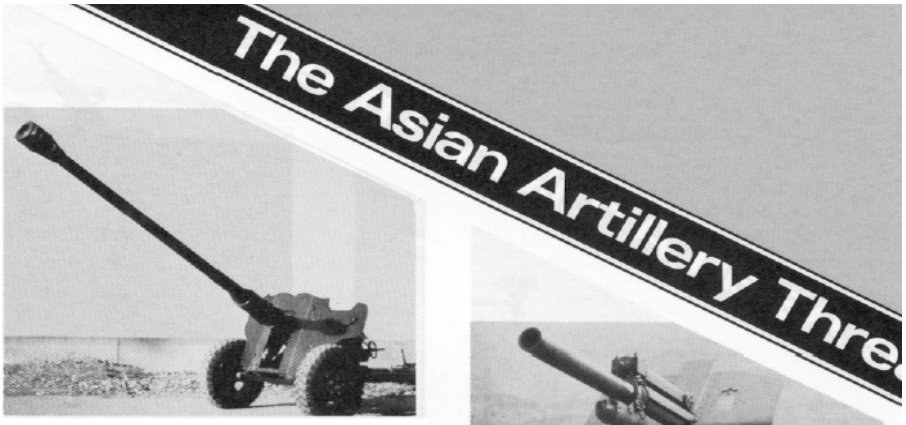
The PRC's Field Artillery inventory is comprised of approximately:

- 12,800 gun and howitzer systems including weapons of 85-mm (Type 56), 122-mm, 130-mm and 152-mm.
- 4,500 multiple rocket launchers.
- 14,000 mortars. These systems may also be supported by a small number of Soviet-supplied SU-76, SU-85, and SU-100 assault guns.

In the event of hostilities, experts believe the Chinese army group headquarters will attach 17 independent PLA artillery divisions to specific armies. The Chinese can also organize both organic and nondivisional artillery into temporary groups to support specific tactical situations. These groups include:

- Infantry regiment support groups normally composed of 122-mm weapons.
- Long-range groups of heavier artillery in direct support of divisions or under army control.
- Destruction groups of heavy artillery formed for the destruction of obstacles and fixed defenses.

The remainder of this article will examine a few of the existing and emerging PLA artillery systems. Until recently, Westerners knew relatively little about PLA artillery weapons. However, with the thaw in relations between the PRC and the West, Chinese representatives have begun to provide equipment information



85-mm gun Type 56.

at some Western defense exhibitions. This exposure, along with China's growing military export trade, is providing a wealth of new defense information about the PLA artillery.

PLA Cannon Systems

● *85-mm Gun Type 56:* This field gun is a direct copy of the Soviet D-44 and delivers antitank fires with fixed ammunition. It also has uses against fortifications and soft targets. The system is simple to operate and maintain. Its crew can maneuver it in and out of firing position. With a maximum range of 15,650 meters and an extremely high rate of fire—15-20 rounds per minute—the system has seen considerable service in both the PLA and Vietnamese Army during recent border clashes.

● *122-mm Howitzer Type 54:* This weapon is identical to the Soviet M30 (M1938). The system is light and easy to maintain, but it suffers from a serious range limitation of 11,800 meters. Its maximum rate of fire is 5-6 rounds per minute. The Chinese have recently begun calling this weapon the Type 54-1.

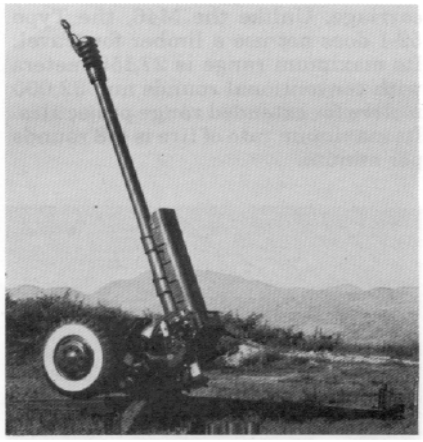
● *122-mm Self-Propelled Howitzer Type 54-1:* This is a self-propelled version of the Type 54. Mounted on a modified Chinese YW531 amphibious armored personnel carrier (Western identification M1967), the cannon is still limited in range; but the chassis allows for increased mobility, decreased emplacement and displacement times of 1 minute each, onboard communications, and infrared driving. Ammunition loading and handling are manual operations.

● *122-mm Howitzer Type D30:* This howitzer is a direct copy of the Soviet D30. Its maximum range is 15,300 meters, and its maximum rate of fire is 7-8 rounds per minute.

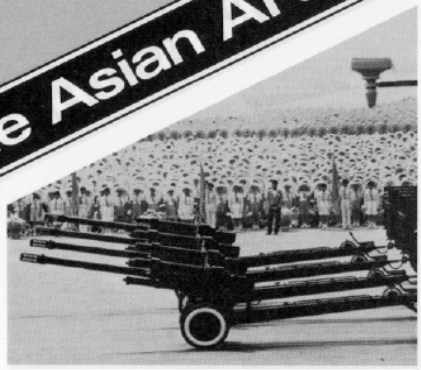
● *122-mm Self-Propelled Howitzer:* This weapon appears to be a turreted Type D30 howitzer mounted to an extensively modified Type 77 armored personnel carrier. The system might be an ideal follow-on to the aging 122-mm self-propelled Type 54-1.

122-mm howitzer Type 54.

122-mm self-propelled howitzer Type 54-1.



122-mm howitzer Type D30.



122-mm Field Gun (M1984).

- *122-mm(?) Field Gun (M1984):* First observed at an October 1984 Beijing parade, this gun still has an unconfirmed caliber. It has not been observed since that parade, and the Chinese are not advertising it for export. The system includes a multibaffle muzzle brake and long split trails. Its maximum range and rate of fire should be about 13-14,000 meters and 6 rounds per minute. The efficient muzzle brake, trail length, and long, sharply-pointed trail spades provide good evidence of the gun's high power. There is also some speculation that this system will replace the Type 54 in Chinese units while the Type D30 will become the export system.
- *130-mm Type 59-1:* This is a hybrid system, composed of a copy of the Soviet 130-mm M46 cannon mounted on a copy of the Soviet D74 carriage. Unlike the M46, the Type 59-1 does not use a limber for travel. Its maximum range is 27,150 meters with conventional rounds and 32,000 meters for extended range projectiles. Its maximum rate of fire is 6-8 rounds per minute.

130-mm Type 59-1.

The Chinese YW531 Family of Armored Vehicles

If it accomplished anything, the People's Republic of China's "lumbering" incursion into Vietnam in 1979 highlighted the deficiencies in the People's Liberation Army's (PLA) personnel, tactics, and equipment. Military analysts have carefully noted and debated the significance of major changes in PLA personnel and structure that have taken place since that time. Yet, information on PLA hardware modernization has been more difficult to obtain.

Fortunately, continuing improvements in relations between the West and the People's Republic is now allowing Western military observers to fill many of the gaps in their knowledge. Recent international exhibitions featuring displays by the China North Industries Corporation (NORINCO) have been particularly helpful in broadening Western knowledge about many Chinese military systems. Most recently, Chinese displays have contained information on the growing number of armored vehicles being produced by NORINCO. Like their Western counterparts who are focusing on advanced vehicle systems like the M113 and Bradley Fighting Vehicle, the Chinese seem to be developing "families of vehicles" based on particular chassis.

Some of the small vehicle families, like the Chinese Type 77-1 and 77-2 amphibious armored vehicles, look very similar to the Soviet vehicle families of the 1950s. However, other families, like the YW534 armored personnel carrier and corresponding YW307 infantry fighting vehicle, seem to be based on newer Chinese designs. The latter situation seems to be the case with the Chinese YW531 family of tracked armored vehicles.

The YW531 family—sometimes referred to as the M1967 in western literature—is based upon 3 tracked armored personnel carriers (APC):

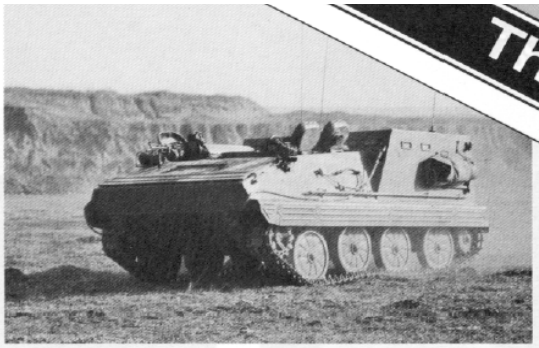
- Type YW531C.
- Type YW531D.
- Type YW531E.

In addition to the 3 APC derivatives, the family also includes 2 armored command vehicles, the 130-mm self-propelled rocket launcher Type 70, and the 122-mm self-propelled howitzer Type 54-1.

The 3 basic YW531 APCs are tracked amphibious armored vehicles used primarily to provide supporting fire and transport for mechanized infantry forces. The vehicles have a combat weight of 12.6 tons and can carry 12 passengers in addition to its crew of 2. They are equipped with a 4-cycle, turbocharged V-8 aircooled diesel engine which has a maximum output of 320 horsepower. With a power to weight ratio of 25.4 horsepower per ton, the vehicle has a top road speed of 65 kilometers per hour and a maximum range of 500 kilometers.

The manufacturer's mobility claims include a maximum gradient and sideslope of 32 degrees and 25 degrees respectively. It can cross a trench 2 meters wide and climb an obstacle .6 meters high. In the water, the YW531 has a maximum speed of 6 kilometers per hour and maximum range of 61 kilometers. It has maximum approach and departure angles of 20 degrees and 25 degrees respectively.

In addition to onboard firing ports, the YW531s can carry a pintle-mounted 12.7-mm anti-aircraft machinegun with 1120 rounds of stowed ammunition. The YW531's 12-mm of armor also provides protection



against 7.62-mm armored piercing ammunition at 300 meters.

The primary differences in the C, D, and E models of the YW531 series are the number of onboard radio sets and firing ports. The C model features one model 889 radio; the D model has 2; while the E model has one model 889 and one model 892. The Type 889 radio is an ultrashort wave FM radio set, and the Type 892 is a short wave single sideband radio set.

All 3 vehicles have one firing port in the rear and one on the right side. However, the C model has 2 ports on the left side as opposed to the D and E models which have one each on the left side.

Much as the M577 command post evolved from the M113 chassis in the West, the Chinese have also developed 2 command variants based upon the same 4 road-wheel chassis. The Chinese label their command variants WZ701 and YW701A.

The WZ701 serves as a command post for regimental and division leaders in Chinese tank units. It carries a crew of 3 plus 5 passengers. Its 13-ton combat weight is powered by a model 6150L inline, 6-cylinder, 4-cycle, water-cooled diesel engine capable of generating 260 horsepower. The crew receives the same armor protection as the YW531 and limited self-defense capability with a pintle-mounted 7.62mm light machinegun. The WZ701 has a top speed of 60 kilometers per hour and mobility equivalent to the 3 APC variants.

The YW701A is the Chinese command post developed for the export market. Major differences from the WZ701 include improvements in system mobility and communications capabilities. The YW701A features the same 320 horsepower, V-8 air-cooled diesel engine found in the basic APCs. Communications enhancements derive through the replacement of the A-220A radio sets with the models 889 and 892. Finally, the heavy 12.7-mm antiaircraft weapon found on the 3 YW531s replaces the 7.62-mm self-defense machinegun found in the WZ701.

Another member of the same family of vehicles is the 130-mm self-propelled rocket launcher Type 70. It provides armor protection and mobility equivalent to the other family members, but features the less powerful 6150L 6-cylinder in-line 260 horsepower engine found in the domestic command post. Additionally, it incorporates the same A-220A radios found in the WZ701.

The major difference in this member of the vehicle family can be found in its integrated weapon system. Instead of a pintle-mounted machinegun for minor self-defense protection, the Type 70 has 19 tubes for 130.65-mm rockets. It takes the 6-man crew approximately 2 minutes to prepare the system for firing. The rockets have a maximum range of 10,370 meters, and the entire salvo of 19 rockets can go downrange in between 9.5 and 11.5 seconds. After firing, it takes the crew only 1 minute to prepare the vehicle for travel.

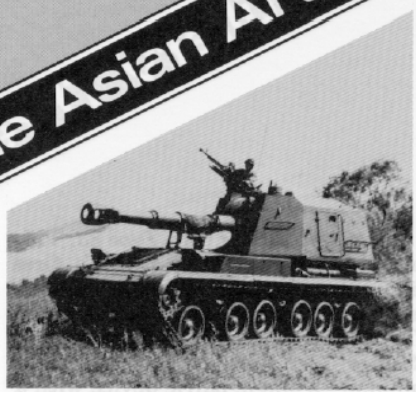
Another member of the YW531 family of vehicles is the 122-mm self-propelled howitzer Type 54-1. This system is a self-propelled version of the Chinese Type 54 cannon, itself a direct copy of the 122-mm Soviet M30 (M1938). The system has a fairly short maximum range of 11,800 meters and requires manual ammunition handling and loading. Mounting the cannon system on the YW531 chassis amphibious capabilities, decreased emplacement and displacement times, and an onboard radio for intrabattery communications.

● *152-mm Field Gun Type 83:* This modern towed gun is China's first indigenously-designed Field Artillery system. In travel configuration, the Type 83 uses a limber similar to the Soviet M46. Its muzzle brake is unique—a single-baffle device with a blast deflection collar to reduce overpressures to the rear of the piece. Along with a firing jack which provides stability and recoil absorption during firing, the system has a recoil and counter-recoil cylinder mounted above the cannon. What's more, each trail mounts a large, removable spade for use in soft terrain. The weapon's increased caliber allows for the use of a significantly more lethal ammunition than a 130-mm gun, and as such the Type 83 represents a major improvement in PRC long-range general support capability. It has a maximum range of 30,700 meters with conventional rounds and 40,000 meters with extended range full bore-base bleed projectiles (ERFB-BB). The enhanced range is quite useful in the Chinese's nearly continuous artillery duels with Vietnamese forces. The Type 83's maximum rate of fire is 4 rounds per minute.

● *152-mm Gun Howitzer MF45:* Similar to the Type 83, the MF45 represents a new addition to the Chinese family of extended-range, medium caliber cannons. The tube is approximately 7 meters long with a double-baffle muzzle brake. The gun incorporates a firing jack with removable jack pad as well as recoil and counter-recoil cylinders positioned above the barrel. The MF45's maximum range is 21,000 meters with M102 high explosive rounds; 30,000 meters with extended range full bore projectiles; and 40,000 meters with ERFB-BB. Its maximum sustained rate of fire is 2 rounds per minute.

● *152-mm Gun Howitzer Type 66:* The Type 66 is a copy of the Soviet D20. Maximum range and rate of fire of 17,200 meters and 5 rounds per minute.

● *152-mm Self-Propelled Gun Howitzer Type 83:* First observed at the October 1984 Beijing parade, the



152-mm self-propelled gun Type 83.

cannon has some similarities to the Type 66. But it differs from the Soviet version in two major ways—a bore evacuator along with recoil and counter-recoil cylinders located below the cannon. The Type 83 chassis has a torsion bar suspension with 6 road wheels and 3 support rollers on each side. The turret has vision blocks for the loader and gunner and a cupola for the commander.

PLA Artillery Fire Control

The family of militarized computers developed by the Chinese Poly Technologies firm provide some good examples of improvements in PRC artillery fire control. The series includes 4 computer versions:

- The AVC-101 to prepare firing data for a variety of weapons.
- The AVC-102 for survey calculations that convert survey measurements into grid and azimuth data.
- The AVC-103 which computes meteorological data from raw weather observations.
- The AVC-104, which uses sound ranging sensings to determine the location of firing artillery batteries.

The output generated by these devices appears on a single 40 character line display, and none of the computers seem to have the capability to store additional information on removable storage media. Indicators that the AVC-series has been partially developed for export include Roman key characters rather than Chinese, marketing brochures in English and

Fire control calculator.

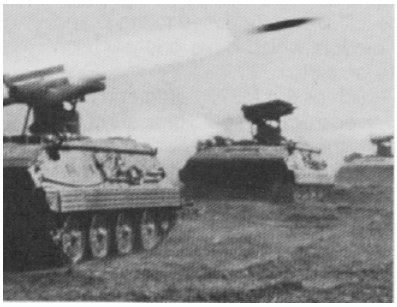
French, and comments that programs can be designed to simulate non-Chinese weapon trajectories. However, the existence of other portable Chinese fire control computers makes it likely that the AVC computers are fulfilling the requirements for lightweight self-contained fire control in some PLA artillery units.

PLA Multiple Rocket Launchers

- *107-mm Type 63:* One of several 107-mm Chinese MRLs, the Type 63's rocket is patterned after the Soviet 140-mm rocket. However, the launchers are of Chinese design. Type 63 is a lightweight, 12-tube (3 rows of 4 tubes each) towed weapon that can be broken into 5 1-man or 3 2-man portable loads. The system's maximum range is 8,300 meters, and its maximum rate of fire is 12 rounds in 11 seconds.
- *107-mm Type 63-1:* Seen only in Vietnam, the Type 63-1 is built of cast aluminum modules. This construction makes it 60 percent lighter than Type 63. It has 4 rows of 3 tubes each.
- *107-mm Type 81:* The Type 81 is the Type 63 launcher mounted on a modern light truck. Normally fired from the rear of the vehicle, the launcher can also be reconfigured with 2 wire spoke wheels for towed operations.
- *Mine Laying MRL Type 74:* Patterned after the old Soviet BM13, the Type 74 has decreased its launch capacity from 8 to 5 "I-beam" type rails. It can fire a total of 10 rockets from above and below these rails. Each rocket contains 10 plastic antitank mines. The Type 74's maximum range is a mere 1,500 meters.

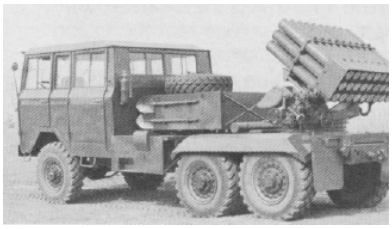
107-mm Type 81.

- *130-mm Type 70:* This weapon first appeared in combat against the Vietnamese in 1979. Initially mounted on a Chinese Type 63 armored personnel carrier, the system later appeared on a modified YW531 (M1967). Both versions use the same 130-mm launcher with 10 tubes on top and 9 on the bottom. Major system improvements have reportedly focused on providing some "incendiary" ammunition capability.



130-mm Type 70.

- *130-mm Type 82:* Paraded in October 1984, the Type 82 mounts on a Chinese 5-ton SX-250 6x6 truck. Both launcher and a large ammunition magazine are on the vehicle cargo deck, thus providing room for carrying two complete salvos. Launcher elevation and traverse appear to be manual, and no leveling or stabilization jacks are visible. The Type 82's maximum range is 10,217 meters.



130-mm Type 82.

122-mm Type 85.

122-mm Type 83.

- *122-mm Type 83:* This weapon is a 24-round launcher with 8 tubes on each of 3 rows. The Type 83 is probably capable of firing any 122-mm rocket of Chinese or Soviet design and has been linked to mine-laying capacity in both designation and description. One report of a mine-laying demonstration describes launches achieving a maximum range of 6 kilometers and placing 1152 mines in one battery salvo over a 650 meter x 650 meter area.
- *122-mm Type 81:* Deployed in the PLA since 1981, the Type 81 is probably an exact copy of the Soviet BM21. The launcher can fire 40 rockets in 20 seconds to a maximum range of 20,500 meters. The 122-mm Chinese rocket is the first known use of preformed fragments in a PRC rocket system. Experts believe the fragments to be steel balls 3 to 4-mm in diameter mixed with a small amount of incendiary material near the fuze well.
- *122-mm Type 85:* Seen only once, this 40-tube launcher is mounted on a variant of the Type 83 152-mm gun howitzer chassis. The system incorporates a magazine and reloader which permits firing a second volley within 2-3 minutes. The crew compartment beneath the launcher features fold-down seats with bullet-proof windows. Launcher characteristics are the same as for Type 81.

273-mm M1978.

- *273-mm M1978:* First observed in 1986, this 4-round launcher fits on a modified Type 60-1 chassis. The lethal area for each rocket is "760 meters," implying some sort of submunition. Reload time is reportedly about 12-15 minutes. The system's range may be up to 40 kilometers.
- *300-mm(?) Mine Clearing MRL:* A 10-tube system first seen in June 1983 (although some references indicate employment against the Vietnamese in 1979), this MRL appears to be quite crude and probably has limited effectiveness against mines and obstacles.
- *305-mm Type 79:* The Type 79 is a mine-laying launcher. Its 8 tubes can deliver 305-mm rockets containing 10 plastic antitank mines each. The system first appeared in a 1984 parade, and its questionable rocket design suggests a limited range capability.

In addition to the forenoted MRLs, the Chinese are also working on a mine-clearing, line-charge system. Chinese sources claim that the charge, which can be fired to a range of 1.5 kilometers, can clear a path 5 meters wide and 60 meters long.

Conclusion

The diverse mix of artillery in the Chinese inventory clearly suggests that the Chinese are entering the world weapons market with some respectable indigenous designs. Their emphasis of mine-laying and clearing MRLs might well indicate a new Chinese appreciation for mine warfare based upon their continuing conflict with the Vietnamese. Moreover, their introduction of several new 122-mm cannon systems points to a continuing appreciation for the value of close support cannon artillery.

Western Field Artillerymen will not only need to maintain a wary eye on these significant PRC artillery developments, but also keep constantly in mind that our increasingly multi-polar world is a fertile seedbed for the creation of interesting and effective fire support weaponry.

Captain Scott R. Gourley, FA, USAR, is a frequent contributor to the *Journal* as well as numerous European and Asian defense publications including *Armada International* and *Jane's Defence Weekly*. He is employed by FMC Corporation Ordnance Division in San Jose, California. Captain Gourley is the recipient of the US Army Forces Command Fourth Estate Award for excellence in military journalism.

Right by Piece

NOTES FROM UNITS

Trading Places

US FORCES, KOREA—The best way to get a real understanding of other people is to "walk a mile in their shoes." The Eighth US Army (EUSA) believes in this axiom and is putting it into practice. Selected officers walk in the other guy's boots as part of the Junior Officer Exchange Program (JOEP).

2LT Michael S. King poses with his Republic of Korea Army sponsor, 2LT Kim Yung-Joo. (US Army photo by PFC Amy Gross)

The JOEP is an ongoing exchange between the Republic of Korea (ROK) and the US Armies. American officers live, sleep, eat, and train with ROK units for 2 weeks while ROK officers do the same with US units. JOEP provides these exchange officers a unique opportunity for outstanding cultural and training experiences.

The program began in September 1984. Since then more than 60 US officers have taken part, and they have learned a lot. US participants find themselves in an environment very different from their own. "Spartan" is the term most often used by returning JOEP officers to describe the life they found in the Korean Army. American leaders used to the amenities of life soon get to enjoy cold showers, life without a post exchange, sleeping on the floor in open bays and eating an unrelenting menu of rice, kimchi (a hot Korean pickled cabbage dish), and soup. They witness vigorous physical training that includes the Korean martial art of Tae Kwon Do. And they find that rugged, aggressive sports competitions are the Korean soldier's primary means of entertainment.

Another major difference US officers note is how highly centralized the ROK Army is. Junior officers have little authority. In fact, the battalion S-3 gives daily training briefings to all officers and NCOs in the unit.

JOEP participants also learn that the real world mission in the Republic of Korea requires extreme readiness. Although specific US units periodically achieve high degree of readiness, such standards are the day-to-day requirement throughout the ROK Army. For example, the security at ROK installations is much greater than normally experienced in a US unit. A typical ROK entrance guard is armed with both live ammunition and grenades.

"This unit keeps the firing data on their guns for targets in North Korea and ammunition stacked beside their tubes at all times," 2LT Michael S. King said.

Participants praise the ROK Army NCO corps for its professionalism and skill. Often Tae Kwon Do black belts, Korean NCOs are generally intelligent, articulate, and so knowledgeable of their responsibilities that preparation for many training presentations is unnecessary.

The US exchange officers also speak highly of the ROK soldier. "The ROK soldier is great," said 2LT Robert Bosworth. "Discipline here is better than I've seen."

Drafted at age 20 for a 30-month service obligation, all ROK soldiers are high school graduates and approximately 40 percent have attended college. Their pay is a meager 3,000 to 5,000 Won per month—about $3.50 to $6.00 in American money.

The ROK Army makes up for its dated equipment with intensive crew and individual training. "ROK expertise in manual gunnery is the most precise I have ever seen," said 1LT Warren C. Cason. "In many cases their units must perform without modern technology."

US officers participating in the exchange are normally volunteers, but even in those instances when an officer is given little prior notice the after-action comments are universally favorable. American officers enjoy their stay with the austere, tough, and ready ROK Army.

ROK officers participating in the exchange also go through a cultural shock. They are most impressed by the US approach to training and the overall autonomy of junior US officers.

One of the most significant products of the exchange program is the bond of friendship that develops between the exchange officers and their sponsors. US personnel find visiting ROK officers to be well-educated, highly motivated professionals with a warm and friendly manner.

The JOEP program improves communications between the 2 countries and provides a great opportunity for all its participants. It provides cultural insights and valuable information to the Korean officer who will deal with the US Army long after his American counterpart has completed his 1-year tour. And it gives the US officer a good look at those combat ready soldiers with whom he would stand shoulder-to-shoulder in combat.

Exercise Crimson Griffon

FORT ORD, CALIFORNIA—The 5th Battalion, 15th Field Artillery recently completed a simulated strategic deployment from Fort Ord, California, to Florence, Arizona. Labeled Exercise Crimson Griffon 86, this operation also included the units of the 153d Field Artillery Brigade of the Arizona National Guard. The exercise took a total of 17 days and involved numerous vehicle convoys as well as long-distance rail and air moves.

The 5-15th, I Corps' only Active Component Field Artillery unit, began the operation with an extensive preparation for overseas movement (POM) exercise.

While portions of the battalion convoyed to Travis Air Force Base for loading on C5A and KC10 Air Force aircraft, the remainder of the unit loaded onto railcars and moved to Davis Monthan Air Force Base near Tucson, Arizona. Simultaneously, 200 soldiers traveled to Tucson via commercial buses.

The Battalion reassembled at Davis Monthan Air Force Base and convoyed to the Florence Military Reservation, an area used by the Arizona National Guard for artillery training. After several days of operating in this large desert training area, the 5-15th joined the 153d Field Artillery Brigade and its own organic National Guard battalions—the 1st and 2d Battalions, 180th Field Artillery. Highlights of the subsequent exercise included 5 brigade time-on-target missions and the 5-15th firing under illumination provided by both the Reserve Component battalions. Following the conclusion of the exercise, the 5-15th redeployed through Davis Monthan to Fort Ord by air, rail, and bus.

The 7th Infantry Division Artillery survey section provided PADS support; the 2d Battalion, 8th Field Artillery provided 2 fire support teams; and the 519th Maintenance Battalion contributed vehicle and artillery maintenance contact teams.

In addition to accomplishing all designated training objectives, the exercise achieved an excellent safety record in that the battalion's vehicles were driven more than 40,000 miles without an accident. Exercise Crimson Griffon was a tremendous success, and the soldiers of the 5-15th look forward to their next Total Army deployment opportunity.

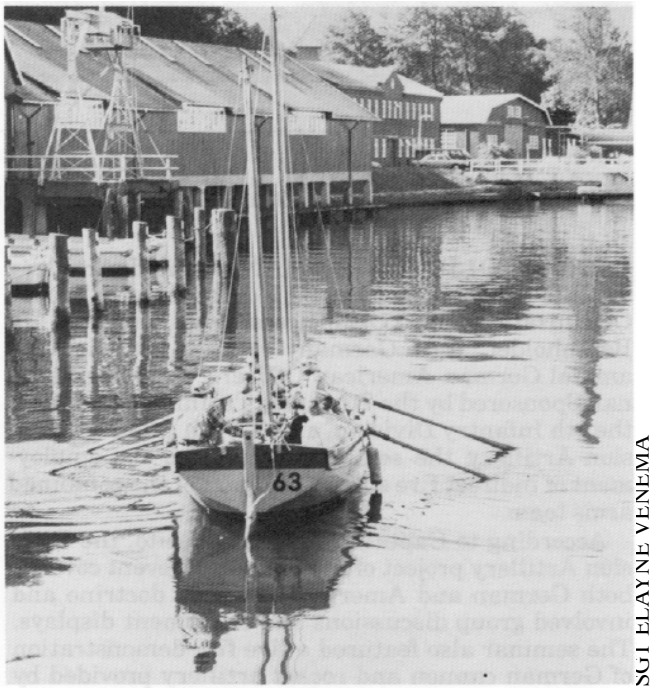
Soldiers Take to the Sea

PIRMASENS, GERMANY—As ocean waters slapped her sturdy gunnels, the tight little craft slipped from the docks. The only sounds her excited crew could hear were the whispers of wind in her sails and an occasional squeak of a wooden plank.

Her hull holds 11, but on this summer day voyage only 9 were aboard the *Aufgetkelter Kutter 63*. And only 3 of those mariners were veteran sailors. The others were soldiers of the 294th US Army Artillery Group on invitation from the Marine-Reservisten-Segelgruppe Flensburg—the German Naval Reserve.

Oars, hooks, ropes, provisions, life preservers, masts, and sails were loaded on board at the onset. After a short row from the pier, the crew set the sails and made final preparations for a day's voyage that would challenge any helmsman.

Kutter 63 is not just a peacetime recreational craft. During wartime, these boats are lowered from the sides of gray, hulking ships and used as lifeboats. But on that special day for the gunners of the 29th, they offered German sailors and American Redlegs a sturdy foundation for fun and cooperation.

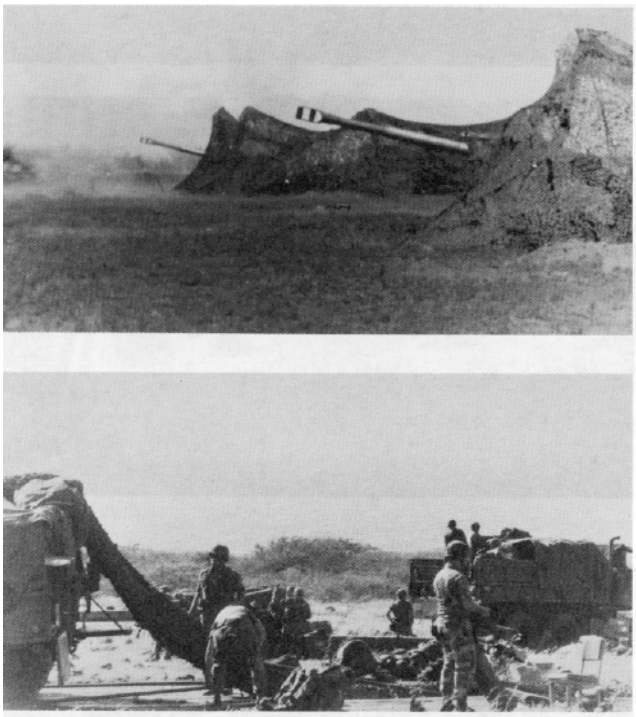


SGT ELAYNE VENEMA

One if by Land, Two if by Sea

SCHOFIELD BARRACKS, HAWAII—The 1st Battalion, 8th Field Artillery Regiment recently took part in Operation Daring Tenacity. As part of this emergency deployment readiness exercise to the Island of Hawaii, Battery A traveled by air while simultaneously Battery B conducted a seaborne displaced to the Island of Kahoolawe.

Battery A flew on Air Force C130 and C141 aircraft to different airfields on the "Big Island." There the battery moved into position and conducted a live-fire exercise at Pohakuloa Training Area. The battery then redeployed by air to Oahu.



Battery B sailed on vessels provided by the Army's 5th Transportation Company based on Ford Island. The Battery's equipment moved on 3 landing crafts utility (LCU) while their personnel sailed on the *US Army Vessel Lieutenant Colonel John U.D. Page*. The LCUs and the *USAV Page* met off the coast of Kohoolawe where personnel transloaded from the *Page* to the LCUs.

After executing the beach landing, the Battery moved inland with the assistance of a US Navy Seabee detachment. Company C, 1st Battalion, 5th Infantry accompanied Battery B, and once ashore the units conducted a successful live fire exercise on the US Navy's range on Kahoolawe.

The simultaneous execution of both emergency deployment readiness exercises required coordination with Air Force, Navy and Army Transportation Corps personnel. These exercises required considerable planning and support from the "Automatic" Battalion's staff. Both firing batteries received extensive support from the unit's headquarters and service batteries. Concurrently, Battery C was preparing to deploy as part of Team Spirit '86 with the 25th Light Infantry Division.

The 1st Battalion, 8th Field Artillery Regiment is in the throes of reorganizing from a divisional general support battalion to a corps asset attached to the 25th Infantry Division. While the Battalion still retains the mission to support Tropic Lightning troops, becoming a corps asset has increased the Battalion's overall mission spectrum.

The 1st Battalion, 8th Field Artillery Regiment must be prepared to deploy to many different locations by many different modes of transport. The air and sea deployments of two of its firing batteries as well as the deployment of another to Korea has served to test the Battalion's abilities. But when all is said and done, training like Operation Daring Tenacity is just what the "Automatic" 8th needs to stay combat ready.

8th Infantry Division Hosts NATO Seminar

BAUMHOLDER, GERMANY—Field Artillery was the hot topic for over 60 North Atlantic Treaty Organization (NATO) officers who gathered in Baumholder, West Germany recently for the 15th annual German-American Officers' Training Seminar. Sponsored by the 7th Army Training Command, the 8th Infantry Division, and the 8th Infantry Division Artillery, the seminar focused on the employment of indirect fire systems as part of the combined arms team.

According to Captain Michael Esposito, the Division Artillery project officer, the 4-day event covered both German and American artillery doctrine and involved group discussions and equipment displays. The seminar also featured a live fire demonstration of German cannon and rocket artillery provided by the German Artillery School at Idar-Oberstein.

SSG Charles Gallagher of the 29th Field Artillery explains his role in TACFIRE to LTC Rudolf Treffer of the Germany Army.

"On the US side the officers were briefed by senior noncomissioned officers on the multiple launch rocket system (MLRS) and the tactical fire direction system (TACFIRE)," Esposito said. "Using a representative piece of equipment at each level of TACFIRE, the officers followed the flow of a typical fire mission down to the firing battery. By seeing the system operate, NATO officers could compare it with their own prototypes and take back new operational concepts."

Esposito noted that on tomorrow's battlefield the combat situations will change rapidly because of fast combat vehicles and airmobile troops. So it will be increasingly difficult for the artillery to keep up with the battle. Computing firing data manually takes too much time. In fact, such delays can be fatal. Automated systems like TACFIRE give the edge to US combat troops.

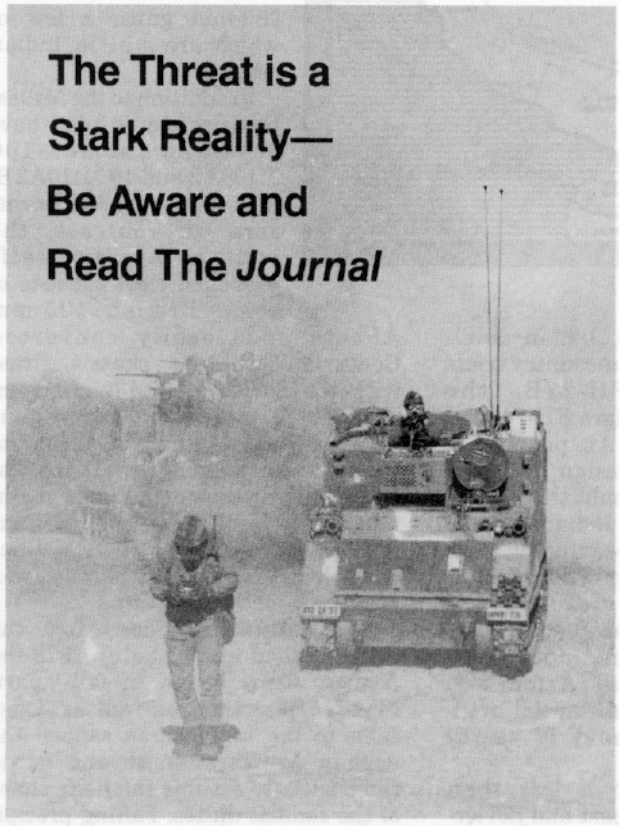
"There's no question that American TACFIRE leads the world in artillery developments in digital processing, accuracy, speed, and command control," Esposito continued. "Recently we linked TACFIRE with the German Adler system in an initial attempt to standardize software and communications. The tests were successful, and they attracted tremendous interest during the seminar."

Lieutenant Colonel Rudolf Treffer, a 25-year artillery veteran of the Germany Army, worked previously with the British Army on the Rhine. The seminar offered him the opportunity to view the US artillery system for the first time. "I must say I'm overwhelmed with what I've seen," Treffer commented. "It's very important for us to work out the incompatibility of our equipment. The priority is to have fire for effect on target as fast as possible. We must not only share in comradeship but in equipment as well, so we can use it if the need arises."

Colonel Hoksbergen, Commander of the Netherland Corps Artillery, added, "We must grow more computer-minded within NATO as we move into the second and third computer generations. This seminar has provided the basis for that cooperation."

Colonel Columbus M. Womble, the 8th Infantry Division Artillery commander, said the seminar was positive in all respects. "The NATO officers were interested in what TACFIRE can and will do for all our systems including the MLRS. They were not concerned about the confidence of the systems but in the ability to interface with them," he said.

Womble went on to say that interoperability becomes important on the battlefield especially when US forces are flanked by NATO troops. "We must ensure NATO artillery can interface with ours," he said. "TACFIRE is a very sophisticated, training intensive system that takes smart soldiers to operate. We must ensure the system provides the fires needed. There is no question; the better we coordinate with our NATO Allies the better it will be for us to fight *together* and fight *adequately*." (Story and photo by Tom Larscheid)



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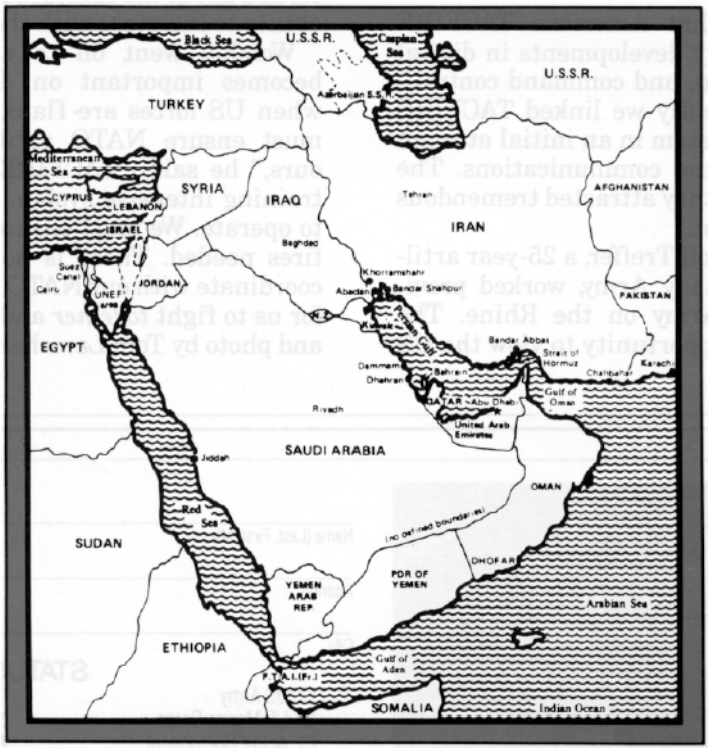
Artillery in the Middle East

by Captain John Gordon

In this article I will describe the artillery of a vast array of nations ranging from India to Libya. Due to the enormous area to be covered, I have elected to divide the region into 3 subareas.

- India, Pakistan, and Afghanistan.
- Iran and Iraq.
- The area immediately surrounding Israel, ranging as far west as Libya.

In every case I will outline the order of battle of each nation and highlight the artillery available. Unfortunately, it is difficult to obtain precise information concerning the number of available weapons in many of these nations. In certain cases the totals presented will be averages of data taken from several different open sources. The reader should, however, gain a reasonable appreciation for the artillery capabilities of the nations of this volatile region.



India-Pakistan-Afghanistan

- ***India.*** With a total strength of 1,100,000 men, India's Army is the largest in the noncommunist world. A volunteer force, the Indian Army owes much of its heritage to the long period of British rule. In recent years the capabilities of the Indian Army have expanded dramatically. What's more, this increase has been paralleled by the growth of the domestic arms industry. Today, India produces high performance jet fighters, large naval vessels, main battle tanks, and Field Artillery pieces.

Until approximately 5 years ago the Indian artillery was dominated by World War II-era British weapons such as 25-pounder and 5.5-inch towed guns, together with Soviet 76-mm and 130-mm weapons. Today, the situation is changing rapidly. The domestically produced MK11 105-mm gun, for example, provides a most satisfactory weapon for the jungle and mountain conditions confronted by the Indian Army.

Over the next few years the Army intends to invest one billion dollars in the purchase and production of more than 1,500 medium artillery pieces. The Army is seeking a 155-mm weapon and anticipates an initial order of more than 400 pieces. To fulfill this requirement, Indian developers are conducting in-country trials of the Bofors FH-77B, the Rheinmetall- Oto Melara FH-70, and Austria's GHN-45. At present it appears the Bofors design is in the lead. There is little doubt that by the end of the decade the Indians will be well on the road to re-equipping their Army with a large number of current-generation 155-mm weapons, and many of them will be produced in-country. In the interim, India's well-trained, professional Army will continue to have a substantial artillery inventory, the envy of nearby Pakistan.

- ***Pakistan.*** With a less than friendly India to the east and Soviet-occupied Afghanistan to the west, Pakistan is hard pressed. Nevertheless, with the help of massive American financial aid over the past few years, Pakistan's armed forces have rapidly re-armed with modern weapons.

Like the Indians, the Pakistanis have been replacing their Second World War era British and Soviet weapons with modern Western arms. Recently, the Pakistanis received 75 M198 towed 155-mm howitzers from the US. However, the Army is now seriously negotiating with Austria for the purchase of an initial 200 GHN-45 155-mm howitzers, which give an exceptional range of 39,600 meters using Noricum's extended range full bore-based bleed (ERFB-BB) projectiles. This would give the Pakistanis the ability to outrange any Indian weapon except the old, cumbersome Soviet-built S-23 180-mm guns, a few of which are still in Indian service.

In addition to the M198s, the Pakistanis also have obtained some 100 M109A2 and 40 M110A2 8-inch self-propelled howitzers. In contrast, the Indian Army's self-propelled fleet consists of some British 105-mm Abbots and locally converted Centurian-type tank chassis, fitted with the Soviet M-46 130-mm gun. Throughout this region, towed guns have and will continue to dominate even as the new equipment is brought on line. Given the much higher maintenance costs of self-propelled guns and the rugged terrain both nations have along their borders, this decision is entirely justifiable.

- ***Afghanistan.*** Soon after the Soviets rolled into Kabul in 1979 the Afghan Army began to fall apart. Massive desertions as well as defections to the *mujahedeen* sapped the Afghan Army's strength and forced the Soviets to assume the lion's share of the combat duties. Falling precipitously from roughly 90,000 men in

THE EASTERN REGION

INDIA:

2 Armored Divisions
1 Mech Division
20 Infantry Divisions
7 Mountain Divisions
19 Independent Bdes (Inf/mountain/armored)
4 FA Bdes

* 25-pounder and 5.5-inch howitzers
* 100 (+) domestic 105-mm towed
* 100 ABBOT SP (105-mm)
* 550 M-46 (130-mm) towed
* S-23 (180-mm) guns
* 75-mm pack howitzers
* D-20 152-mm howitzers (towed)
* FH-70, FH-77B 155-mm towed
* FROG - 7 SSM

PAKISTAN:

2 Armored Divisions
17 Infantry Divisions
12-14 Ind Bdes (armored and inf)
8 FA Bdes

* Over 1,500 guns and howitzers
* 25-pounder, Type-59, 5.5-inch towed
* M-116 75-mm pack howitzers
* 12 M-7 105-mm SP
* 75 M198 (155-mm) towed
* GHN-45 155-mm towed
* 100 M-109 155-mm SP
* 40 M110 (8-inch) SP
* 122-mm MRL

AFGHANISTAN:

11 Infantry Divisions (2,000-3,000 men each)
3 Armored Divisions (same as above)
1 FA Bde

* Some 900 guns and howitzers
* M-1944 (76-mm) howitzers
* M-30 (122-mm), D-1 (152-mm) howitzers
* 50 BM-13-16 MRL

Figure 1. Equipment totals.

1978, the Afghan Army stands at a current strength of approximately 47,000. It must be noted, however, that in recent months reports indicate that Afghan Army performance is on the upswing.

The artillery, like the rest of the Army, is totally dependent on Soviet handouts. For years, virtually all Afghan artillery pieces have been of Soviet origin. What's more, there is virtually no local capability to produce heavy weapons.

The equipment totals cited at Figure 1 are very suspect but represent the best available data. While their weapons certainly outgun anything the *mujahedeen* has, the Afghan Army artillery is very poorly armed for conventional combat. Its lack of self-propelled weapons is particularly noteworthy.

Recent reports from the rebels describe massive artillery bombardments supporting Soviet and Afghan Army ground offensives. It is, therefore, possible that the artillery arm of the Afghan Army is competent enough to participate in these bombardments.

Of the 3 nations reviewed in this section, India is by far the most powerful and is in the most favorable strategic situation. The Indian and Pakistani artillery arms are now in the early stages of massive modernization programs which should culminate in revitalized, powerful artillery arms. In India's case there is a concomitant expansion of the domestic armaments industry that by the mid-1990s should render the artillery arm independent of foreign imports.

Iran-Iraq

Engaged in a bitter conventional war that has raged for 6 years, Iran and Iraq have paid horrific human and financial costs. Some estimates go as high as 1 million total dead and as much as $500 billion in treasure loss. 1986 has witnessed some of the most bitter fighting as each side becomes desperate due to decreasing oil revenues and the ever climbing cost of financing the conflict.

Viewed from afar, the role of the artillery in this conflict is somewhat unclear but certainly important. Neither side has been able to employ much in the way of close air support. In Iran's case this is largely attributable to lack of spare parts for its American aircraft. On the other hand, the Iraqis have retained an air force capable of deep strikes inside Iran and on oil terminals in the Persian Gulf. In either case, most observers credit artillery as the primary source of battlefield support.

The Iranians began the war with a large artillery park consisting of a mixture of American and Soviet guns and howitzers. Since the war began, the importance of the American weapons has declined due to lack of spares and ammunition. Both Syria and China have supplied Soviet-type weapons, ammunition, and spare parts to Iran.

In 1984 and 1985, the Iranians suffered appalling losses in mass infantry-heavy frontal attacks. Currently Iran appears to be conducting a huge mobilization for a decisive final offensive along Iraq's southern front. Approximately 1,000 battalions of infantry, some 350 to 500 men each, are poised to launch this projected attack. But if the Iranians expect to break through and avoid further slaughter, they will certainly have to employ their artillery in better fashion. The total lack of ability to produce heavy weapons domestically makes the Iranian artillery even more dependent on foreign sources.

Of particular note here is Iran's recent use of Soviet-made SCUD-B rockets against Iraqi civilian targets. Baghdad itself is exposed to such fire; and as recently as August, Iranian SCUDs landed in a Baghdad suburb. The great cost of these rockets will certainly make the Iranians careful in choosing their targets.

Like Iran, Iraq is almost totally dependent on foreign sources of supply to continue the war. This is particularly true of heavy weapons. Prior to the war, Iraq artillery was almost exclusively Soviet in origin. That trend has continued, but since the war began the Iraqis have also been able to acquire a variety of Western weapons. These have included American-made M114 and M109 howitzers as well as Austrian GHN-45 155-mm howitzers. Recently the Iraqis ordered some French GCT 155-mm self-propelled guns. Such acquisitions have been financed with billions of Saudi Arabian dollars. But the recent drop in oil prices has, of course, made it much more difficult for the Saudis to maintain such levels of aid. Soviet weapons still make up the majority of Iraqi artillery, and since the war began the Iraqis have upgraded their Soviet artillery inventory with 2S1 and 2S3 self-propelled guns. More Soviet-made multiple rocket launchers have also arrived.

The Iraqis have been fortunate that the Iranian Air Force has been so weak. This has kept Iraqi artillery positions safe from Iranian air attack. Once again, specific reports are hard to find, but Iraqi artillery unquestionably contributed greatly to the massive casualties inflicted upon the Iranian offensives of 1984-85. Recent fighting has centered in the marshy terrain south of Basra. This will certainly make movement of large amounts of artillery difficult.

IRAN AND IRAQ	
IRAQ:	**IRAN:**
5 Armored Divisions 5 Motorized Divisions 10 Inf Divisions 4 Mountain Divisions 25-30 Reserve/Independent Inf Bdes	3 Mech Divisions 7 Inf Divisions 8 Revolutionary Guard Divisions Numerous Bde and Bn size independent units, most of which are infantry
* Over 3,000 guns and howitzers * D-44, D-30, M-1938, M-1955, M-101 towed (85, 122, 152, 105-mm) * 2S1 and 2S3 122 and 152-mm SP * GCT and GHN-45 155-mm (SP and towed) * SU-100 and 122 SP * M-46 (130-mm) towed * BM-21, BM-14, FGT-108 (108-mm) MRL * FROG - 7, SCUD - B, and SS -12 SSM	* Possibly 1,200 to 1,500 guns and howitzers * M-116 75-mm pack * M-1965 (85-mm) * M-46 (130-mm) * M-101, M-114 (105 and 155-mm) towed * M-109, M-110 SP * Type - 63, BM-21 MRL * SCUD - B SSM
Note: Due to the lack of reliable information coming from the region, constant war losses, and the efforts of both sides to procure additional equipment as rapidly as they can, the totals listed above are of course very suspect.	

Figure 2. Available data on Iranian and Iraqi ground forces.

Figure 2 lists the best open source data available on Iranian and Iraqi artilleries. The reader should be cautious. This data does not reflect likely heavy losses. Despite the heavy costs both nations have paid there is little hope of an end of belligerence. In fact, an Iran advance into Iraqi territory along the Gulf coast might well spill over to other Gulf states and expand the conflict to even more serious proportions.

Israel and Beyond

The final area covered in this article is that group of states stretching west of Iraq to Libya. This area is the focus of the bitter Arab-Israeli conflict and warrants detailed consideration.

- ***Syria.*** Long a mortal foe of Israel, Syria is also an enemy of Iraq. In fact, it has rendered significant assistance to Iran during the 6-year Gulf War. Recently, however, Jordan's King Hussein has concluded what appears to be a move to bring Syria and Iraq together. Only time will tell what effect this might have upon the Iran-Iraq war.

Since its battles with the Israelis in 1973 and 1982, the Syrian Army has received gigantic quantities of Soviet hardware including considerable amounts of artillery. A decade ago there were 2 independent artillery brigades supporting Syria's 6 divisions. Today, there are 6 artillery brigades supporting 9 divisions.

Should the Syrians decide to launch another 1973-style blitzkrieg to retake the Golan, they would need massive amounts of artillery to suppress and destroy Israeli defenses. The consistently poor showing of the Syrian Air Force has forced the Army to face that fact. In fact, the evidence suggests that they have realized that close air support in large quantities is probably a dream. Naturally, the quantity and quality of artillery has increased enormously.

In the 1973 War the Israelis noticed that the Syrians had great difficulty in concentrating the fire of more than 2 or 3 battalions of artillery on a given target. Presumably the Syrians have corrected this problem. And now that they have concentrated in their home territory all division-size units, they could probably support an attack on the Golan with over 1,000 guns, howitzers, and heavy mortars. Today, a fair number of these weapons are self-propelled. Presumably the Syrians could better support an attack moving westward through Israeli defenses. This was not the case in 1973 when Syrian tanks broke through in the southern Golan and drove westward virtually on their own.

Of critical importance to Syria's artillery would be protection from the Israeli Air Force. Given that Syrian fighters would not be able to protect the artillery positions, the Syrians erected an even more formidable air defense system than existed in 1973. There are now approximately 600 SA-6 and SA 2 and 3 launchers located from Damascus to the forward zone opposite the Israelis on the Golan.

One additional area in which the Syrians have recently shown considerable interest is surface-to-surface missiles. They currently have Soviet-made SS-21s which pose a threat to airfields in northern Israel, even when positioned far from the front.

All told, Syria's artillery arsenal is very formidable. A precise total of available weapons is not available, but the combination of towed and self-propelled guns and howitzers plus the ubiquitous Soviet-style multiple rocket launchers give the Syrian Army a powerful fire support capability.

- ***Jordan.*** South of Syria is the Kingdom of Jordan. A direct descendant of the Arab Legion of the British era, Jordan's small professional Army is probably the best force in the Arab world. It has always performed well in battle, but suffers from near total dependence on financial support from Saudi Arabia and other friendly Arab nations.

Jordan's Army is heavily outnumbered by both the Israelis and the often hostile Syrians. It has 16 battalions of guns and howitzers to support 2 armored and 2 mechanized divisions. Virtually all Jordan's pieces are American made; but like several other nations in the region, Jordan is now buying up to 200 of the popular Austrian GHN-45 howitzers.

An additional complicating factor is the recent frustrations the Jordanians have experienced in trying to acquire sophisticated American arms including air defense weapons. Due to American unwillingness to sell, the Jordanians have begun to approach the French and British. They have also struck several recent deals with the Soviets, but not for Field Artillery weapons.

Unlike many other Arab armies of the region, Jordan's Army has retained a very Western outlook on tactics and training. The British influence is particularly strong. Although small, the Jordanians are a formidable force, and Jordanian officers are often sought by other Arab armies to provide assistance and advice.

- ***Israel.*** The Israeli Army is expandable to roughly 4 times its peacetime size within 96 hours of

THE WESTERN REGION

SYRIA:

5 Armored Divisions
3 Mech Divisions
1 Special Forces Division
2-11 Indiv. Bdes (depending how many are mobilized) Inf, Mech, Armd
3 FA Bdes
3 SSM Regts

* Over 4,000 guns, howitzers, heavy mortars, and MRLs as follows (specific totals not available for most weapons)
* D-44 (85mm) towed
* M-1931/37/38, D-30, M-1944 (152, 122, 100-mm) towed.
* ISU-122/152 SP
* 2S1, 2S3 SP (122 and 152-mm)
* D-46 (130-mm), S-23 (180-mm) towed
* BM-21/24/14-16 MRL
* FROG - 7, SS-21, SCUD - B SSM

EGYPT:

4 Armored Divisions
5 Mech Divisions
3 Inf Divisions
1 Republican Guard (Armored) Brigade
9 Ind Armored/Mech/Inf/Airmob/Para Bdes
12 FA Bdes
2 Heavy Mortar Bdes
2 SSM Regts

* Approx. 2,500 guns/howitzers/heavy mortars/MRL
* D-44, M-1931/37, D-46, S-23, D-30 towed
* SU-100, 152 SP
* M-109 (155-mm) SP
* BM-24/Sagr-18/30, VAP-80, BM-13-16, BM-21 MRL
* M-43 120 and 160-mm mortars, M-1953 240-mm
* FROG - 7, SCUD - B SSM

JORDAN:

2 Armored Divisions
2 Mech Divisions
2 Ind Bdes
16 FA Bns

* 17 M-59 (155-mm) SP
* 36 M-101 (105-mm) towed
* 38 M-14 (155-mm) towed
* 180 GHN - 45 (155-mm) towed
* 108 M109 (155-mm) SP
* 24 M110 (8-inch) SP
* 4 M115 (8-inch) towed

SAUDI ARABIA: (Regular only)

2 Armored Bdes
4 Mech Bdes
1 Inf Bde
1 Para Bde
5 Ind FA Bns

* 124 105-mm howitzers
* 72 (+) FH-70 (155-mm) towed
* 34 M-198 (155-mm) towed
* 275 M-109 and GCT 155-mm SP

ISRAEL:

11 Armored Divisions
9 Mech Bdes
7 Para Bdes
12 Militia Bdes
15 FA Bdes
3 Inf Bdes

* 70 M-101 (105-mm) towed
* 140 M-107 (175-mm) SP
* 300 M-68, M-50, M-72 (155-mm) SP
* 450 M-109 (155-mm) SP
* 48 M-110 (8-inch) SP
* Unspecified, but large (i.e. hundreds) number of ex-Soviet D-46, D-30 guns/howitzers
* Unspecified, but large number of MRL, including BM-21/24, LAR-160, and MAR-290
* 160-mm heavy mortars mounted on tank chassis
* LANCE and Ze'ev SSM

LIBYA:

38 Tank Bns
54 Mech Inf Bns
41 FA Bns
6 SSM Bdes

* 420 D-74 and M-46 122 and 130-mm guns
* 400 D-30, M-1938, M-101 towed 122-mm and 105-mm howitzers
* 100 (+) 2S1 and 2S3 122 and 152-mm SP
* 400 (+) BM-11/21 MRL
* FROG - 7, SCUD - B SSM

NOTE: The majority of the Israeli formations listed above are maintained at cadre strength during peacetime, but have exceptionally rapid mobilization schedules, normally within 96 hours.

Figure 3. Western Region orders of battle.

mobilization. Its 100,000 active duty personnel mushroom to more than 400,000 soldiers manning 11 armored divisions and numerous separate units including 15 artillery brigades.

Until the 1973 War, the Israeli Army relied very heavily on close air to provide fire support. The terrible losses suffered by the Air Force in 1973 underscored the need for more artillery, now available in large numbers.

A mixture of captured Soviet, American, and locally produced models, the Israeli artillery can provide massive firepower to the armored units that are the core of Israel's Army. In comparison to their Arab neighbors, the Israeli artillery has a far greater density of self-propelled weaponry. Of course, this conforms to the nation's doctrine of using tank-heavy formations to force quick decisions in any conflict.

Israel's artillery also has a wide variety of multiple rocket launchers, most of which are booty from its several wars with its Arab neighbors. Never ones to discard old but serviceable gear, the Israelis have locally produced pieces including 160-mm mortars and 155-mm howitzers mounted on Sherman tank chassis. Thus they capitalize on cheap but workable weapons. The Israelis also own a few American-made Lance missiles, and some of their own ZE'EV (Wolf) surface-to-surface missiles. Exactly what role the Israelis have in mind for those weapons remains sheer conjecture.

During the 1973 War, the Israelis found that self-propelled artillery was vital for the successful movement of armor. The heavy losses sustained by Israeli armored units in the first few days of the war stemmed largely from the fact that there was virtually no fire support available to the tank units which engaged swarms of Arab infantry armed with man-portable, antitank missiles and rocket launchers. However, the Israelis did learn quickly. During the 1982 invasion of Lebanon, Israeli artillery played a very important role particularly during the initial advance and later during the siege of Beirut.

Israeli artillery is a powerful force well suited for support of an armor-heavy force. In coming years, it probably will have to rely on existing weapons because of the very heavy economic drain imposed by maintaining a modern tank arsenal and air force. Nevertheless, their artillery arm is evidence that a hard-hitting army can have a formidable fire support force without insisting on state-of-the-art weapons.

- ***Egypt.*** Egypt's artillery is in a state of transition. Prior to 1973 the vast majority of its weapons were of Soviet origin. After President Sadat broke with Moscow, Russian spares began to dry up. Egypt then turned to the West. Since Camp David, the US has been a major supplier of artillery weapons to Egypt.

The Egyptian artillery proved itself during the 1973 War. It provided excellent support to the maneuver forces during the assault crossing of the Suez Canal. Today's senior Egyptian officers are quite comfortable with their Soviet-style doctrine, and once they obtain sufficient quantities of Western weapons they will once again be able to provide effective support to the Army.

- ***Saudi Arabia.*** By far the largest of the nations in the Arabian Peninsula, Saudi Arabia is the key financial backer of a number of Arab states. But it also has a significant military force composed of two major components—the Regular Army and the National Guard. Both have artillery, but the former force is far better equipped.

The Regular Army of some 35,000 men has 8 brigades supported by 5 artillery battalions. Most of the weapons are US and French self-propelled 155s, but there are also US and European towed 105s and 155s including the FH-70 now coming into use.

The Saudi National Guard has a few US M102 105-mm howitzers unsuited for protracted conventional combat but probably appropriate for the force's possible political purpose.

The Saudis have seen little combat, so it is difficult to make an objective judgment about their effectiveness. Interestingly, they may soon confront the Iranians advancing through southern Iraq toward the Gulf states on Saudi Arabia's northeast frontier. Thoroughly alarmed, the Kuwaitis have asked the Saudis to deploy forces to their northern border to stop an Iranian incursion. It may be then that the well-armed Saudi artillery will be put to the test. That is, however, a battle the Saudis would like to avoid.

- ***Libya.*** To the west of Egypt is Libya. Despite a huge stockpile of well over 1,000 mostly Soviet artillery pieces, the Libyan Army is a small force whose largest permanent organization is the battalion. In fact, the Libyan's approximately 109 maneuver battalions are supported by 41 Field Artillery battalions. Thus, the Libyans have an enormous surplus of weapons. Some writers have speculated that the Libyan surplus is in fact the stocks for a Soviet "rapid deployment force." That is an interesting thought, especially in view of Libya's recent request to join the Warsaw Pact.

Like several other Arab nations which have Soviet weapons, the Libyans have a limited supply of Soviet surface-to-surface missiles. Following the American air strike in April 1986, the Libyans fired two SCUD-B missiles at the US Navy's LORAN station on Lampedusa Island, 175 miles northwest of Tripoli. Both missiles fell roughly 2 miles short of the 6 mile-long island. This incident may well provide some insight into the overall effectiveness of Libya's artillery arm. In any case, with little combat experience and only low-level training, Libyan artillery would have a tough time in a large-scale, mechanized war.

Conclusion

In this article, I have surveyed the artilleries of the major nations of Southwest Asia and Northern Africa. In the process, I have offered some specific insights into the armies in question. As a whole, these nations are all quite heavily armed. Although their artillery arms may not be as sophisticated as America's, their sheer number of weapons remain impressive. American artillerymen would do well to follow the trends in fire support in this critical, volatile region of the world.

Captain John Gordon, FA, is Chief of Marketing Branch, Headquarters 5th Recruiting Brigade at Fort Sam Houston, Texas. He received his commission through ROTC at the Citadel and is a graduate of the Field Artillery Officer Basic and Advanced Courses. His past assignments include fire support team chief with the 82d Airborne Division, G3 with the 2d Infantry Division, gunnery instructor and battery commander at Fort Sill, Oklahoma. He is completing a master's degree in international relations.

Command Update

NEW REDLEG COMMANDERS

Active Army

COL Gregory W. Mason
24th Infantry Division Artillery

COL Edward G. Anderson III
17th Field Artillery Brigade

COL George H. Hegg
72d Field Artillery Brigade

LTC Arthur J. Keating
4th Battalion, 4th Field Artillery

LTC Warren S. Lacy
1st Battalion, 5th Field Artillery

MAJ Robert D. Sander
4th Battalion, 5th Field Artillery

LTC George Coan
2d Battalion, 11th Field Artillery

LTC James D. Crabbe
6th Battalion, 11th Field Artillery

LTC Terry M. Huling
7th Battalion, 11th Field Artillery

LTC Alan E. Lambert
6th Battalion, 14th Field Artillery

LTC William T. Russell, Jr.
1st Battalion, 15th Field Artillery

LTC Joseph C. Dooley
7th Battalion, 15th Field Artillery

LTC Richard L. Quinn
3d Battalion, 19th Field Artillery

LTC James W. Newell, Jr.
4th Battalion, 27th Field Artillery

LTC Walter B. Brown II
6th Battalion, 29th Field Artillery

LTC Stephen D. Williams
5th Battalion, 41st Field Artillery

MAJ James R. Chambless
1st Battalion, 77th Field Artillery

LTC William J. Rice
1st Battalion, 84th Field Artillery

LTC Dennis W. Tighe
1st Battalion, 319th Field Artillery

LTC Robert H. Kimball
2d Battalion, 377th Field Artillery

LTC Charles S. Beeson
6th Training Battalion

LTC Neil E. Nelson
Training Command Battalion

Regiments and Honorary Colonels

MG(Ret) George Ruhlen
3d Field Artillery

COL(Ret) Vernon R. Rawie
5th Field Artillery

COL(Ret) Billy H. Watson
8th Field Artillery

COL(Ret) Donald Curtis
29th Field Artillery

MG(Ret) Vernon B. Lewis, Jr.
319th Field Artillery

COL(Ret) Arthur P. Lombardi
320th Field Artillery

Army National Guard

I Corps Artillery
BG James M. Miller
1-140—LTC Stanley J. Gordon
1-145—LTC Lawrence F. Phillips
2-222—LTC John M. Esplin

26th Infantry Division Artillery
COL William P. Ambrose
1-101—LTC Edward H. Russell
1-102—LTC Able C. Leite
2-192—LTC Robert J. Weitzel
1-211—LTC Richard A. Barcelo

28th Infantry Division Artillery
COL Joseph F. Perugino
1-107—LTC Raymond D. Faczan
1-108—LTC Heinrich N. Babb
1-109—LTC Anthony J. Mangan
1-229—LTC Dalvia J. Stafford

29th Infantry Division Artillery
COL Terry J. Tyler
2-110—LTC J. Donald Haynes
2-111—LTC Cecil A. Broome, Jr.
1-246—LTC Grover E. Scearce

35th Infantry Division Artillery
COL Ronald D. Tincher
1-127—LTC Dennis E. Petty
2-138—LTC Earl L. Doyle
1-161—LTC Anthony D. Lyons
1-168—LTC Wesley E. Tlustos

38th Infantry Division Artillery
COL Donald D. Cox
1-119—LTC James P. Caie, Jr.
3-139—LTC Michael A. James
2-150—LTC Roger P. Peterman
1-163—LTC David M. Burgett

40th Infantry Division Artillery
COL Edgar B. Morrison
1-143—LTC Alex F. Kennett
1-144—LTC James P. Lowsley
2-144—LTC Paul E. Myron
3-144—LTC Wayne Watkins

42d Infantry Division Artillery
COL Norbert J. Coggins
2-104—LTC William Horvath
1-105—LTC Donald Roberts
1-187—LTC William P. Kiley
1-258—LTC Glenn E. Armstrong, Jr.

47th Infantry Division Artillery
COL Kenneth B. Digre
2-123—LTC Robert O. Fitch
1-151—LTC George H. Jordan
1-175—LTC Robert L. Bode
1-194—LTC Jerry L. Gorden

49th Armored Division Artillery
COL David L. Harmon, Jr.
2-131—LTC John Avila, Jr.
1-133—LTC John F. Hafner
3-133—LTC Charles P. Flanagan III
4-133—LTC Lawrence A. Lippke

50th Armored Division Artillery
COL Hector G. Pieretti, Jr.
1-86—LTC Clarence A. Wright
1-112—LTC John H. Ford
3-112—LTC William J. Apgar
4-112—LTC Paul J. Glazar

45th Field Artillery Brigade
COL Tommy G. Alsip
1-158—LTC Jim R. Stafford
1-171—LTC Bobby D. Thomasson
1-189—LTC Kenneth W. Bray

57th Field Artillery Brigade
COL Lawrence P. Kaplan
1-121—LTC Marvin I. Strawn
1-126—LTC David F. Thompson
1-125—LTC Louis O. Bode

103d Field Artillery Brigade
COL Richard J. Valente
1-103—LTC James F. Ryan
2-103—LTC Joseph E. Goddard

113th Field Artillery Brigade
COL James R. Martin
4-113—LTC William M. Abell
5-113—LTC Forest M. Grimes

115th Field Artillery Brigade
COL Henry Castillon
1-49—LTC Robert C. Edwards
3-49—LTC Sidney A. Humberson

118th Field Artillery Brigade
COL Fred W. Shaver, Jr.
1-214—LTC Paul L. Rushing
2-214—LTC Jordan B. Gaudry

135th Field Artillery Brigade
COL Duane M. Norman
1-128—LTC William E. Stucker
1-129—LTC Dempsey D. Gottschalk

138th Field Artillery Brigade
COL Julius L. Berthold
1-623—LTC Michael F. Goutt

142d Field Artillery Brigade
COL Bobby H. Armstead
1-142—LTC Charles J. Linch
2-142—LTC Robert E. Lee

147th Field Artillery Brigade
COL Leon J. Vanderlinden
1-147—LTC Darrell E. Hanson
2-147—LTC Michael H. Hansen

151st Field Artillery Brigade
COL Edward S. Baldwin
3-178—LTC Nicholas P. Sipe
4-178—LTC Harry B. Burchstad, Jr.

Army National Guard Continued

153d Field Artillery Brigade
COL David H. Pilcher
1-180—LTC Jay P. Gordon
2-180—LTC Manuel Davila

169th Field Artillery Brigade
COL Joseph T. Boyersmith
1-157—LTC William R. Suhre
1-157—LTC Jesse T. Stacks III

196th Field Artillery Brigade
COL Carl E. Levi
1-115—LTC James S. Pack
1-181—LTC Jackie T. Rose

197th Field Artillery Brigade
COL Gerald F. Janelle
1-172—LTC Charles K. Hennessey
2-197—LTC Norman H. Lacasse
3-197—LTC Carl L. Nolin

227th Field Artillery Brigade
COL Eugene M. Bass
1-116—LTC James R. Shoemaker
3-116—LTC John C. Bridges

631st Field Artillery Brigade
COL Shelley K. Brantley
1-114—LTC James H. Lipscomb III
4-114—LTC Sidney E. Hester

209th Field Artillery Brigade
COL Joseph N. Brill
1-152—LTC Sheldon R. Lyons
1-209—LTC Thomas K. DeRue

Separate Units

1-111—LTC William T. Perry
1-113—LTC Bobby R. Dowles
2-114—LTC Harry W. Richards
3-115—LTC Donald F. Hawkins
2-116—LTC Jerry L. Neff
1-117—LTC Ira K. Jones
2-117—LTC Joel W. Norman
3-117—LTC Harold K. Logsdon
1-120—LTC Ernest Woorster
2-122—LTC Luke J. Moretti
2-130—LTC Jerry J. Eggleston
1-136—LTC John T. Donnellan
1-141—LTC Urban B. Martinez, Jr.
2-146—LTC Michael S. Croy
1-156—LTC Roy R. Thomson
1-160—LTC Dale E. Carney
1-162—LTC Roberto Marrero
2-162—LTC Ricardo Ruiz
1-178—LTC Kenneth W. Brown
1-182—LTC Charles G. Larsen
1-201—LTC Edmund F. Roleff
5-206—LTC Roy L. Rowe
2-218—LTC David S. Hawkins
1-230—LTC Wiley M. Dewitt, Jr.
1-487—LTC John K. Hao

United States Army Reserve

428th Field Artillery Brigade
COL Robert S. Wetterstroem
4-20—LTC Paul A. Sivicek
4-38—LTC Ronald Grammel
4-333—LTC Michael W. Grissom

434th Field Artillery Brigade
COL Donald J. Mellskog
7-1—LTC Roy J. Cimeley, Jr.
4-75—LTC Robert F. Bracki

479th Field Artillery Brigade
COL Robert R. Armstrong
4-8—LTC Gary M. Bentsen
4-92—LTC Thomas C. Whitten

Separate Units

5-5—LTC Richard S. Colt
7-9—LTC Thomas C. Tomlinson
3-14—LTC Larry D. Ruchti
3-15—LTC Paul D. Wharton
4-17—LTC John M. Ringler, Jr.
5-28—LTC Francis M. Hyle
3-42—LTC John J. Murphy
3-75—LTC Lee T. Cornelison
3-83—LTC Billy W. Keyes
6-83—LTC David D. Tucker
3-92—LTC George A. Fromholtz

3d Brigade (Field Artillery One Station Unit Training) 84th Division
COL Bruce W. Koopika
1-334—LTC Richard F. Hanesworth
2-334—LTC Charles E. Bartelt
3-334—LTC Robert W. Roth

402d Brigade (Field Artillery)(Training) 95th Division (Training)
COL Ronald G. Honeycutt
1-89—LTC Barry Grabel
2-89—LTC Jerry Bradform
3-89—LTC Gerald N. Nakashima
4-89—LTC Gene G. Jordan
5-89—LTC Fred R. Rowzee

Marine Corps Commanders

1st Marine Division Artillery
COL Hugh P. Pate
11th Marine Regiment

LtCol George B. Brown III
1st Battalion, 11th Marine Regiment

LtCol James M. Hayes
2d Battalion, 11th Marine Regiment

LtCol James M. Canario
3d Battalion, 11th Marine Regiment

LtCol Nicholas F. Carlucci, Jr.
5th Battalion, 11th Marine Regiment

2d Marine Division Artillery
COL James B. Way
10th Marine Regiment

LtCol William W. Broadway
1st Battalion, 10th Marine Regiment

LtCol Samuel C. Decoteau
2d Battalion, 10th Marine Regiment

LtCol E. A. Smyth
3d Battalion, 10th Marine Regiment

LtCol John R. Todd
4th Battalion, 10th Marine Regiment

LtCol John P. Glasgow
5th Battalion, 10th Marine Regiment

3d Marine Division Artillery
COL Regan R. Wright
12th Marine Regiment

LtCol Jerome J. Hudak
1st Battalion, 12th Marine Regiment

LtCol Wayman R. Bishop III
2d Battalion, 12th Marine Regiment

LtCol James H. McKelligon
3d Battalion, 12th Marine Regiment

4th Marine Division Artillery
COL Torrence W. Rogers
14th Marine Regiment

LtCol R.B. Wright
1st Battalion, 14th Marine Regiment

LtCol Thomas E. Chandler
2d Battalion, 14th Marine Regiment

LtCol R.E. Lyman
3d Battalion, 14th Marine Regiment

LtCol John B. Wilkes IV
4th Battalion, 14th Marine Regiment

LtCol Jay A. Graham
5th Battalion, 14th Marine Regiment

CENTAG Commander/Command US Army Europe, 7th Army, General Glenn K. Otis

"We need you as an integral part of the Combined Arms Team"

Q: Is there an adequate appreciation of the fire support threat our forces confront in Europe?

A short answer is yes. From the viewpoint of an army group commander in NATO, I think that the toughest, most difficult threat we face is the enemy's fire support. The enemy is known to emphasize the use of artillery with mammoth preparatory fires in those areas of major attack. He has good systems for doing that now. Weapon-for-weapon, his tubes outrange ours; so I'm most concerned about enemy fire support.

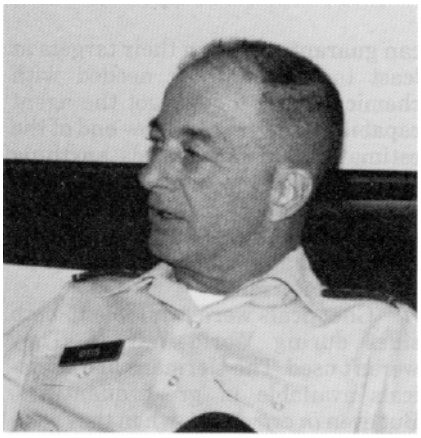
Fire support in its broadest view is not just the artillery. It also involves surface-to-surface missiles and air-to-surface attacks. The Soviets have in recent years emphasized the development of attack helicopters and have a growing number of larger models. Of course, they push their air-to-surface fixed-wing threat down to *front* level for close air support of the ground forces. We face a 3-dimensional attack, and we have a good appreciation for it.

Q: As the CENTAG Commander, do you have the fire support resources you need to defend your area of operation?

I don't think any commander ever feels he's got all he needs and wants. So, I think the short answer is no. But that doesn't mean we automatically lose.

We're in the process of deploying a multiple launch rocket system in Europe. This is the first time the United States has had a major multiple rocket capability. That has added a tremendous dimension to our own fire support capabilities.

In addition, I've emphasized in the combined NATO arena that aircraft allocated to the ground commanders in support of their ground



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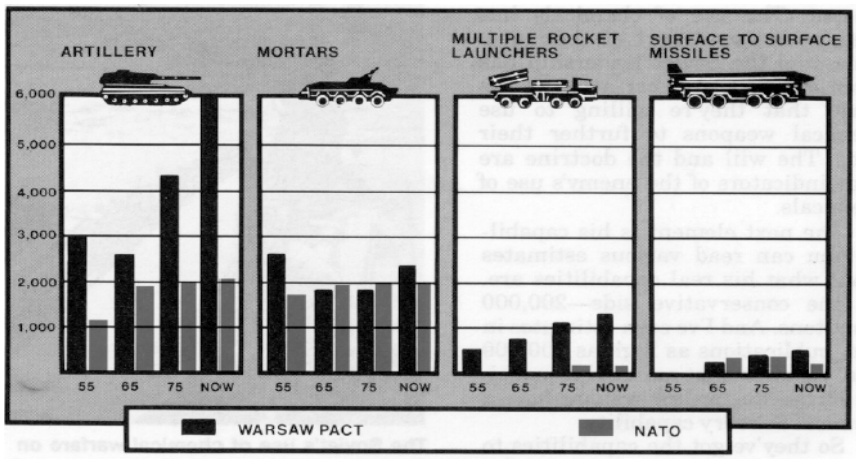
efforts have got to receive some priority for use against the enemy's artillery and fire support.

So, in looking at the friendly fire support picture, we don't have enough. We need more. But in terms of the broad "we," many of us are doing something about that.

Q: As they look into the future, fire supporters look to the joint surveillance and target attack system (JSTARS) and the Army tactical missile system (ATACMS). How will the advent of those systems change the way American commanders will operate in Europe?

In a dramatic way! The US unilaterally has proposed a doctrine called AirLand Battle as the operational-level doctrine for its forces. A fundamental part of that doctrine is that there are 3 battles going on simultaneously. The battle at the front, the battle in our own rear, and the battle in the enemy's rear.

JSTARS is one more capability in our quiver of arrows to go out and find the enemy in the depths of his forces. Given that we are able to find him accurately, then the necessary first step in the process of attacking that second echelon—his deep forces—is present. So JSTARS is an important adjunct to our capability to look deep.



A comparison of the Threat's arms build-up to that of the NATO forces.

Now, given that we can find him, we need to take him under attack. Today, the ground forces' capability to do that is limited by the range of organic systems—Lance being our deepest capability, and we do not have too many of those. On the other hand, we're not going to fight just as a land force, but as a land-air campaign. A key factor then is not only to find them, but also to integrate both ground and air in an orchestrated way and then allocate some of that capability to the deep battle attack.

And the third dimension of all that is to attack the proper pieces of the enemy. For example, there are some conditions and some times when the right payoff is to go after enemy tanks, but that's probably not the majority of the time. What a ground commander must do as these new systems and new capabilities come around is analyze very carefully what the high leverage targets are in the second echelon. If you need to destroy tanks, then you go after tanks. But if you really want to delay a second echelon, it might be that you want to go after his command and control or his support forces.

Q: In addition to looking at the Soviet's massive conventional capabilities, many leaders are very concerned about weapons of mass destruction. How serious is the Soviet chemical threat? Will the proposed binary initiative really provide us with a viable deterrent?

First of all, let's talk about the Soviet threat. There is no doubt from the evidence available in open sources that the will to use chemicals is present. The use of chemicals has been an integral part of their doctrine, and the Soviet leadership has given evidence in other areas of the world that they're willing to use chemical weapons to further their aims. The will and the doctrine are clear indicators of the enemy's use of chemicals.

The next element is his capability. You can read various estimates about what his real capabilities are. On the conservative side—200,000 agent tons. And I've seen estimates in open publications as high as 700,000 tons. We know that most of his principal surface-to-surface systems have a chemical delivery capability.

So they've got the capabilities to deliver it; they've got the circular error probable (CEP) available that

Lance has the deepest capability of all the American tactical fire support systems.

can guarantee hitting their targets at least to the accuracy needed with chemicals; and they've got the agent capabilities even on the low end of the estimates that far exceeds anything that's in the Blue inventory. So with the will and the capability, it requires only that the Soviets find a need for using it. That brings us to your question of a deterrent.

Chemicals were available to both sides during World War II. They weren't used. The Germans had chemicals available in great quantities. But even *in extremis*—when they were in danger of losing the war—the Germans did not resort to chemical warfare. The reasons for this were twofold:

- The other side also had chemical weapons.

The Soviet's use of chemical warfare on the modern battlefield is an integral part of their doctrine.

- The Germans remembered the experiences of World War I where huge casualties resulted. There are estimates as high as 4 million Russian chemical casualties in World War I.

The historical examples show that when both sides have the capability to use an awesome, horrible weapon of war, that a deterrent exists. So it seems reasonable that today we in the Free World ought to have a chemical deterrent.

Among the nations in NATO, the US is probably the only one that has any capability at all, and ours is totally inadequate. We have neither the delivery systems nor the agents that are needed to provide a realistic deterrent. Therefore, it's critical that we modernize our capability and add to it. Binary gives us that chance, if we can produce it. As of today, we have no binary capabilities. So our deterrent is woefully lacking, and that is a clear and present danger.

Q: You have already alluded to the necessity to approach the battlefield in Europe from a joint and combined perspective. What is NATO doing to enhance our joint and combined fire support operations?

Let me focus on the central region where the overall commander is the Commander-in-Chief, Allied Forces Central Europe, a German 4-star general, General Chalupa. He commands the ground and the air. So at the top side in the central region, we have a single combined commander who pulls together ground and air assets. That seems to me to be a very good first step. Now he fights the war using 2 Army groups on the land and on the air side 2 Allied tactical air forces.

At the Central Army Group level, which is my command, the 4th Allied Tactical Air Force is in direct support of our jointly designed campaign plan. Now, I don't command it; but along with its commander I am charged by General Chalupa with pulling together a land-air campaign aimed at achieving the objectives of defense.

As a matter of fact, at Central Army Group-4th Allied Tactical Air Force level we have integrated our staffs in those areas where war-fighting is required. For example, our targeting staffs are integrated. That's a clear indication of what we've been doing in the combined and joint arenas.

Q: Sir, from your perspective, what are the most pressing doctrinal, organizational, training, and hardware needs of the Fire Support Community?

Well, let's start with doctrine. I think our doctrine is clear. We have a doctrine we're comfortable with. On the US side, that doctrine is written where you live. But it isn't written in a vacuum, and it's pulled together through the Combined Arms Center. So that artillery support—in fact, fire support in the broad sense—is clearly outlined in the doctrine. There are always debates about small pieces of it. But the doctrine requiring automated command and control, requiring redundant communications, and requiring the integration of total fires with the ground and air plans is quite clear. On the NATO side, the doctrine is equally clear. Broad guidelines and standardization agreements have been promulgated. All nations have signed up, and the troops in the field practice them. So on the doctrinal side, we're set.

Now for the materiel side. Today the artillery is overloaded with missions. You now have so many different rounds of ammunition that one of our most stressed systems is the 155-mm howitzer. Nevertheless, the materiel exists.

Now some improvements are needed. We certainly don't have all the ammunition we'd like to have in certain specific cases—the Copperhead is one. On the other hand, we've got an awful lot. So that the United States is not ill-prepared in the way of ammunition reserves.

We also have an automated command and control system, but it's not very user friendly. And so it needs some real improvements. I perceive that those improvements are in the mill.

We need improvements in communications, but some of those are not being designed with just fire support in mind but with broader capabilities. Some of those are on the books and on the way.

- The position and locating reporting system-joint tactical information distribution system (PLRS/JTIDS), for example, will handle data.
- The single channel ground and airborne radio subsystem (SINGARS), or at least a new combat net radio is sorely needed.
- And, of course, we've gone to contract for the multiple subscriber equipment or MSE, and that's good.

The materiel side has some deficiencies, but those deficiencies are being addressed. So I'm optimistic.

The laser-guided Copperhead projectile is an accurate and deadly addition to the US arsenal of weapons.

And in many cases, some of those materiel deficiencies which exist not only on the US side but in NATO in general are being satisfied by parallel systems or identical ones in the NATO Community.

However, we are still going to have to continue to put some money into the fire support arena in order to bring to fruition some of the ideas and some of the research and development that's ongoing. That's a quick brush on the materiel side.

Now, for training. Every nation has its own way of handling fire support. The key to interoperability, and therefore the key to combined operations in NATO, is that each nation understands how to employ, use, and receive support from its neighboring nations; and in NATO an awful lot of that is going on.

For example, there are very clear instructions, texts, and agreements on how a German frontline Infantry commander can call for support from a neighboring US artillery battalion or vice versa. We understand how to do that, and in all of our combined exercises it's almost routine today for US Infantry battalions to call for fire support from a Dutch or Belgian or United Kingdom, or a German artillery outfit.

So with standardization agreements, with combined training, with the doctrinal stuff that we already have, and with the in-place systems and ammunition we're doing very well. It doesn't mean there aren't deficiencies, and I indicated some of those.

Q: How do you envision using the new corps-level multiple launch rocket system (MLRS) battalions?

Well, first of all, as an army group commander, I am not going to use them in the general sense. They belong to and will be used by the corps commanders.

Now, I understand the added dimension that the multiple launch rocket system gives to the corps; and, therefore, the missions assigned to the corps which have them will be very different. The corps commander, of course, has the capability to hold the MLRS at his level in a general support or a general support reinforcing role, or he can allocate the battalion down to one division. Or he can position it so that it supports a wider range of forces. In addition, it gives one other important capability. By proper tasking and proper positioning, a multiple launch rocket system

(MLRS) can support 2 corps. And there are places and times in our operations where that will have to happen.

The 2 German corps in CENTAG also have a multiple rocket launch capability. It isn't what they want, and I anticipate they will adopt the MLRS in the future. But at least they have some capability now.

I guess then in answer to your question, the multiple launch rocket system gives us a great payoff. It's more survivable because of its capability to shoot, run, and move. It has a built-in location system which gives it an added dimension for accuracy. And it has a rapid reload system. Put all that together, and the added dimension that MLRS gives us in fire support is great.

But I hasten to add that this added capability is only serving to reduce the incremental difference between the Soviet-Warsaw Pact and the NATO artilleries.

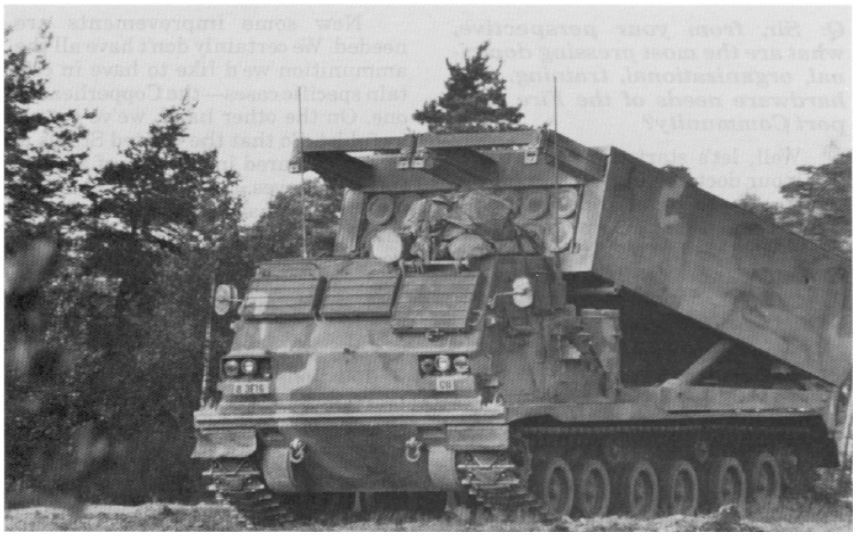
Q: Moving to the heavy hitting end of the Field Artillery perspective, how significant is the role of the European-based Pershing IIs?

The significance there is strategic as well as theater or operational. The Pershing II as compared to its Pershing Ia predecessor has given us an added capability in many different areas. For example, it has a much greater range, and that is why the Soviets are so concerned about it. It also has much greater accuracy. Therefore, for a much lower warhead payoff you get a bigger target payoff. It can shoot and move very rapidly as compared to its predecessor. And it doesn't need a prepared position—nothing more than a hole in the forest to shoot through. What's more, you can change targeting on it very rapidly. So, all of those things add to our nuclear deterrent at the theater level in a very real degree.

We replaced Pershing Ia's with Pershing II's on a one-for-one basis. We added no extra nuclear warheads to the theater. But it certainly gave us a much greater nuclear deterrent.

Q: We are hearing great things about the National Training Center. Will there ever be an NTC-like training area in Europe?

There will! However, I see no future capability in the Federal Republic of Germany on the same order of magnitude as the National Training Center. We won't have the



The abilities to shoot, run, and move along with built-in locator and rapid reload systems make MLRS more survivable.

Pershing II's greater range and accuracy along with its shoot and move capability give US Forces a better theater-level nuclear deterrent.

Redeye will soon be replaced by the STINGER.

training area, nor the capability to build it like the National Training Center.

On the other hand, we can make use of what we've got in a better way. So we have created the concept of a combat maneuver training center (CMTC) at one of our US-held training centers. We're building it on the scheme of the National Training Center by:

- Having a permanent opposing force stationed there.
- Having them trained on enemy tactics.
- Using the multiple integrated laser engagement system (MILES).
- Having it on German-type terrain.
- Instrumenting it so that we can record all the events and play them back for after-action reviews among the troops.

In those respects, we will have a small model of the National Training Center.

Now it's going to take several years to do all that. We've got to build some barracks and other support facilities at Hohenfels, and we've got to get the money to instrument the ranges, station the opposing forces there, get them equipped, and then maintain the facility. Nevertheless, the plans are laid, and I have received some high priority support both from the Department of the Army and TRADOC. And I would envision that within the next few years, we'll have a small-scale National Training Center at about the battalion level.

Q: How would you describe your concept of how to use fire support in maneuver warfare?

There has been no change in that in the 40 years I've been around the Army. The concept is that you must integrate fires—the total fires, the total effort—of the combined arms team to be successful in battle. That integration or synchronization is still the fundamental requirement.

Now, the combined arms team of today is much more complicated than it was 40 years ago because today that team not only has Infantry, Armor, and Field Artillery but also an air arm that goes with it. We have invested in a lot of very good air capabilities—our Cobras today and most importantly our AH64s of tomorrow. They provide a complete new dimension.

Now, the Air Force has A-10s whose only role is to support the ground commander either directly on the FLOT or fairly close to it; that's another dimension. What's more, we have proliferated throughout the Armed Forces electronic warfare (EW) elements—the gun part of EW—as part of the combined arms team. And now we've got, throughout the battlefield, air defense capabilities with Vulcans, Chaparrals, Stingers, and Redeyes.

So what we have done has not changed the artillery's fire support requirement and the necessity for it to be integrated with the ground commander's overall plan. What we have done is to provide a whole panoply of extra instruments to the orchestra. So that the orchestra leaders—the company commanders right on through the Army group commanders—are faced with having so much more capability and so many more instruments to harmonize that they need an awful lot of training. That's the real change.

We used to think that we had to train the troops in how to handle attack, defense, delay, withdraw, and so on. We still have to do that. We still have to train teams to operate the weapon systems, and units to handle the complexity of maneuver on the battlefield. But the big requirement is the special and extra demands on commanders and their staffs starting with the company commander on up. And in the Army in Europe we are doing an awful lot to stress that kind of professional development.

Q: In the Army in Euope, how are you dealing with challenges of rearming, refueling, and repairing particularly up close to the front?

First of all, we are using standard Army doctrine. Second, we're experimenting with some different ideas to see how well they work.

Now, standard Army doctrine would say that down in the lower-level units you ought to create the brigade support area. So we do that. Lower than the brigade support area, you create unit maintenance collection points.

The doctrine also says "fix forward." I think we've finally defined that. It means that where something breaks down you take action to get it to work. But if you don't worry about repairing small components up front; you do those repairs in the rear. For example, if a tank breaks down up front, instead of sending out a diagnostic team to find out what broke down and then get the right repair parts to fix the tank on site, you change the major black box or the major assembly. You make a quick swap, and bring the bad major component back to a relatively secure area where experts can fix it. So "fix forward" means make it operational forward, then repair the components in the rear. That's the maintenance part of it.

Now, resupply is going to be critical on the future battlefield. We'll use the "push forward" scheme with trailer transfer points for ammunition. We'll also use prepackaged loads that are standardized for given outfits. So that instead of each commander having to order so many rounds of this and so many rounds of that and go to bulk supply points to pick up items, we're working with standardized packages. That way, when you get a package you know what is going to be in it; you use what you need of it; and the rest goes back when another package arrives.

Last, I want to talk about Class III. In a mechanized force, which is what we have today in the NATO environment, adequate Class III is essential to the battle. For example, we made the judgment on the M1 tank that we wanted to go with a 1500 horsepower tank that would give us battlefield mobility and extra alacrity in terms of acceleration. But when you go from a 750 horsepower vehicle like the M60 to a 1500 horsepower vehicle like the M1, clearly you've got to give it more fuel. So, fuel takes on added importance as we modernize. The same thing can be true of helicopters. They eat a lot of fuel.

Much of our work has involved getting fuel from the wholesale level at the rear to the retailer where it's needed. And we've developed trucks,

The Cobra and the Apache add a new dimension to the Combined Arms Team's effectiveness.

pump units, as well as ideas and concepts about how to do that.

Once again, even with Class III, we have standardized doctrine that we follow, but we are looking at various innovations internal to certain units to see what ideas pay off in terms of procedures.

Q: What role do you see your fire support organizations having in the rear area of the battle?

A big role! Given that you located your artillery properly for its primary focus—the battlefield at the front and in the depths of the enemy formations—you still need to consider the battle in your own rear. And depending upon whether you're a battalion commander worried about the front or a division commander worried about the rear, then your notion of how you locate artillery and how you assign missions takes on very real differences.

The flexibility of artillery is its ability to range. An enemy battalion landing by assault helicopters may necessitate deploying Infantry and Armor units from their current locations to where the rear battle location. In many cases flexible artillery can support from where it already is or with very little movement. The key things are command and control and the capability to call for our artillery support and fire support in general in that rear area. That means that we must train many folks whose normal jobs don't get them into calling for fire support.

So in the rear areas one of the key points has got to be—and we don't do very well on this—the sensitizing and the training of commands and staffs whose normal mission is not fighting the frontline battle, but who may be engaged in calling for emergency support.

Q: Sir, as you look down the line, is Aquila an important system from the European perspective?

Well, let me take the liberty of changing the question. Instead of asking about Aquila, let's talk about a remotely piloted vehicle without regard to its name.

If Aquila is the right one fine. But there is no question that we need a remotely piloted vehicle (RPV) capability in Europe. You may know that since 1978 the Germans have had in every one of their divisions a remotely piloted vehicle capability. It's a drone rather than a real RPV. Nevertheless, the division commander has had the capability to go, look, come back, and produce hard copy photos across the line and across the next hill, to see what's there. The US still doesn't.

We need it in a very real sense. If follow-on forces attack is going to be executed and if AirLand Battle doctrine is going to be executed, then we need the capability to find and to see the enemy before he gets near the FLOT.

To see him, you need a whole set of different sensors. Some of them can be electronic, some of them can be photographic, some of them can be human on the ground; but some of them ought to be by real eyes employing relatively inexpensive, low manpower systems like remotely piloted vehicles.

So, I'm highly in favor of getting an RPV into US hands quickly in Europe. Let us experiment with it, get comfortable with it, and understand better how to use it while we design a better mousetrap somewhere downstream.

Q: Sir, what do you expect from the next generation of direct support artillery weapons?

Well, first of all, I want better range than we have today—better meaning deeper range capability. Second, I need more weapons. Third, an adequate supply of the bullets. Fourth, a command and control system that allows you to mass or disperse the fires rapidly and with accuracy. Finally, I think it needs to be less manpower-intensive.

One of the most manpower-intensive systems on the battlefield is artillery. Over the last few years it has been cut back, but you're still very manpower-intensive. You ought to be looking at ways to reduce that. That's what I see.

Q: Of late you have had several COHORT battalion rotations to Europe. How have they worked out?

First of all, the first battalion rotation to Europe has just been completed. So the jury is still out. They arrived in good shape. They came with families, pets, and all their personal belongings; and they were put into housing rapidly. Overall, it's gone very well.

But all that happened while we had a PCS freeze in Europe. That meant that the whole community was focused on bringing in the 4 COHORT battalions and shipping home the other 4. We could concentrate only on those battalions because nothing else was going on in individual rotation. That's a key point. If those 600 to 1,000-person battalions with another 400 to 500 family members had come in during the normal PCS rotation, which is heavy in the summer, then we would have had more stress on our system to receive them, process them, take care of them, and do all the things you've got to do.

I think the idea of unit replacement for overseas is the right way to go. And I've strongly urged the Department of the Army to use unit replacement as the fundamental concept. Individual replacement, which has to continue because of tables of distribution and allowance (TDA) units and a whole bunch of other reasons, should be the secondary concept.

I believe that we ought to do unit replacement at the company level. There is a host of reasons. Some of them have to do with readiness; others have to do with unit capabilities. But company-level rotation seems to make sense. The jury is still out on how that all looks in the battalion system.

Q: One final question, sir. The* Field Artillery Journal *and the other publications we produce at Fort Sill reach out to an estimated quarter of a million people, not just in the Field Artillery but in the broader Fire Support Community as well. What message would you send out to those warriors?

Early on in this conversation, I told you that my perception of the Threat is that the most serious element of That threat is his fire support. It follows, therefore, that our own fire support has to be the most professional and the best that it can be.

So my message to the Field Artillery or the broader Fire Support Community is this: We need you as an integral part of the combined arms team—maybe one of its most important parts. Certainly in any war that I know of, the artillery has played one of the major roles. I see no diminution of that role in any future battle.

Soviet Artillery—
A Time of Change

The Long-Range Threat

by Captain Scott R. Gourley, USAR

Western defense experts recognize artillery forces as the main element of firepower in the Soviet concept of combined arms combat. This conclusion is as true today as it was when M.V. Frunze first enunciated the following precept as a cornerstone of Soviet military doctrine: "Fire constitutes the decisive factor and main force in modern combat." Throughout the history of the Red Army, the shock, surprise, responsiveness, and destructive power of the Field Artillery arm has been without equal in Soviet panoply of ground forces.

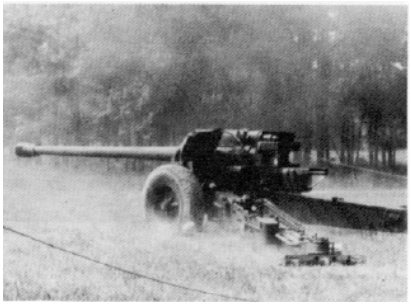
In recent years, the introduction and modernization of cannon and rocket systems capable of delivering munitions of vastly increased destructiveness has magnified this potential threat to US artillery units. In some cases the introduction of these new systems has also been complemented by organizational and doctrinal changes. The following examination of Soviet artillery doctrine and equipment modernization should acquaint US Field Artillerymen with this very real, evolving battlefield threat.

Long-Range Tubes

All Soviet artillery assets present a possible threat to US Field Artillery systems. However, Soviet long-range artillery normally receives the specific mission of neutralizing enemy fire support organizations, especially those equipped with nuclear capable weapons. *Dal'noboynaya artillerya* or long-range artillery, traditionally includes field guns, self-propelled guns, and some multiple rocket launchers. This category of weapons has seen some of the greatest improvements over the last few years. In addition to neutralization of enemy fire assets, long-range artillery has responsibilities to attack enemy reserves, command and control elements, communications stations, buildings, and fortifications.

M46 130-mm Field Gun

In the field gun arena, US Field Artillerymen are most familiar with the M46 130-mm field gun. Originally introduced in the early 1950s, the M46, with its maximum range of 27,490 meters, had the distinction of outranging North Atlantic Treaty Organization (NATO) artillery until the fielding of the M107 175-mm self-propelled gun in 1963. The M46 is a rugged system that is well suited for employment in demanding terrain like the Middle East. What's more, its accuracy has been praised by those who have fired the system in combat. Available ammunition includes fragmentation-high explosive, armor piercing capped-tracer (APC-T), illumination, and chemical.



M46 130-mm Field Gun.

Nevertheless, the M46 does have weaknesses. The thick shell walls

required by the system limit projectile cavity size and thus lethality. This small space would not only limit the number of submunitions should the Soviets decide to develop an improved conventional munition (ICM) for this weapon, but also would make a nuclear capability highly improbable. Finally, the field gun's 8,450 kilogram weight and its single axle lower carriage impose mobility limitations, in spite of the fact that a limber is employed.

M1976 152-mm Field Gun

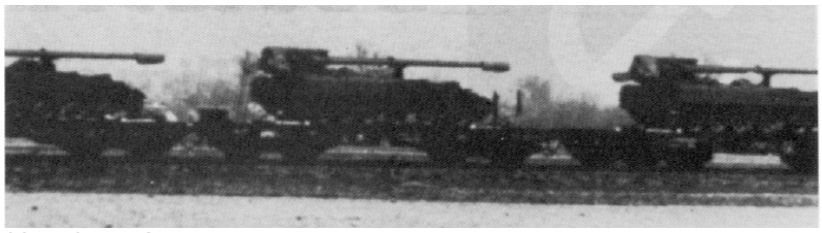
The Soviets solved many of the M46's apparent deficiencies in 1981 with the fielding of a 152-mm towed artillery weapon, referred to by NATO as the M1976. The M1976 is a high performance field gun with a conventional range of at least 27 kilometers and a reported extended-range of 37 kilometers with enhanced ammunition. The M1976 probably has a 4 to 5 rounds per minute rate of fire. This makes it as least as good as the 1950s vintage 152-mm gun-howitzer D20. More importantly, the weapon is capable of firing nuclear projectiles.

M1976 152-mm Field Gun.

2S5 152-mm Gun

Although the M1976 does incorporate significant mobility improvements, it suffers from the same lengthy emplacement and displacement times as the M46. Consequently, another long-range artillery modernization measure has been the recent introduction of a self-propelled version of the 152-mm gun, called the 2S5. The 2S5 displays the same range and rate of fire as the M1976, but it can emplace and displace in 1 to 2 minutes, roughly one-fifth the time required for a towed gun.

Another recent change in Soviet long-range artillery involves increasing



2S5 152-mm Gun.

the number of guns assigned to Soviet artillery units. At the army level, some Soviet artillery battalions are expanding from 18 to 24 guns. Combined with new guns and improvements in ammunition lethality, this jump in the number of artillery tubes promises a dramatic improvement in the effectiveness of massed fires.

The Significance of Change

All of these changes have enhanced Soviet counterfire capabilities. To appreciate this fact, one need only compare the number of rounds of 130-mm and 152-mm ammunition required to achieve similar results against the same target.

For example, it would require 360 rounds of 130-mm (M46) fire to achieve the requisite 20-30 percent damage on an M109A3 platoon located 10 kilometers from the Soviet artillery position. By comparison, the same effects could be achieved with only 270 rounds of 152-mm (M1976) fire—a 25 percent ammunition savings. What's more, the fact that the rounds would fall on target within a shorter period of time would even further heighten the total lethality of the strike.

When the 152-mm 2S5 system attacks a comparable target, the situation becomes even more favorable for Soviet gunners. Decreased ammunition expenditures combine with the rapid emplacement and march order capabilities of self-propelled artillery to decrease the amount of time that the Soviet battery would be exposed to hostile counterfire.

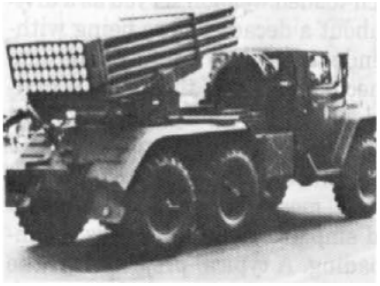
The grave implications of this situation are compounded by the advent of the new Soviet munitions entering the counterfire equation. NATO countries have long recognized that cannon projectiles with submunitions increase fire density by improving coverage of the target area. The technology required to produce such projectiles is now mature and should be within the capabilities of the USSR. One would naturally expect the Soviets' new long-range cannons to have ICM projectiles now or in the near future.

Long-Range Rockets and Missiles

Modernization measures are also occurring in Soviet rocket and missile units. One particularly telling indication of the significance of these changes is the increasing frequency with which Soviet military writers refer to the "Chief of Missile Troops and Artillery" (CMTA) rather than the familiar "Chief of Rocket Troops and Artillery" (CRTA) (See "Soviet Man of Steel," *Field Artillery Journal*, May-June 1983). Whether or not this new terminology reflects major doctrinal shifts remains to be seen. But no one can gainsay the obvious missile and rocket hardware upgrades clearly evident in programs like the BM21 and the BM27 220-mm multiple rocket launcher. These weapons are unparalleled in their ability to cover area targets with large quantities of munitions.

BM21

The BM21 is the most widely deployed and copied multiple rocket launcher in the world. One BM21 battalion has the capability to deliver 16 warhead tons in less than 40 seconds. Although this weapon has been in service for more than 20 years, its performance could still be greatly enhanced by the development of improved conventional munitions such as those developed by the Egyptians



BM 21.

for their 122-mm multiple rocket launcher. Another simpler and less costly method of improving effectiveness against lightly protected vehicles and equipment would be through the use of preformed fragments such as the steel balls used in the Argentinian and South African 127-mm rocket warheads.

BM27

The most devastating new multiple rocket launcher to enter the Soviet inventory is the 220-mm BM27. This 16 tube launcher has a range of 40 kilometers and is capable of firing fragmentation-high explosive, chemical, and ICM warheads. Effective against soft or lightly protected targets, the submunitions include fragmentation bomblets, incendiary munitions, and minelets.

If one were to accept that the new BM27 fragmentation-high explosive warheads are at least as lethal as the old 240-mm BM24, then neutralization of a tactical fire direction system (TACFIRE)-equipped division artillery tactical operations center would require less than 2 BM27 launcher volleys—a total of 30 rockets. But the submunition warheads will certainly be more lethal. This gives the BM27 incredible destructive potential.

Another feature that favors rockets for long-range artillery fire is that their flight characteristics produce the same footprints at any range. By comparison, to ensure proper effects on target, the Soviets require cannon units to fire 20 percent more ammunition per target for each additional kilometer of range past 10 kilometers.

System Limitations

Fortunately, even with recent improvements, Soviet long-range artillery is not without its flaws. The limited number of charges available along with system elevation restrictions (guns are not capable of high angle fire and rockets are limited to less than 50° elevation) makes it extremely difficult for these weapons to engage targets in built-up areas or deep defilade. And although the towed systems display inherent mobility limitations, even the self-propelled systems lack armor and nuclear, biological, and chemical protection for crews during firing operations. Consequently, while in firing position, many Soviet systems will be vulnerable to accurate hostile counterfire.

Conclusion

Unfortunately, Western armies will find these system limitations difficult to exploit. As recent open source developments reflect, the Soviets are shoring up their weaknesses through artillery weapon, ammunition, organizational, and doctrinal modernization.

Because the Soviets recognize the value of improving their artillery capabilities, Western military leaders must work hard to counter the growing threat posed by Soviet artillery modernization. US Field Artillerymen in particular must devote the time and effort required to study these systems and to identify and exploit all possible weaknesses in this cornerstone of Soviet military force—firepower.

Captain Scott R. Gourley, FA, USAR, is a frequent contributor to the *Journal* as well as numerous European and Asian defense publications including *Armada International* and *Jane's Defence Weekly*. He is employed by FMC Corporation Ordnance Division in San Jose, California. Captain Gourley is the recipient of the US Army Forces Command Fourth Estate Award for excellence in military journalism.

The Mechanized Threat

by Mr. Steven J. Zaloga

The new Soviet Ground Forces self-propelled howitzers, like the divisional artillery SO-122 (2S1) Gvozdika and SO-152 (2S3) Akatsiya, are fairly well known. Their larger cousins, developed for *front* and army-level independent artillery brigades or artillery divisions, are far more enigmatic. In fact, a considerable amount of controversy and uncertainty surrounds these larger howitzers. The Soviet Ground Forces have traditionally called this category of non-divisional artillery *artilleriya rezerva glavnogo kommandovaniyar*

or Artillery of the High Command Reserve. Western experts refer to the category as the ARGK.

Historically, the artillery of the ARGK have been towed weapons such as the M-46 130-mm gun, S-23 180-mm gun, and M-240 240-mm heavy mortar. The Soviets did experiment with self-propelled super-heavy artillery in the early 1950's, and in 1957 displayed 2 specific examples—a 310-mm self-propelled gun and a 420-mm self-propelled mortar. Both were based on new tracked chassis using components from the IS series of heavy tanks. There is some question as to whether either system actually entered active service.

The relatively slow pace of Soviet developments in this field can be attributed to a variety of factors.

- A major role for long-range artillery of this category is the delivery of tactical nuclear projectiles. Technological constraints in warhead miniaturization led the Soviets to prefer rocket-delivered warheads, notably the FROG series such as the FROG-7 (Soviet R-75 Luna M) and the larger Scud SS-1b/c.
- The Soviet Ground Forces were also slow in the development of self-propelled artillery in the postwar years. One shouldn't forget that the Soviet artillery branch suffered from many distractions during the late 1940's, notably in the building up of the new PVO national air defense force and in the efforts to develop nuclear weapons and missiles. These high priority projects attracted the cream of the Soviet artillery and diverted attention away from the more conventional concerns of artillery modernization. It was not until the 1959 formation of a separate strategic missile force, the RVSN, that the hemorrhage of talent from the Soviet artillery branch began to mend.

The New Generation

The first hints of a new generation of Soviet heavy self-propelled artillery began to appear in the mid-1970s. To date, Western intelligence experts have identified no fewer than 3 such systems:

- The 2S4 240-mm self-propelled heavy mortar.
- The 2S5 152-mm self-propelled gun.
- The 2S7 203-mm self-propelled gun.

The first 2 derived from the standard Soviet medium armored transporter also used with the 2S3 (SO-152), the ZRK Krug (SA-4 Ganef) system, and the GMZ minelayer. The 2S7 is based on an entirely new, heavy armored transporter.

The 2S4 was originally given the STANAG designation 240-mm self-propelled mortar M1975, and Western experts presumed that it entered Soviet service in the 1970s. However, I believe that this vehicle in fact entered service in the early 1960s. The 2S4 is based around the M-240 240-mm heavy mortar designed by Boris I. Shavyrin's design bureau in 1949-50. This breech-loaded weapon served as a divisional mortar for about a decade before being withdrawn into independent artillery units in the late 1950s due to the mechanization of the old rifle divisions and the towed mortar's mobility shortcomings.

The likely genesis of the 2S4 self-propelled 240-mm mortar comes from the desire to provide this large weapon with a more convenient method of transportation and emplacement, as well as a simpler method of reloading. A typical projectile for the M-240, such as the F-864 high-explosive round, weighs a whopping 130-kilograms. This massive

Speculation or Fact? The Soviet 2S9

by Captain George Norris, USAR

In May 1985, the Soviets unveiled yet another new weapon system. This 120-mm weapon mounted on a modified BMD airborne vehicle is the subject of a good deal of speculation, but there is little factual information about what Western observers are calling the 2S9. The most thorough open source description of the system was a speculative report in the 2 August 1986 issue of Jane's Defense Weekly.

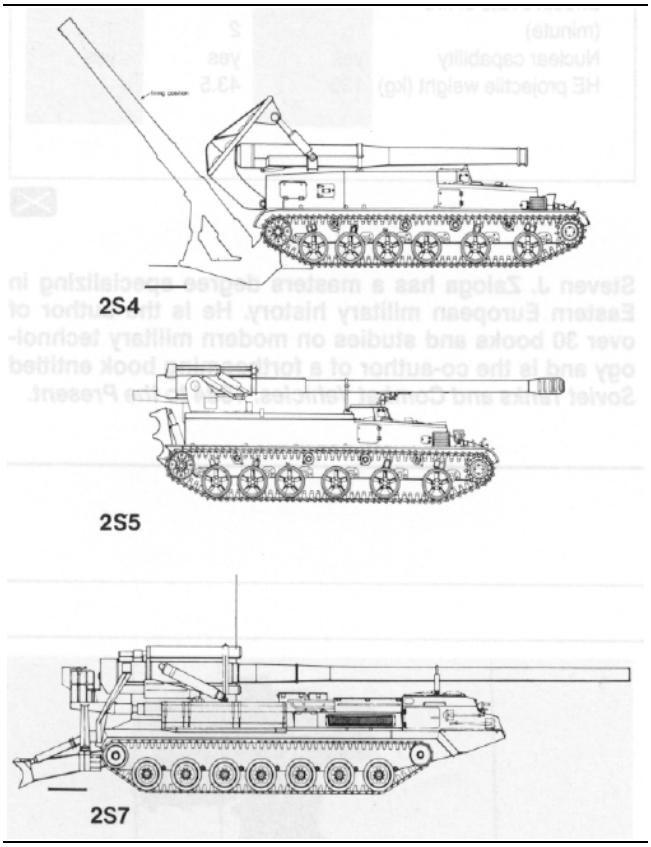
Jane's assessment found the Soviet 120-mm weapon to be similar to a Thomson-Brandt breech-loaded gun-mortar and a newer Royal Ordnance self-propelled mortar system. If this is true, what the Soviets have fielded is a weapon usable in both antitank and artillery roles.

The fact that it incorporates the BMD chassis suggests that the 2S9 is intended primarily for service with the Soviet airborne divisions. Although the specific performance of the weapon is unknown, the Jane's analysis concludes that the Soviets now have a weapon system unmatched in any of the Free World's armies—a mobile protected gun system which can deploy with the airborne infantry.

In a combat situation, it is quite likely that the crew of the vehicle would remain in their vehicle during the drop. This seems improbable to US personnel, but Soviet airdrop techniques are actually sophisticated enough to allow such drops and for the crew to survive. The ramifications of such delivery techniques are significant. The weapon can begin operations immediately upon landing, at a time when airborne forces are typically most vulnerable.

All of this information is, of course, highly speculative; but it does point out the continued Soviet emphasis on both the mobility and fire support required by even the lightest airborne forces.

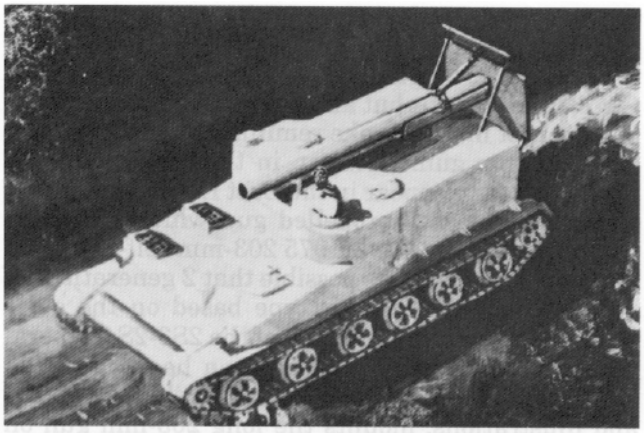
round caused some significant handling and loading problems in the old rifle divisions. In contrast, the 2S4 appears to use a power-assisted loading system. The ammunition is probably stowed in trays in the vehicle hull. The mortar is hydraulically lowered over the back of the vehicle, with the barrel pointing rearward. As in the case of the towed version, the barrel is pivoted on its trunnions to expose the breech for loading. This brings the breech near the hull rear, where a power-assisted rammer pushes a round into the breech. This system circumvents the mobility and loading shortcomings of the towed M-240. There are few unclassified details regarding the deployment of the 2S4, but it seems likely that it is used in special heavy mortar units at *front* level or in independent artillery divisions. No unclassified photos of this vehicle have been released to date.



These mechanical drawings of the 3 new ARGK weapons point out a common weakness—little crew protection.

The 2S5 Self-Propelled Gun

Since its unclassified photo appeared in *Soviet Military Power,* the 2S5 is probably the best recognized of the new trio of ARGK vehicles. The 2S5 mates the new 152-mm M-1976 gun with a derivative of the same medium armored transporter used with the 2S1, 2S4, and other Soviet armored vehicles mentioned above. The self-propelled version of this new



This depiction of the 2S4 shows the simple configuration of the vehicle with the self-propelled heavy mortar mounted in a fully exposed position on the rear of the chassis.

152-mm gun was first spotted in 1981, some 5 years after the towed version. The gun itself is completely unarmored. The towed version of the 152-mm gun is replacing the older M-46 130-mm gun, and presumably, a self-propelled version was developed to complement it. As in the case of the 2S4, no details have been released about its deployment pattern, but it is presumably used by independent artillery regiments and brigades at *front* level or in the artillery divisions. Open sources indicate that it is nuclear capable and its main roles are probably counterbattery fire and nuclear weapons delivery.

This photo of the 2S7 appeared in the Bulgarian press in 1985. The immense size of the vehicle is quite evident in this view. The wheels bear some resemblance to those on the T-80 tank, and the chassis may be related to that used with the SA-X-12 Gladiator air defense missile vehicle.

The 2S7 Self-Propelled Gun

Perhaps the most confusing member of the new ARGK trio is the 2S7 203-mm self-propelled gun. At the center of the confusion is the basic appearance of

the vehicle. DOD depictions of the gun in the past 2 editions of *Soviet Military Power* (SMP) not only show it based on a lengthened version of the 2S3, 2S4, GMZ, Krug chassis but also show the gun fitted with a pepperpot muzzle brake reminiscent of that on the S-23 180-mm gun. However, in the spring of 1985, photos began to appear in the East European press of a new 203-mm self-propelled gun which bore very little similarity to the M1975 203-mm self-propelled gun shown in *SMP*. It is possible that 2 generations of vehicles exist—an earlier type based on the older medium armored transporter of the 2S3-2S4 generation and a new vehicle based on a heavy armored transporter. The newer vehicle, shown here in photos and illustrations, mounts the long 203-mm gun on the rear of the vehicle hull. The driver's cab is front mounted, and the engine is immediately behind the cab. The gun has a power-assisted loading system reminiscent of that on the US M110 8-inch self-propelled howitzer.

Other Initiatives

Besides this new trio of artillery vehicles, other elements of Soviet long-range artillery have been modernized, notably in the rocket and missile field. The BM-27 multiple rocket launcher as well as the SS-21 Scarab and SS-23 Spider ballistic missiles have entered the Soviet arsenal in the past few years.

The data presented in the accompanying table are provisional estimates until more reliable official information becomes available.

	2S4	2S5	2S7
Crew	4 + 5	4 + 4	4 + 4
Weight (tonnes)	30	30	40
Length (m)	8.5	9.5	12.8
Width (m)	3.2	3.2	3.5
Height (m)	3.2	2.8	3.5
Ground clearance (cm)	40	40	40
Vehicle engine	V-59	V-59	
Engine hp	520	520	
Engine type	diesel	diesel	
Fuel stowed (1)	850	850	
Road range (km)	500	500	
Max. road speed (km/h)	62	62	
Weapon type	mortar	gun	gun
Weapon caliber (mm)	240mm	152mm	203mm
Depression/elevation	+ 40 + 70°	-3 + 65°	-3 + 65°
Max. rate of fire (min.)	1	4	2
Effective rate of fire (minute)		2	1
Nuclear capability	yes	yes	yes
HE projectile weight (kg)	130	43.5	

Steven J. Zaloga has a masters degree specializing in Eastern European military history. He is the author of over 30 books and studies on modern military technology and is the co-author of a forthcoming book entitled *Soviet Tanks and Combat Vehicles: 1984 to the Present*.

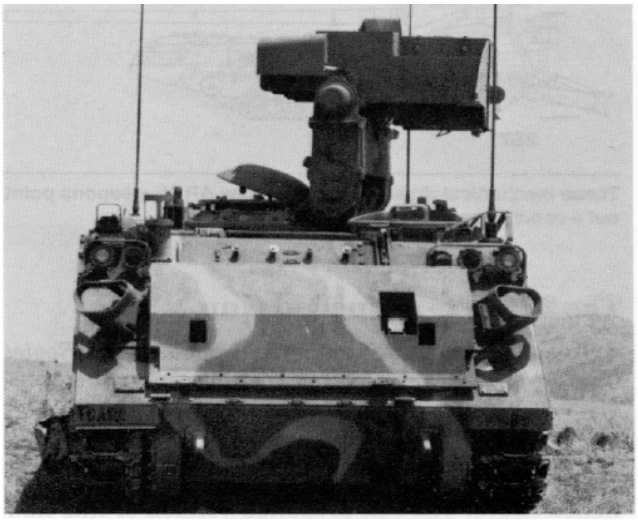
Fragments

FROM COMRADES IN ARMS

Joint Laser Teams

Fire support teams (FIST) equipped with ground/vehicular laser locator designators (GVLLDs) may someday fight as part of a joint laser team. In fact, such versatile teams could significantly increase the combat capability of the close air support team.

Today the Army employs laser designators—the GVLLD and the handheld lightweight target designator (LTD)—and the Air Force employs laser trackers such as the PAVE PENNY system. But neither service regularly conducts joint laser training. The implementation of such training holds tremendous promise because the FIST has good capability to identify high-payoff targets for attack by pilots who run tremendous risks when forced to acquire and strike targets visually.



Laser target designation by FISTs will overcome many of the conditions which reduce a pilot's ability to acquire targets. By the time a pilot closes to 2000 feet slant range, he has less than a 50 percent chance of seeing a tank-sized target. Even this limited capability erodes dramatically when the enemy employs decoys and camouflage or when night conditions or uniformity of terrain obscures the target.

On the other hand, the first pass acquisition rate of targets designated by ground lasers and attacked by PAVE PENNY has exceeded 90%. Moreover, flares and illumination are not necessary because laser designation teams equipped with night vision devices can acquire and mark specific targets.

There are several specific situations which beg for joint laser team operations. For example, the attack of enemy forces in rear and heavily populated areas require precision which virtually mandates the employment of lasers. Joint laser teams will have the accuracy needed to destroy enemy targets while minimizing damage to friendly assets and the local populations.

Future employment of lasers on the battlefield will require the FIST to assume an additional role. As a member of the joint laser team, he will add a new dimension to the term AirLand Battle by allowing Air Force aircraft to attack point targets quickly, accurately, and effectively around the clock.

Weather Smarts

The US Army Laboratory Command's (LABCOM) Atmospheric Sciences Lab (ASL) at White Sands Missile Range, New Mexico, has the mission of improving the Army's tactical weather intelligence capabilities. The lab recently fielded tactical weather intelligence software modules for use with the Army's MICROFIX computers. That means that soldiers finally have a way to assess the operational effects of weather on the battlefield. The program uses raw weather data and forecasts to identify weather opportunities or threats. The system also provides low level commanders the capability of using local weather to advantage.

The 9th Infantry Division and the 3d Armored Cavalry Regiment have successfully demonstrated tactical weather intelligence during training exercises. And this spring, a new equipment training team (NETT) from the United States Military Academy will show MICROFIX users in engineer battalions how to employ the new software.

Jeep-mounted tactical weather intelligence (TWI) sensing devices make surface observations above the ground. Operators then send the resulting weather data to a central processing point.

Close Air Support Command and Control

The Tactical Air Command (TAC) is working hard to improve tactical air (TACAIR) support to Army maneuver units. As part of their efforts, TAC experts are exploring ways to make close air support (CAS) coordination and control more flexible and responsive to the needs of battlefield commanders.

Suggested CAS improvements center around the tactical air control parties (TACP), which support Army maneuver units. Specifically, TAC is upgrading the quality and quantity of training of a critical TACP player—the air liaison officer (ALO). In response to the Army's request for greater TACAIR advisory support, TAC has also aligned "by name" tactically qualified, rated officers with the 225 Active and Reserve Component battalions deploying in the early stages of several contingencies. These air liaison officers will be the battalion commander's primary advisor on TACAIR. The battalion ALO will train with the assigned battalion in peacetime and deploy with it to combat.

Although the battalion ALO is a qualified forward air controller (FAC), he will normally leave terminal CAS control to other Air Force specialists—like FAC—dedicated to that function. A pool of airborne FACs (AFACs) made up of CAS control specialists will be managed by the appropriate air support operations center (ASOC). In low and medium threat scenarios, the AFAC may perform CAS integration and control with assistance from the supported battalion TACP. During periods of high threat, the AFAC will function as an airborne tactical air coordinator (TAC-A) and remain outside the threat envelope until enemy air defenses are suppressed. Then the AFAC will move forward and again operate as CAS final controller. While operating as a TAC-A, the AFAC will work closely with the battalion TACP which will be responsible for the final control function.

Specifically trained and certified enlisted men known as 2750s will do battalion CAS control when an AFAC is not available or during high threat situations. Commander-selected 2750s will attend the Joint Firepower Control Course for noncommissioned officers where they will learn terminal CAS control. But the ultimate certifying official will be the Air Force commander who assigns the NCO the routine duty of controlling CAS in a battalion TACP. 2750s certified for CAS control will give the Tactical Air Force increased flexibility and depth.

In addition to battalion ALO alignment and improved CAS operational procedures, 22 new battalion TACPs and 23 brigade and division ALOs will be added to the Air Force force structure by fiscal year 1988. These augmentations support the Army of Excellence growth.

Actions are also underway to replace our aging FAC aircraft with a FAC replacement aircraft (FRA). The Air Force is retiring the O-2As left in the inventory and adding T37s until an FRA is selected and fielded in the mid-1990s.

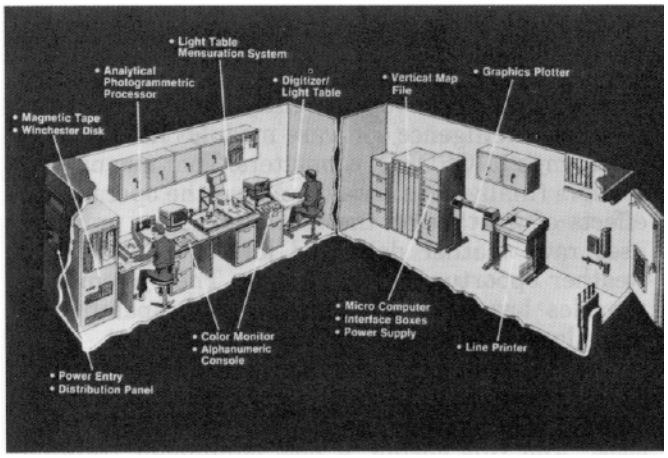
CAS command and control enhancement initiatives have reaffirmed the Air Force's commitment to provide TACPs and FACs for Army support. Air Force leaders fully appreciate the fact that CAS control elements are vital to the Army and must be survivable on the modern battlefield. Consequently, the Air Force's goal is to improve command and control and provide the timely and accurate TACAIR support for the Army's battalion commander. Only by a true combined arms team can the services hope to win the AirLand Battle.

Terrain Analyst Work Station

Our Army must be an agile, highly lethal combat force that can move against an enemy and win the AirLand Battle. To achieve such capabilities, combat commanders will need to know as much as possible about the enemy, terrain, and environment. They will need up-to-date combat information and intelligence to enhance their agility and mobility. But today's intelligence generation process is slow and cumbersome. Too many analysts take too long to gather information and develop intelligence using manual techniques. Scientists from the Engineer Topographic Laboratories (ETL) at Fort Belvoir, Virginia have developed a way to help commanders shortcut several key steps in that process. Specifically, it provides fast, dependable information and intelligence about battlefield terrain.

The Terrain Analyst Work Station (TAWS) uses an automated system to create, update, and analyze digital terrain data. TAWS computes information on such factors as elevation, slopes, soil, and vegetation to help analysts predict the terrain effects on Army weapons, sensors, vehicles, and equipment.

Army terrain analysts in Germany got the first opportunity to work with TAWS in 1985. They concluded that TAWS will be of great assistance to commanders in planning combat operations. What's more, they provided some excellent recommendations for improving the system by identifying specific products they could use to plan this year's Reforger exercise.



The only field test of TAWS occurred at Fort Lewis, Washington, during exercise Bold Venture '86. Mr. Laslo Greezy, an ETL project engineer, states that TAWS training is already in great demand worldwide. The system should reach soldiers in Hawaii next and other posts throughout 1987. Training with TAWS involves a 3-week program.

Although TAWS is still in development, such training helps the ETL experts by putting the system through its paces. They are convinced that garrison and field demonstrations at various posts will help them validate and refine the techniques needed for efficient and effective terrain analysis support in the future.

Symposium on Low Intensity Conflict

The United States Southern Command (SOUTHCOM) and the US Army Materiel Command (AMC) will sponsor a symposium on low intensity conflict (LIC) in cooperation with the American Defense Preparedness Association. The symposium occurs on 4 and 5 March 1987 at the Naval Training Center in Orlando, Florida. It will address the global aspects of the LIC threat, implications of LIC for US forces, and the Department of Defense organizational structure for LIC.

Specific topics of discussion at the symposium will include logistics and engineering. It will also deal with command, control, communications, and intelligence (C3I); land force, aviation, and "brown water" mobility; materiel requirements and future development for LIC; and training. The symposium will be unclassified except for one session on C3I which will be Secret/No Foreign.

The major aim of the sponsors is to apprise industry of LIC developments and materiel requirements. Planners expect more than 400 managers, engineers, and scientists from the DOD Research, Development, and Acquisition Community as well as industry to attend.

For additional information call AMC's project office for low intensity conflict located at the Belvoir Research, Development, and Engineering Center on AUTOVON 354-6873 or commercial (703)664-6873.

View from the Blockhouse

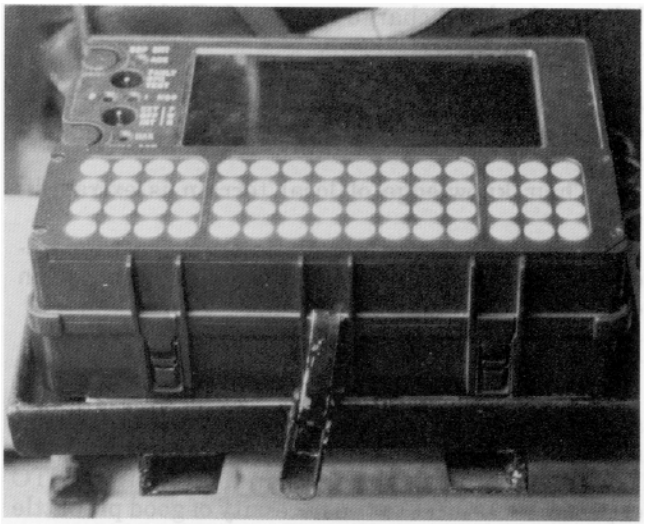
FROM THE SCHOOL

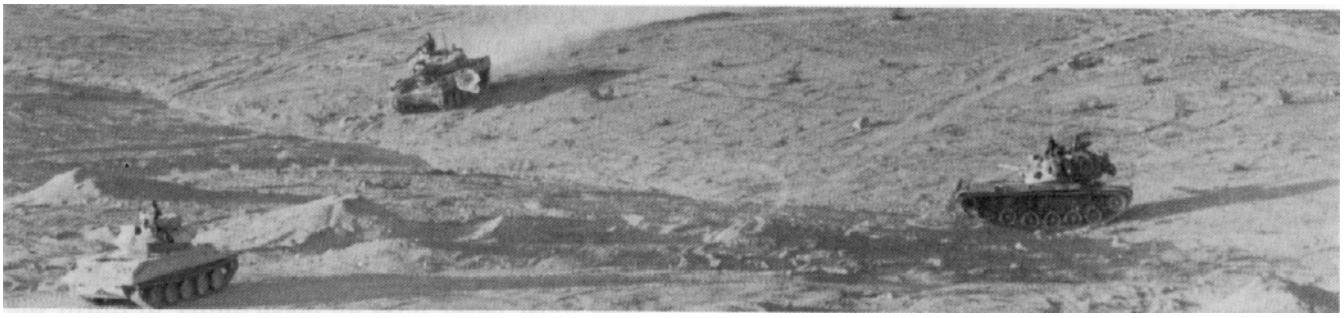
BATTLEKING

BK 18-86, Digital Message Device (DMD) Bracket (Source: 1st Battalion, 77th Field Artillery). The 1st Battalion, 77th Field Artillery has developed a mounting bracket to secure the DMD near the radio or on top of an M113 without interfering with any periscopes or sights.

According to the US Field Artillery Board's evaluation, the bracket will mount in any vehicle used by a forward observer. It is made from the angle iron found in most motor pools and can be produced at nearly any unit location. The latches come from unserviceable M51 decontamination kit or fire extinguisher brackets.

The Board's evaluation of the DMD bracket concludes that it adequately secures and protects the DMD. Moreover, the bracket frees the operator to perform other simultaneous functions such as monitoring radios, compiling grids and targets, and updating map boards.





The NTC—It's More than a Game

By Brigadier General Jerry C. Harrison, Assistant Commandant, USAFAS

Soldiers spend entire lifetimes training for battle, but until 1980 only actual combat could determine who would be the winners. That's when the National Training Center (NTC) at Fort Irwin, California was created to give soldiers a feel for the *real* problems associated with combat. In fact, the training and tactical problems are so realistic that many Field Artillery units are hard pressed to meet the game standards in this pseudo-war. Most Redlegs find the action at Fort Irwin to be quick and dirty—so quick and dirty that the battles may be lost before they're fought.

There is a problem with fire support at the NTC and it is multidimensional. The problem involves the Field Artillery, maneuver and the NTC itself. For our part, there are actions Field Artillery leaders can take *now* to improve fire support for our maneuver forces.

The need for a multiple integrated laser engagement system (MILES)-like indirect fire system is often cited as the crux of the problem at the NTC. I don't buy that as the sole answer to our prayer. While the device will be helpful, report after report cites the failure of maneuver and Field Artillery units to apply the basic principles of fire support.

The net result of this is to improperly train a generation of maneuver commanders. If we as a Fire Support Community don't aggressively solve this problem, then in the next war maneuver commanders will not have an appreciation for the combined effects of maneuver *and* firepower. We will once again learn the hard way that maneuver can't win it alone and good soldiers will die while we learn.

The problem is serious and far reaching, we can and must fix it. This multidimensional dilemma can be resolved with the aid of our maneuver brothers in arms and the NTC itself, but the ultimate responsibility to lead the charge rests with Field Artillerymen worldwide.

The opposing force at the NTC serves as a chilling example of what we will face on a battlefield in Central Europe. They operate with 2 distinct advantages:

- Their knowledge of local terrain is extraordinary.
- Their aggressive reconnaissance program frequently gives them a relatively complex appreciation of the Blue Commander's intent.

Making Doctrine Work

Countering this wiley force requires full understanding of the 4 tenets of AirLand Battle doctrine—synchronization, depth, agility, and initiative.

- ***Synchronization.*** Long and often bitter NTC experience testifies to the necessity of good prebattle planning. That's when synchronization is born. Field Artillery units should not come to the dry California desert until they've completed exhaustive combined arms training at home station. The emphasis in this effort should be simple, straightforward fire support planning and uncompromising execution. The dynamics of the NTC battlefield do not reward complex fire plans; fire support officers are too busy trying to engage fast-moving opposing forces to execute sophisticated schemes.

The time to create an effective, well-practiced fire support machine is during command post and field training exercises in local training areas where the fire support officer can talk to the air liaison officer, the S-3 air, and the S-2. Knowledgeable, seasoned staff organizations tested by fast-paced exercises not only produce synchronized operations at Fort Irwin, but also disciplined performance in battle.

Home station training is also the time to learn how to work with the maneuver commander. Redlegs should study how he operates, teach him what fire support can do, and learn what he expects to see in terms of fires on the battlefield.

- ***Depth.*** Depth is another dimension of AirLand Battle doctrine that pays dividends on the Mohave. Fire support officers tend to error in extremes on this point. They either plan too few targets and allow the opposing forces to slip by, or they lay out a "measle sheet" of irrelevant targets.

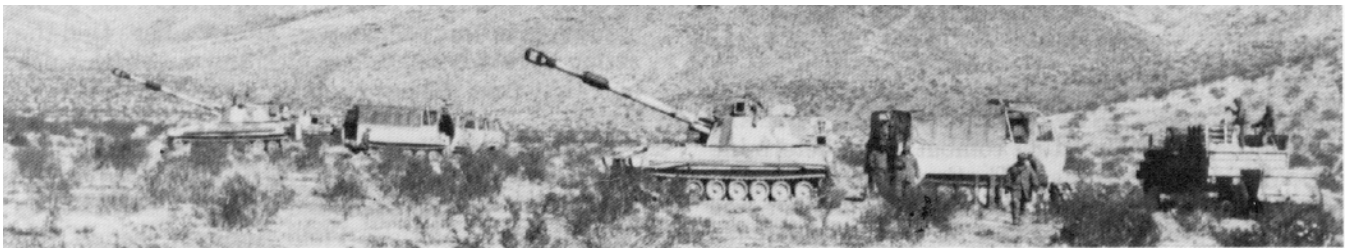
Remember, Redlegs achieve depth through a realistic appraisal of the enemy's capabilities and actions. They determine his favored avenues of approach and his likely diversions. They place targets on a few, easily identified locations whose attack will rob the opposing force of the initiative. In the defense, the smart fire support officer doesn't limit targets to those that protect friendly units with final protective fires, rather he seeks to restrict the opposing force's movement as the enemy attempts to engage.

To achieve depth, fire support officers need to understand the maneuver commander's estimate inside out, and they need every bit of help the S-2's intelligence preparation of the battlefield (IPB) can offer. Armed with this information, Redlegs can identify likely enemy courses of action and plan targets coordinated with the command's obstacle plan. Their objective should be to trap the opposing forces in an engagement area.

Remember, advanced planning is everything. The enemy's exceptional intelligence gathering capabilities and the accelerated pace of battle won't allow many chances for opportunity fires. To gain synchronization and depth, the fire support officer has to plan.

- ***Agility and Initiative.*** The remaining tenets of the AirLand Battle doctrine—agility and initiative—are critical as well. Field Artillery units must be agile. They must displace to remain in range of targets during the fastest battle. Forward observers also require agility so they can continue to direct fires onto tanks that may be moving toward them at 30 mph.

Fire support officers must seize the initiative at every level. They must take calculated risks, and they must never miss an opportunity to fulfill the maneuver commander's intent.



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Battery A, 2-35th FA, 155-mm howitzers send salvo after salvo of high explosives onto approaching enemy targets during the defensive live-fire segment of the 3-19th Task Force's NTC maneuvers on Desert Sting 2-85.

Voice of Experience

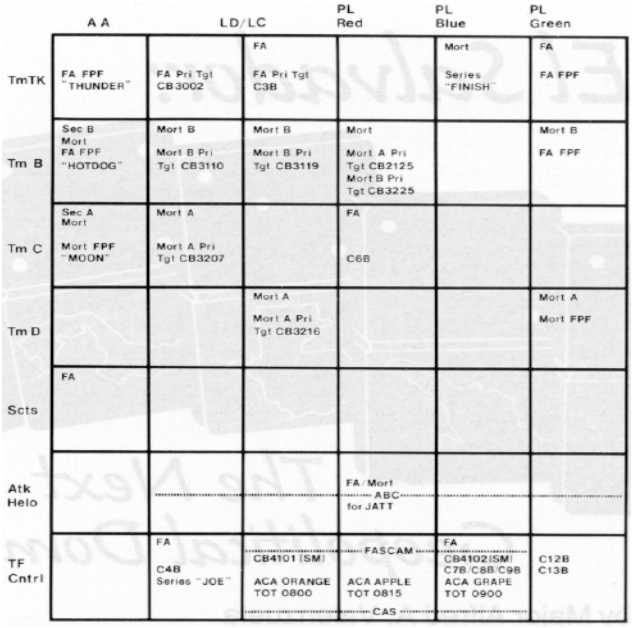
LTC Glen Skirvin, the outgoing Senior Fire Support Observer and Controller at Fort Irwin, has neatly captured the major fire support issues and lessons learned in 7 simple points.

- The combined arms team is the *sine qua non* on this battlefield. Parochialism is a non-starter, and the "best and brightest" must fill the team's critical positions like fire support officer (FSO) slots.
- Everyone must understand the mission and how the commander intends to accomplish it.
- The commander's intent is the point of departure for all planning and execution. Ironically, the commander's vision of the battlefield is often neglected by Redlegs. LTC Skirvin noted that the leaders in most unsuccessful artillery units at the NTC never understood what support the maneuver commander wanted at the moment and place of decision. Successful teams have commanders who understand the capabilities and limitations of the artillery and close air support. They also have fire support officers who meet, teach, and socialize with the officers of their supported unit.
- The S-2's intelligence preparation of the battlefield is a significant tool for the FSO. The targets generated by intelligence collection and analysis should coincide with the commander's picture of the enemy or something is amiss.
- Wargaming involving the maneuver staff and the FSO is essential. In fact, it is particularly effective when the artilleryman plays devil's advocate instead of cheerleader for the commander's plan. The goal here should be to barter for better firing positions, realistic volumes of fire, and free airspace for air attacks.
- Target lists should reflect the time available for completion and the number of fire units available for support. An overlay littered with unfireable targets will not produce victory.
- The fire support execution matrix answers the crucial questions of who, what, and when. Originally developed by a unit at Fort Irwin and described in the May-June 1986 *Journal*, it has proven to be a winner. The matrix allows commanders and planners to set up logical fire support responsibilities before the battle begins.

Recommendations

Short of an actual war, the National Training Center is the closest Redlegs will come to combat. It's our single best school. To make a passing grade, artillerymen must rise to the occasion by seizing LTC Skirvin's observations and running with them. In that regard, I have several specific recommendations.

- Proper selection and training of key personnel in the fire support positions is our most frequent error. Some units allow lieutenants to cut their teeth as fire support officers at Fort Irwin, and the poor results testify to their inexperience. We can't afford to let undertrained, untried officers decide the course of battle. Commanders should send into the fray only their best Redlegs steeped and practiced in the tenets of sound fire support.



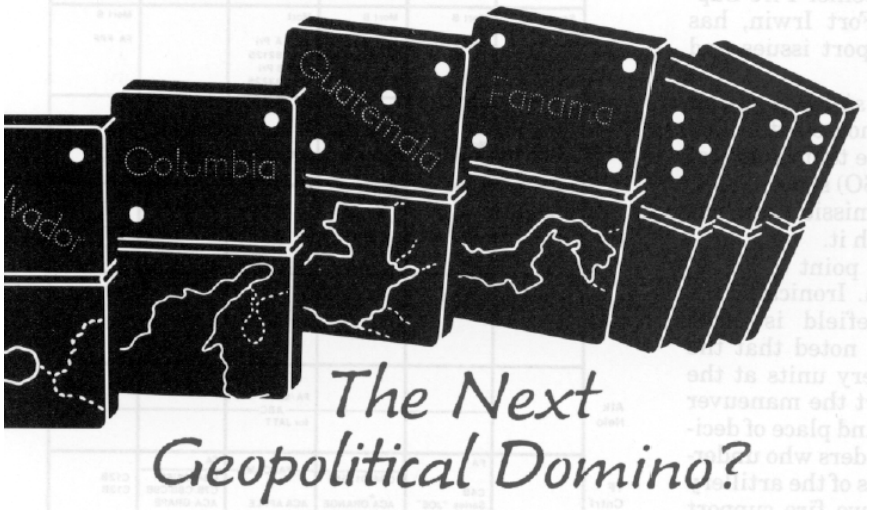
Fire Support Execution Matrix.

- Forward observers have to train to hit the moving targets they'll face at NTC. Report after report says that observers often are neither positioned to see the battlefield nor prepared for the speed and maneuverability of the opposing forces. Check out the May-June 1986 issue of the *Journal* for several outstanding training techniques on this critical task.
- Insufficient coordination within the combined arms team is a recurring problem at the NTC. Failures occur in fire support when the FSO doesn't talk to the engineers and in consequence doesn't cover or reinforce obstacles with fires including FASCAM. Disaster awaits the FSO who doesn't train with the mortar platoon to ensure properly executed mortar support. And the Redleg who isn't included in the S-2 and S-3's planning and wargaming is a sure loser.
- Outbriefings at the NTC underscore one final artillery challenge that can't be overemphasized—Redleg leaders must never rest until they fully understand the maneuver commander's intent. We can't do a thing for the Infantry or the Armor until we know what they intend to do and where they're going. The successful artilleryman may sometime have to be a royal pain in the backside to get a clear picture of the plan, but he must take the risk or the entire team will pay the price.

Conclusion

Winning at the NTC means one thing—killing the opposing forces and in the process accomplishing the mission. Success demands intelligent planning, decisive execution, and close coordination before and during the battle. Remember, Redlegs go to Fort Irwin to do 2 things—to learn and to win. So far we've been learning a lot and occasionally winning. Now it's time to learn even more and to win every time out.

El Salvador: The Next Geopolitical Domino?



by Major Alfred A. Valenzuela

A fundamental and continuing objective of US foreign policy is to protect our nation from threats to its security. El Salvador is a critical link in a chain of geostrategic states in Central America, and its instability enables the Soviets not only to contribute to regional insecurity but also to infiltrate the United States' strategic rear area. As long as the Soviets continue to use regional surrogates like Cuba and Nicaragua to export revolution and to establish footholds in Central America, this threat will remain acute. Thus, the US must hold fast in El Salvador to protect its vital interests and prevent further Soviet power projections.

A New Breed of Warfare

Unlike their fanatical predecessors, present-day terrorists have introduced a new breed of warfare in terms of techniques, objectives, and support. The globalization and brutalization of modern violence makes it abundantly clear that we have entered a new "age of terror" with all its frightening ramifications. Clearly, Central and Latin America are among those unfortunate regions where state-sponsored terrorism has become commonplace. Although the high intensity areas are El Salvador, Colombia, Guatemala, and Peru; there are now signs of terrorist infringements in Mexico and Venezuela.

Today's insurgent movements are no longer isolated bands of disgruntled persons seeking to bring about local change. Rather, they are sophisticated political-military organizations which enjoy extensive international support and garner worldwide attention.

Not too many years ago even successful insurgent movements could expect to effect little beyond a change in provincial leadership. Today, guerrillas play for much higher stakes. Such groups can cause major shifts in the balance of international power as a result of their threats and actions. The Central American situation provides 2 cases in point.

- Nicaragua has undergone a revolution, and the subsequent radicalization of its regime has altered the global picture.
- El Salvador is in the midst of a civil war that has acquired deep ideological and strategic significance.

El Salvador—The Next Domino

El Salvador is *strategic* ground. A guerrilla takeover there might well trigger instability in Honduras, Guatemala, and eventually Mexico. The "domino theory" validated in Southeast Asia in the wake of the American withdrawal might well be repeated in Central America. But El Salvador is not Vietnam. It is not separated from the US by the vast expanses of the Pacific Ocean. This small, poor country lies only about 1,000 miles from *our* southern border.

Every American military professional needs to know about the threat to our backyard. And every Redleg leader should use this article to learn about the forces in El Salvador and the threat directed against our combined security.

Insurgents

The terrorist forces in El Salvador fall under the broad leadership of the Farabundo Marti' Front for National Liberation (FMLN). Forces involved in the conflict fall into 3 basic categories.

- The 7,000 to 9,000 ***armed insurgents*** within the terrorist's military organization are trained fighters who pose a threat to the El Salvadoran government.
- Some ***guerrilla militia*** members support the insurgents and are becoming more combat worthy.
- An unknown number of other persons known as ***"Masas"*** provide various degrees of support, often involuntarily and under coercion.

Since the early 1970s, leftist organizations in El Salvador have grown from small, fragmented factions to today's coalition which wages a large-scale insurgency within the country. The FMLN serves as an umbrella organization which coordinates the actions of 5 guerrilla factions.

- The ***ERP*** or the People's Revolutionary Army has an estimated 3,500 to 4,200 armed insurgents. Experts consider it the most militarily powerful of the factions.
- The ***FPL*** or Popular Liberation Forces is the oldest guerrilla faction. Founded in 1970, it maintains an approximate strength of 3,500 armed insurgents.
- The ***FARN*** or the Armed Forces of National Resistance has less than 860 armed insurgents.
- The ***FAL*** or Armed Forces of Liberation is the guerrilla arm of the Salvadoran Communist Party. It has approximately 1,500 armed insurgents.
- The ***PRTC*** or Central American Revolutionary Worker's Party is largely a high-profile propaganda organization with less than 1,500 armed insurgents in its ranks.

The FMLN controls these factions through 2 major agencies—

- The ***DRU*** or Unified Revolutionary Directorate consists of 3 representatives from each faction.
- The ***FDR*** or Democratic Revolutionary Front serves as the FMLN's political arm and diplomatic commission in the international arena.

War Zones

The insurgents have divided El Salvador into the 5 war zones or guerrilla *fronts* shown on map 1.

- The ***Western*** Front includes the Departments (equivalent to US states) of Ahuachapan, Santa Ana, and Sonsonate.
- The ***Central*** Front includes the San Salvador, La Libertad, Cuscatlan, and Chalatenango Departments.
- The ***Paracentral*** Front includes La Paz, San Vincente, and Cabanas Departments.
- The ***Eastern*** Front includes Usulutan, San Miguel, Morazan, and La Union Departments.
- The ***Northern*** Front encompasses the entire disputed border area between Honduras and El Salvador.

In each of these *fronts,* the FMLN has tried to control specific territorial regions instrumental to their strategic and tactical objectives. As shown in map 2, the insurgents are most active in the Northern, Paracentral, and Eastern Fronts. They are least active in the Western *Front*. These concentrations do not mean that the area is effectively occupied or that terrorist forces are massed in the zone. In fact, guerrilla forces frequently move to adjacent departments in support of their military objectives and in order to avoid direct confrontation with superior government forces.

Guerrilla Strategy and Tactics

The FMLN's strategic aim is to conduct a war of attrition designed to destroy the national will of the El Salvadoran populace, the morale of her armed forces, and the economic infrastructure of the republic. They intend to execute this strategy in 2 arenas—international and domestic.

First, the FMLN seeks to win the war on an international plane. They cultivate the perception that the government of El Salvador is being decisively beaten. In this regard, the terrorists understand that the outcome of the war will likely be determined not by military conquests, but rather by the preponderance of international opinion. A complementary component of the international struggle is the exploitation of forces materiel, and personnel available in extraordinary quantities from Nicaragua and other Soviet surrogates.

From the perspective of the El Salvador General Staff, the FMLN's *most dangerous* domestic course of action is the destruction of critical hydroelectric

The division of El Salvador into the 5 war zones or guerrilla *fronts*.

dams and refineries as well as the seizure and occupation of major political or population centers. During the course of the war, the terrorists have demonstrated little inclination to deviate from the classic tactics and techniques of guerrilla warfare. That is, the terrorists fight on the ground they want and at the time of their choosing in order to gain a propaganda advantage and tactical surprise over the government forces.

The terrorists have had little difficulty in obtaining sufficient armaments to conduct their operations. These materials are funneled from Nicaragua over Honduran land and air infiltration routes. Guerrilla forces also efficiently police the battlefield as they seek to recover weapons, ammunition, and supplies from government sources and local populations. Thus, the terrorist forces possess a wide variety of Eastern and Western infantry weapons. The introduction of more sophisticated weaponry has been rumored, but there is no evidence to substantiate such claims.

Recently, the guerrillas have not only stepped up urban sabotage and assassinations but also have declared periodic transport shutdowns, set up roadblocks, and attacked transport on major highways. They avoid direct clashes with the Army and prefer to mine roads and trails. This specific

Terrorist force concentrations are shown in the shaded areas.

tactic has caused a full 70 percent of the government's casualties.

The terrorist operational doctrine focuses on 5 major points.

- Concentrate a large force. The FMLN seeks a 3 to 1 advantage to overcome smaller government forces. It also deploys security elements to ambush reinforcing or relieving units.
- Cut lines of communications. The insurgents sabotage electric and communications links, attack ground transportation means, and raid facilities crucial to economic development.
- Employ terrorism and propaganda. These tactics are especially common in urban areas.
- Conduct harassing attacks. Such efforts seek to wear down and demoralize government forces.
- Continue to hit high-payoff targets. The FMLN hits high visibility installations for maximum tactical and media advantage.

Without the external support of arms, personnel, material, and training the terrorists would not pose a serious military threat to the Salvadoran Armed Forces who could contain and eventually destroy the FMLN's fighting capability. However, with continued external support from the Sandinistas, the insurgents remain a military force with which the Salvadorans must contend.

El Salvadoran Military

The Salvadoran military establishment consists of 2 basic components—the

In this conflict, terrorist *strengths* are:

- Night Operations
- Freedom of Action
- Ability to Mass Small Units
- Element of Surprise
- Local Control of Isolated Areas
- Concealed Operations and Logistics Bases

Their *weaknesses* are:

- Internal Power Struggle
- Lack of Popular Support
- Lack of Medical Support
- Insufficient Personnel
- Desertion & Disorganization
- Extensive Casualties
- External Logistics Support

FMLN strengths and weaknesses.

Armed Forces and the Security Forces. The Armed Forces comprise the conventional military arms and services; the Security Forces include the country's police elements charged with maintaining public order and safety. Both components fall under the control of the Minister of Defense and are integral parts of the Defense Organization.

The recent constitution of December 1984 clearly establishes the non-political and subordinate position of the Armed Forces. The President is Commander in Chief empowered to organize and maintain all military and security components. The administration of the Armed Forces is the responsibility of the Minister of Defense. He is similarly responsible for the execution of national defense policies through the military chain of command.

The national organization of the military establishment is depicted in the accompanying chart. The Chief of the General Staff, subordinate to the Minister of Defense and to the President, is responsible for the joint staff and the operations of the National Military Control Center. Operational control of the forces extends from the staff headquarters directly to the Commanders of the Navy and Air Force, and directors of the National Guard, the National Police, and the Treasury Police.

With its 1,500 personnel, the Air Force accounts for less than 5 percent of the total strength of the military establishment. Yet the slight edge in relative combat power currently enjoyed by government forces is directly attributable to this relatively small military arm.

Designed primarily to support ground forces, the Air Force also conducts aerial resupply, reconnaissance, airdrop, and airlift operations. Its operational elements include:

- A school of aviation and helicopters.
- Various transport and combat squadrons.
- A maintenance and combat support group.

Activated in 1952 as a successor to the Coast Guard, the Navy is a small force designed for coastal patroling and protection of fishing waters. With a strength of 500 officers and men, it has a 200-man naval commando unit.

Because of its size and traditional prominence, the Salvadoran Army is the primary element and command component of the Armed Forces. The General Staff of the Armed Forces serves as the headquarters for all elements, and the operational chain of command extends from the Minister of Defense through the Chief of the General Staff and then through the joint staff to all tactical components. The joint staff exercises operational command over 6 territorial infantry brigades, a Field Artillery brigade, a cavalry regiment, an engineer brigade, and 5 immediate reaction infantry battalions.

Thus, the Army is primarily a light infantry force, supported by rapidly expanding artillery and support branches. Captains command some battalions and have no staff officers or sections. Therefore, any comparison to US unit organization should associate a Salvadoran brigade with a US battalion. In fact, the brigade is the largest Salvadoran unit. It will have at least one dedicated 4- to 6-gun battery under its operational control for a minimum 6 month period.

Salvadoran combat experiences probably fall within the current US military definition of low intensity conflict. The principle combat units are 21 antiterrorist infantry battalions known as BIATs and 12 counter-subversion infantry battalions or BICs. A BIAT consists of 4 rifle companies with a total strength of 606 soldiers. A BIC is a somewhat smaller organization. It has only 412 soldiers. Combat support companies with logistic, security, signal, fire support, and reconnaissance sections are relatively new additions to the conflict.

ORDER OF BATTLE

SECURITY FORCES:
11,000 includes 2 combat battalions. Each department has a military garrison, and there are 6 brigades that overlap the departments.

ARMY (39,000)

INFANTRY:
- 8 Immediate reaction counter-guerilla battalions.
- 12 Medium battalions of BIAT antiterrorist battalions.
- 21 Light battalions of BIC counter-subversion battalions.
- 19 Airmobile and parachute battalions.
- Special operations units.
- National Strategic Reserve of 5 immediate reaction battalions and 2 airborne battalions.

ARTILLERY:
- 24 -105-mm, M102 (1983/84)
- 8 -105-mm, M101A1 (1955)
- 18 -105-mm, M56 (1979) Yugoslav pieces
- 12 -120-mm Mortars (Czech models, US firing tables)
- 20 -20-mm (1979, Yugoslav Air Defense Guns)

CAVALRY:
- 21 US modified M-114
- 12 Fr modified M245
- 5 Fr modified M3A1
- 10 GE modified UR 416
- 9 GE Deutz Cargo Trucks

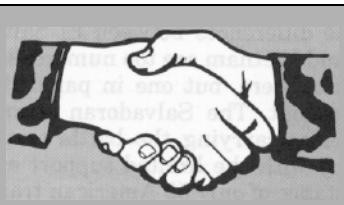
Military Zones

Geographically, the Army operates in the 6 brigade-sized military zones and the 8 military detachment areas shown in the accompanying map.

- ***Military Zone 1*** embraces the Departments of La Libertad, San Salvador, and Cuscatlan in the Central Highlands. Forces in this zone include the 1st Brigade at San Salvador, Military Detachment 5 in Cojutepeque, the Field Artillery Brigade in San Juan Opico, and the National Strategic Reserve at Ilopango Air Base.
- ***Military Zone 2*** is responsible for the Western one-fifth of the Republic and the Departments of Santa Ana, Ahuachapan, and Sonsonate. The 2d Brigade as well as the 6th and 7th Military Detachments operate in this zone.
- ***Military Zone 3*** encompasses the Eastern Departments of La Union, San Miguel, and Morazan. This military zone has the largest concentration of government forces including the 8 BIATs of the 3d Brigade, the Armed Forces Commando Training Center, and the 3d Military Detachment.
- ***Military Zone 4*** safeguards the Department of Chalatenango. Presently, 4 BIATs and a BIC operate in the zone as the 4th Brigade.
- ***Military Zone 5*** contains 2 of the least populous departments—San Vicente and Cabanas. Army troops in the zone include the 5 maneuver battalions of the 5th Brigade and the 2d Military Detachment.

The El Salvadoran Army operates in 6 brigade-sized military zones and 8 military detachments.

Up Close — On the Front



In 1983 at the request of the Salvadoran government, US forces evaluated the Salvadoran Armed Forces' ability to conduct low intensity conflict operations. As a result of this study, the El Salvadoran leaders reduced the strength of its infantry battalions to smaller, lighter, and more mobile organizations. What's more, it created additional light Field Artillery units.

The Field Artillery portion of the study also identified several other important requirements:

- Reorganize and upgrade the artillery brigade.
- Update of the current Field Artillery doctrine.
- Assignment of a Field Artillery trainer.
- Modernization of the fire support force.

The United States Field Artillery School (USAFAS) sent the first Field Artillery advisor to the US military group in El Salvador in mid-1983. The 193d Infantry Brigade in Panama provided 2 13B howitzer section chiefs from D Battery, 320th Field Artillery. Operating as a team, these 3 United States advisors were able to train El Salvadoran lieutenants and captains on firing battery operations for their 24 newly-purchased 105-mm howitzers.

Until the arrival of the M102s, the El Salvadoran forces' primary means of fire support were antiquated howitzers and mortars. For example, the Field Artillery brigade had 8 105-mm M101A1s purchased in 1959, 18 Yugoslavian M36 105-mm howitzers, 12 Czechoslovakian 120-mm mortars, and 20 20-mm Yugoslavian air defense guns. The Field Artillery brigade also had 3 operational French Pack 75s.

While training the trainers on battery operations, the US gunners requested a Fort Sill Redleg Mobile Training Team (MTT), which consisted of a captain and a sergeant first class. These experts not only provided instruction on gunnery and maintenance operations, but also complemented the ongoing firing battery training effort.

The 1900-man Field Artillery brigade was reorganized into 11 firing batteries assigned to 3 Field Artillery battalions. Salvadoran infantry brigades retained operational control of 6 firing batteries, and 2 firing batteries received general support-reinforcing missions during major combat operations. The brigade sector security and basic training missions went to the remaining 3 batteries.

The brigade also included an air defense battalion which consists of a 120-mm mortars and 20-mm air defense guns. This unit provides fire base and strategic site security.

Three things helped the Fort Sill team accomplish its objectives.

- First, in the initial preparation for the assignment the advisor had to rely on other officer and NCO comments and experiences.
- Second, many Field Artillerymen occupied key positions in the El Salvadoran Army. Of the 6 infantry brigade commanders, 3 were Field Artillerymen and 2 were graduates of the officer advanced course. Half of the infantry battalion commanders were artillery officers and at least one-third of them were graduates of the Field Artillery School.
- Finally, the advisor had the assistance of other artillerymen at Fort Sill who understood the difficulty of the mission in El Salvador provided the needed support.

The complexity of the war definitely took a turn for the better with the support of the Field Artillery, and fire support now provides a key ingredient in the El Salvadoran Army's operations.

- ***Military Zone 6*** covers the Departments of La Paz and Usulutan as well as the lower portion of the Department of San Vicente. Within the zone, 3 BIATs make up the 6th Brigade and 2 BICs support the Armed Forces Engineer Training Center.

Military Support Arms

The Field Artillery Brigade provides significant firepower to the El Salvadoran Armed Forces. Composed of 3 artillery and 1 air defense battalions, it has already made a significant contribution to the war by providing responsive direct support to government forces in contact and through fires directed at terrorist force concentrations.

Each brigade has an artillery battery attached for 6 months at a time. Three batteries remain in reserve for use by the National Headquarters in general support operations. Two batteries are responsible for the security of the 1st Brigade Zone, and 1 battery provides basic and advanced individual training.

Protection of the Pan American and Coastal Litoral Highways as well as other major roads falls to the Cavalry Regiment. Broken down into 3 ground troops and 1 support troop, the cavalry performs zone reconnaissance and route security throughout El Salvador.

The immediate reaction infantry battalions are "go anywhere, anytime" shock forces which have repeatedly thwarted terrorist initiatives. Capably led, professionally trained, and adequately equipped, the 5 battalions along with the airborne battalion of the Salvadoran Air Force comprise the National Strategic Reserve for responsive employment and reinforcement.

Military Strategy

The national strategy governing the employment of these military arms and services is threefold:

- To destroy the terrorists' will to fight.
- To destroy the FMLN's war-fighting capability.
- To provide for continuing national security with a focus on the national campaign plan.

The military strategy as outlined in the national campaign plan envisions a 3-step operational process.

- ***Step 1*** of the campaign seeks to use offensive thrusts into known strongholds to clear up major guerrilla units.
- ***Step 2*** orients on the reestablishment of appropriate health, education, and welfare services provided by government ministries. This step depends heavily on the use of the Salvadoran Armed Forces to provide a relatively threat-free working environment.
- ***Step 3*** consolidates gains made during step 2 through long-term civic action programs.

The Salvadoran military complements this phased program with 2 distinct types of concurrent operations.

- Hard-hitting ***strike*** operations in the most contested areas. These efforts seek to keep the guerrillas off-balance.
- ***Economy of force*** operations in less troubled areas such as Western El Salvador or in recently pacified areas such as in the Paracentral *Front*.

Implementation of the strategy clearly depends on Salvadoran Armed Forces gaining and maintaining the initiative. And that is exactly what has happened.

Since the inception of the campaign plan in 1984 and the introduction of the Field Artillery as part of the combined

arms team, the Armed Forces have prevented the terrorists from launching a large scale attack on any major location. The initiatives of the Armed Forces have disrupted guerrilla lines of communication, reduced the number of guerrillas, and safeguarded the electoral process. Government troops continue to have the upper hand and strive to keep it by increased patrolling, enhanced mobility, and more fire support.

Conclusion

El Salvador is a key piece of strategic real estate. Our failure to prevent a communist takeover in El Salvador could result in serious political, military, and commercial consequences.

The differences between El Salvador and Vietnam are too numerous to mention here, but one in particular stands out. The Salvadoran Armed Forces is carrying the battle to the enemy with the limited support and assistance of only 55 American trainers and technical specialists. Although continued US equipment support is absolutely essential, the Salvadorans themselves have the will and the ability to defeat their often brutal and increasingly unpopular foes. As one American trainer said, "If our advisors in El Salvador have played a role in this increasingly successful counterinsurgency effort—and I believe they have—then I too am proud to claim credit on behalf of my fellow trainers who served there!"

Major Alfred A. Valenzuela is the Secretary of the General Staff at the US Army Field Artillery Center at Fort Sill. He was a distinguished military graduate from Saint Mary's University. Major Valenzuela has commanded a 105-mm air mobile battery; a 155-mm battery; and was the S3 and S4 in the 1st Battalion, 77th Field Artillery, 1st Cavalry Division Artillery at Fort Hood, Texas. He was the S1 and S2 of the 528th Artillery Group in Turkey; and assistant Division Artillery S3; and Executive Officer, 6th Battalion, 37th Field Artillery, Republic of Korea. More recently, he was assigned to the National Security Agency before serving in El Salvador as a brigade infantry and artillery advisor.

1986 Redleg Reference

The following is a list of articles, "On the Move" columns, and "View from the Blockhouse" (VB) items, appearing in the *Journal* during calendar year 1986. The entries are categorized by subject and listed by title and issue.

Ammunition and Fuzes

Electromagnetic Propulsion: The Wave of the Future, Jul-Aug
Getting the STRAC Straight, Mar-Apr (VB)
Liquid Propellants—A Potential Power Punch, Jul-Aug
Where is the Ammo?, Mar-Apr
Where There's Smoke..., Jul-Aug (VB)

BATTLEKING

BK 5-85, Laser Designators; Jan-Feb (VB)
BK 3-85, FIST V Configuration Changes; Jan-Feb (VB)
BK 57-85, Chamber Swabs; Mar-Apr (VB)
BK 64-84, LS-454 Speaker as a Radio Remote; Mar-Apr (VB)
BK 20-86, Powder Thermometer; May-June (VB)
BK 7-84, 1:100,000 Map for TACFIRE; May-June (VB)
BK 27-86, Pintle Lighting Bracket; Jul-Aug (VB)
BK 23-86, Spare Tires for M102 Towed Howitzers; Jul-Aug (VB)
BK 20-85, MARWIN Meteorological System; Sep-Oct (VB)

Combat Service Support

A Canned Exercise: The Combat Field Feeding Test, Mar-Apr
Bite the Bullet: Looking at Red CSS, Mar-Apr
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