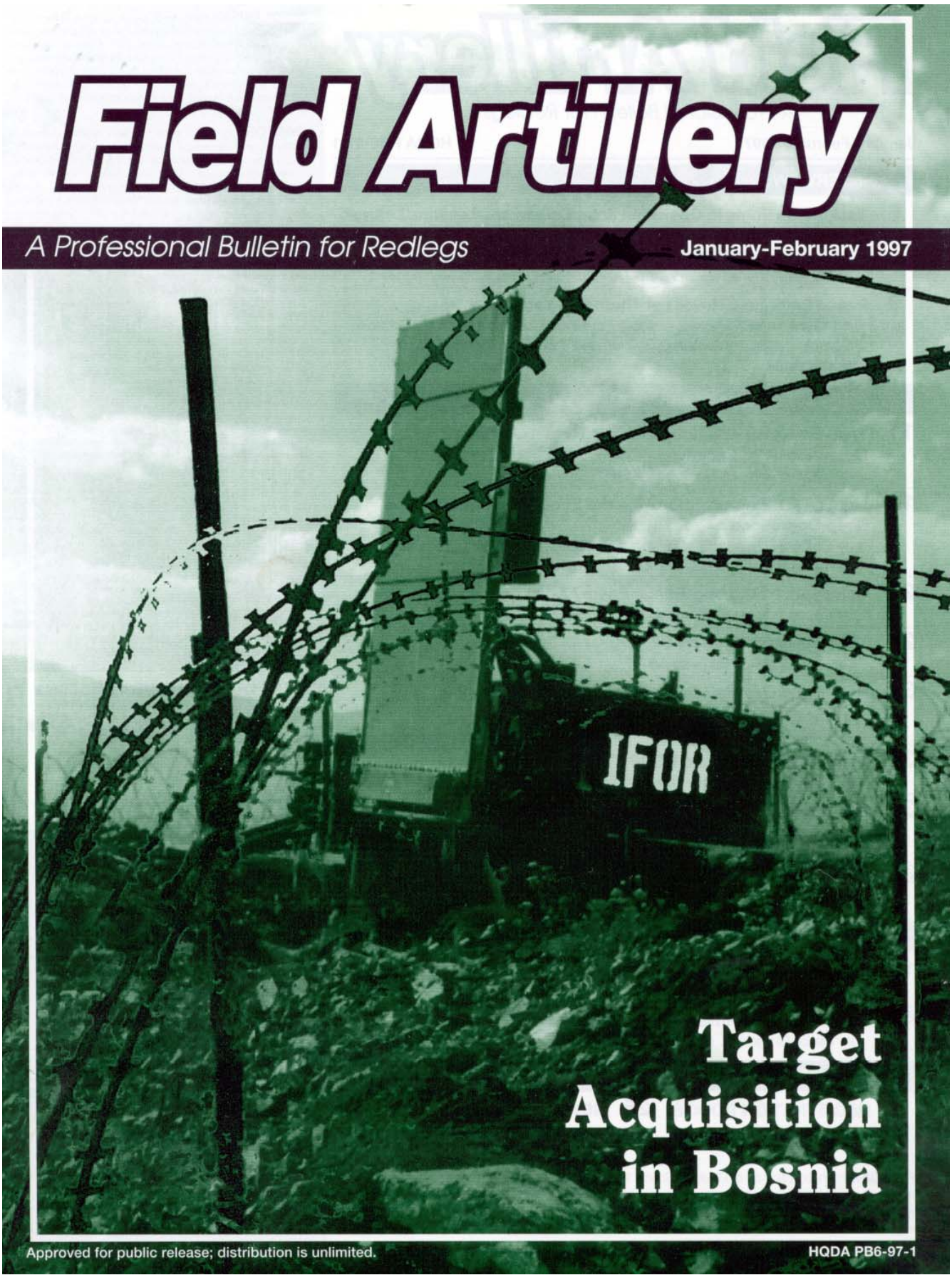
Field Artillery

A Professional Bulletin for Redlegs

January-February 1997



Target Acquisition in Bosnia

HQDA PB6-97-1

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Front Cover: *Photo taken by SGT Nicole Smith, 135th PAD, of an A/25 FA Q-36 radar on Mount Vis in the US-led Task Force Eagle sector of Bosnia. "IFOR" identifies the multinational NATO Implementation Force in the former Yugoslavia to enforce the terms of the Dayton Peace Accord.*

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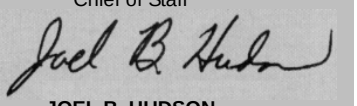

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Targeting UAVs—

The Need is Great, *The Time is Now*

Former Chief of Staff of the Army General Gordon R. Sullivan once described his vision of the Force XXI Army as an army that can conduct dominant maneuver, execute precision strikes and protect the force. To achieve these capabilities, we must "win the information war," that is, we must fuse battlefield information and make it available to the warfighters who need it.

Despite deepening budget cuts and declining resources, the Army has made tremendous progress toward making General Sullivan's vision a reality. But there's still much work to do—particularly with regard to winning the information war and getting timely, usable information to the appropriate decision makers and executors.

From the fire support perspective, "timely, usable information" translates into getting targetable data to a selected attack asset that meets the established attack guidance parameters required to achieve desired results on a given target. Getting the information we need to execute precision strikes demands reexamination of a key modernization effort: the unmanned aerial vehicle (UAV) program.

Current UAVs. Today's UAV programs include the Air Force's Predator and the Army's Outrider. Predator can loiter for 24 hours at ranges from 300 to 900 kilometers beyond the forward line of own troops (FLOT). Predator normally focuses on satisfying the reconnaissance, surveillance and target acquisition (RSTA) needs of the joint force commander (JFC). With JFC approval, the air component commander (ACC) allocates and apportions Predator as part of the air tasking order, usually 24 to 48 hours in advance of mission execution. Accordingly, the Army's ability to leverage Predator capabilities specifically for targeting purposes in fast-moving, time-sensitive situations is, understandably, limited.

Outrider entered its two-year advanced concept technology demonstration (ACTD) development phase in May 1996. This system will provide immediately responsive RSTA support for maneuver brigade commanders. Another Army system, the Hunter UAV, gives the division and corps commanders a similar capability out to a range of 300 kilometers. Hunter, however, is being employed for Army Warfighting Experiment (AWE) purposes only and will not be fielded as part of Army XXI.

While all three systems support selected commanders' battle management decision making, their focus is on intelligence rather than on targeting. None meet the needs of fire supporters. As valuable as intelligence information is to determine threat disposition and intent, such information loses value if fire supporters can't act on it immediately.

Targeting UAV Need. To optimize current and future weapons systems, fire supporters in general and Field Artillerymen in particular need an acquisition asset with targeting as its primary mission—a *dedicated* UAV that furnishes timely, targeting-level accuracy for high-payoff targets. The joint precision strike demonstration to rapidly counter multiple rocket launchers ACTD provides a compelling case in point.

The FY 96 ACTD in Korea demonstrated a significantly enhanced capability to defeat North Korean artillery targets sets, primarily consisting of 240-mm MRLs and 170-mm guns (self-propelled). Accomplishing this mission meant overcoming two formidable challenges: one, finding the targets, and two, exploiting a narrow window of opportunity to attack and destroy those targets before they could return to protected hide positions.

In finding enemy artillery, both the joint surveillance and target attack radar system (JSTARS) and U2R reconnaissance aircraft proved to be of little utility. UAVs, on the other hand, experienced much greater success in locating the target sets—particularly when they were cued by the Q-37 Firefinder radar.

The Predator UAV, for example, located some 15 artillery batteries in a five-hour period while employed as a theater-level asset in a general support (GS) role. Even more significantly, for the same five-hour period, the number of batteries located *tripled* when the Predator was placed in direct support (DS) of the 2d Infantry Division and *more than quintupled* when a combination of a GS Predator and two DS tactical UAVs was used to support the division.

In attacking enemy artillery, the marriage of a capability dubbed "automated weapon target pairing (AWTP)" with established MLRS tactics, techniques and procedures (TTP) proved to be an optimal solution for exploiting that very brief window of target vulnerability. AWTP maximizes the synergy inherent in the Q-37/UAV/MLRS triad. In brief, the Q-37 detects enemy artillery firing and simultaneously sends artillery target information via AWTP to the MLRS battalion for attack and to a UAV operator who vectors UAVs to selected target areas. Once a UAV is on station, the operator confirms the target set and transmits targetable data to AWTP for attack by postured MLRS launchers. Further, the operator also could employ the UAV in a proactive mode to locate additional target sets for attack as targets of opportunity.

Arguably, the value-added warfighting potential of this demonstrated capability may be even greater at the operational level. Armed with a combination of extended-range UAVs, long-range delivery systems, lethal precision munitions and a state-of-the-art command and control system, Army fire supporters will provide the joint force a responsive ground-based capability to interdict targets at depths approaching 500 kilometers. In tandem with other joint force systems, this capability will ensure our dominance of any enemy, anywhere, anytime.

The bottom line is the Army needs dedicated UAVs to successfully execute targeting operations—the benefits to be realized by our joint forces are simply too great to ignore.

Maintaining the Q-37 Firefinder in Bosnia

Maintaining the AN/TPQ-37 Firefinder radar during 24-hour operations in Bosnia was a great experience for me as a 35M (Firefinder Radar Repairer). I was assigned to C/333 FA (Target Acquisition) Radar Section 5 and was responsible for the organizational and direct support maintenance of the radar system. But when I went to Bosnia in Operation Joint Endeavor, I had the opportunity to operate the radar and track targets, allowing me to better understand the system as a whole.

In the process of learning how the radar works, I learned how important the radar was for operations in Bosnia. I also learned how important organizational maintenance is to keep the system operational by preventing faults before they occur. In Bosnia, I implemented a few tricks to help prevent unnecessary down time and manage the varying maintenance schedule.

Radar Knowledge. But first, I had to *know* the radar—see it operate in the field and get to know how it performs—an advantage for a direct support repairer. For example, if while sitting in the shelter as an operator, I notice a fluctuation of shelter lights and blower motors as a transmitter fault occurs, I learned to check the generator immediately. Sometimes the generator settings will drift or vary, giving a false indication of a transmitter fault.

Also, by studying the test data printouts daily and paying attention to the values, I can see changes in the system compared to its normal values. This notice of changes has given me time to analyze data, determine the cause and ensure parts are on hand to correct the problem, preventing maintenance supply down time.

Because faults can occur without notice or obvious preliminary indicators, operating the system allows me to see the more subtle indicators. For example, as an operator, I've learned there should be clutter displayed on the B-scope. If there's no clutter visible, it's a good indication the system won't track targets. The only other way to detect that the system won't track targets is to run the shelter and trailer Fault Isolation Test, which is done during maintenance periods and when on-line faults occur. Normally, the A/D alignment is the cause of on-line fault messages.

One of the most important lessons I've learned is how critical it is to follow organizational-level maintenance procedures. *TM 11-5840-355-20-1 Organizational Maintenance Manual (Functional Description and Maintenance) for Radar Set AN/TPQ-37(V)* describes the radar's major functions, controls and indicators, troubleshooting procedures, alignments and preventive maintenance checks and services (PMCS). This manual has helped me isolate faults and kept me on track. While troubleshooting procedures may not always isolate the faults, they do help localize the fault to the appropriate area within the system.

PMCS can identify shortcomings before larger problems occur. For example, the coolant resistivity check performed daily ensures purification cartridges are changed before transmitter faults can occur. The availability of these cartridges is very important to the continuous operation of the system. Also, I recommend replacing the particulate filters in the cooler at the same time.

Maintenance Tricks. Learning the hard way, I've come up with a few tricks to help reduce the amount of time the system is down.

Because the analog-to-digital conversion may drift at any time and alignment may have to be performed, I attach the alignment procedures to the inside of the signal processor door. This saves time—I don't have to locate the procedures in the manuals. In the PX, I bought an eyeglass repair kit with a small screwdriver that is perfect for alignment and can easily be kept in my BDU [battle dress uniform] shirt pocket. I also keep a clip lead needed to perform the alignment inside the door for fast and easy accessibility.

Another trick I've learned is to clean card pins and reseat suspected bad cards before replacing them. This quick procedure is very effective, saves time and keeps me from turning in otherwise perfectly good cards to the supply system.

One trick to help me manage maintenance time and track the radar's PMCS is to use a simple monthly calendar. As our maintenance periods vary from 30 minutes to two hours, I use the calendar to ensure PMCS items are performed on schedule or, at least, within a reasonable tolerance. By listing on the calendar PMCS item numbers completed daily, I can easily see which item numbers I need to complete for that week, month or quarter. This calendar acts as an easy reference for me to manage and plan the scheduled maintenance.

In almost a year in Bosnia, I learned a great deal about the Firefinder radar system—more than the schoolhouse could ever teach me. As a previous instructor and with my return to Fort Sill, Oklahoma, at the end of my deployment, I hope to pass on my knowledge and understanding to students. I believe this knowledge will help produce a more qualified, confident repairer for the Firefinder radar system.

SSG William J. Parker, FA
Ordnance Training Detachment
Fort Sill, OK

"Air Fires" Edition—Bilenski's Letters-to-Editor about USAF Articles Miss the Mark

As always, *Field Artillery* editions impress me with the tremendous advances of the US Army in general and Field Artillery in particular since my retirement some 14 years ago.

I read the May-June 1996 issue on "Air Fires" with immense pleasure. Major General [Randall L.] Rigby's introductory remarks ["The FA and Air Attack Team"] in his "Registration Points" feature were particularly important. The follow-on articles, especially those by Lieutenant Colonels [Ricky R.] Ales (USAF) and [H. Alleyne] Carter (USAF), each contained information

critical to the fire support professional.

As a bit of ancient history, I was reminded of my article "Tactical Airpower" that appeared in the May-June 1981 issue. In those days, my purpose in writing that article was to drag fire support professionals "kicking and screaming" into employing the fire support resources of tactical air power in the ground commander's scheme of maneuver. I am pleased to see that much has been accomplished in the past 16 years.

But then I read two letters by Mr. Vincent R. Bielinski, Chief of the Doctrine Division of the Field Artillery School, in the July-August 1996 "Incoming" section that responded to the two articles cited. Although generally positive, Mr. Bielinski chose to emphasize several attitudes often ascribed to the Air Force, attitudes that would result in the Air Force's diverting tactical air power resources from supporting ground operations. More than a few of my Army contemporaries perceived those attitudes and happily used them to support the then popular belief that "there was no sense in requesting tactical air power support because we will never get any anyway." It was a classic self-fulfilling prophecy that cannot be tolerated today.

I would have been more comfortable with Mr. Bielinski's remarks if he had emphasized the role of the joint commander with deployed air and army forces. Service doctrine has its place and will always be most important to those who scurry about in the recesses of the Pentagon. But for deployed forces, it will be that joint commander who determines how to employ his air and ground resources.

General Robert J. Dixon, Commanding General of what was then (mid-1970s) the US Air Force Tactical Air Command, once put it rather succinctly when he noted that in a joint command, the job of each component commander is to accomplish the joint commander's mission. In his "Registration Points," General Rigby also was rather clear: "No battle is strictly a branch or even a service fight. Every fight is a joint and combined arms effort, and integrating fire support is a condition for success."

In the joint arena, fire support professionals must be thoroughly familiar with the theater air control system (TACS) and, thus, be able to integrate tactical air power resources into the fire support scheme for ground operations.

COL(R) Griffin N. Dodge, FA
Santa Fe, NM

FA Warrant Officer Azimuth Check

Light Field Artillery (FA) battalions are not properly developing and utilizing their FA targeting technicians, formerly called target acquisition warrant officers (TAWOs). We can link these shortcomings to two general observations. First, the targeting technician [radar section leader] is not an integral member of the FA tactical operations center (TOC) or battalion staff. His involvement in mission analysis and planning consists of after-the-fact recommendations and an occasional radar site selection.

Second, FA warrant officers working as targeting officers in brigade fire support elements (FSEs) are not receiving the training to prepare them for their new-found responsibilities. They are relying entirely too much on their radar experience as the foundation for becoming effective targeting officers.

Based on recent discussion with other warrants, these observations are not exclusive to artillerymen who train at the Joint Readiness Training Center (JRTC) [Fort Polk, Louisiana]. To grow an effective targeting officer, we must develop a quality, well versed, multitalented individual proficient in a multitude of fire support tasks.

The Developmental Plan. During the 1992 Target Acquisition Conference at Fort Sill, Oklahoma, one of the architects (then CW4 Gordon Baxendale) explained the restructuring concept of the 131A Radar Technician into the TAWO. The intended result would be the following.

1. Grow a targeting expert with a zero-sum gain in personnel from a Total Force perspective.
2. Marry fires and maneuver, developing a greater credibility with the combined arms commander.
3. Cross-fertilize targeting experience between heavy/light and higher/lower echelons, building on successful procedures.
4. Help the Field Artillery better use our warrant officers' expertise while positioning the FA for the smaller, high-tech Army of the future.

The restructure called for replacing commissioned officers with warrant officers in a majority of the targeting and counterfire positions throughout the Army. The true genius of the plan was stability. Historically, units filled the targeting officer positions with short-term senior lieutenants or junior captains awaiting their next assignments. Additionally, the consensus was that radar warrant officers could bring experience gleaned from years of assisting FA S2s and S3s during the command estimate process.

The opportunity for expansion received an enthusiastic response by most present. The 131A would no longer stay exclusively with the radar for his entire career. Unfortunately, because of personal or professional considerations, several senior warrants chose to retire rather than make the change.

The intended evolution begins at Fort Sill with the FA Warrant Officer Basic Course (WOBC). The WOBC program-of-instruction (POI) is predominately radar-oriented. However, the seven-month course does incorporate approximately six weeks of targeting.

Currently the basic and advanced warrant officer courses are undergoing review. Except for a couple of minor changes, the new 131As are receiving adequate targeting instruction. The purpose of the targeting instruction during the basic course is to provide exposure, not make the new warrant a resident expert.

After completing WOBC, the WO goes to his initial assignment, hopefully as a radar section leader. This is where he begins to gain the Field Artillery operations experience he later will use to execute the duties of the targeting officer. Proficiency comes from doing hard jobs well, continuous self assessment and a steady interaction with subordinates and peers, coupled with solid mentoring from competent superiors.

The Problems. Due to a shortage of senior personnel, new WO1s are going straight into targeting officer positions. This is obviously not in accordance with the original intent, but in many cases, this may be the only option available.

To develop an FA warrant into a targeting officer requires a strict, regimented process: basic course, radar and eventually targeting. If we disrupt this sequence or fail to properly educate the targeting technician, we must get this process back on track.

In some cases, units discover that after assigning a new WO1 to a target officer position, he has a wealth of fire support experience gained during his enlisted time and can handle the position. However, those situations are the exception.

The artillery is accessing warrants from a variety of MOS [military occupational specialties] that may or may not provide good background experience for a targeting technician: 13B [Cannon Crewman], 13C [Tactical Fire Direction Specialist], 13E [Fire Direction Specialist], 13F [Fire Support Specialist], 13R [FA Firefinder Radar Operator], 82C [FA Surveyor] and 93F [FA Meteorological Crewman].

Commanders must realize that while the warrant officer may have gained radar technical expertise and targeting familiarity during WOBC, he has not received the skills and knowledge he needs to make him an effective staff officer. Additionally, the reality of being the targeting officer at the brigade level is that he will be the assistant brigade FSO [fire support officer] as well. This must be the focus of professional development for targeting technicians as they arrive in a unit.

What should be an additional advantage the light targeting technician has is his assignment to the direct support (DS) artillery battalion. In almost all cases, the targeting technician's place of duty in garrison is the light division's DS battalion operations shop. [Light divisions have a Q-36 section assigned to each DS battalion, as compared to the heavy division that has its radars in a target acquisition battery.]

Because of the radar section leader's proximity, one would expect that a synergistic relationship with the S2 and S3 would begin to foster immediately. Unfortunately the association often focuses on the warrant's additional garrison duties (quarterly training briefs, land management, training schedules, unit status report, ammunition, S3 air or all-around daily troubleshooter) and not his warfighting skills. The majority of targeting technicians we see at the JRTC have minimal interaction with the TOC.

As a trend, they appear to limit their involvement in FA TOC combat operations exclusively to supervising the radar section. Once the radar has established itself and is conducting operations, the targeting technician appears reluctant to leave the confines of the radar section and integrate himself into planning for future operations with the S2 and S3.

How effective can he be if his contribution to the task force is limited simply to executing force-fed orders from higher? If the target technician does not exploit his opportunities to interact with the battalion staff, he brings nothing to a brigade FSE when assigned as the targeting officer.

Recently, there has been much discussion about where the best place is for the targeting technician to fight the battle. The JRTC takes the position that during a fixed battle, the warrant's place of duty is the radar site. JRTC scenarios, much like the majority of our recent real-world operations, do *not* have a definite start and stop time. It's extremely difficult to define when the enemy will strike and from what direction during contingency operations.

What it really comes down to is priorities of work supported by effective time management. If an opportunity that will facilitate the warrant officer's exposure to operations and fire support issues presents itself, then WO and unit leaders must exploit it. A warrant officer sitting idly at a radar for an extended period is not serving himself or his commander to the best of his ability.

We have three environments in which warrants are receiving training in the field: combat training centers (CTCs), home station and actual deployments. The most significant challenge for a targeting technician is freedom of movement and his ability to go to the TOC. In Bosnia, the radar sites can be a considerable distance from their TOCs. We observe the challenges units experience here at the JRTC and the procedures required to negate the risks involved in traveling to and from the TOC.

But what about home station training? Are we taking full advantage of available training time? An alarmingly high number of units admit their home station training focus is predominantly on friendly fire. A majority of the target acquisition plans we see evolve from partial or incorrect assumptions of the radar's capabilities.

For example, as astonishing as it may sound, key personnel—the S3, S2 and even targeting technician—attempt to apply friendly fire considerations to hostile fire situations. In some extreme cases, units ignore potential problems, assuming the radar section members can compensate for flawed planning through diligence.

These actions are indicators that valuable home station training time is being squandered on excessive friendly fire operations. Without a change in home station training, any graduate-level training for our warrants is unattainable.

The Fix. The development of the FA warrant into an effective targeting officer needs some fine tuning to get it back on track. The five players involved in the fix are FA School instructors, commanders, FSOs, battalion operations officers and FA warrant officers.

Fort Sill is leaning forward in the foxhole on this one. The Radar Branch has formed a committee to review the instruction to ensure it conforms to the needs of the users. Feedback from the field substantiates the requirement to review the courses. So if anyone wants to provide input, speak now or forever hold your peace.

Next, commanders, FSOs and S3s need to evaluate their own situations as they pertain to their *targeting warrant officers*—determine each individual's level of expertise and build on it. For example, a battalion S3 who brings his targeting technician in early, focuses him, forces him to make recommendations and gets him involved is well on his way to producing a seasoned officer.

Finally, the new warrant officer must understand that a "radar-only" focus is no longer acceptable. If he is a radar section leader, his primary concern, of course, must be the effective employment of his system. However, staff interaction is inevitable and can help him plan, prepare and execute radar operations while simultaneously preparing him for his next duty position.

We're all involved in the fix.

CW2 Walter C. Ayer, 131A
Senior TA Observer/Controller
JRTC, Fort Polk, LA

Major General William L. Nash, Commanding General of the 1st Armored Division and Task Force Eagle, Bosnia-Herzegovina

Task Force Eagle in Operation Joint Endeavor—

Lessons Learned in Peace Enforcing

Interview by Patrecia Slayden Hollis, Editor

Editor's Note: This interview was conducted in Tuzla, Bosnia, on 14 October 1996, just before the US 1st Armored Division began redeploying to Germany. Task Force Eagle had 26,000 soldiers from 11 nations and included two brigades of the 1st Armored Division, a Russian airborne brigade, Nordic-Polish brigade and Turkish brigade as its maneuver brigades. The task force arrived in Bosnia-Herzegovina in December 1995 as part of NATO's Implementation Force (IFOR) for the Dayton Peace Accord. Task Force Eagle was responsible for 22,000 square kilometers of the disputed area of the former Yugoslavia. (See the map on Page 6.)

The operation, called Joint Endeavor, was to enforce the military provisions of the accord—stop the fighting among the Muslims, Serbians and Croatians. The provisions stipulate that the former warring factions be separated by a four-kilometer zone of separation (ZOS) approximately along the cease-fire line, withdraw their heavy weapons outside a 10-kilometer zone, store their air defense weapons, return equipment to storage sites and personnel to cantonment areas and remove thousands of mine fields set during the previous four years of war.

Q *What are the most significant lessons you've learned in this peace enforcement mission?*

A First, I'm convinced that our success has been directly related to our proficiency and credibility as a warfighting force. From Day One, the former warring factions only saw a disciplined, competent, professional military force—not a provocative one, but one prepared to fight if anybody wanted to give us a fight.

That approach translates into how soldiers do everything all the time. For example, an artillery platoon's rehearsal at its base camp is critical for it to conduct a road march to a firing position several kilometers away and occupy the position rapidly, all in the most efficient and professional manner. We've probably had more AARs [after-action reviews] in the past year than the NTC [National Training Center, Fort Irwin, California] has had in the last five—that's a hell of a statement because I know how many AARs the NTC has had.

The former warring factions watch us all the time and notice details, such as the direction the howitzer tubes are pointing. Word quickly reaches the factions' leaders that the IFOR has positioned a firing platoon in range of "x" compound or "y" activity. That allows the IFOR commander to deal with issues from a position of strength. So warfighting skills are critical to peace enforcing.

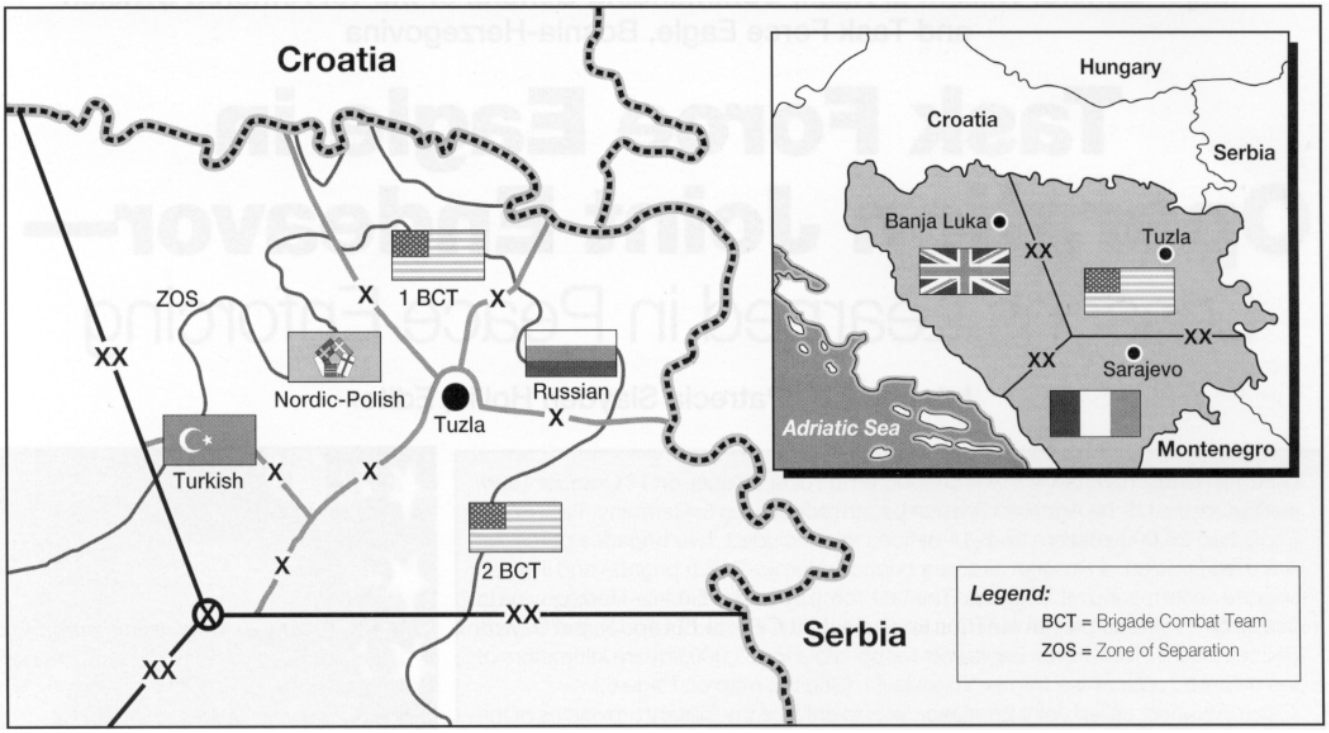
The second thing we concluded is that in peace enforcing and similar military operations in the world today, the land combat soldier is the key to getting the job done—on the ground with boots in the mud and snow. In Joint Endeavor, he separates the factions and makes sure they comply with the military provisions of the Dayton Accord. I would tell you that our proficiency at decentralized operations is a strength of the American Army—our junior leaders can take the commander's intent, plan the mission and execute at their levels.

In the Balkans, land power rules. To use only super smart, stand-off icon technology to deal with these people would be to misunderstand the nature of the conflict. A "smart" bomb doesn't always work against a "dumb" enemy.

Now, having said that, our land combat soldier *better* be the best equipped, smartest guy on the battlefield, or the peace field. He has to be backed up by superior technology—automation, equipment, intelligence systems, etc. Supporting the land combat soldier must be a joint effort to maximize his capabilities.

Third, we learned that when you use land combat power in the peacekeeping or peace building role, you can't achieve an end state of long-term peace—of stability and prosperity in the area. In general, a military element only can bring about an absence of war.

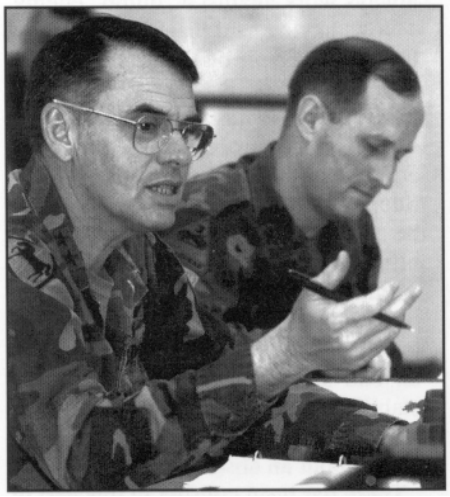
There has been conflict in this part of the world for many centuries. To achieve peace, the factions will have to address



Task Force Eagle's Sector in Bosnia-Herzegovina. The task force had troops from the US 1st Armored Division from Germany and 10 other nations.

the political, economic and social aspects of the conflict. Regardless of how successful Operation Joint Endeavor is—and I'm pleased with the results of our military mission—there will be no peace unless the people and leaders of Bosnia-Herzegovina achieve it. It's evident the political, economical and social components of peace are harder to build and have not been as successful to date.

My last lesson deals with force protection. In a multinational environment such as this one, this subject can be somewhat controversial as armies' philosophies of military operations are different. The fact is, the American Army focuses on force protection as a dynamic incumbent of military operations.



MG Nash with his Chief of Staff COL Brown during a nightly battle update brief (BUB).

Force protection is important for a number of reasons. Commanders must take care of the sons and daughters entrusted to them to accomplish the nation's military missions. Force protection multiplies combat power, ensures you have the soldiers to get the job done right.

Force protection has a psychological impact on the opposing force, in this case, the former warring factions. When we entered the Balkans in the dead of winter efficiently, rapidly—something no army in the history of the world has done—and we did it safely, the Balkan people were impressed. Force protection makes us more proficient and credible as a warfighting force.

One misperception is that force protection is something static, something akin to staying safely in base camp. Not so. The 1st Armored Division has driven more miles and flown more hours in Bosnia-Herzegovina during Joint Endeavor—for example, B Battery, 4th Battalion, 29th Field Artillery has driven four times the mileage it drove in Germany and has driven them in the mountains.

Force protection is actively patrolling and having an intelligence system everywhere. It's poking your finger into the chest of folks who tend to want to get into mischief. Force protection is more than sweat and sand bags; it's aggressive acts to keep the peace.

Q *What is the Joint Military Commission and how did you use it?*

A The JMC conducts regular meetings led by task force commanders to bring faction leaders together to ensure everyone understands the requirements of the peace accord and to resolve issues. The value of the JMC is all sit in the same room and hear the same rules consistently from the corps to the battalion levels. The JMC meetings at the brigade and battalion levels are held more frequently and bring more of the implementers—or potential perpetrators—together for no-nonsense discussions.

At my level, I'll have an occasional JMC meeting to put out the "rules of the road" to everyone, but I concentrate on bilateral meetings to discuss issues with

one faction or another. Those meetings are a little easier because the factions can't needle each other and don't put on a show of bravado. I found that less formal meetings are more effective—a little kindness, a little humor go a long way.

Q *When a problem arises between factions, you use a "non-lethal engagement" process to solve it. How does the process work?*

A We've come up with a four-step process to solve faction problems. The steps sound simple but are, in fact, very complicated.

First, when a problem arises, you isolate the situation—you don't allow a local incident to become a national problem. That means ensuring you understand the scope of the problem and reacting quickly to move information to the units that need it and an appropriate level of force into the problem area.

Second, you dominate the situation—not only physically with forces, but also morally with a firm stand based on the peace treaty. Our commanders have done that brilliantly.

In the third step, we maintain moment-by-moment updates on the incident and convey that information up and down the chain of command. We fly UAVs over the incident. We also send Kiowa Warriors and some Apaches deep into areas that might have impact on the situation—for example, faction forces that might move to support one side or another. We also conduct covert operations to ensure our intelligence systems are focused and that we're the smartest guy on the block.

It's very important that the entire chain of command has common situational awareness. In this CNN world we live in, local incidents can quickly have strategic implications. Therefore, the platoon leader or company commander at the point of action must share his view of the situation rapidly up the chain of command, maybe all the way to SHAPE [Supreme Headquarters Allied Powers Europe] and Washington, D.C.

The fourth step is taking what we call "multi-echelon, multi-dimensional actions" to resolve the situation. In our more than 300 days in country, we've had hundreds and hundreds of incidents. As we say, "a crisis a day—somedays small, somedays big."

The problem that occurred yesterday never became a national incident because we followed the four steps—took multi-echelon, multi-dimensional actions. Local police took a refugee family of one faction hostage as the family returned to the village. The police beat up the hostages, took cameras from our military cameramen and threatened our Russian brigade soldiers, who had responded to the incident.

In terms of multi-echelon actions, we had task force soldiers on the scene trying to defuse the situation and commanders at the brigade level dealing with their faction counterparts—one commander in the security police headquarters, working the issue from that point of view. Meanwhile, I was talking to government officials and faction corps military commanders and my ARRC [Allied Central Europe Rapid Reaction Corps] commander was talking to the president and minister of interior of one country and the president of another. Simultaneously, we all sang the same tune: there's a problem in this village; we'll handle it; make sure your soldiers stay in their barracks; and (for the guilty faction) pass the order down to the local police to get in line with the treaty.

Our corrective actions also are multidimensional—on the scene, through the factions' recognized chain of command and, as necessary, in the "deep attack." If, say, the local police of a village continues to break the peace accord, we position Apache helicopters "deep" at the storage site of the guilty faction's heavy equipment, which may be 20 or 30 kilometers away from the village. Then we make sure the guilty faction understands that if the incident blows up, the Apaches will destroy that equipment in about 45 seconds. And, oh-by-the-way, we may have a couple of F-18s from an aircraft carrier fly low over the incident area and/or the weapons site to further demonstrate our determination to carry out the threat, as necessary.

In the incident yesterday, the local police acquiesced—released the family members, returned the cameras and backed off. So the steps worked to defuse the situation, and most of the world never knew the incident happened.

Q *What was your organization for combat coming into country and how and why did you change that organization as Operation Joint Endeavor progressed?*

A It was exciting trying to determine our organization for combat in the September-October time frame last year because of several dynamics. One was they were still negotiating the Dayton Accord, still defining the military provisions. So we kept one eye on the negotiations while simultaneously putting together the multinational coalition.

Major General Nash talks to a Russian soldier from the Russian airborne brigade in Task Force Eagle.

Another dynamic was our trying to understand the situation in Bosnia-Herzegovina. Even though the division had worked on Bosnia for a number of years, all the expertise was based on different missions—imposing combat power into the area or supporting a UN withdrawal. As we were figuring out the situation in Bosnia, we were putting the force structure together.

We knew we wanted a lot of fire support assets in Task Force Eagle. A major challenge came when the Nordic-Polish Brigade [Norway, Sweden, Denmark, Finland, Poland, Latvia, Lithuania and Estonia] decided to bring small mortars as its only indirect fire assets.

So we chopped a battery from our 2d Battalion, 3d Field Artillery to the Nordic-Polish Brigade to provide guns and an FSE [fire support element] for the fire support coordination slice while FIST [fire support team] assets from the 28th Infantry Division, Pennsylvania Army National Guard, provided the forward observation piece. Then my FSCOORD [fire support coordinator] tied that all together with radar coverage and integrated it into the division artillery—a classic example of how we structured multinational fire support in Task Force Eagle. That was our Total Army, multi-echelon fire support solution, and it worked very well.

We designed the force as a combined arms team with fire support integrated into the scheme of maneuver, including positioning fire support assets for visibility—close air support aircraft, attack helicopters, artillery and mortars.

We brought an unusual amount of counterbattery/countermortar radar assets with us, including the three Firefinder target acquisition batteries from US Army Europe [USAREUR]. We brought in additional radars from the 35th Infantry Div Arty [35th Infantry Division (Mechanized) Artillery], part of the Kansas National Guard, to cover Sarajevo under the tactical control of the 6th French Division but technically supervised by our FSCOORD.

Firefinder not only covered areas to detect indirect fires but also identified small arms fires—a bit of a challenge for the number of acquisitions. With the help of some great folks from CECOM [Communications and Electronic Command], those batteries developed excellent radar acquisition and target processing procedures and are the best trained in the US Army. So we designed the force initially to be, as Secretary of Defense William Perry said, "the toughest, meanest, biggest dog in town." Then as the former warring factions routinely and habitually complied with the provisions of the peace accord and massively demobilized, our force requirements to counter their militancy reduced.

So we began to focus on providing security for the national elections in September 1996. In the summer, we redeployed two heavy battalions back to USAREUR and introduced two military police [MP] battalions. Although we still maintained substantial warfighting capabilities, we traded slightly more than a hundred armored vehicles for well over 200 MP armored HMMWVs [high-mobility multipurpose wheeled vehicles]. The HMMWVs can go more places and cover larger areas while causing less damage to the limited, fragile Bosnia-Herzegovina roads.

Interestingly enough, this placed a burden on the military police to be the combined arms integrator for the tank, infantry and FA battalions—to interface with the FSEs, PYSOPs [psychological operations], civil affairs teams and the other combined arms combat multipliers. The MPs did extremely well.

On a smaller scale, we brought in unmanned aerial vehicles (UAVs) to keep an eye on the factions' weapons and ammunition storage sites and activities, reducing the requirement to constantly patrol. One of [Air Force UAV] Predator's great features is that headquarters elements at multiple echelons can see the same picture at the same time. Our aviation assets also have provided thousands of valuable hours of surveillance—as well as specific reconnaissance and demonstration-of-force missions.

SGT Nicole Smith. 135th PAD. Steel Castle Base. Bosnia

Q *What message would you like to send Army and Marine Redlegs stationed around the world?*

A Thanks for your great work. Task Force Eagle artillerymen are in all positions on the task force team, including being sent into some very difficult, nasty situations—setting up and inspecting faction weapons storage sites, convincing faction leaders to do the "right thing" and defusing situations. Redleg professionalism and superb performance have been paramount to the success of this operation. And we have been successful at our mission: stopping the conflict.

The responsibility for peace—stability and prosperity—rests on the shoulders of the people and leaders of Bosnia-Herzegovina. Regardless of whether or not peace ensues, I'll remain proud of and feel it an honor to have served with the soldiers of Task Force Eagle—be they Americans, Russians, Turks, Swedes or any other nationalities in the force.

Major General William L. Nash commanded NATO's Task Force Eagle, composed of 15 brigades and 26,000 soldiers from 11 nations, in Bosnia-Herzegovina from December 1995 to November 1996; simultaneously, he commands the 1st Armored Division now redeployed to Germany. His previous assignment was as the Program Manager for the Saudi Arabian National Guard Modernization Program in Riyadh. He commanded the 1st Brigade, 3d Armored Division in Germany and during Operations Desert Shield and Storm in the Gulf.

Colonel Gregory Fontenot, Commander of 1st Brigade Combat Team, 1st Armored Division and Task Force Eagle, Bosnia-Herzegovina

Peace Enforcing:

Never Let Them See You Sweat

Interview by Patrecia Slayden Hollis, Editor

Editor's Note: This interview was conducted on 13 October 1996 at Kime Base, the 1st Brigade Combat Team's headquarters north of Tuzla, Bosnia-Herzegovina (see the map on Page 6), shortly before the brigade began redeploying back to Germany. As Major General Nash, commander of Task Force Eagle, indicated in the previous interview, the Joint Military Commission (JMC) at the brigade and battalion levels are the "front lines" of negotiations in treaty compliance enforcement.

Q *Bringing together the leaders of former warring parties in JMC meetings who may or may not have been belligerent toward the IFOR, how did you ensure the JMC would work?*

A We crossed the Sava River into Bosnia-Herzegovina on the 31st of December. But the JMC preparatory work started about the 20th of December. A few of us in four HMMWVs [high-mobility multipurpose wheeled vehicles] ferried across the river and faced 30,000 armed troops. We stopped at the first Serbian tank, and I banged on the side of the turret with my helmet to get somebody's attention. The Serbian liaison officer with us thought we were all going to die.

It was theatrical, banging on the side of a T-72 turret with my helmet. But we wanted them to understand clearly up front that they didn't want to tangle with us—"We're the IFOR, and we're here to enforce the treaty, any questions?" Then we lumbered across the Sava River bridge with the lead tank flying the red and white cavalry guidon, helicopters in the air and howitzers with their big gun tubes rumbling around everywhere. That said, "We're here, and if you start something, we'll take care of business and be back across the river headed home in two days."

In this type of mission, looks count. So

we were calm, professional and deliberate without being provocative. We were tough-minded without "swaggering" (challenging them to take us on) or without making them feel small. We made sure they all understood we had legitimate authority to enforce the military provisions of the treaty and would do so impartially.

For the first few JMC meetings, we occasionally had a show-of-force as the faction leaders arrived for a meeting: Cobras passed by low, high-performance aircraft flew at 5,000 feet or less and tanks and howitzers moved around. It got their attention.

Occasionally, about 30 to 40 minutes into a meeting, loud jets would pass over. At that point, I would become annoyed and tell my JMC deputy—who, by the way, was my FSCOORD [fire support coordinator]—to get rid of those jets. Then, all of a sudden, the jets or other "annoying" show-of-force systems would disappear. The faction leaders respect the fact that the IFOR commander can summon or dismiss considerable force—but you don't want to overplay that.

It all worked. Ten months into the mission, some of the factions leaders told us they believed that from the beginning, we were deadly serious. The key here is, we were.

So, initially, that's how we established the JMC. I have to tell you, those were pretty scary times. But we never let them see us sweat.

Q *How did you operate the JMC?*

A The JMC was so critical to our mission that we prepared for each meeting as if it were a battle, war-gaming all the possibilities. My FSCOORD, the commander of 2d Battalion, 3d Field Artillery, was in charge of treaty weapons and ammunition site inspection and verification, so it made sense for him also to be the JMC deputy. The faction leaders knew he inspected their sites and had the indirect fire assets to target their sites. So he was ideal to play the "heavy" in the JMC meetings—bad cop to my good cop—when I needed him to.

We also employed a number of strategies in the JMC. First, we met with each faction separately, helping to develop a plan to withdraw forces, store their weapons at sites, etc.—intuitively, the faction leaders knew it was their responsibility. Then in meetings with all parties present, we codified the agreements reached bilaterally and reduced the argumentative, provocative aspects of those sessions.

The second strategy was to make the plan the factions' idea through education, coaching and discussions. For example, for the separation of forces JMC meeting, I had a detailed plan on how to separate their forces and was prepared to brief it if they couldn't agree on an arrangement; however, they agreed on a plan similar to the one we prepared, so we tore up our plan.

A principle we always adhered to was never to lie or exaggerate about requirements or consequences. We always told the factions the terms precisely and made

sure they understood the ladder of escalation—exactly what would happen if they didn't comply.

Let me give you an example. Early on, we were trying to transfer an armored brigade with its tank battalion and several APC [armored personnel carrier] battalions from one side of the ZOS [zone of separation] to another. We were not sure how the battalions were going to comport themselves because of an ongoing crisis. An IFOR aircraft had flown one of that faction's senior generals accused of being a war criminal to The Hague to be considered for trial. That faction had "broken relations with us."

So the day this brigade was supposed to move its forces across the ZOS, we had Bradleys at the start point and brought in Apaches and high-performance fixed-wing aircraft overhead. The brigade commander and one of my battalion S3s had a brief discussion about whether the unit was to move on time—so I brought the Bradleys and helicopters in closer and the jets down about 5,000 feet. The faction commander said, "Don't attack. We'll do what you want." Our response was, "It's not what we want, it's what the treaty requires." Problem solved.

There's a lesson here. If part of your peace enforcing mission is show-of-force with the goal of not having to fight, then you need to show overwhelming force.

We applied another principle (after we tested and confirmed it): go into the JMC with the assumption that the factions want to make the treaty work—even when they have problems complying or need to vent their frustrations. If one leader says his commander won't let him do such-and-such, then you work through the JMC at Task Force Eagle or higher level to make sure faction leaders up and down the chain are on line with the requirements of the treaty.

We are like referees. We maintain a presence, patrol and verify compliance by inspection and inventory. When faction soldiers violate the treaty, say for example, have weapons in the ZOS, we take their weapons. We impose penalties that compel the factions to comply with the treaty.

Q *Your direct support [DS] FA battalion is organized into a minidivision artillery [Div Arty] with a meteorological section, target acquisition battery and multiple-launch rocket system (MLRS) platoon. Why?*

A The reason is twofold. First, our AOR [area of responsibility] is large: 3,500 square kilometers. The Div Arty doesn't have enough resources to position them throughout Task Force Eagle's AOR—more than four times the size of our AOR. So the Div Arty commander decentralized operations and assigned support assets to his FA battalions; in effect, the DS battalion commanders became mini-Div Arty commanders.

The second reason for this organization is the way the task force functions. It has 15 brigades, five of which have AORs assigned in decentralized operations. The task force commander functions like a corps commander. The maneuver brigade has some divisional functions to perform in its AOR, such as running its own counterfire program. The brigade has slices of everything needed to plan and execute operations in a decentralized mode. For example, we have our own air capability and surgical team.

The problem this FA organization has caused is I don't have enough fire support assets to do all I need to do. So with the advice of my FSCOORD, I decide where the gaps in coverage will be. Ironically, I used to blame the division commander for gaps in coverage; now I'm responsible.

Another challenge has been that the FA battalion staff isn't robust enough to perform all the additional functions. What I'm saying here is, we still need a division artillery.

Q *You deployed your howitzer platoons in "presence missions." Why and what were the advantages and risks involved?*

A Here in 1st Brigade, we send a howitzer platoon out to occupy a position that can range certain targets for three or four days as an IFOR presence. Actually, 2d Brigade does something similar, which it calls "Raids." But as I understand it, 2d Brigade's howitzers come back to their base camps every night.

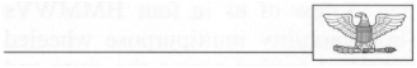
My area is so large that we, literally, maneuver our FA platoons to certain important towns and areas that we otherwise physically could not cover. We never want the factions to forget that our howitzers are here and prepared to take care of business.

We have invited faction soldiers and leaders to watch howitzers occupy positions and conduct fire drills and to examine our fire direction system. It did not take them long to appreciate that our FA is significantly more effective and faster then their artillery—not a capability they want to examine from the business end.

We based our platoon presence missions on the assumption that, doctrinally, an FA platoon can defend itself. Obviously, the risks include the potential for a small unit tactical defeat, if attacked. However, there's also a certain amount of risk associated with parking all the howitzers in base camps, so we decided the risk was manageable. We always position what few howitzers we have to range targets of value to the brigade.

Q *What message would you like to send Redlegs stationed around the world?*

A I would tell Redlegs two things. First, when you train, think in terms of providing fire support in decentralized operations with no front line, no rear and no flank. Second, keep your bags packed—we need you and you're going to go.



Colonel Gregory Fontenot commands the 1st Brigade, 1st Armored Division, Germany, also part of Task Force Eagle in Bosnia-Herzegovina for Operation Joint Endeavor from December 1995 to November 1996. He commanded 2d Battalion, 34th Infantry, part of the 1st Infantry Division (Mechanized) at Fort Riley, Kansas, and during Operations Desert Shield and Storm in the Gulf. His battalion earned a Valorous Unit Award for actions during the initial breech of the Iraqi forces and a night tank battle against a Republican Guard brigade. In the 3d Armored Division in Germany, he commanded B Company, 33d Armor. Colonel Fontenot served as the Director of the School of Advanced Military Studies at the Command and General Staff College, Fort Leavenworth, Kansas, before taking command of his brigade.

TA in Sarajevo—

Multinational and Terrain Challenges of Operation Joint Endeavor

by Captain John H. Campbell, KSARNG

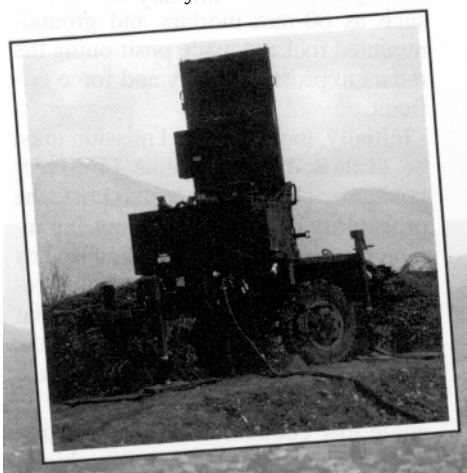
In February 1996, 30 soldiers of E Battery, 161st Field Artillery (Target Acquisition), 35th Infantry Division (Mechanized), Kansas National Guard, were mobilized for duty in Operation Joint Endeavor, a NATO peace enforcement mission in Bosnia-Herzegovina. A detachment—two of our Q-36 Firefinder radar sections with command and control elements—arrived in country in March with the mission of recording and reporting any firing violations of the Dayton Peace Accord in Sarajevo.

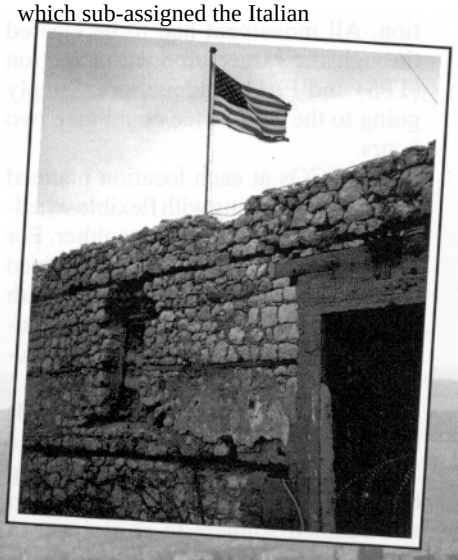
The challenges were considerable. For six months we performed TA in a multinational environment set in the midst of a war-torn city in mountainous terrain.

Background

Although E/161 FA Detachment (FAD) was assigned to the US-led Task Force Eagle, we were under the tactical control of the multinational Allied Command Europe (ACE) Rapid Reaction Corps (ARRC) in Sarajevo, some 120 kilometers south of the task force. The ARRC, in the French Sector, assigned the 6th French Division tactical control of the FAD, which sub-assigned the Italian Garibaldi Brigade tactical control of us. We also worked closely with the ARRC fire support coordination cell (FSCC) in Sarajevo, which was manned by British and US soldiers.

Training for the Mission. Our mobilization plan called for 30 days of training at the mobilization site. The superior support of the Kansas National Guard made it possible for the FAD to deploy to Germany in under 15 days. During this period, we received new five-ton trucks, the initial fire support automated system (IFSAS), the single-channel ground and airborne radio system (SINCGARS), 100 percent of our prescribed load list (PLL) and many other items needed for operations in an area so far from the US support system. Theater-specific training, such as cold weather survival, minefield awareness, rules of engagement and other combat skills, was received at the Combat Maneuver Training Center in Hohenfels, Germany. The 41st Field Artillery Brigade, also in Germany, worked with us on equipment and maintenance issues, ensuring we had everything we needed to operate as a US TA slice under the tactical control of an allied headquarters.





35th Infantry Division (Mechanized), Kansas National Guard, Q-36 Radars positioned at the airport (left) and the ruins of an old Turkish fortress (right). The radars cover Sarajevo (below).

35th INFANTRY DIVISION

We knew the radar could track objects other than indirect fire rounds, such as small arms fire or aircraft, but we didn't know how to manage those acquisitions. Communications and Electronic Command TA experts from Fort Dix, New Jersey, conducted detailed technical training on the volume and types of acquisitions we could expect and how to refine the radar's information to accurately assess if an acquisition was indirect fire or another violation of the accord.

The Threat. Sarajevo was the economic and cultural center of Yugoslavia and the scene of some of the most fierce fighting among the Muslims, Serbians and Croatians during the four years of war prior to the Dayton Peace Accord. The city has numerous tall office and apartment buildings that provide great places for snipers operations. Along the main trafficway, nicknamed "Sniper Alley," snipers would sit in the tall buildings that line the street and shoot at will. Like most of Bosnia, the city also was mined heavily.

Sarajevo is the only "Federation" or dually governed city in Bosnia-Herzegovina and is governed by the Croatians and Muslims. Considerable animosity still exists between the Croats and the Muslims, so the Federation is very fragile. This is complicated by the fact that many Serbs remain in Sarajevo, resulting in skirmishes several times a week in old Serbian neighborhoods. These skirmishes involved anywhere from a couple of combatants up to several hundred. Additionally, many internationally known terrorist groups have a presence in Sarajevo.

When we first arrived in Sarajevo, we experienced drive-by shootings and mines exploding in heavily used roads. These incidents probably were a show of bravado and intended for harassment. And, of course, there always was the danger of indirect fire from the former warring factions' considerable artillery and mortar assets.

The threat lessened as the situation stabilized with the verification and inspection of the factions' stockpiled weapons and their compliance with other aspects of the treaty. Our focus shifted a little. Countering complacency became increasingly difficult due to long dull periods. However, there was always the potential for a small event to escalate into an international incident.

Lessons Learned

As a TA slice working with allies in a nontraditional operation, we learned a lot about how to accomplish the mission on tough terrain.

Training. Continuous training in both military occupational specialty (MOS) tasks and situational awareness is the best way to reduce the danger of mines and other potential threats. However, the challenges of operating in Sarajevo made finding the time to train difficult.

Everyday functions required considerable planning and time. Convoys in the US Task Force Eagle Sector in the north had to have a minimum of four vehicles and eight soldiers as a force protection measure. We had fewer vehicles and personnel, so our convoys had a minimum of two vehicles and four soldiers—half the soldiers in a radar section. All movement had to be cleared through the target production section (TPS) and FAD headquarters. Simply going to the post office could take two hours.

Our NCOs at each location planned overlapping training with flexible schedules to accommodate every soldier. For example, radar crews often combined emplacement and displacement drills with maintenance shutdowns. The FAD headquarters or other units provided instructors to maximize training opportunities.

We cross-trained every soldier in 13R FA Radar Operator tasks and 13F Fire Support Specialist target processing tasks. Cross-training reduced boredom and enabled soldiers to participate in the two-week Rest and Relaxation program without endangering our ability to accomplish the mission. Additionally, our trouble-shooting skills improved as soldiers' knowledge expanded.

Multinational Lines of Communication. Complicated lines of communication intensify any confusion that exists, which is further exasperated by the lack of a common language. Communicating the capabilities and limitations of the radar and procedures for reporting and evaluating potential targets to our allies was complicated and time-consuming. Not only did we have to establish guidelines for passing information, but we also had to learn how to gather and assimilate intelligence from three very different international organizations: Italians, French and British. Eventually, we became an integral part of the Italians' intelligence collection plan. The Italians gave us access to their assessments of the current situation, including force protection issues.

Translators were not available; occasionally, an allied soldier spoke some English, but in most instances neither party could communicate effectively. We learned to write down every point or procedure we were attempting to communicate in important conversations and review them carefully with the allied officer or NCO in charge.

Positioning in Mountainous, Urban Terrain. We positioned two radars to cover the city and detect fires from the plentiful smaller caliber mortars. Unfortunately, this increased the probability of acquiring "unwanted" or "false" targets. Unwanted targets are things not normally considered targets, such as automobiles; "false" targets are acquisitions that aren't there. Traditionally, radars orient on likely positions of hostile weapons.

Sarajevo is not a large city, covering only about 20 square kilometers. However, mountains ring the city, and the variety of potential weapons available, such as 60-mm mortars and ground-mounted rockets, made positioning the radars to protect the city and force difficult.

Initially, the terrain and mission must be evaluated to determine Firefinder positions. The intent is to maximize the probability of the radar's acquiring indirect fire and limit problems caused by terrain, such as large buildings and vehicle traffic. Ideally, the Q-36 radar needs a low intermittent crest to the front of the antenna. This allows the operator to set the search beams at an angle low enough to ensure detection yet high enough that metallic objects moving on the ground won't cause unwanted acquisitions.

Building tops in Sarajevo would have made excellent positions. However, the majority of these structures either were too severely damaged or untenable due to force protection issues. To take advantage of the terrain, one radar was positioned on the ruins of an old Turkish fortress on a hill west of the city and the other at the airport on the southwest side.

The fortress radar had excellent coverage of the east-to-west valley in which much of Sarajevo is located. The negative aspect of the site was the altitude and the lack of a screening crest, producing the effect of looking down on

the city and increasing unwanted acquisitions. But the stone ruins of the old fortress and limited access to the position made force protection simpler. The radar section lived in the old fortress with a squad of Italian infantry for security.

The airport site was at a much lower altitude. It had a ridge line between the radar and the city that was high in some places, but two saddles in the ridge allowed good coverage to the northeast and southeast. The site was within the perimeter of a French infantry battalion securing the airport.

As one might expect, there was a considerable difference in the volume of activity at each location. The fortress radar averaged twenty more acquisitions a day than the airport radar. Most of the additional acquisitions were unwanted or false. The volume of acquisitions created target processing and management problems.

Multiple Acquisitions. We had to develop procedures to determine the validity of volumes of acquisitions and report them through our communications channels. We had thousands of acquisitions—only a few of which were valid targets. We had to report valid targets simultaneously to the Italians, French, ARRC and Task Force Eagle.

In the article "Evolving Tactics, Techniques and Doctrine for Fire Support in Peace Enforcement Operations" by Lieutenant Colonel Peter S. Corpac (July-August edition), the author comments on Firefinder's ability to track bursts of small arms fire. In fact, during a six-month period, we had more than 7,000 acquisitions, and none were from indirect fire. The high volume of possible targets required us to refine our analysis process. We had to develop a method for reporting only the pertinent information.

Our solution was similar to the flow chart developed by C Battery, 333 FA (TA) in the article "Red Rain—Counterfire Operations in Bosnia-Herzegovina" by Captain Brian A. Hodges, et al., that appeared in the September-October edition. In essence, we developed criteria to help sort through the huge amount of acquisition information.

We used the zone of separation (ZOS) mandated by the treaty and the known minimum ranges of the potential threat weapons as part of the criteria for determining the credibility of an acquisition. For example, acquisitions that didn't cross the ZOS from one faction to another or didn't fit the profile of an indirect fire weapon were merely logged. Others were processed further using some common-sense tests, i.e., is there a logical "target" at the impact grid? An impact on a deserted hilltop south of the city is not as serious as an impact in a crowded market place.

When we identified a potential target, we had to validate our data. If the acquisition was confirmed as a treaty violation, our information would be used as evidence. This meant someone had to visually inspect the source of the acquisition and the impact point.

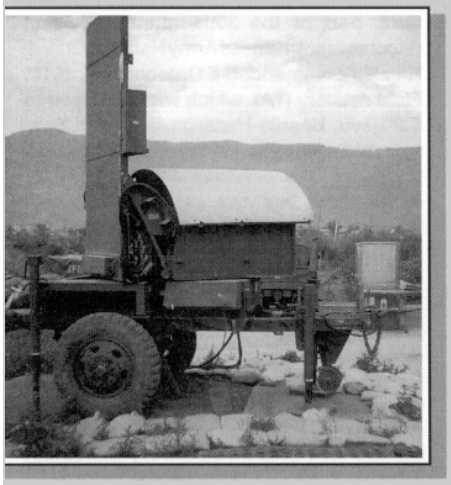
We began by calling the Italian, French and ARRC FSCCs as well as the Task Force Eagle fire support element (FSE) simultaneously on mobile subscriber equipment (MSE). Because we had to contact units of four different nationalities, we had to have four separate MSE systems available at all times. The MSEs were unique at the battery level and, due to our lack of familiarity with the system, very difficult to maintain.

Sarajevo is divided into two sections for command and control—one controlled

Firefinder Maintenance Tips

Our Q-36 radar site was on an old helicopter pad at the Sarajevo airport for Operation Joint Endeavor. In seven months, our radar operated 24 hours a day, seven days a week with only 48 hours down time. During our deployment, we learned several tricks to help maintain our radars.

• We shielded our antenna group from the elements, greatly extending the life of electrical components. We devised a simple aluminum cover for the antenna group (see the picture), which lowered the temperature by 12 to 15 degrees and shed rain water to prevent moisture accumulation inside the component cabinet.



• We built a weather cover over our S250 shelter from a tarp and a discarded support system from an M548 tracked command post. This cover shed rain and snow and reduced the internal temperature in the shelter to lengthen component life. To ease operator fatigue during the hot weather spells, we positioned the cover to allow 18 inches of air space between the top of the shelter and the tarp, promoting a cooling effect by natural air flow.

• While the equipment was stationary, we removed exhaust filters to promote the flow through air filters. Air filter maintenance was a daily concern because of the smoke and airborne dust in the city.

We removed the exhaust filters to increase the air flow and reduce back pressures. By operating in a static mode, road dirt and insects were not a problem in the open exhaust ducts. A constant stream of exhaust air prevented any contamination from entering the system.

• We wiped out the interior cabinets with alcohol weekly to prevent dust from building up.

• We adhered strictly to all adjustments and radar alignments—to include daily, weekly and monthly maintenance.

• Radar operators checked generator settings hourly. Once in a while, generator voltage and hertz settings drifted causing many faults and components to break down. A simple fix was to have radar operators do hourly generator setting checks to ensure clean, correct in-coming power.

• When we had to move, we moved slowly and carefully. The fine dirt and rough surfaces most convoys travel over would break our equipment connections and shake many equipment components loose. If we had to move, we did so slowly and easily.

Although not designed to track small arms fire, the radar did so quite effectively. Because of our grid-precise acquisitions, special teams made arrests and confiscated weapons, helping to ensure the former warring parties adhered to the Dayton Peace Accord.

CW2 Bruce B. Bryant, 131A
E/161 FA (TA), 35th IN Div (Mech)
Kansas ARNG

by a French Brigade and the other by the Italian Brigade. Our TPS had to interface with the headquarters of two different nationalities for the assets to visually inspect a suspected target and respond to a potential incident.

For example, acquisitions from a random single source (usually celebratory small arms fire) often came from one section of the city while the predicted impact was in the other. The TPS had to call both brigade headquarters and negotiate to determine who would send out a patrol to check the firing and predicted impact locations. Frequently, one brigade checked both areas, despite the coordination boundary separating the two.

After the visual inspection of the sites, a decision was made about how to respond to the incident. A confirmed attack from indirect fire could be countered with indirect means (in our seven months, we did not detect indirect fire). Other responses included the use of ground or air assets—AH-64 Apache attack helicopters or AC-130 gunships.

In the small arms fire example, our allies routinely dispatched a patrol to collect the weapon of the offender and issue a stern warning. In almost every instance, the Bosnian was puzzled about his detection and asked how the patrol found him. Very quickly our detection reputation spread throughout Sarajevo—we were dubbed "The Sniper Hunters." The fact that our 35th Infantry Division patch (shown upper left) resembles a rifle sight added credence to the title.

By studying the terrain and information about the structures in the area, the TPS was able to refine location data by mathematically correcting for the height of buildings. In many cases, we provided the exact grid of the source, precluding the necessity for a building-by-building search.

The system is designed to follow the contours of the terrain. But selecting which terrain feature to follow can be difficult, especially in urban, mountainous terrain. A program built into the radar will generate a limited sketch of the terrain and recommend a mask angle—the angle at which the search beams are emitted from the radar. In flat areas, the radar performs well with the program's mask. When the geography varies, such as in Sarajevo, the operator must refine this data by manually tracing the terrain with an aiming circle.

Integrating the manual terrain following within the limits of each site was a continual process. Many factors can cause an operator to change the mask angle. For example, the fortress radar had to account for a larger flow of vehicles on the streets as the crowds and traffic began to return when the city began to stabilize. Our solution was to raise the mask angle high enough to exclude the street but still observe sub-caliber mortars.

Looking East from the Turkish Fortress. Mountains close to a radar make it possible for rounds behind the crest to go undetected.

Tall mountains close to a radar produce a high mask angle, making it possible for rounds behind the crest to go undetected. The mask angle is usually between the extremes and requires the operator to have considerable experience and patience.

Maintenance. Peace enforcing operations typically require the radar to operate continuously, increasing the emphasis on maintenance. The radar's developers focused on the Cold-War battlefield and a Fulda-Gap scenario. Radiation times were limited to a few minutes in a single location before detection was eminent. We developed schedules to cue the radar at key moments.

TA for peace enforcing is a 24-hour operations. In spite of our grueling radiate schedule, we only had one maintenance problem that resulted in more than a few hours of down time for a radar during our six months in Sarajevo.

Our maintenance schedule included a daily one-hour shut down for preventive maintenance checks and services (PMCS) and a weekly six-hour stop for a thorough look. Elements from the FAD maintenance and communications sections were always on site to assist the crew.

However, the key to a successful maintenance program begins with the operator. Simple things, such as rotating generators or faithfully performing PMCS, require dedicated soldiers and NCOs. The FAD worked to develop a maintenance SOP that was practical. Every soldier had input and, therefore, ownership of the plan.

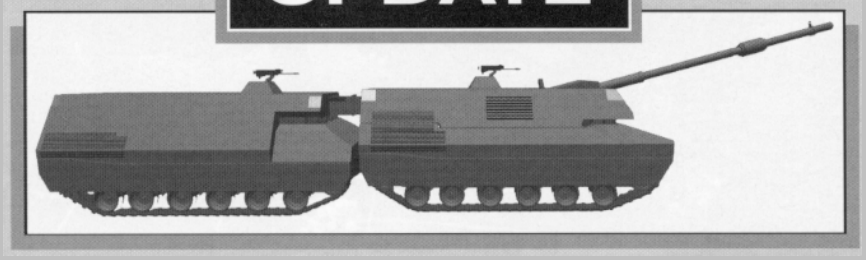
During our seven-month tenure in Bosnia, conditions in Sarajevo changed drastically. The city's population grew from about 200,000 to 400,000 people during our deployment. By the end of May, the sidewalks were filled with pedestrians and the streets with vehicles as people returned to rebuild their city. We, literally, witnessed the re-birth of Sarajevo.

In September 1996, all 30 of the original members of E/161 FAD redeployed home to Kansas. We returned with a new appreciation for TA and its role in a multinational peace enforcement operation. Additionally, our ability to operate in tough terrain improved our appreciation for our equipment considerably. As stability operations become more prevalent, it's clear that Firefinder radars will be actively employed. We are proud of our service in peace enforcement, especially our role in providing security to the people of Sarajevo.

Captain John H. Campbell commands E Battery, 161 Field Artillery (Target Acquisition), part of the 35th Infantry Division (Mechanized), Kansas Army National Guard. He also commanded E Detachment, 161st Field Artillery (TA), which was deployed to Sarajevo, Bosnia-Herzegovina, from February to September 1996 for Operation Joint Endeavor. His previous assignments include three months as Squadron Fire Support Officer (FSO) for the 3d Squadron, 3d Armored Cavalry Regiment during Intrinsic Action 93 in Kuwait; Commander of B Battery, 2d Battalion, 130th Field Artillery, part of the 130th Field Artillery Brigade in Kansas; and Company FSO with the 1st Battalion, 127th Field Artillery, also part of the 130th Field Artillery Brigade. Captain Campbell is a graduate of the University of Kansas and Vice President for Marketing and Sales of the Studdard Moving and Storage, Inc., Leavenworth, Kansas.

CRUSADER

UPDATE



Crusader, the Army's priority development program, will field the next-generation 155-mm self-propelled howitzer and resupply vehicle combination in 2005. In July, Crusader moved out of the Requirements Analysis Phase and into the Demonstration and Validation Phase where we design and start testing the vehicles. The next major review of the Crusader program is in the summer of 1997.

Requirements. Crusader must meet more than 500 operational requirements that cover the spectrum from rate-of-fire, range, accuracy, cross-country speed and reliability thresholds to operator decision aids. The most important subset of these requirements is called the key performance parameters (KPPs), which reflect the minimum characteristics required (see the figure).

The remainder of the requirements undergo a continual process of challenge-and-defend; some probably will be reduced or traded off to balance program costs, risk and performance.

Development Approach. The Crusader howitzer and resupply vehicle are being designed by the same team at the same time and will share hardware and software to the greatest degree possible.

One of the first steps in the Demonstration and Validation Phase is the preliminary design of the two vehicles. This step will begin to define subsystems such as armament, resupply, mobility, crew and command, control and communications. The prime contractor, United Defense Limited Partnership of Minneapolis, Minnesota, also is emphasizing supportability, transportability, reliability, availability, maintainability and training aspects in the designs.

Each vehicle will have a three-man crew that fights from a compartment in the front of the vehicle, relying on periscopes and electronic vision to navigate and maintain surveillance. Behind the howitzer crew will be the weapons compartment, home to the main gun armament and 60 complete rounds stored in automated magazines. Behind the resupply vehicle crew will be the ammunition compartment with 130 complete rounds stored in similar magazines. A 1500-horsepower diesel engine and transmission will be located in the rear of each vehicle, ensuring commonality of maintenance tasks.

	Required	Desired
Howitzer		
Rate of Fire (Rounds per Minute)	10	12
Max Range with M549A1 (Kilometers)	40	50
Resupply Vehicle		
Rearm Howitzer (Minutes to Load 60 Rounds)	12	<12
Howitzer and Resupply Vehicle		
Cross-Country Speed (Kilometers per Hour)	39	48
Highway Speed (Kilometers per Hour)	67	78

Crusader Key Performance Parameters

Crusader will fire all current and developmental 155-mm projectiles and fuzes, including the new XM982 dual-purpose improved conventional munition (DPICM) round and the XM773 multi-option fuze artillery (MOFA). The automated ammunition handling system will not be compatible with current bag charges, so more robust and efficient solid propellant has been designed. This two-charge modular artillery charge system (MACS) consists of the XM231 low-zone increment and the XM232 high-zone increment.

Throughout Crusader development, the systems will undergo rigorous testing and experimentation. The culmination of the Demonstration and Validation Phase will be an early user test in 2000, setting the stage for Crusader to enter the Engineering and Manufacturing Development Phase.

Recent Developments. After considering proposals from around the world, the contractor selected the domestic XM297 cannon as the armament system for Crusader. The US Army's Armament Research, Development and Engineering Center (ARDEC), Picatinny Arsenal, New Jersey, will design the cannon and cannon mount in an innovative "subcontractor" relationship to United Defense.

The Army's decision to transition FA battalions in heavy divisions from 3x8 to 3x6 organizations has increased Crusader's expected usage rates. Under average combat conditions in a 3x6 battalion, Crusader is expected to fire 45 missions per tube for a total of 448 rounds per tube per day and conduct more frequent survivability moves and howitzer-to-resupply vehicle rearm and refuel automated dockings per day. The new expected rates will increase the demands on the vehicles, requiring careful engineering.

Crusader for Army XXI. Even as we field the M109A6 Paladin, deficiencies are readily apparent. With a maximum range of 30 kilometers and rate-of-fire of four rounds per minute, many foreign systems outgun Paladin. The venerable M109 family of howitzers has served the Army well, but its 30-year-old chassis can't handle additional upgrades to the suspension and power pack. Limited ballistic protection and manpower-intensive operations are additional limitations.

Crusader is being developed to correct these deficiencies and increase cannon firepower for Army XXI. Analysis shows that Crusader's capabilities will increase the performance of the total force—not just the fire support force—by more than 50 percent.

MAJ John R. Holland, FA
Field Artillery School Representative
Team Crusader, Minneapolis, MN

Light COLT Platoon:

Improving the Effectiveness of Brigade Deep Operations

by Colonel Raymond T. Odierno, Major James L. Watson, Jr. and First Lieutenant Scott S. Marhold

The combat observation lasing teams (COLTs) of the 1st Cavalry Division, Fort Hood, Texas, are high-payoff targets (HPTs) for the opposing force (OPFOR) at the National Training Center (NTC), Fort Irwin, California. However, this has not always been the case.

About a year and a half ago, we took a hard look at the way our COLTs are organized and trained as well as how we employed them in combat situations. We found our COLTs couldn't survive the OPFOR's counterreconnaissance efforts—couldn't survive long enough to be effective during the deep and main battle area fights. In addition, they lacked adequate command and control to ensure they operated as a cohesive team and executed the brigade scheme of fire support. Essentially, our COLTs were ineffective; we couldn't rely on them to provide brigade combat team (BCT) commanders time-sensitive information and deep fire support observation.

Faced with these performance weaknesses, the 1st Cavalry Division Artillery (Div Arty), the Red Team, studied COLT initiatives of other division artilleries (including the 1st Infantry Division—The Big Red One) and implemented several initiatives to enhance the combat readiness of our COLTs. This article describes the organizational modifications and training initiatives we've employed. Additionally, we describe how our COLTs operated during NTC rotations and as a part of Joint Task Force-6 (JTF-6) counterdrug, border patrol operations.

The platoon leader conducts pre-combat inspections of team equipment. Here he verifies the operability of the ground/vehicular laser locator designator (G/LLVD).

COLT Platoon Organization

One of the primary factors contributing to COLT ineffectiveness was inadequate command and control. The current modified table of organization and equipment (MTOE) for a direct support (DS) 155-mm Field Artillery battalion authorizes six COLTs. Each team has three personnel: the COLT chief (13F20), a fire support specialist (13F10) and a radio-telephone operator (13F10).

With this organization, we lacked fidelity and leadership in four key areas: command and control for the six separate teams, mission planning for COLT operations, supervision of pre-combat checks (PCC) and pre-combat inspections (PCI), and understanding of COLT critical fire support tasks (CFST). The brigade fire support officer (FSO) and fire support NCO (FSNCO) were too entrenched in the brigade planning process

to provide the leadership the COLTs needed. The result was six COLTs operated without cohesion and accomplished only a portion of their potential for the BCT commanders.

Our solution was to develop a COLT platoon, joining the six teams into a cohesive unit under the leadership and supervision of a COLT platoon headquarters. (See Figure 1.) To staff the platoon headquarters, we decremented the DS battalion one company FSO and selected a Ranger-qualified lieutenant as the COLT platoon leader. In addition, we diverted one sergeant first class position from aerial observer positions in the Div Arty fire support element (FSE) to each of the DS battalions.

In certain situations, it's beneficial for the COLTs to operate as squads. Each squad consists of two teams working together with the senior NCO as the squad leader. These situations include missions requiring a large equipment load or two teams to travel along a similar route until they to move to their respective observation posts (OPs). In the latter situation, the COLTs most likely will provide redundant observation for each other during the battle.

Our COLTs usually operate with several pieces of equipment, creating soldier loads well over 90 pounds. This equipment includes a ground/vehicular laser locator designator (G/VLLD), night-sight, tripod, single-channel ground and airborne radio system (SINCGARS), enhanced position location reporting system (EPLRS), M16A2, night-vision goggles (NVG), precision lightweight global positioning system receiver (PLGR), rations, extra water and personal gear.

In addition to the team's challenge of carrying all that weight, it's very difficult for a three-man COLT to configure the load within their rucksacks; there's simply not enough room for the equipment.

To alleviate this problem, four-man teams are often necessary. The division's engineer brigade now requires each of its supporting engineer battalions to include an engineer soldier habitually as the fourth man on our COLTs for all training and deployments. The additional soldier enables the COLT to improve obstacle identification and employ a sleep plan that guarantees 50 percent security and observation at all times.

The COLT platoon leader and platoon sergeant provide the leadership the brigade FSO and FSNCO could not provide. They plan and coordinate the execution of the platoon's CFSTs. They also prepare and brief a COLT operations order to the COLT chiefs, focusing on their respective tasks, purpose and part in the overall brigade scheme of fires. Through the brigade FSO, the COLT platoon leader and platoon sergeant are the command and control link into the brigade battle staff for critical, time-sensitive intelligence reporting and brigade deep-fires planning and execution.

Reorganizing the COLTs into a platoon has advantages. The command and control provided by the platoon leadership has increased the COLTs' effectiveness. Each COLT more clearly understands its role in the brigade scheme of fires and, perhaps more importantly, its role in collecting critical battlefield information from which the brigade commander can make more informed decisions.

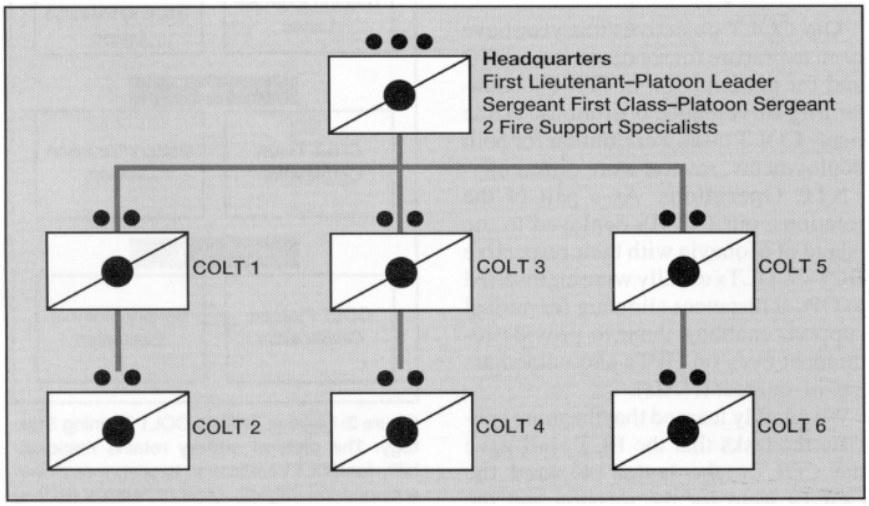


Figure 1: COLT Platoon Organization. Each of the six COLTs has a staff sergeant as the team leader, three fire support specialists and a high-mobility multipurpose wheeled vehicle (HMMWV).

COLT Training

It's difficult for one COLT section to maintain proficiency in both heavy and light operations. Consequently, we focus on light COLT operations and training. Our "light" COLTs combined with our heavy fire support teams (FISTs) provide heavy and light observers and enhance the brigade commander's flexibility to adapt plans to varying terrain and situations.

COLT Tasks. We implemented several training initiatives for our light COLTs to enhance their effectiveness and abilities to survive. These include integrating divisional aviation and reconnaissance team assets; sending COLT platoon leaders to the scout platoon leader's course at Fort Knox, Kentucky; and implementing a team certification process administrated by the Div Arty FSE.

To focus our training, we established individual and team tasks for COLT certification, as listed in Figure 2. Platoon headquarters tasks that focus on command and control and planning and preparing the platoon for combat operations also are listed in Figure 2.

Individual and Team Tasks

- Infiltrate by air, dismounted and mounted.
- Conduct immediate action drills on contact.
- Communicate—conduct remote single-channel ground and airborne radio system (SINCGARS) operations and retransmissions and erect expedient antennas.
- Evacuate soldiers wounded in action (WIA) and those killed in action (KIA).
- Exfiltrate.
- Conduct pre-combat inspections (PCI) and preventive maintenance checks and services (PMCS) on equipment.
- Conduct a Copperhead priority mission.
- Follow reporting procedures and execute the fire support execution matrix (FSEM).
- Know threat doctrine.
- Conduct a passage-of-lines.
- Establish triggers.
- Occupy an observation post (OP).

Platoon Headquarters Tasks

- Develop a COLT fire support plan.
- Develop an observation plan.
- Conduct battle tracking.
- Conduct back briefs and rehearsals.
- Develop a communications plan.

Figure 2: COLT Tasks. Each COLT has to demonstrate proficiency in individual and team tasks for team certification. The headquarters tasks focus the platoon's command and control and planning and preparation for combat.

Our first task was to develop the basic soldier readiness skills required for COLTs to survive and operate deep independently for several days. We structured training in three areas: physical fitness, small unit tactics and air insertions. We also incorporated fundamental artillery observation skills into the basic combat readiness training.

Aviation Insertion Training. The best method to insert COLTs into an area is air insertion by helicopter. Using this insertion method, COLTs can maneuver undetected to their OPs under the cover of darkness.

To develop the skills required to load and unload the helicopters as well as react to emergency situations, we coordinated with our aviation brigade liaison officer (LNO) to conduct training using the "crawl-walk-run" philosophy. First, we conducted static-load training on grounded aircraft at a designated landing zone (LZ). We then trained on uploading and downloading from the aircraft at several LZs along an air route during daylight. In our final stage of training, we performed the same tasks at night.

Skills such as marking an LZ for aircraft, calling in aircraft, loading equipment and personnel safely onto aircraft, and dropping the correct team at the correct LZ required many training events. We even conducted air insertion training in the preliminary weeks at an NTC rotation to take advantage of the mountainous and near-zero illumination conditions at Fort Irwin.

Division Reconnaissance Team (DRT) Training. Another unique aspect of our COLT training involves DRTs. In coordination with the division cavalry squadron, we plan and execute multi-day, off-site exercises. These exercises train our COLTs on survival tasks, reporting intelligence information and other tasks unique to DRT operations, such as rescuing a downed pilot. The training is realistic—we have an OPFOR search for the COLTs and DRTs while they provided accurate, timely intelligence reports.

COLT Certification. The certification process consists of a series of situational training exercises (STXs) with hands-on and written examinations to assess the COLTs and their platoon headquarters. In addition, we use the training set fire observation (TSFO) and live-fire to train and assess COLT fire support observation skills.

As much as possible, we integrate COLT certification into the DS battalion

The COLT platoon leader verifies the operability of the precision lightweight global positioning system receiver (PLGR).

Paladin tables and battery external evaluations. Another realistic assessment might be combining COLT certification with force-on-force training with a maneuver brigade.

Unlike FIST certifications conducted by the respective DS battalions, the Div Arty oversees COLT certification. The Div Arty's certification training strategy is depicted in Figure 3. By retaining responsibility for certification, the Div Arty commander can ensure that COLTs operating with one BCT can perform to the same standards as COLTs operating with another. This enhances the BCT commanders' flexibility to conduct deep reconnaissance and fire support operations.

COLT Operations

Our COLT objectives this year have been to prepare for rotations at the NTC and for participation in JTF-6's counterdrug surveillance operations. While many COLT tasks were similar for both deployments, several were different.

NTC Operations. As a part of the rotations, our COLTs deployed to the island of Mohavia with their respective BCTs. COLTs usually were air inserted to OPs at distances allowing for mutual support, enabling them to provide redundant eyes on HPTs and named-areas-of-interest (NAIs).

We quickly learned that the more specific the tasks that the BCT staff gave the COLTs, the better prepared the COLTs were for the mission and the better they understood their contribution to the brigade scheme of operations and fires. This more focused guidance from the staff enabled the entire BCT to mass its effects to support the commander's guidance more efficiently and effectively.

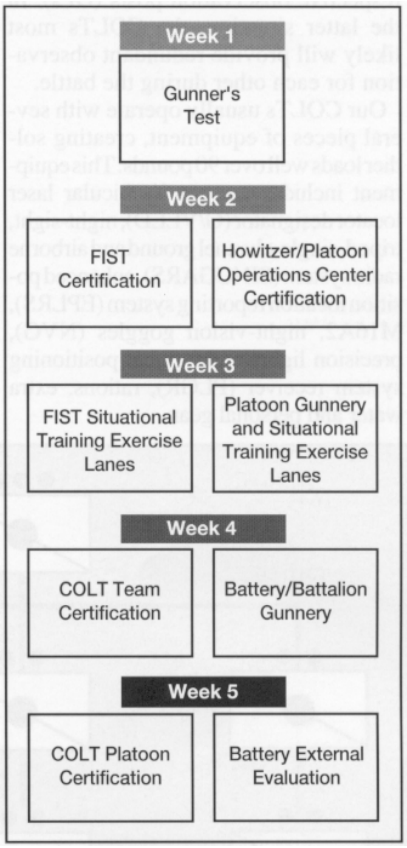


Figure 3: Division Artillery COLT Training Strategy. The division artillery retains responsibility for COLT certification to ensure each can enhance its brigade combat team's (BCT's) ability to conduct deep reconnaissance and fire support operations.

Air insertions allowed the COLTs to travel in darkness and rapidly insert at deep locations—10 to 14 kilometers in front of our forward line of own troops (FLOT). These insertions were relatively close to the COLTs' OPs and minimized noise and light. With the exception of one COLT inserted within one kilometer of an SA-8, all COLTs inserted by air survived every battle.

With COLTs inserted deep, communication is key. The OPFOR is good at locating observers when they transmit over FM radios. Consequently, we train our COLTs to use a new communication system: EPLRS. The system is effective because it is relatively easy to use, weighs about the same as a SINCGARS radio and the OPFOR can't use its direction-finding capabilities to locate the COLTs. EPLRS automatically relays transmissions through other EPLRS systems, allowing our COLTs to communicate at greater distances. EPLRS also provides continuous self-location and the location of all other EPLRS.

Our COLTs use EPLRS from the time they move out in helicopters or vehicles to approximately one hour before line-of-departure (LD)—the friendly or enemy force's LD. One hour allows the COLT platoon leader enough time to reestablish FM communications with each team. This is important because, as soon as forces cross the LD, the COLTs are overloaded with reporting intelligence and calling for fires.

When communicating over FM, the COLT platoon needs an internal net for platoon command and control and to improve the teams' ability to send the brigade tactical intelligence reports and fire missions. Otherwise, the platoon has to use a net already prescribed for other purposes, usually the brigade operations and intelligence net or FA battalion command fire net. Without an internal net, stations that key their microphones will "step on" the COLTs' long-distance transmissions. A dedicated COLT net allows the platoon headquarters to communicate efficiently and clearly with its teams, enhancing unity of command.

- Implement the rules of engagement (ROE).
- Infiltrate dismounted and mounted.
- Conduct immediate action drills on contact.
- Communicate—conduct remote SINCGARS operations and retransmissions, erect expedient antennas and conduct satellite communications (SATCOM).
- Exfiltrate.
- Evacuate soldiers WIA and KIA.
- Conduct PCI and PMCS on equipment.
- Follow reporting procedures.
- Know threat doctrine.
- Occupy an OP.

Figure 4: COLT Individual and Team Tasks in Support of Joint Task Force-6. For JTF-6, some tasks received special emphasis—implementing the ROE, medical evacuation procedures and reporting procedures. The reporting procedures were critical as the civilian border patrol agents were not familiar with military procedures.

JTF-6 Operations. When comparing the COLT tasks required for JTF-6 missions (shown in Figure 4) to those required for combat (Figure 2), one can see some JTF-6 tasks reinforce combat tasks. Preparing for and executing surveillance operations in support of JTF-6 enhance the combat readiness of COLTs.

For surveillance operations, we again focused on the basics: dismounted operations, dismounted and mounted land navigation, OP occupation procedures and reporting procedures.

However, some tasks required for JTF-6 operations were unique and received special training emphasis: applying rules of engagement (ROE), conducting a medical evacuation and following task force reporting procedures. The reporting procedures were crucial because each COLT sent reports to military personnel and civilian border patrol agents unaccustomed to military procedures.

Part of a COLT team prepares to move to a helicopter for air insertion.

Conclusion. An OPFOR regimental commander recently stated that, in terms of relative combat power, a COLT-kill was worth an additional motorized rifle company (MRC). He had learned that a well trained COLT in the right position can disrupt every step of his operations. Respect for our COLTs has grown as the teams improve their survivability and capability at the NTC and on the border with the JTF-6.

With training and certification of our new platoon organization and its integration with aviation assets, Red Team COLTs are more effective and lethal, significantly enhancing the BCT commanders' battlefield awareness.

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Major James L. Watson, Jr., is the Executive Officer for the 3d Battalion 82d Field Artillery, 1st Cavalry Division. His previous assignment was as the Fire Support Officer for the 2d "Blackjack" Brigade of the 1st Cavalry Division, deploying to Kuwait for Operation Intrinsic Action 95-03 and the National Training Center, Fort Irwin, California, for rotation 96-07. He commanded two batteries in the 3d Battalion, 29th Field Artillery, 4th Infantry Division (Mechanized), Fort Carson, Colorado. He's a graduate of the Command and General Staff College, Fort Leavenworth, Kansas.

First Lieutenant Scott S. Marhold until recently was the Combat Observation Lasing Team (COLT) Platoon Leader for the 3d Battalion, 82d Field Artillery, 1st Cavalry Division. Currently, he's a Paladin Platoon Leader for B Battery in the same battalion. His previous assignment, also in the battalion, was as a Company Fire Support Officer where he deployed to the Joint Readiness Training Center, Fort Polk, Louisiana, in a challenging heavy-light rotation. Lieutenant Marhold is a graduate of the Field Artillery Officer Basic Course, Fort Sill, Oklahoma, and Airborne and Ranger Schools, Fort Benning, Georgia.

Competing with Long-Range Enemy Artillery

by Captain Daniel S. Burgess, MI

US Multiple-Launch Rocket System (MLRS)

Russian Smerch 300-mm 9A52-2 (12-Round) Rocket Launcher

In today's world, there are many armies that have bought or built artillery systems that outrange our artillery systems. This threat is continually portrayed in Battle Command Training Program (BCTP) Warfighter seminars and exercises.

Until our army fields new systems—Crusader and the extended-range multiple-launch rocket system (MLRS)—that can fire 40 kilometers and beyond, artillerymen will face this threat. We must think of calculated, aggressive and lethal methods of employing artillery to compensate for and compete with long-range enemy artillery systems.

BCTP's Artillery—Countering the Threat

The BCTP opposing force (OPFOR) planners emphasize fire support as the principal means to destroy enemy combat forces. The OPFOR plans to deliver massive amounts of accurate fires quickly and then exploit the results of these fires using ground forces. This Soviet-based doctrinal philosophy is copied in several foreign armies in the world.

The OPFOR commander organizes his long-range artillery into army artillery groups (AAGs) and army groups of rocket artillery (AGRAs). These groups doctrinally deploy four to eight kilometers from the forward edge of the battle area (FEBA).[1] However, from our experience facing the World-Class OPFOR commander, these published doctrinal distances are rarely followed. The OPFOR realizes that the artillery is his center of gravity. He must be able to leverage his long-shooters at decisive moments to compensate for other inherent weaknesses—less capable armored vehicles, lack of night vision devices, etc.

The preservation of the enemy's long-range artillery is the absolute key to his ground plan. Therefore, the OPFOR commander positions his long-range artillery 20 to 30 kilometers from the FEBA. This is based on the fact that we doctrinally position MLRS five to 15 kilometers from the forward line of own troops (FLOT) and minimum ranges for the enemy's artillery systems. Such positioning allows the enemy to take advantage of his range standoff and fire with little or no counterfire threat.

During the 4th Infantry Division (Mechanized) Warfighter, Fort Hood, Texas, the division artillery (Div Arty) experienced this same problem. We were constantly challenged by the AAG/AGRA or corps artillery groups (CAGs) firing while we were out of range. The enemy's cannon and rocket systems as compared to the 4th Division's during its Warfighter 96 are shown in Figures 1 and 2. Note the number of systems that outrange ours.

Positioning Forward—Keeping MLRS in the Fight

During war gaming for the last III Corps Warfighter, it became readily apparent that the restrictive, mountainous terrain would create some special challenges for the division. Maneuver space was extremely limited in our area of operations (AO), and the enemy positioned

his long-range artillery to take advantage of his superior range.

Our planners decided to push MLRS far forward to mitigate the enemy's tactic. During war gaming, our primary consideration for determining artillery positioning was the difference in planned target sets for both direct support (DS)/reinforcing (R) artillery and general support (GS) artillery.

Experienced enemy artillery commanders displace their long-range artillery rearward to stay out of our MLRS range fan. This move is generally based on their assessment of the expected rate of the forward movement of our MLRS artillery. Most threat armies expect our GS to follow DS artillery. Our doctrine states that MLRS usually is positioned five to 15 kilometers behind the FLOT. Therefore, the key to defeating the enemy's "positioning tactic" is to move our MLRS forward more rapidly than he expects.

During the corps Warfighter, positioning MLRS forward didn't interfere with our DS artillery because the brigade's high-payoff target (HPT) sets were primarily within 10 kilometers of the FLOT. Our DS/R artillery assets can hit those targets from positions as far back as 20 kilometers—10 kilometers preferred, using the 1/3-2/3 rule (one-third of the system's range is behind the FLOT while two-thirds is beyond the FLOT). So moving GS artillery forward didn't inhibit the DS/R mission.

Even if the enemy artillery's range is equal to or slightly shorter than friendly systems, he can keep it out of our range fan if we don't aggressively position our GS assets forward. We either must get Field Artillery within range or use other assets to kill his artillery. The only way to get Field Artillery in range is to position it farther forward than he expects (or he will just reposition his systems farther back).

The corps Warfighter scenario demonstrated the usefulness of positioning GS assets forward. Such positioning is logical in most environments and situations, based on the doctrinal roles and missions of the division and corps in counterfire and deep interdiction. DS/R units are primarily intended for close support and interdiction. According to the "Inherent Responsibilities of FA Missions" found in *FM 6-20 Fire Support in the AirLand Battle*, the DS/R unit's zone of action is the supported unit's zone of action—typically a brigade.[2] The DS/R M109A5 and M109A6 howitzers usually can accomplish their missions from 10 kilometers or more behind the FLOT. Therefore, MLRS forward of the DS/R artillery allows the launchers to attack and destroy enemy long-range artillery while not interfering with the DS/R missions.

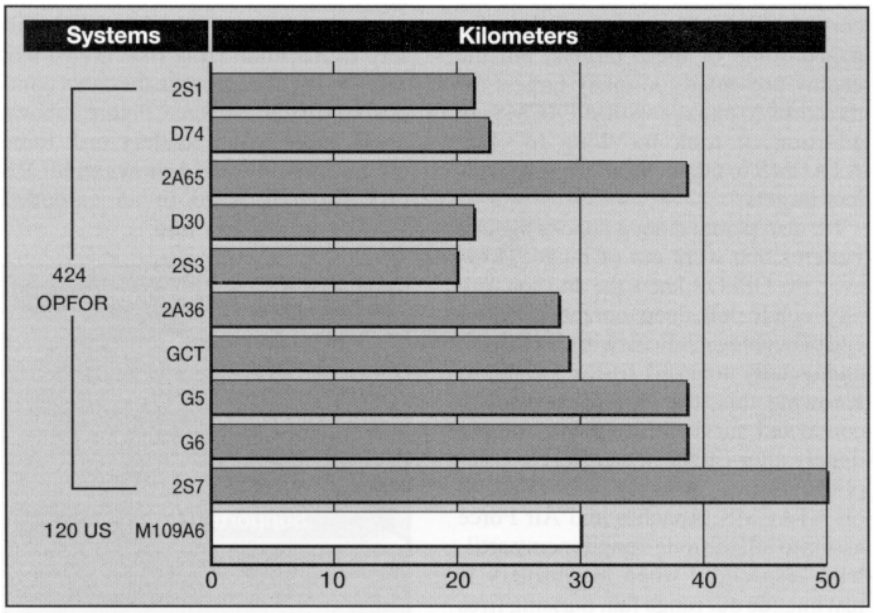

Figure 1: Tube Artillery in Division BCTP Warfighter Exercise. The BCTP opposing force (OPFOR) tube artillery systems outnumbered the division tube artillery systems 3.5 to 1. Note the number of OPFOR systems that outrange the US systems.

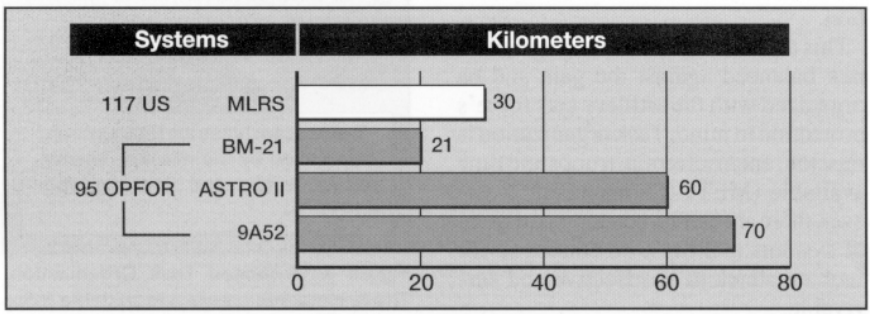

Figure 2: Rocket Launchers in the Division BCTP Warfighter Exercise. The US multiple-launch rocket systems (MLRS) outnumbered the OPFOR launchers slightly—1.2 to 1. But the OPFOR launchers had a decided range advantage.

Deep Interdiction Strikes—Taking the Fight to the Enemy

Another method to be considered to counter the long-range artillery threat is a MLRS deep interdiction strike. Much has been written about deep interdiction strikes. Aviators might call this concept a variation of a joint air attack team (JAAT). Although the term "JAAT" is losing popularity as a doctrinal term, the Air Force describes it as a joint air attack team in a coordinated attack on one target array by helicopters and fixed-wing aircraft, normally supported by artillery or naval gunfire.[3] Some artillerymen might call this a "raid."

FM-6-50 Tactics, Techniques and Procedures for the Field Artillery Cannon Battery states, "The air assault artillery raid is the rapid movement of artillery assets by air into a position to attack a high-priority target with artillery fires."[4] Although this concept is similar, it doesn't cover the total spectrum of assets we need to accomplish the mission of destroying long-range enemy artillery.

One concept was introduced in the article "Deep Interdiction—The MLRS Deep Strike Option."[5] The article details how the 75th Field Artillery Brigade, III Corps Artillery, conducted deep interdictive strikes. The concept is based historically on artillery raids or preparatory raids conducted by MLRS batteries and cannon artillery before the ground assault during Operation Desert Shield.

The term "deep interdiction strike" is non-doctrinal. But it evolved from necessities driven by many BCTP exercises. Those necessities still exist. Therefore, I propose the following for conducting a deep interdiction strike. First, the primary purpose of the strike should be to kill high-payoff, long-range artillery systems. Second, the unit must conduct a risk assessment to ensure that the gain would equal or exceed the loss.

To explore the concept further, I'll review artillery raids conducted by the 1st Marine Division in Kuwait in January 1991 to kill Iraqi artillery, among other HPTs.[6]

The I Marine Expeditionary Force's (I MEF's) mission was to deceive and disrupt Iraqi forces operating in defensive belts along the southwestern border between Kuwait and Saudi Arabia. After conducting mission analysis, the MEF commander decided to push his artillery forward—to conduct an artillery raid—because of the depth of the targets. The raiding task force was the 5th Battalion, 11th Marines (5/11), consisting of two M198 batteries (155-mm, towed), one M109A3 battery (155-mm, self-propelled) and one M110A1 battery (8-inch). These were all GS assets.

Accomplishing the raid mission and protecting the force were considerations for determining the organization of the task force. The task force had a light armored infantry (LAI) company assigned to reconnoiter the firing position and secure the area. The task force used a forward air controller (FAC) to control EA-6B Prowlers to jam ground surveillance radars (GSRs) when the task force entered the enemy's range fan. Additionally, the FAC had F-18s and A-6Bs on-call to attack certain targets in coordination with the artillery, when appropriate.

Other assets under the operational control of the task force commander were a communications detachment to provide global positioning navigation and satellite communications; a motor transport battalion to provide heavy equipment transport (HET); an amphibian assault battalion; and a surveillance, reconnaissance and intelligence detachment to provide a mobile electronic warfare (EW) capability.

The task force conducted three raids. In the first, an infantry brigade command post was the primary target with secondary ones being targets of opportunity within the AO. In the second raid, the target was an Iraqi signal intelligence site with GSRs near the Umm Gudair oil fields. And in the last raid, the target was two Iraqi artillery batteries. All the raids were considered successful.[7] The raids provided the commander options to deal with special situations.

Generally, the purpose for adopting a deep interdiction strike strategy should be to kill long-range, high-payoff artillery systems—most frequently the HPTs that are the greatest threat to friendly forces. Positioning MLRS within range of these systems will allow divisions to be proactive in killing them without having to depend on the corps army tactical missile system (ATACMS).

In the last three division/corps BCTP exercises, the enemy's ability to use his standoff range and the division's inability to employ counterfire against those targets greatly reduced our capacity to defend ourselves. During our Warfighter, we passed targets out of range to the corps artillery. The corps artillery engaged some of these targets, but the enemy presented too many targets for the corps to engage with ATACMS. In addition, it took too long to clear ATACMS to attack these fleeting artillery targets.

We also planned deep attacks against systems that were out of range. However, the OPFOR knew the division usually conducted deep operations after end of evening nautical twilight (EENT) and usually attacked artillery systems. Knowing this, the OPFOR habitually conducted survivability moves immediately after EENT in an effort to complicate our targeting. We can't depend on ATACMS, Apaches and Air Force assets to kill the long-range enemy artillery—especially when his artillery is just outside our range fan, massing fires on our division forces. We need a rapid, deadly counterfire response. We must have a tactic that deals with this situation.

This tactic must be based on a prudent risk balanced against the gain and be organized with the artillery task force's protection in mind. Task organization is mission, enemy, terrain, troops and time available (METT-T)-dependent; however, there are certain concepts and types of systems that must be employed for such an attack to be effective and survivable.

During the planning for the USMC raids, a ground maneuver force was attached to ensure the effectiveness of the mission and the survivability of the task force. Another key to the protection of the force is the Q-37 Firefinder radar. The radar should be linked (sensor-to-shooter) to an MLRS unit. This counterfire unit would be positioned forward with the other task force firing units but would remain silent until the enemy fired. Another option is to have an ATACMS battery prepared to protect the task force in cases where fires come from outside the MLRS range fan.

Other forces supporting the task force should include engineers to dig in survivability positions and reconnoiter the raid routes; on-call medical evacuation assets; on-call attack, fixed-wing air support and preplanned EW, the latter to jam GSRs; dedicated intelligence sensors to refine targets and assess the battle damage; Air Defense Artillery (ADA); and nuclear, biological, chemical (NBC) reconnaissance assets. All the elements combined create a formidable task force capable of ranging the enemy's long-range, high-payoff artillery while minimizing risk. Given that METT-T will determine the exact composition of the task force, Figure 3 shows an example of an artillery task force organization. Figure 4 shows an MLRS task force forward in an extended FLOT—an artillery raid.

Artillery Task Force

- ❑ 1 MLRS Battalion
- ❑ 1 AN/TPQ-37 Firefinder Radar
- ❑ Ground Security Force (Mechanized Infantry/Armored Forces)
- ❑ 1 Avenger Platoon (6 Systems)

Supporting Forces

- ❑ Engineer Package*
- ❑ On-Call Medical Evacuation
- ❑ On-Call Fixed-Wing Air Support (Close Air and Electronic Warfare)
- ❑ 1 Unmanned Aerial Vehicle (UAV) Package
- ❑ Nuclear, Biological and Chemical (NBC) Reconnaissance Capability*

* These asset types and amounts are determined by the mission, enemy, terrain, troops and time available (METT-T).

Figure 3: Proposed Task Organization. These elements create a formidable force to range the enemy's long-range high-pay-off artillery while minimizing the risk to friendly forces.

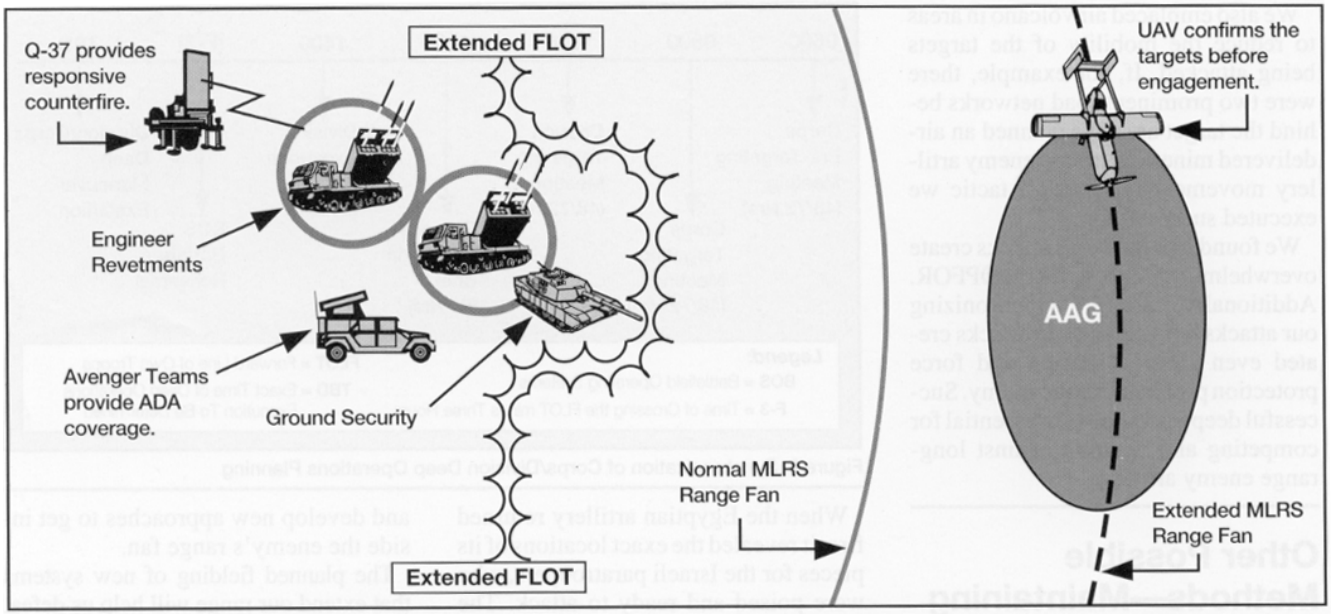

Figure 4: Extended FLOT. In this example, MLRS extends the previously established forward line of own troops (FLOT) to range the enemy's army artillery group (AAG). As the FLOT extends for MLRS, maneuver units secure position areas forward, further increasing the depth of the attack.

Deep Operations—Leveraging Assets

Another important key in competing with enemy long-range artillery is division and corps deep attacks. In the 4th Division, the commander forms a deep operations coordination cell (DOCC) to help plan, coordinate and execute division deep operations as well as coordinate deep operations with corps or a joint force headquarters. Our philosophy combines deep maneuver, deep fires, command and control warfare (C^2W) and countermobility operations. The DOCC is comprised of two teams: targeting and execution.

The targeting team (see Figure 5) deconflicts and synchronizes corps and division deep targets. It keeps division lookers and shooters synchronized through the life of the current plan using 24-, 48- and 72-hour time blocks. It also participates in deep operations working groups that war-game each day's operations and develop a detailed F-Hour (cross-FLOT hour) sequence to synchronize each deep attack. The targeting team lays the ground work for the execution team.

The execution team (Figure 6) oversees the execution of the deep operation. It ensures synchronization occurs between all echelons and forces concerned—an ongoing process. (See Figure 7 on Page 24.)

The synchronization sequencing begins at 0600 when the division's corps liaison officer (LNO) attends the corps targeting meeting. This meeting provides the division the corps deep forecasts for 24, 48 and 72 hours. The corps' forecasts and deep targets are back-briefed to the targeting team.

G3*
Deputy Fire Support Coordinator (DFSCOORD)*
Collection Manager
Air Defense Artillery (ADA) Rep
Air Liaison Officer (ALO)
Deep Operations Coordinator
G2*
Engineer Rep
G3 Air
FA Intelligence Officer (FAIO)
Electronic Warfare Officer (EWO)
G3 Plans and Exercises Rep
Aviation Brigade Rep
G3 Operations Rep
All-Source Production Section Rep

*Essential members of the team.

Figure 5: Deep Operations Coordination Cell (DOCC) Targeting Team

At 1000, the division targeting meeting convenes. Targets for the 24/48/72 hours are discussed and formalized. At 1200, the corps LNO attends the decision briefing to the corps commander.

Chief of Staff
Aviation Brigade Commander
All-Source Production Section Rep
Army Airspace Command and Control (A^2C^2) Rep
Deep Operations Coordinator
FSCOORD
Military Intelligence Battalion Commander
G3 Operations Rep

Figure 6: DOCC Execution Cell

At 1400, the division execution briefing covers the deep operations planned for that evening.

The execution team meets at approximately F-3—three hours before cross-FLOT operations. This team conducts final coordination, target refinement and the deep operations rehearsal to ensure the success of the mission.

In planning our deep operations, we integrated the division's close air support (CAS) nominations and short-duration air volcano (scatterable mines emplaced by helicopters) for simultaneous attacks across the battlefield. For example, during the first phase of our deep attack, we had the Air Force strike the AAG while attack helicopters attacked the AGRA. The attacks then shifted—the attack helicopters targeted the AAG while the Air Force fast movers went after the AGRA.

We also emplaced air volcano in areas to reduce the mobility of the targets being attacked. If, for example, there were two prominent road networks behind the target area, we planned an air-delivered minefield to stop enemy artillery movement rearward, a tactic we executed successfully.

We found simultaneous attacks create overwhelming problems for the OPFOR. Additionally, carefully synchronizing our attacks with corps deep attacks created even more confusion and force protection problems for the enemy. Successful deep operations are essential for competing and winning against long-range enemy artillery.

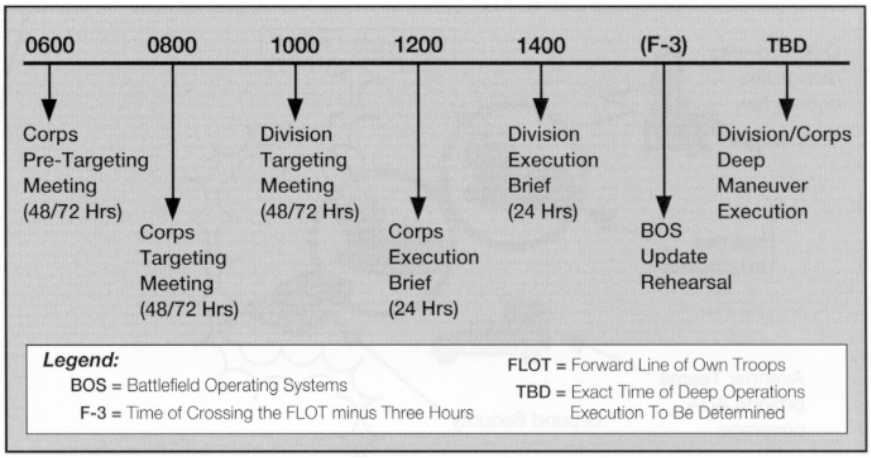

Figure 7: Synchronization of Corps/Division Deep Operations Planning

Other Possible Methods—Maintaining Flexibility

Another asset to attack enemy long-range artillery is an air mobile task force. This task force concept was successfully executed during the Egyptian-Israeli battle of Abu Ageila in 1967.[8]

The key to the Egyptian defensive positions was the artillery. The Israel Army Broadcast Service was quoted as saying, "Silencing the enemy artillery was the first objective in securing the mastery of Abu Ageila."[9]

The Egyptians relied on Soviet-made 122-mm field guns and 152-mm howitzers that outranged the Israeli 155-mm howitzers by 5,000 meters. Because of his range disadvantage, Israeli Brigadier General Sharon decided to use a paratroop brigade with two battalions against the prepared artillery positions.

In drawing up this bold and complicated plan, Sharon used three waves of six CH-34 Choctaw helicopters to transport 200 paratroopers to their landing site. Sharon then unleashed an artillery preparation that lasted for 30 minutes. Sharon's reaction to the preparation—"For half an hour, the fire was tremendous...I have never seen such fire in all my life."[10]

When the Egyptian artillery returned fire, it revealed the exact locations of its pieces for the Israeli paratroopers, who were poised and ready to attack. The attack was divided into three companies with each platoon targeted on an Egyptian gun emplacement. The paratroopers carried automatic weapons, grenades and knives.

The attack "helped demoralize Egyptian troops in the trenches by blurring the distinction for them between front and rear."[11] The front line forces thought they were being cut off, which created confusion and resulted in Egyptians' firing on their own forces. It also left the Egyptian infantry without fire support during a decisive time in the battle.

Sharon's bold attack set the conditions for the success of the Israeli Army in 1967. Doctrinally speaking, he followed the tenets of US Army operations. He used *initiative* by changing the terms of the battle, his attack allowed the *agility* of his forces to overrun Egyptian positions, the paratroopers' attack provided *depth* which was *synchronized* with the rest of his forces and his unique use of paratroopers to attack longer range artillery defines *versatility*.

Enemy long-range artillery poses the single greatest threat to US forces. To defeat these systems, we need to surprise the enemy—do the unexpected—and develop new approaches to get inside the enemy's range fan.

The planned fielding of new systems that extend our range will help us defeat the enemy's artillery positioned deep. But until they're fielded, we will continue to be challenged by this threat. The Army must use bold, decisive and lethal means to beat the enemy's long-range artillery.

Captain Daniel S. Burgess, Military Intelligence, until recently, was the S2 for the 4th Infantry Division (Mechanized) Artillery, Fort Hood, Texas, where he participated in four division and corps Battle Command Training Program Warfighter exercises. Currently, he is the Assistant S3 of the 4th Division's 104th Military Intelligence Battalion. Also at Fort Hood, he served as the III Corps Targeting Officer, 303d Military Intelligence Battalion. Captain Burgess served as the S2 for the 5th Battalion, 21st Infantry, part of the 7th Infantry Division (Light) at Fort Ord, California, and for the 3d Battalion, 20th Field Artillery, 41st Field Artillery Brigade, V Corps Artillery, Germany. He is a graduate of the Field Artillery Officer Basic Course and Targeting Course at Fort Sill, Oklahoma; the Military Intelligence Advanced Course at Fort Huachuca, Arizona; and the Combined Arms and Services Staff School, Fort Leavenworth, Kansas.

Notes:

1. *Training and Doctrine Command (TRADOC) Pamphlet 350-16 Heavy Opposing Force (OPFOR) Tactical Handbook*, (Fort Monroe, VA: Headquarters, TRADOC, 1994), 8-8.
2. "Inherent Responsibilities of FA Missions," *FM 6-20 Fire Support for AirLand Battle* (Fort Monroe, VA: Headquarters, Training and Doctrine Command, 1988), 2-9.
3. *Tactical Air Command Pamphlet (TACP) 50-20 Multi-Procedures for Joint Air Attack Team Operations* (Washington, DC: Headquarters, Department of the Air Force, October 1991), 1-1.
4. *FM-6-50 Tactics, Techniques and Procedures for the Field Artillery Cannon Battery* (Fort Monroe, VA: Training and Doctrine Command, 20 November 1990), F-5.
5. COL Dennis Cline and LTC Joe G. Taylor, Jr., "Deep Interdiction— The MLRS Strike Option," *Field Artillery*, PB6-93-2 (April 1993), 26.
6. LTC James L. Sachtleben, USMC, "Artillery Raids in Southwestern Kuwait," *Field Artillery*, PB6-91-5 (October 1991), 25.
7. MAJ Norman R. Brehm, *Evolving Field Artillery Standard Tactical Missions for Force XXI*, Master of Military Science Thesis, Fort Leavenworth, KS, 1995.
8. Dr. George W. Gawrych, "Key to the Sinai: The Battles for Abu Ageila in the 1956 and 1967 Arab-Israeli Wars," Research Survey No. 7, Combat Studies Institute, Command and General Staff College, Fort Leavenworth, KS, 1990.
9. Ibid, 96.
10. Ibid, 107.
11. Ibid, 109.

JSTARS' FSO/Aviation Officer Crewmembers

Beginning in February 1997, the Army gains greater leverage on the capabilities of the Air Force's joint surveillance and target attack radar system (JSTARS) as a force multiplier when the air crew includes a fire support officer (FSO) and/or Aviation officer. From Operation Desert Storm through the present time, the only Army personnel on board the aircraft during missions were Military Intelligence. The new Army FSO/Aviation officer positions allow greater flexibility in combining the intelligence, fire support and aviation expertise required for specific mission.

Paired with extended-range attack systems—such as helicopters, Army tactical missile system (ATACMS) and joint assets—JSTARS enables commanders to rapidly locate and destroy targets at great depth. The addition of the FSO/Aviation officers' expertise to JSTARS operations will help synchronize and execute Army deep operations. Also, by focusing the collection effort to support the Army commander's objectives, these new crewmembers will streamline the targeting process.

In 1994, the Training and Doctrine Command (TRADOC) initiated a study to assess the value of adding an FSO and/or Aviation officer to the on-board JSTARS crew; this study was in response to shortcomings identified during Operation Desert Storm. The Air Force agreed to evaluate the concept.

The Depth and Simultaneous Attack Battle Lab along with the Fire Support and Combined Arms Operations Department (FSCAOD) of the Field Artillery School, both at Fort Sill, Oklahoma, did the preliminary assessment of the FSO/Aviation officer positions, which were evaluated during the JSTARS ground station module (GSM) test in 1994. From the evaluation, a mission-essential task list (METL) for these positions were developed for the JSTARS augmentation experiment, also in 1994.

Although a METL analysis indicated the majority of tasks could be performed by accessing GSM information from the ground, some deep operations tasks are envisioned to be enhanced with the addition of the FSO and/or Aviation officer on board JSTARS. For example, the new crewmembers will expedite the engagement or restrike of targets, especially during the initial stages of force projection or coalition operations when GSMs might not be available.

The concept was further refined during the March 1996 JSTARS Command, Control and Communications Intelligence and Targeting Functional Analysis, better known as the JSTARS Manning Study. The study concluded that adding FSO/Aviation officer positions to the air crew would enhance the Army's ability not only to analyze battlespace, but also to adjust operations, particularly targeting priorities in deep operations.

The study defined baseline functions best accomplished on the aircraft. It makes three points. First, the JSTARS operator's duties do not include the deep attack operations functions identified for the Army positions. Second, no JSTARS air crewmembers are trained in Army Field Artillery and Aviation operations, to include detailed expertise in deep operations. Third, the FSO/Aviation officer positions could be critical for cross-forward line of own troops (FLOT) and deep attack operations on a noncontiguous battlespace.

After the positions were approved by the Army and Air Force, the Army JSTARS detachment table of organization and equipment (TOE) was amended to include the FSO/Aviation officer positions and is being reviewed at Headquarters, Department of the Army. The TOE now includes two Field Artillery officers (a lieutenant colonel and major) and two Aviation officers (a major and captain)—up to two of whom could fly as part of a JSTARS air crew, as the mission warrants. These officers will train as JSTARS crewmembers and serve two-year assignments with the 93d Wing at Warner-Robbins AFB, Georgia. As training and subsequent operations progress, the number of Field Artillery and Aviation officers in the detachment may be adjusted.

JSTARS will participate in the Task Force XXI Advanced Warfighter Experiment (AWE) in March 1997 at Fort Hood, Texas. Even though JSTARS intelligence feeds and downlinks will be simulated, the AWE will provide a great opportunity for the Army officers "on board JSTARS" to demonstrate the FSO/Aviation officer positions' contributions to the fight and refine tactics, techniques and procedures (TTP).

MAJ Quincy R. Jones, ARARNG
Depth and Simultaneous Attack Battle Lab
Fort Sill, OK

FA Publications and More on the Internet

The Field Artillery School, Fort Sill, Oklahoma, has placed some of its publications and draft documents on fire support for Task Force XXI on the Internet via the Training Command Home Page. To access the home page, search for http://sill-www.army.mil/tngcmd/tc.htm. The following can be accessed on the Internet:

FA Publications

- *FM 6-30 Tactics, Techniques and Procedures (TTP) for Observed Fire*, 16 Jul 91.
- *STP 6-13F14-SM-TG Soldier's Manual and Trainer's Guide for the Fire Support Specialist, MOS 13F, Skill Levels 1-4*, 24 Sep 93.
- *STP 6-82C14-SM-TG Soldier's Manual and Trainer's Guide for the Field Artillery Surveyor, MOS 82C, Skill Levels 1-4*, 22 Jul 93.
- *ST 6-1-1 Tactical Fire Direction System (LTACFIRE/IFSAS)*. (This document is no longer available in a paper-based copy.)
- *ST 6-1-2 Interim Fire Support Automated System (IFSAS) Aid* (This document is no longer available in a paper-based copy.)

Draft Task Force XXI Documents

- "Tactics, Techniques and Procedures (TTP) for the Advanced Field Artillery Tactical Data System (AFATDS)"
- "Tactics, Techniques and Procedures (TTP) for the Task Force XXI Paladin Battalion"
- "Task Force XXI Fire Support Handbook"
- "Experimental Force (EXFOR) Cannon Battalion Mission-Essential Task List (METL)"
- "Tactics, Techniques and Procedures (TTP) for the Strike/Recon Platoon (Striker)"

If readers have questions, they can call (405) 442-6101 or DSN 639-6101.

George L. Fogg
Technical Publications Editor, WIDD
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Training the Targeting Technician

The FA 131A Warrant Officer (WO) Targeting Technician evolved when we began putting WOs in targeting, FA intelligence officer (FAIO) and counterfire positions traditionally held by artillery officers. These officers were seldom in the positions long enough to become experts. Typically, they were only waiting for commands or other positions to become available.

Even with the advanced Field Artillery tactical data system (AFATDS) or the initial fire support automation system (IFSAS), targeting still requires timely, knowledgeable human decisions. Senior FA warrant officers assigned to targeting, FAIO and counterfire positions at the division artillery and higher levels can provide the needed expertise.

The seven-week Warrant Officer Advanced Course (WOAC) teaches senior WOs about division fire support automated systems and the fire support and targeting processes. Students develop the warfighter skills required to understand the "art" of making targeting decisions and the "science" of applying the tactical decision-making process.

Firefinder radar positions are filled by warrant officers one (WO1s) and chief warrant officers two (CW2s). Ten years ago, new radar warrant officers came up from the ranks of senior staff sergeants and sergeants first class—even master sergeants—and had radar operator and repairer backgrounds. Today, new WO1s arrive at the WO Basic Course (WOBC) with less than eight years in service and, typically, little fire support or radar experience.

In the six-month WOBC, new WOs receive six weeks of radar tactics, three weeks of radar operations and four months of radar maintenance training. Their training ranges from the tactical decision-making process and the intelligence preparation of the battlefield (IPB) to radar tactical and technical considerations, radar theory and basic electronics. Their initial assignment should be in radar technician positions.

The old radar technician, with his extensive electronics background, is retiring, making way for the younger warrant officer who receives more tactical training—is less technically oriented. The younger WO applicants from the various artillery military occupational specialties (MOS) ensure longer warrant officer retainability.

Younger warrant officers' assignments and development will align more closely with officer and senior NCO career progression: WO1 to CW2 to radar sections, CW3 to counterfire officer and FAIO positions, CW4 to division and corps targeting positions and CW5 to corps and above targeting positions.

Operation Joint Endeavor in Bosnia-Herzegovina has highlighted the technical challenges of employing radars in urban terrain. The Firefinder radar was designed to acquire hostile indirect fire weapons in combat. Difficulties in discerning hostile weapon targets from false or unwanted targets in an urban environment has been a key command concern. The new WO assigned to a Q-36 radar finds his system detecting small arms fire, helicopters and other anomalies. (Working on lower frequencies and having side lobe cancelers, the Q-37 has been more successful in urban and mountainous regions.)

Shades of FA in Bosnia October 1996

Sergeant First Class Jenny Clements, senior Meteorologist of the 1st Armored Division Artillery, clears her rifle before entering the "White House"—Headquarters, Task Force Eagle on Tuzla AFB. The sign reads: "1. Clear all weapons here before entering building. 2. Remove magazine before entering building. 3. Must be in proper uniform to enter building (weapon, mask, ice, kevlar). 4. 100% identification check required to enter building."

In addition, stability operations in Somalia and Bosnia have revealed a need for hardware and software improvements. The Communications and Electronics Command (CECOM), Fort Monmouth. New Jersey, is developing and testing new software for the Firefinder's force protection and for its information-gathering mission in stability operations.

Experience gained from these operations and our Combat Training Centers (CTCs) is being incorporated into training to prepare our junior warrants. For example, more than two years ago, the Target Acquisition Division of the Field Artillery School at Fort Sill started gleaning lessons from the National Training Center (NTC), Fort Irwin, California. We now have NTC exercise scenarios and products to train the WOBC and WOAC in division- and brigade-level targeting and fire support.

We recently added instruction on the tactical decision-making process and radar employment products to improve targeting and radar operations training. Our maintenance training also has been broadened to include supervisory troubleshooting skills, technical manuals and schematics. We now have a video device lab to improve students' electronic comprehension through self-paced individual learning. In the past two years, we've upgraded WOBC with additional training emphasizing radar employment and radar theory. The basic electronics lessons now focus on the Firefinder radar rather than general theory.

CECOM has provided engineering information on the radars to merge Bosnian issues with targeting and radar classes. For the new WO, this clarifies the radar's technical limitations and capabilities under the different terrain conditions, ranging from the Kuwaiti desert to the mountains in Korea and Bosnia.

Today, instructors develop products teaching lessons learned from Bosnia. Students study false and unwanted targets acquired at the CTCs or actual deployments—Panama, Bosnia, Somalia, Iraq and Korea. Today's WOBC students study target processing and force protection missions unique to stability operations as well as conventional target acquisition for combat operations.

The WOBC/WOAC evolution increases our warrant officers' professional confidence and knowledge. Confidence will translate into field effectiveness. The younger warrant officer will mature into the artillery target acquisition/targeting expert envisioned by our leaders.

CW3 Michael A. Eaton, 131A
TA Division, FSCAOD
Field Artillery School, Fort Sill

Bosnia Special—Maintenance in the Mud. This photo captures the flavor of battery maintenance in Bosnia and alludes to the gritty, boot-sucking, turret-topping challenges of most firing battery operations in country. Here, Redlegs of Task Force Eagle's B Battery, 4th Battalion, 29th Field Artillery repair howitzers at Demi Base south of Tuzla. The battery maintained a 98 percent vehicle readiness rate in Bosnia.

Photos by Sergeant Nicole Smith, 135th PAD, Steel Castle, Bosnia

The Role of the Div Arty S2

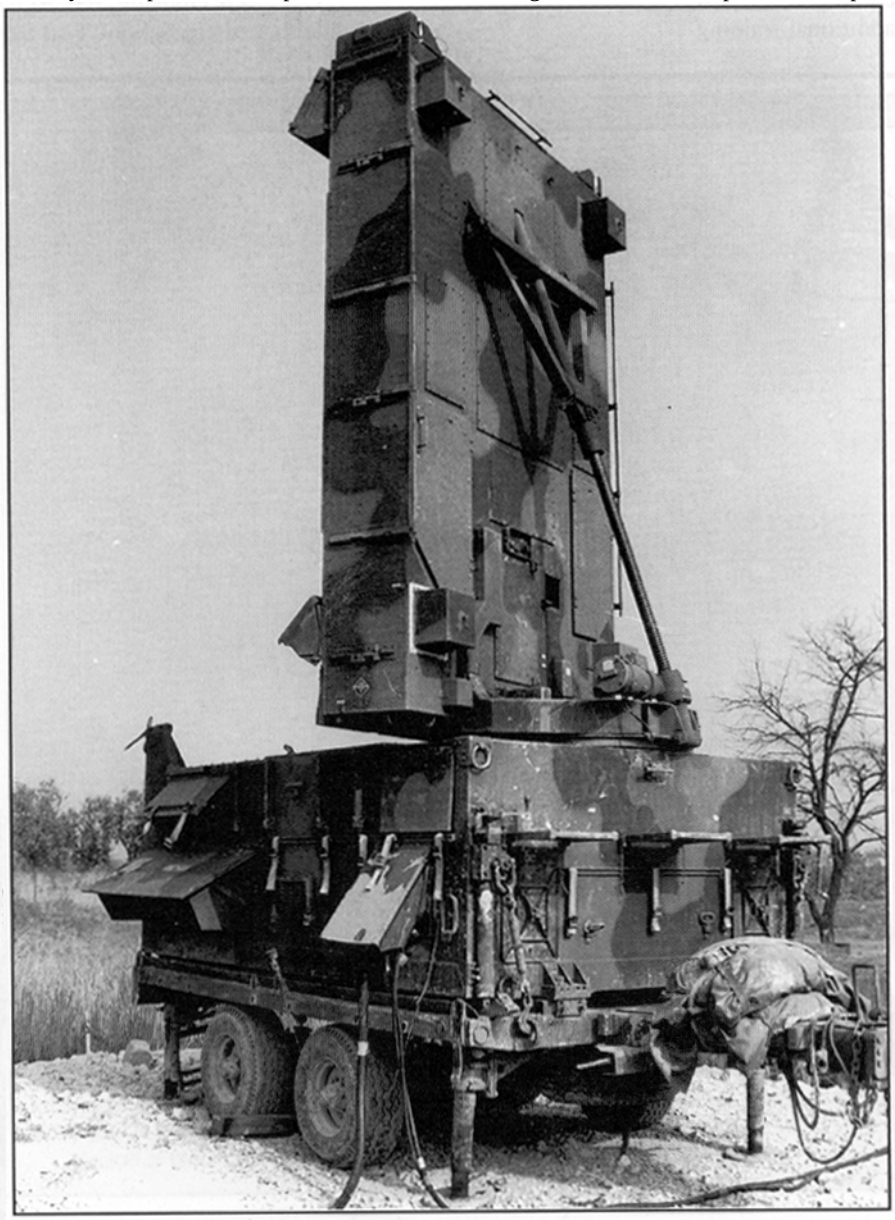
by Captain Daniel S. Burgess, MI

In 4th Infantry Division (Mechanized) Artillery (Div Arty), Fort Hood, Texas, the S2 is a key player in the division's Battle Command Training Program (BCTP) exercises. He focuses on the enemy's artillery—usually the enemy's center of gravity.

The Div Arty S2 assesses the enemy artillery composition, disposition and strength and then tracks the artillery; coordinates call-for-fire zones (CFFZs) for the division's AN/TPQ-37 Firefinder radars; and advises the S3 on positioning general support (GS) assets.

During our last division and corps BCTP Warfighter exercises, we learned several valuable lessons. These included tracking the battle on computerized maps, creating battle damage assessment (BDA) spreadsheets, linking unmanned aerial vehicle (UAV) "lookers" to multiple-launch rocket system (MLRS) "shooters," using common sensor boundaries to synchronize radar coverage for the division and corps counterfire fight and implementing radar survivability measures.

The Div Arty S2 section established and validated tactics, techniques and procedures (TTP) for the division's standing operating procedures (SOPs) during our BCTP ramp-up and Warfighter exercises. This article outlines that TTP, which could be helpful for other Div Arty S2 sections.



O-37 Firefinder. SGT Nicole Smith. 135th PAD

Tracking and Assessing the Enemy's Artillery

The Div Arty S2 plays a key role in tracking the enemy artillery. He uses radar acquisitions, the division's operations and intelligence (O&I) net combat information and the G2's order of battle database to confirm or deny the enemy artillery template and form the basis for the section's analysis. This information is battle-tracked on an all-source analysis system-remote work station (ASAS-RWS).

Battle Tracking Maps. The ASAS-RWS station operator maintains three maps on the computer: target acquisition (TA), spot report and current order of battle. On the TA map, Q-37 radar acquisitions are plotted manually. (The new version of ASAS-RWS communicates directly with the advanced Field Artillery tactical data system, AFATDS, eliminating manual plotting.) The acquisitions are color-coded by time. This allows the ASAS-RWS operator to see the sequence of artillery fires—i.e., Phase I fires by the army artillery group (AAG) or army group rocket artillery (AGRA). Additionally, the artillery template and CFFZs are managed and updated on this map.

The spot report map plots reports and combat information passed over the O&I net on the single-channel ground and airborne radio system (SINCGARS). The Div Arty S2 section depends on this map when piecing together the enemy situation—especially when mobile subscriber equipment (MSE) communications are lost.

The order of battle map is the division's current enemy situation from the all-source correlated database (ASCDB) in the analysis control element (ACE). The three maps can be overlaid on one another to improve the S2 section's analysis

or used to create other situational or event templates.

These graphics help produce intelligence products for the division. The Div Arty S2 section provides graphic overlays (via ASAS-RWS), intelligence reports (INTREPs) and intelligence summaries (INTSUMs) for all major subordinate commands (MSCs), the main and tactical fire support elements (FSEs) and the ACE. Coupled with the S2 section's prediction of how the enemy will employ his artillery in the future, these products help the Div Arty commander and his staff assess the strength and disposition of the enemy's artillery.

The assessment always is discussed with the order of battle technician or the G2 at the ACE before being disseminated. This ensures continuity within intelligence channels and verifies a common picture of the battlefield with the division ACE.

Additionally, the division commander requires the Div Arty S2's graphic INTSUM be briefed at his 0600 and 1800 updates, so he can see how the enemy is using his artillery, helping him to visualize the battlefield. Artillery is usually the enemy's tactical center of gravity for the BCTP opposing force (OPFOR) and, probably, most threat armies. For the briefing, the graphic INTSUM is combined with a written artillery summary, sensory summary and conclusions paragraph.

BDA Spreadsheet. The Div Arty S2 section also produces a BDA spreadsheet for enemy artillery (see Figure 1). The S2 section accesses unobserved fire missions and gathers other BDA-related reports to produce the spreadsheet.

For unobserved fires, Q-36 and Q-37 radars generate two types of acquisitions. The first is an acquisition that comes from a specific, predesignated zone or one that violates one of the zones. The zones usually are CFFZs or critical friendly zones (CFZs). The second type of acquisition occurs when fires come from outside a predesignated zone or don't violate one of the zones.

Acquisitions coming from a CFZ or CFFZ generate calls-for-fire. After the mission is fired, an ammunition and fire unit/mission fired report (AFU;MFR) is generated to indicate the number of rockets or rounds used to attack the target.

If the acquisition comes from outside a predesignated zone or does not violate a zone, an artillery targeting intelligence/coordinates report (ATI;CDR) is generated and analyzed by the target production section (TPS) to determine whether or not to nominate the target. If the target is nominated and shot, a AFU;MFR also will be generated.

The S2 section uses an algorithmic table based on the joint munitions effectiveness manual (JMEM) to determine the damage to be assessed for fire missions. It plots the missions and assesses the damage to the nearest firing unit.

This BDA assessment is prepared and disseminated every six hours from 0700 hours on. The spreadsheet accounts for observed and unobserved MFRs, pilot reports, UAV reports and other information from assets reporting artillery BDA on the O&I net. The BDA spreadsheet is usually a conservative assessment.

The graphical intelligence summary and BDA spreadsheet provide input to several divisional agencies. They support deep targeting and show the Div Arty commander and his staff a pattern of enemy fires over time. The INTSUMs help the ACE with its overall assessment of the enemy, and the BDA helps everyone understand the enemy artillery's strength.

UAV—Looker to Shooter. Another concept the division successfully experimented with during its corps Warfighter exercise was placing a division UAV under the operational control (OPCON) of the Div Arty. This OPCON relationship enabled the division to find long-range, high-payoff targets (HPTs) quickly. However, when we linked the looker with a shooter, we had problems ensuring the shooter was in range of what the looker saw.

The Div Arty S2 coordinated with the 1st Brigade S2 to establish the flight pattern of the UAV missions. The Div Arty S2 determines the location of the enemy artillery units based on information from the Q-37 radar, his situational template and the enemy's order of battle.

First, the Q-37 gives a rough estimate of the type of system firing (i.e., mortar, medium/light cannon/rockets, or heavy artillery) and an impact prediction of that system's munition. In other words, the S2 plots the acquisition and impact-predict grids. The distance between the grids determines the range of the system that fired. Based on acquisitions,

1st Tactical Echelon
(23d Infantry Div)

1st RAG	Start	Current
82-mm Mortar	19	15
120-mm Mortar	13	10
107-mm MRL	6	5
M1977 (122-mm)	13	11
M1974 (152-mm)*	13	7
% Strength		53%

23d DAG	Start	Current
M1974 (152-mm)	13	6
M1975 (130-mm)*	13	12
BM21 (122-mm)	13	10
M1981 (122-mm)	13	13
% Strength		57%

2d RAG	Start	Current
82-mm Mortar	19	17
120-mm Mortar	13	12
107-mm MRL	6	0
M1977 (122-mm)	13	11
M1974 (152-mm)*	13	13
% Strength		59%

3d RAG	Start	Current
82-mm Mortar	19	13
120-mm Mortar	13	10
107-mm MRL	6	0
M1977 (122-mm)	13	0
M1974 (152-mm)*	13	13
% Strength		40%

*Not organic to the unit.

Legend:

DAG = Divisional Artillery Group
MRL = Multiple Rocket Launcher
RAG = Regimental Artillery Group

Figure 1: Enemy Artillery Battle Damage Assessment (BDA) Spreadsheet. The S2 section assesses unobserved fire missions from Firefinder radar acquisitions and gathers other BDA-related reports to produce this spreadsheet on the enemy's artillery.

impact predicts and knowledge of the order of battle, the S2 can determine the type and echelon of the artillery system firing. This is important because some enemy artillery systems yield higher payoff values than others.

The Div Arty S2 then works up a set of grids upon which to focus the UAV. In one or our exercises, the UAV flew first to the template of the divisional artillery group (DAG) (assessed at eight percent strength) and then deeper to look at the corps artillery group (CAG).

Upon reaching the DAG grids, the UAV only found burning trucks. This made sense, given the DAG's estimated strength, but we wanted to fly the mission to target any remaining BM-21s in the DAG and confirm the BDA. Within minutes of reaching the CAG area, the UAV found a battery of 240-mm multiple rocket launchers (MRLs), then a battalion, then the rest of the artillery *brigade*. Unfortunately, these targets were out of range of our division's shooters—MLRS.

The targets were sent to corps as Army tactical missile system (ATACMS) nominations. Minutes passed without engagement. Finally after about 25 minutes, ATACMS hit one of the five targets.

The delay was due to the care taken to use the limited number of ATACMS to best advantage. The ATACMS' controlled supply rate (CSR) is so low that the missiles only can be used to attack the most threatening targets. Furthermore, a certain percentage of the missiles must be held in reserve to fire suppression of enemy air defense (SEAD) targets for the corps' next deep attack.

This situation created a dilemma. The targets clearly met the criteria in the attack guidance matrix (AGM) but could not be fired because of the quantity of ATACMS issued to corps. By not shooting these targets, the enemy artillery posed a significant threat to US forces within the range fan.

However, even if the corps had fired all the ATACMS, there might not have been enough missiles to destroy all of the HPTs the UAV found; then corps wouldn't have had any missiles to shoot SEAD for the deep attack.

Valuable lessons were learned from this experience.

•We depend on ATACMS; quantities issued during the exercises are not adequate.

•UAVs OPCON to the Div Arty S2 work, but we have to anticipate and plan for looker/shooter linkages. For example, an artillery raid could have been planned and executed to service the planned target areas and provide this linkage.

• The division should consider this type of OPCON relationship as an option—perhaps with brigade UAVs.

Keeping the Q-37s in the Counterfire Fight

Synchronizing the division and corps counterfire fight is integral to destroying the enemy's artillery. During our last Warfighter, III (US) Corps positioned an FA brigade and a TA detachment (TAD) in the division's sector.

This created several challenges for the Div Arty. First, the Div Arty had to manage four Q-37 radars in a division-sized zone. Second, we had to keep the corps MLRS forward in zone to range enemy artillery HPTs.

Common Sensor Boundary (CSB). To reduce the duplication of target acquisitions, the Div Arty and corps artillery used CSBs by designating a line to define boundaries in which CFFZs are planned and established. (See Figure 2.) Brigade CSBs allowed Q-36 radars and DS battalions to focus on enemy mortars and regimental artillery groups (RAGs) approximately eight to 10 kilometers from the forward line of own troops (FLOT). The divisional CSB enabled the division to focus on killing the DAG, while the corps CSB allowed the corps to attack targets beyond 20 kilometers with MLRS.

Due to the tempo of the battle, we found this relatively easy to execute in the defense but very difficult in the offense.

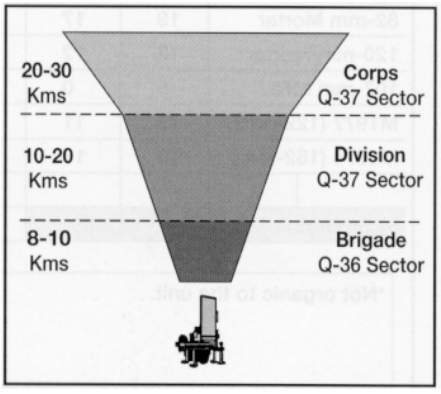


Figure 2: Common Sensor Boundary (CBS). The CSBs designate boundaries in which the various levels plan and establish call-for-fire zones (CFFZs).

During offensive operations, all counterbattery and mortar radars in a division's zone must be under centralized control. This allows the division to synchronize the movement and positioning of corps and division radars, provide continuous radar coverage during moves and support a single counterfire plan. In doing so, CFZs and CFFZs quickly can be deconflicted.

We also learned that on a nonlinear battlefield, radars must be reoriented to acquire enemy artillery firing cross-boundary or away from the direction of attack. We learned this from an enemy salient that created an L-shaped defense. The artillery that supported the southwestern-most enemy division fired almost due east into the division zone. Some of these acquisitions were missed because of the radars' orientation. Battle tracking and cross talk between the S2 and TPS is critical to avoid this orientation problem.

Radar Survivability. The corps and division counterfire fights were successful mainly due to the radars' survivability. Five factors helped the radars stay in the fight: an effective cueing schedule, engineer support, the use of smoke, survivability moves, providing a security force and the use of dummy radars.

The cueing schedule initially was based on the Div Arty S2's assessment of the electronic intelligence (ELINT) threat. The cueing guidelines we followed are listed in Figure 3.

We coordinated with the engineer brigade to provide primary and alternate dug-in radar positions before crossing our line of departure (LD). The Div Arty lost two Q-37 radars during our ramp-up exercise due to indirect fires called in by enemy special purpose forces (SPF). The lesson we learned was to dig in the radars and enhance their survivability.

In the defense, we provided a smoke screen for the dug-in radars, denying the enemy ground and aerial observation. We also used smoke in the offense to obscure the radars' frequent displacements. The radar sections conducted survivability moves based on total accumulated cueing time, enemy contact (direct and indirect fires) and before and after beginning morning nautical twilight (BMNT) and end (of) evening nautical twilight (EENT).

Another important key to survivability was the use of a dedicated security element to protect the radar from ground and air attack. The division provided a

Threat	On-Time	Off-Time	Cue-Time in Position
High	15 Seconds	30 Seconds	10 Minutes
Medium	40 Seconds	20 Seconds	30 Minutes
Low	50 Seconds	10 Seconds	8 Hours

Figure 3: Guidelines for Cueing. This cueing schedule initially was based on the Div Arty S2's assessment of the electronic intelligence (ELINT) threat.

Bradley fighting vehicle section for each radar section. The Bradley section maintained elements three to six kilometers from the radar to provide a roving perimeter defense. The Bradleys proved invaluable in discovering SPF probes that could have targeted the radars. Also, during movement, the Bradleys reconnoitered and secured new areas.

We also received a radar deception element comprised of two mock radars from corps artillery. These "dummy" radars produced no electronic signal. We positioned them approximately three to five kilometers forward of the real radar locations. Both dummy radars were targeted and destroyed during the division and corps Warfighter exercises. Although we were unable to confirm the specific reason for the OPFOR's targeting of them, it's likely the OPFOR thought they were radars.

No Q-37 radars were lost to SPF targeting or by direct ground attack. The combination of our five survivability measures enabled the division to protect these high-value assets used so successfully in the reactive counterfire mode.

The Div Arty S2 plays a vital role in assessing and tracking the enemy artillery. He must develop information to help commanders and their staffs "see" and share a common picture of the battlefield for further actions against the enemy's center of gravity—his artillery.

Captain Daniel S. Burgess, Military Intelligence, until recently, was the S2 for the 4th Infantry Division (Mechanized) Artillery, Fort Hood, Texas, where he participated in four division and corps Battle Command Training Program Warfighter exercises. Currently, he is the Assistant S3 of the 4th Division's 104th Military Intelligence Battalion. Also at Fort Hood, he served as the III Corps Targeting Officer, 303d Military Intelligence Battalion. Captain Burgess served as the S2 for the 5th Battalion, 21st Infantry, part of the 7th Infantry Division (Light) at Fort Ord, California, and for the 3d Battalion, 20th Field Artillery, 41st Field Artillery Brigade, V Corps Artillery, Germany. He is a graduate of the Field Artillery Officer Basic Course and Targeting Course at Fort Sill, Oklahoma; the Military Intelligence Advanced Course at Fort Huachuca, Arizona; and the Combined Arms and Services Staff School, Fort Leavenworth, Kansas.

New Joint Targeting School Classes and Mobile Training Teams Available

Although the six-step joint targeting process is similar to the Army's four-step decide-detect-deliver-assess targeting process, the joint steps are considerably more complex. To learn more about the joint targeting process, fire supporters can attend the newly formed five-week Joint Targeting School (JTS) at the Fleet Combat Training Center-Atlantic, Dam Neck, Virginia.

The mission of the JTS is to provide formal joint targeting training for Department of Defense (DoD) mid-career operations and intelligence personnel destined for either joint targeting positions in unified commands, on the Joint Staff or in other defense agencies; or service-specific targeting positions that will be involved in joint targeting operations in times of crisis. Sponsored by the US Atlantic Command (USACOM) J-7, JTS will ensure targeting personnel have a common knowledge of joint targeting terms and tactics, techniques and procedures (TPP).

In 1992, the Senate encouraged the formation of the Joint Targeting School to address the shortfalls in joint targeting strategies, interoperability and standardization revealed during Operation Desert Storm. After more than three years of interservice negotiations and course development, the first JTS class graduated in early 1996.

The school's curriculum applies to corps fire support personnel who could serve as part of a joint task force (JTF) or army force (ARFOR) headquarters. It also is useful for division fire support personnel who will be leveraging and integrating attack and acquisition assets from other service components to support the commander's concept of operations.

Attendance at JTS is open to NCOs, warrant officers and officers. The academic standards are high. The level of difficulty of the classroom instruction is equivalent to the Combined Arms and Services Staff School (CAS^3) at Fort Leavenworth, Kansas. Attendees should be well grounded in the targeting process used by their respective services.

Although quotas for the course are allocated by services and unified commands, personnel interested in attending a class should feel free to call for seats as late as a week before the class start-date when all seats will be filled, regardless of quotas. The following are the dates of JTS classes remaining in this FY: 28 April to 30 May; 12 May to 13 June; 11 August to 12 September; and 25 August to 26 September.

JTS also offers mobile training teams (MTTs) for home-station training at corps- and division-level headquarters that could serve as JTFs or ARFORs. The MTTs offer up to two weeks of instruction on the joint targeting process and other joint topics. The headquarters arranging for the MTT can tailor its course's contents and length, based on its mission.

To arrange for an MTT or attendance at JTS, call the school's Quota Control Coordinator Chief Yeoman Greg Begley at DSN 433-0276/0277/0271 or commercial (757) 433-0276/0277/0271. The JTS FAX number is 0280 and works with both DSN and commercial prefixes

MAJ Albert A. Mrozek, Jr., FA
Joint Targeting School, Dam Neck, VA

Detect and Deliver:
I Corps' DeepLook 96

by Major General James M. Miller, UTARNG,
and Colonel Howard E. Baysinger, Jr.,

Fire support is a prime killer on the battlefield. To make the most of our fires, we need precise data on high-payoff targets (HPTs) anywhere on the battlefield to execute them rapidly and effectively—we must acquire and fire those targets.

The goal of I Corps's DeepLook exercise at Dugway Proving Ground, Utah, in June of last year was to do just that: detect deep targets and deliver the fires to take them out. The four-day, joint, multi-echeloned exercise focused on the connectivity between target acquisition and delivery assets—sensors-to-shooters—to kill targets deep.

Exercise Design. DeepLook 96, the second iteration of this exercise, realized its three objectives. First, it provided a realistic joint tactical event in a field environment to enable multi-echeloned units to train on their mission-essential task lists (METLs). A second objective was to maximize annual training (AT) resources by simultaneously training a number of units varying in size and type. (See the list of participants in the figure.) Finally, the exercise achieved near real-time data links between various joint sensor platforms and fire support delivery units.

Dugway Proving Ground provided the battlefield for units in the field and simulations. Live emitters were deployed at Dugway to replicate enemy systems of the Joint Conflict Model (JCM). The Battle Simulation Center at Fort Lewis, Washington, operated the JCM battle simulation using a world-class opposing forces (OPFOR) for the exercise.

As shown in the figure, several commercial contractors were involved in the exercise. They provided state-of-the-art sensors and down-link equipment to connect the sensors through to the deliver assets in real time via such systems as the initial fire support automation system (IFSAS).

A joint command center (JCC) comprised of members of the Utah National Guard (both Army and Air Force) staff provided overall exercise control. The JCC integrated live sensor feeds into the tactical scenario and drove live mission events. A four-man team was the liaison between the JCC at Dugway and the JCM simulation at Fort Lewis.

I Corps deployed a deep operations coordination cell (DOCC) and a deployable intelligence support element (DISE) to a field site at Dugway. The agencies provided the doctrinal link for corps deep operations to plan, coordinate and execute all notional and live joint deep attacks. In addition, many Department of Defense (DoD) and national acquisition systems and Utah Army National Guard special operations forces (SOF) and artillery units deployed to Dugway to improve their target detection, data connectivity and target attack capabilities.

One multiple-launch rocket system (MLRS) section of the 1st Battalion, 163d Field Artillery, Kentucky Army National Guard, test fired an Army tactical missile system (ATACMS) missile during the exercise. The test-firing was integrated into the battalion's METL-based scenario.

Three sources drove the exercise's scenario. The JCM supplied the battlefield information. The JCC published intelligence and friendly battle summaries throughout the exercise to ensure consistency of base-line battle information. And last, real assets supplied electronic emissions and signatures for the various acquisition systems.

National Guard

Headquarters, Utah Army National Guard
State Area Command
- I Corps Artillery
  - 1st Battalion, 140th Field Artillery (155 Towed)
  - 2d Battalion, 222d Field Artillery (155 Towed)
  - B Battery/1st Battalion, 148th Field Artillery (155 Self Propelled)
  - 1st Battalion, 163d Field Artillery (Multiple-Launch Rocket System)*
- 97th Troop Command
  - 1-19th Special Forces Group (A), 19th Special Forces Group
  - 116th Engineer Company (Corps Support Element)
  - 211th Aviation Battalion (Attack), 211th Aviation Group (Attack)
  - 1st Battalion, 141st Military Intelligence (Ling) 300th Military Intelligence Brigade (Ling)

Headquarters, Utah Air National Guard
- 109th Air Control Squadron
- 169th Intelligence Squadron

* Unit from the Kentucky National Guard brought one MLRS launcher.

Active Component

Army
- I Corps
  - Deep Operations Coordination Cell (DOCC) (-)
  - Deployable Intelligence Support Element (DISE) (-)
- Fort Lewis Simulation Center
- Dugway Proving Ground Operations Center
- Missile Command

Navy
- Naval Air Systems Command

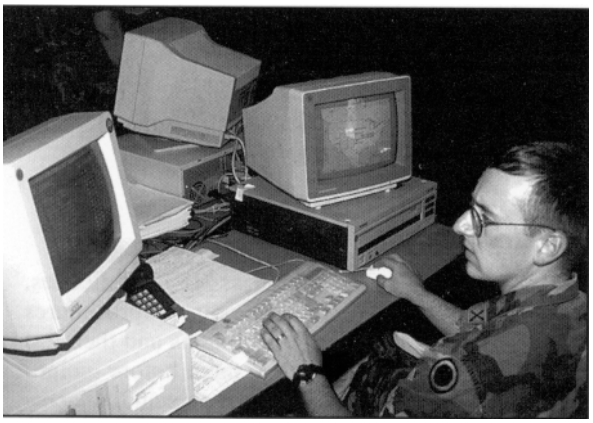
Air Force
- Detachments 1 and 4, 645th Materiel Command

Defense Contractors

California Microwave
Cincinnati Electronics
E-Systems
Evans and Sutherland
GDE Systems, Inc.
GEC Systems, Inc.
Honeywell, Inc.
Litton Data
Litton Laser Systems
Local Electronics
Lockheed-Martin Corp.
Tactical Aircraft Systems
Motorola
Photo Telesis
Veda

1st Battalion, 163d Field Artillery, Kentucky Army National Guard

Participants in DeepLook 96. DeepLook was a joint, multi-echeloned exercise that stressed the *detect* and *deliver* portions of the corps deep operations targeting process.



ADOCS. ATACMS, MLRS and cannon delivery systems relied on ADOCS data via IFSAS for rapid sensor-to-shooter target engagment.

Conducting DeepLook. Using the decide-detect-deliver-assess (D^3A) methodology, the DOCC first *decided* what to acquire. This was done by first identifying enemy high-value targets (HVTs). The DOCC then developed HPTs by categories. The next step was to *detect* those HPTs.

The collection manager in the DISE tasked various agencies, units, systems, sensors and platforms to detect deep targets identified by the DOCC. The menu of detection agencies to select from included national. Air Force and SOF. Communications links to these systems provided real-time data transfer to the DOCC.

We employed many collecting systems—for example, the Air Force Senior Scout and Senior Troupe. As another example, the SOF used the lightweight video reconnaissance system (LVRS), which is part of the Photo-T system, and Tamer, a laser designation system that superimposes grid coordinates onto a Photo-T image.

When targets were located, *delivery* systems received this information through real and near real-time data transfer via the tactical data link (TDL), tactical information broadcast system (TIBS) and other state-of-the-art systems. Some collection systems were linked directly to the delivery platform. Attack aviation aircraft (AH-64 Apaches) linked their on-board target acquisition and designation systems (TADS) to Photo-T. That gave them real-time photo input from the special forces' LVRS.

Other systems relied on data transfer between automated systems to complete the linkage to the delivery platform. Air Force air interdiction (AI) and close air support (CAS) aircraft relied on the automated deep operations coordination system (ADOCS) and IFSAS in the DOCC to move the data into Air Force channels. ATACMS, MLRS and cannon delivery systems also relied on ADOCS data via IFSAS.

All intelligence merged in the all-source analysis system (ASAS)-Warrior, regardless of its source. The military intelligence system down-loaded selected targets into ADOCS to facilitate target coordination among elements in the DOCC. Operators transmitted the firing data on the ADOCS' target via IFSAS to the executing weapon.

The Future. Planning for the third iteration of DeepLook this summer has already begun. The exercise will continue to train and evaluate corps deep operations targeting and delivery capabilities. In the exercise's realistic "war-like" environment, we'll validate our D^3A methodology and refine our deep targeting tactics, techniques and procedures (TTP).

We will continue to isolate the detect portion of D^3A to provide deep targeting training for intelligence personnel. Often, the analysis control element's (ACE's) larger mission of producing intelligence hinders training on providing data for other critical functions, such as targeting.

We will continue to include MLRS launcher(s) in future exercises. The five-day training period surrounding the ATACMS launch affords a lot of realism for operators, NCOs and officers. Exercises without the full ADOCS-IFSAS-MLRS's fire direction system (FDS) combination in place yield non-doctrinal work-arounds to fire ATACMS and MLRS digitally.

We also will continue to use external observer/controllers (O/Cs). The Battle Command Training Program (BCTP) O/Cs greatly enhance DeepLook's training value. On-the-spot recommendations and mid-exercise after-action reviews (AARs) led to many fundamental changes in the operations of the DOCC and ACE. Because DeepLook has a narrow focus, we implemented recommendations immediately rather than recording them for later discussion.

For future exercises, we plan several enhancements, the most significant of which follow:

• Include unmanned aerial vehicles (UAVs) to provide more reliable target information for both the pre-strike detection phase and the post-strike damage assessment phase. The UAV is an integral part of the corps deep battle and warrants live participation.

• Do what it takes to get counterbattery radar information to the DISE. Because the software needed to pass counterbattery radar information directly from ADOCS to Warrior was not yet fully "debugged," we put a Warrior terminal in the corps artillery headquarters. The corps artillery Warrior operator had to create a counterbattery radar database and overlay and then transmit it to the DISE Warrior where the overlay was superimposed on the Salute database plot.

• Increase the use of satellite communications (SATCOM). SATCOM can enhance remotely driven exercises in a number of ways. One possible enhancement could be integrating Field Artillery brigades and MLRS units at remote locations into the exercise via their training simulators. We used tactical satellite (TACSAT) for remote digital communications between the I Corps Field Artillery headquarters at Dugway and the FA brigades at the Fort Lewis Simulation Center.

Conclusion. DeepLook 96 was a beneficial and successful exercise. The combination of simulation and live events provided excellent METL training.

DeepLook is an outstanding forum for exercising connectivity between target acquisition and delivery systems—a critical part of corps operations. It should be continued.

Major General James M. Miller is the Adjutant General of the State of Utah. He provided the scenario, access to Dugway Proving Ground, Utah, and both Army and Air Force National Guard units for the DeepLook 96 exercise. Major General Miller also commanded I Corps Artillery and the 2d Battalion, 222d Field Artillery, both part of the Utah Army National Guard, and served as Deputy Commander for Army National Guard in the Training and Doctrine Command (TRADOC).

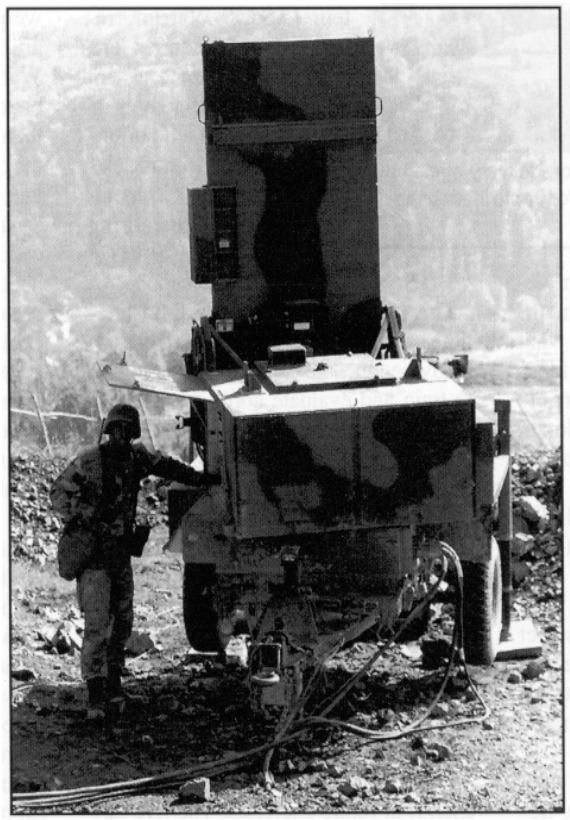
Colonel Howard E. Baysinger, Jr., commands I Corps Artillery, Utah Army National Guard. In previous assignments, he served as Director of Plans, Operations and Training; Director of Personnel and Community Activities; and Chief of Staff for the Utah Army National Guard. Colonel Baysinger also served in I Corps Artillery as Deputy Commander, Executive Officer, G3 and Director of Plans, Operations and Training.

Radar Section TLP and RSOP TTP

by Chief Warrant Officer Three Donald F. Cooper

Employing Firefinder radar systems (AN/TPQ-36 and the Q-37) most effectively has become more important as our Army's structure has changed. The reorganized Army has less in which to execute more. To compensate, the Army must make the most of Firefinder, one of its premiere combat multipliers.

Based on challenges in Bosnia-Herzegovina during Operation Joint Endeavor and feedback from the combat training centers (CTCs), two problem areas are apparent in radar operations. First, some targeting technicians assigned as radar section leaders aren't proficient in troop leading procedures (TLP). The radar section leader's execution of those procedures and involvement as a key planner and leader during the tactical decision-making (orders) process is critical to successful radar employment and, ultimately, responsive counterfire. Second, we need to improve skills in reconnaissance, selection and occupation of radar positions (RSOP)—critical to employing the radar.



In Bosnia a soldier pulls maintenance on the Q-36 antenna trailer group (ATG). *(Photo by SGT Nicole Smith, 135th PAD, Steel Castle Base, Bosnia)*

Radar units need additional training in these areas. One reason is because home-station training tends to be predominately on friendly fire missions. This mode of training calls only for degraded combat leadership skills and doesn't teach the tactical decision-making process to our junior warrant officers. In addition, occupying known radar sites and tracking friendly unit fire missions doesn't challenge Redlegs to find the best site and select the radar position (based on the radar's operational parameters) or implement survivability measures.

Our radar manuals have tactics, techniques and procedure (TTP) holes. Although the new *FM 6-121 Field Artillery Target Acquisition* to be fielded this summer includes TLP, the manual has very little TTP for RSOP. Each site is unique and presents unique problems—problems our radar section leaders need to learn to solve in training, not in combat.

Radar Section Leader TLP

The new FM 6-121 includes TLP taken from *FM 71-123 Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigades, Battalions/Task Forces and Company/Team* that has been modified for a radar section. (See Figure 1.)

The TLP in Figure 1 serves as a general guide for developing unit-specific radar section troop leading procedures. Each division should have standardized radar section TLP based on its mission, enemy, terrain, troops and time available (METT-T). For example, the steps may happen simultaneously instead of sequentially, as METT-T dictates. Units can modify the procedures for their missions and then test and refine them before including them in their standing operating procedures (SOPs).

The ability to develop and issue clear warning orders, develop time lines, conduct precombat checks and inspections and determine priorities of work are key to the success of any mission. The radar employment plan and section preparation time line must be integrated and synchronized with the scheme of maneuver. The S3, along with the brigade fire support officer (FSO) or division artillery counterfire officer, must ensure the radar's movement plan and the planned radar zones are included on both the fire support execution matrix (FSEM) and the artillery battalion's execution matrix—the decision support template (DST).

The radar section leader should receive the same information and products a battery commander receives at the Field Artillery support plan (FASP) briefing. The radar section leader then will have what he needs to refine the initial section order developed during the mission's analysis, course-of-action (COA) development and war-gaming. He must be a key planner and troop leader during the entire tactical decision-making process. In addition, a precise, concise section order increases the team's ability to maximize the radar for the specific mission and encourages initiative at all levels.

Troop leading procedures focus the section's planning, preparation and execution of the radar employment plan. If done correctly, the threat will be clearly identified to the section that also understands the mission, knows who has what responsibilities and knows the time each has to carry out those responsibilities.

Part of those responsibilities is to conduct RSOP.

Radar RSOP

Performance and feedback indicate that too many radar section leaders and their leaders don't understand technical radar site parameters and RSOP requirements. If a firing battery commander or platoon leader executed poor RSOP procedures resulting in improper positioning of a firing element, their leaders have the knowledge to identify the problem immediately and teach the Redleg the correct procedures. In contrast, some of our radar section leaders are failing in this critical area, and we look to other sources and improved technologies to solve the problem.

1. Receive the mission (RDO, SITTEMP, operations graphics and FSEM).
- Perform mission analysis/assess the threat (S2, Radar Section Leader and Radar Section Chief).
- Review critical tasks, positioning guidance and planned zones (S2, Radar Section Leader and Radar Section Chief).
- Prioritize PCC/PCIs (Radar Section Leader and Radar Section Chief).
- Make a time line (Radar Section Leader and Radar Section Chief).

2. Issue a concise warning order to your section (Radar Section Leader). Include—
- Section's Mission
- Positioning Guidance
- Threat and Countermeasures/Immediate Action Statuses
- PCC/PCI Priorities
- Priorities of Work
- Time Line

3. Make a tentative plan (Radar Section Leader, Radar Section Chief and Senior Radar Operator). Take into consideration—
- METT-T
- Logistical Resupply
- Survivability Measures
- Section Rehearsals, (Site Occupations/Displacements, Defense, etc.)

4. Initiate movement (Radar Section Leader and Radar Section Chief).
- Conduct PCC/PCIs.
- Conduct rehearsals.
- Issue movement order and perform risk assessment.

5. Conduct reconnaissance (Radar Section Leader).
- Select sites to support mission requirements.
- Perform/coordinate for survey requirements.
- Assess the site for survivability (MTF, site defend ability, etc.).

6. Complete the plan (Radar Section Leader and Radar Section Chief).
- Report site assessments to DS FA battalion S2 or division artillery CFO.
- Prepare a verbal order for the section.
- Develop route strip maps and the preliminary site defense plan.
- Develop battle tracking overlays for reconnaissance vehicle and shelter.

7. Issue the order (Radar Section Leader). This should be a huddle—each player must understand his role.
- Focus on movement, positioning, site defense and survivability measures.
- Be clear and concise.
- Require a back brief from the section chief and senior radar operators.
- Ensure adjacent unit coordination for security and medical support is conducted.

8. Supervise (Radar Section Leader).
- Conduct final PCIs.
- Conduct crew drill rehearsals for occupations, site defense, shelter configuration, NBC operations and hasty medical care and treatment.
- Execute.

Legend:

CFO = Counterfire Officer	**NBC** = Nuclear, Biological and Chemical
DS = Direct Support	**PCC** = Pre-Combat Checks
FSEM = Fire Support Execution Matrix	**PCIs** = Pre-Combat Inspections
METT-T = Mission, Enemy, Terrain, Troops and Time Available	**RDO** = Radar Deployment Order
MTF = Manual Terrain Following	**SITTEMP** = Situational Template

Figure 1: Guidelines for Radar Section Troop Leading Procedures. Based on METT-T, each division should standardize its radar section troop leading procedures and include them in its standing operating procedures (SOP). The products listed in this guideline can be altered to fit the individual unit's mission.

At Fort Sill, Oklahoma, the Radar Branch of the Field Artillery School is reviewing how this critical warfighting task is trained and testing improved technologies for fielding now and integration into future systems. But the immediate fix rests in a combination of technology and improved training. The radar RSOP TTP outlined in this article will help units fix problems in radar site selection.

Radar site selection begins as soon as the supported unit receives the mission. At this time (mission analysis), the radar section leader must be an active member of the planning process and help identify the radar position areas required to support the developing COAs. As the staff is considering the METT-T factors for employing FA assets, the radar section leader must carefully analyze *technical* and *tactical* requirements for radar positioning. Once a sufficient number of position areas are identified, the direct support (DS) battalion S2 or counterfire officer, along with the radar section leader, must select the best position areas for the COAs during the war-gaming process. Figure 2 on Page 36 shows some technical and tactical factors to consider.

This process generates a prioritized list of position areas from which triggers for radar movement can be developed. Together, these form the positioning plan the radar section leader uses to plan and execute his reconnaissance operations.

The majority of the map reconnaissance requirements should have been completed as a result of COA development and war gaming. The minimum map reconnaissance information must include an analysis of the terrain for technical requirements, routes of approach, selection of landmarks to aid navigation and all known threat data that could affect reconnaissance.

A ground reconnaissance is then conducted to confirm the map reconnaissance, sweep the area and select sites that meet both technical and tactical requirements to support the mission. To ensure a successful ground reconnaissance, the radar section leader must organize and time his reconnaissance effort to meet his supported unit's time line of critical events.

There are four key steps in ground reconnaissance: select multiple sites in

1. Enemy Electronic and Signals Intelligence (ELINT/SIGINT) Capabilities

2. Survivability Measures (Adjacent Friendly Units, Casualty Collection Points, Decontamination and Counter ELINT/SIGINT Procedures, etc.)

3. Terrain (Slope, Severely Restrictive/Restrictive, Screening Crest, Tunneling, Back Drop) and Weather Effects

4. Critical Times and Events the Radar is in Position to Support the Scheme of Maneuver

5. Integration of the Radar Positioning and Sector of Search into the Divisional (or Higher) Headquarters TA Coverage Plan

Figure 2: Technical and Tactical Radar Positioning Considerations. These are the RSOP factors the S2 (or counterfire officer) and the radar section leader must consider to position the radar most effectively for a course-of-action.

each area, measure the screening crest with an aiming circle, use a compass to determine masking problems in search sectors and develop a complete battle-tracking map.

1. Select multiple sites within a position area. By picking multiple sites, the radar section leader builds flexibility into his battle plan. Multiple sites allow the section to quickly maneuver into a viable position and limit the time required to move and occupy a position.

2. Measure the screening crest with an aiming circle. The aiming circle measures the screening crest (manual terrain-following) and identifies a potential site's blind spots. (See "Firefinder Mask Considerations" on Page F-1 of FM 6-121.) In addition, this manual terrain-following information should be loaded into the radar during initialization to supplement the radar's selection of a mask angle. (See "Manual Terrain-Following Mask Angles" on Page 2-246 of *TM 11-5840-378-10 Operator's Manual for Radar Sets AN/TPQ-36(V) and AN/TPQ-38(V)5.)*

3. Use a compass for hasty elimination of sites with masking problems in planned search sectors. The compass can quickly eliminate sites that pose obvious masking problems. The radar section leader simply stands in the proposed location of the radar antenna trailer group (ATG), faces toward the selected primary azimuth and moves to the right and left limits. Obvious masking problems should be apparent immediately, eliminating a site and allowing the radar section leader to move on to a new location.

4. Develop a complete battle-tracking map to ensure routes and positions match the scheme of maneuver. This map is a crucial component of site selection and invaluable in the cyclic site selection process required to keep a radar in the fight. Enemy information—avenues of approach, chemical strikes, family of scatterable mines (FASCAM) and obstacles—are posted and updated on this map. Additionally, the map reflects friendly information, such as casualty collection points, aid stations, decontamination routes, etc. Finally, selected radar position areas with friendly adjacent units (all units, not just artillery) and terrain restrictions are posted on the map to facilitate the ground reconnaissance. Armed with this information, the radar section leader can select initial and subsequent radar positions that best support the operation.

These four steps help the radar section leader optimize tunneling, screening crests and other site technical parameters to reduce the radar's generation of false or unwanted target acquisitions. A properly selected radar site combined with situational awareness—awareness of such things as helicopters flying through the search sector, ricocheting tank rounds and shrapnel from explosions—enables the radar section and target production section (TPS) or DS battalion S2 to identify as false any of the remaining reported targets.

Once site selection is complete, the radar section leader reports an assessment of the site to the controlling tactical operations center (TOC). He assesses survivability factors (tunneling, screening crest, defendability, trafficability, etc.) so the TOC staff can plan movement triggers and evaluate risk versus mission requirements in issuing the radar section movement instructions.

At this point, the radar section focuses on occupying the site. The radar section leader issues a movement order and organizes his section to support the order and site occupation. A planned occupation or series of occupations must be tailored to mission requirements and the identified threat. Offensive operations requiring rapid and multiple moves require different load plans and occupation crew drills than defensive operations.

The radar section leader must clearly articulate to the section the differences during movement and warning orders and rehearse procedures to ensure successful occupations.

The involvement of the radar section leader during the supported unit's tactical decision-making process and corresponding rehearsals is critical to the radar's integration into the scheme of maneuver. Each fire support coordinator (FSCOORD) or S3 should have the radar section leader back brief his positioning and movement plan at the earliest opportunity. This back brief should be similar to a battery commander's briefing to the FSCOORD once the FASP is issued.

This ensures the radar section leader understands his critical events and triggers and has planned, rehearsed and performed reconnaissance in preparation for the battle. This also allows the senior Field Artilleryman an opportunity to mentor his junior leader and improve the radar section leader's warfighting skills.

The commander, S3, S2, counterfire officer and radar section leader all play vital roles in radar employment. Accordingly, the commander must ensure home station training prepares the battle staff, radar section and its radar section leader for success on the battlefield. Radar sections should drill on RSOP in varying terrain and conditions, preparing them to maximize their radars for any mission.

The Field Artillery community must take every opportunity to integrate the targeting technician into all phases of the planning, preparation and execution of the mission. For, the Field Artillery targeting technician assigned as the radar section leader is exactly that, a *leader*.

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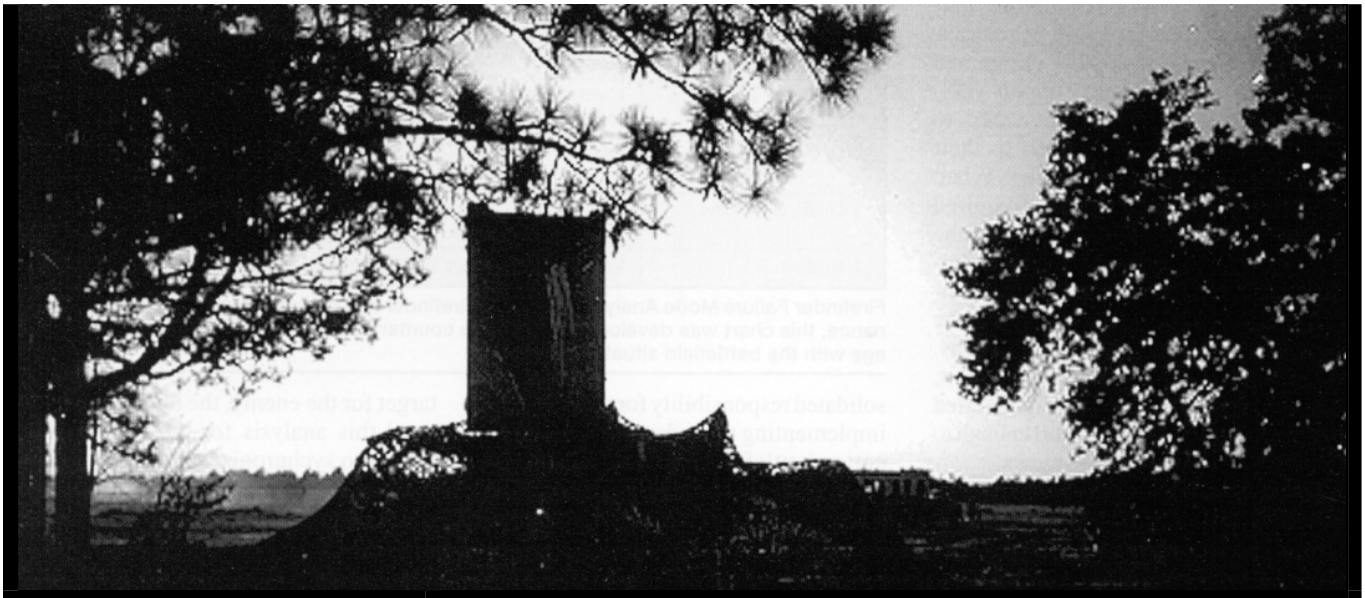

RS^2: Radar Survivability and Synchronization for the 82d Airborne Division BCTP

by Warrant Officer One John A. Robinson

This article discusses radar force protection in the 82d Airborne Division's and 18th Field Artillery Brigade's (Airborne) Battle Command Training Program (BCTP). Specifically. I recount our counterbattery and countermortar radar protection plan and the tactics, techniques and procedures (TTP) that resulted. Given the critical role of Firefinders on the modern battlefield and our successes in protecting them, this information is valuable to all who execute the counterfire fight as a matter of business.

The 82d Airborne Division, Fort Bragg, North Carolina, conducts one of the most vigorous BCTP train-up programs in the Army today. Its Giant Step Exercise series trains brigade-level and higher staffs and corps battle simulation (CBS) operators, as well. (In terms of the latter, training and practice on operating CBS programs to most accurately portray the execution of carefully laid out plans should not be an afterthought.)

The 18th FA Brigade, also at Fort Bragg, assumed the reinforcing mission for the 82d, as it frequently does. As part of this mission, the brigade was the force counterfire headquarters. In large part, this was due to the enhanced capabilities and ranges of the brigade's M198 towed howitzers and multiple-launch rocket systems (MLRS) as compared to the 82d Division Artillery's M119 howitzers. In addition, the brigade brings the counterbattery assets of the 1st Field Artillery Detachment (Airborne), which has the modern AN/TPQ-37(V)8 Firefinder radars.

In its role as counterfire headquarters, the 18th FA Brigade controls its two Q-37 and the division's three Q-36 radars. In close consultation with their Div Arty counterparts, the brigade counterfire officers coordinate battlefield coverage of the radars, based on the threat, commander's intent and his weighted efforts.

Protect the Force—RS^2

Capitalizing on the lessons learned from ours and other BCTPs, the brigade counterfire team devised a force protection package and refined its TTP during the series of Warfighter train-ups. (For example, see "A Force Protection Package for Friendly Artillery Forward" by Lieutenant Colonel Stuart G. McLennan II, October 1995, and "Deadly Thunder: 25th Div Arty BCTP Campaign Plan" by Colonel Reginal G. Clemmons, April 1994.) As a result, our TTP now includes an action plan for radar survivability and synchronization—dubbed "RS^2."

Survivability—Dedication of Supporting Assets. The 82d Division commander identified Firefinder radars as priority assets requiring dedicated force protection. To that end, the counterfire team identified several ways to protect those radars.

First, to accomplish 24-hour continuous radar operations, the counterfire team had to reduce the site reconnaissance and perimeter security burden on the radar crews. The division provided two infantry platoons equipped with tube-launched, optically tracked, wire-guided missiles (TOWs). The two platoons were divided into sections for a total of four sections. Three sections were task organized to protect the three Q-36 systems. The fourth section was subdivided into two teams, one for each Q-37.

Second, the division commander emphasized engineer support, where applicable. The Q-36s usually remained with their parent direct support (DS) battalion and, therefore, had access to the engineer assets dedicated to their respective maneuver brigades. When unusual engineer support was required for the radars, including the Q-37s, the FA brigade counterfire officer, who coordinated closely with the engineer liaison officer (LNO), quickly relayed the request to an engineer unit working nearby. If Firefinder required engineer support, assets were either immediately diverted to the job or the delay was short enough to minimize the danger to the radars.

The engineers' priority support of radars did not happen on the first train-up—or even the second. However, by the end of the final train-up, the counterfire and engineer officers were working together like a well oiled machine.

As we increased the survivability of the radars, we had to address logistical details. Radar resupply is ordinarily not a problem for a brigade or Div Arty S4. But our configuration created some unique requirements of the CBS system.

Because all radars were centralized under one CBS computer terminal for ease of command and control, cross-leveling supplies became a concern. We sought to duplicate the actual process, meaning whatever we accomplished via CBS had to replicate real-world logistical coordination to the observer/controller's (O/C's) satisfaction. We developed a two-tiered approach.

The first tier dealt with routine resupply of the radars and their supporting infantry. We discovered that as long as the radar and its infantry listed their higher headquarters as the nearby DS FA battalion, we could cross-level resupply—if the FA battalion was no more than five kilometers away. The controller of the radar station, who represented the officer in charge (OIC), could pass a requisition to either the FA brigade or Div Arty S4 in the workstation cell. The O/Cs allowed this procedure as it followed the radar section leader's procedures in the field.

In the second tier, we developed a simple fill-in-the-blank form to facilitate the request process. We included items not organic to a radar section, such as TOWs or 40-mm ammunition, for our infantry elements that also used the form.

Synchronization—Coordinating the Coverage. As the counterfire headquarters, the brigade's counterfire cell consolidated responsibility for planning and implementing the radar coverage of the entire battlefield. This consolidation "briefs well," as we like to say, but can be complicated in the implementation stage, primarily in the orders process.

Available Systems	Coverage
3 Q-36s, 2 Q-37s	No Failure, no change from original coverage plan.
2 Q-36s, 1 Q-37	Center Q-37, reorient radars for maximum overlap and reposition shooter to support the main effort, if necessary.
1 Q-36, 1 Q-37	Center Q-36 and Q-37, extend Q-37 coverage to support the main effort and centralize shooters.
1 Q-36, 2 Q-37s	Center Q-36 and offset Q-37s left and right for maximum width of coverage.
1 Radar	Weight main effort and centralize shooters.

Firefinder Failure Mode Analysis. Because Firefinder has periodic down times for maintenance, this chart was developed to help the counterfire officer synchronize radar coverage with the battlefield situation.

The Q-37s assigned to areas in the vicinities of the FA brigade and Div Arty tactical operations centers (TOCs) moved infrequently and received radar deployment order (RDO) guidance based on their positions, the battlefield coverage requirements and the need to complement other radar areas of search. Their moves were so infrequent that cueing and coverage guidance rarely changed. However, zones such as critical friendly zones (CFZs) and call-for-fire zones (CFFZs) did change somewhat as the battlefield evolved with intelligence updates of enemy capabilities and positions.

The Q-36s required more constant attention. Because their DS battalions rarely stayed in place for extended periods, they, too, displaced frequently.

The counterfire officer has two primary responsibilities for every Q-36 move. First, he must ensure the area left uncovered by the displaced radar is blanketed by other systems, possibly requiring a shift in azimuth, often by one of the Q-37s. Second, he must devise a new plan for the displaced Q-36 once it arrives at its location. This plan must include applicable zones, azimuth, left and right limits and a fresh look at survivability. The plan is not difficult to devise, providing his target production section has continuously updated his situation map with the locations of radars on the battlefield.

The final piece to help synchronize radars on the battlefield comes in the form of the failure mode analysis used for some time in the 18th FA Brigade (see the figure). Because Firefinder has periodic down time for maintenance and because the radar is a high-payoff target for the enemy, the brigade developed this analysis for the counterfire officer to sychnronize the employment or redeployment of his radars with the battlefield scenario. The chart proved to be a handy little reference during train-up exercises.

Fighting the Battle

Here are a few tips on fighting to win with radars (with an emphasis on staying alive).

1. Consolidate all radars being controlled during the battle under one station. Make the OIC a targeting technician and the supporting cast Firefinder crewmembers (13R) with at least one exceptional NCO on each shift. It's too much to ask those controlling FA battalion workstations to control radars too.

2. Ensure radars *always* occupy a prepared defensive position. The radars must start in a prepared position as the battle begins and never move without establishing a prepared defensive position at their proposed follow-on site. We learned the hard way that, as in the real world, it's dangerous enough to move with a soft-skinned Q-36 without the additional hazard of waiting at the new site for the defensive position to be constructed.

If the DS battalion insists on moving and a prepared defensive position isn't waiting at the new site, *ask to stay put*. Order a defensive position to be prepared through the counterfire officer and move only after it has been established. Thus, while moving from position to position, you will keep survivability to a maximum and lost coverage time to a minimum.

3. Don't merge the radar and infantry elements into one unit for ease of command and control. We tried it both ways. The bottom line is there are things you'd like to do with the infantry element that are autonomous of the radar element.

To replicate the real battlefield conditions, the elements should act semiautonomously.

4. Don't bother to create a prepared defensive position for the infantry element. If you're using it correctly, the soldiers are moving too much to make good use of one.

5. Create prepared defensive position templates for Q-36 and Q-37 sections and transmit those plan names to the engineer LNO through your counterfire officer.

6. Have the workstation OIC handle logistical matters and coordination with higher headquarters, and let the NCOs and troops handle the acquisitions and operations side of the house. This is a good, realistic division of duties.

7. The OIC must develop a working relationship with those who'll process his local logistical requests (S4s). The counterfire officer must, likewise, establish a close relationship with the higher logistical element that will resupply or repair lost or damaged Firefinder systems. For us, this element was 1st Corps Support Command (COSCOM). Don't become complacent in thinking that a request for a replacement radar from COSCOM is just another routine requisition. Replacing a radar is not routine for the COSCOM.

8. Recognize that the infantry brings with it a few unique problems. Ours were so far from their parent unit (of course) that the parent units virtually disowned them. This was not a major problem because the radar section leader "calls the shots" on infantry operations. The only real snag was that certain logistical needs, such as infantry personnel and some ammunition, aren't readily available through FA logistical channels. FA brigade and Div Arty S1s and S4s must plan ahead to coordinate for infantry logistical requirements—especially personnel.

9. Finally, the best defense of the systems turned out to be a good offense. We aggressively attacked nearby enemy scouts with the infantry elements attached to each section. Not only did we invariably enjoy the element of surprise, but we were remarkably successful in destroying the enemy. After all, most enemy scouts snooping in the vicinity of the radars (usually in a fairly secure zone for the most part) were about the same size as the radars' attached infantry elements.

If a radar is destroyed, its infantry element can be task organized and attached to another radar section in a critical safety area. (The element always can be unattached later and attached to the reconstituted or replacement radar section.)

10. When in doubt, cell OICs should consult with their counterfire officers at higher headquarters for advice on moving both organic and attached troops.

Encouraging Results

Initially, our RS^2 plan was modestly successful. But after working out the bugs through four Giant Step train-ups, we approached the Warfighter with confidence in our force protection plan.

The result? Only one radar (a Q-36) was lost but was resupplied within 12 hours. At the end of the exercise, all our Firefinders were intact and fighting. But most importantly, the battlefield commander had a 98 percent counterfire return rate.

Warrant Officer One John A. Robinson is an FA Targeting Technician for the newly activated 234th Field Artillery Detachment (Airborne), 18th Field Artillery Brigade (Airborne) of the XVIII Airborne Corps Artillery, Fort Bragg, North Carolina. His previous assignments were as Brigade Counterfire Officer in the 18th Field Artillery Brigade and Radar Technician for the 1st Field Artillery Detachment (Airborne), also in the 18th Field Artillery Brigade. As an NCO, he served in many fire support leadership positions, including Company and Battalion Fire Support NCO and Aerial Fire Support Observer. He holds a bachelor's degree from the University of Maine and a master's degree from Troy State University of Alabama.

Redlegs Needed for ARNG Paladin NETT

The Army National Guard (ARNG) is seeking applicants for Paladin New Equipment Training Team (NETT) members to field the Paladin weapon system to 14 FAARNG battalions. The fielding will begin in FY 98 and extend through FY 00—perhaps beyond. Fielding team members will serve in Title 10 Active Guard Reserve (AGR) status for the duration of the fielding. Home station will be Fort Sill, Oklahoma, with 60 to 75 percent of the members' time spent TDY to support the mission.

Individuals must agree to be appointed/enlisted in the ARNG before applying. Effective date of appointment/enlistment may be after the acceptance date of the application. ARNG, US Army Reserve and Active Component (RA) personnel may apply. Applications will be accepted until all positions are filled.

The following grades/skills are required: one lieutenant colonel 13A; one major 13A; one captain 13A; one sergeant first class 13C; five (plus or minus) sergeants first class 13B; five staff sergeants 13E; and 16 staff sergeants 13B. All personnel will serve as instructor-writers and also may be supervisors. All personnel will be required to travel.

If interested, please contact Lieutenant Colonel Jim Scott, Major Tim Keasling or Sergeant Major R.J. Moulton of the Tour Management Office at the Army National Guard Readiness Center in Arlington, Virginia, at DSN 327-9790 or commercial (703) 607-9790. Email is scott@arngrcemh2.army.mil and the fax is 7189, which works with the DSN or commercial prefixes.

Firefinder
Improvements for the 21st Century

by Mark Conrad

The introduction of Firefinder radars in the early 1980s *almost* solved the problem of locating active enemy indirect fire assets. The smaller AN/TPQ-36 Firefinders countered the short-range mortar threat to the brigade; the larger AN/TPQ-37, two per division, located hostile indirect fire weapons 20 to 25 kilometers away to well within 100-meter accuracy. After detecting a target, the radar's location accuracy doubled with only a few more hostile shots.

Firefinder operators passed target locations to counterfire batteries via the tactical fire direction system (TACFIRE), which essentially meant the enemy artillery could remain silent or fire and die.

Other countries realize the US Firefinder's usefulness. It isn't unusual for political and military crises in various parts of the world—such as Bosnia-Herzegovina—to result in inquiries from friendly countries regarding the capabilities of these weapon-locating systems. In stability operations, the terrorist-type threat tends to employ highly mobile mortars or single-launch rocket stands. In such a situation, speed is of the essence. Firefinder is key to providing near instantaneous location data to counterfire assets, such as the multiple-launch rocket system (MLRS), attack aircraft or rapid-reaction insertion forces.

Current Q-37 Improvements

The original Firefinders, although remarkably versatile, were based on the now obsolete technology of the 1970s. Although no other weapon-locating radar in the world is as effective as Firefinder, the Army must improve Firefinder to handle future enemy threats—detect tube and rocket weapons of increased ranges (as well as tactical missiles), counter jamming and defeat radar-seeking missiles, such as the antiradiation missile (ARM) launched from aircraft. The radar's mobility also needs to match that of its supported units—for example, MLRS batteries.

The Project Manager (PM) Firefinder is working with the Communications-Electronics Command, both at Fort Monmouth, New Jersey, to implement the artillery-locating radar requirements determined by the FA School at Fort Sill, Oklahoma.

Block I Enhancements. Several Q-37 Firefinder enhancements are being fielded as part of Block I. Most are based on lessons learned in Operations Desert Shield and Storm.

One such improvement is in the radar's mobility via an upgraded antenna trailer; the underside of the trailer was redesigned to accommodate special rubber track belts that fit over the regular tires. Trailers with these medium-tracked suspension systems (MTSS) are being fielded to all active Army Firefinder users. The radar's strategic mobility also has been improved by attaching caster wheels to the antenna trailer to enable it to roll on/off C-130 or C-141 aircraft.

The trailers now have a self-survey capability through the modular azimuth positioning system (MAPS), a precise inertial navigation device based on a ring laser gyro. MAPS meets all the Field Artillery's requirements for site survey accuracy and is combat-proven by the British Army's Warrior armored vehicles during Desert Storm.

Block I Enhancements include improvements to the radar subsystem. An upgraded cooling system for the high-powered radar transmitter that is more rugged and reliable in hot conditions and rough terrain is being fielded.

Also, updated software will reduce false target locations and provide longer range trackings. This software upgrade will be fielded with the next update to troop units—Package 11 with a TACFIRE/advanced Field Artillery tactical

data system (AFATDS) interface will be issued in early 1998.

Survivability Suite. In a separate development effort, PM Firefinder has designed a survivability suite for the Q-37 that provides an electronic countermeasure against anti-radiation missiles. This feature is not being fielded with the Block I Enhancements but is being kept in reserve at the depot level. Its technology has been demonstrated but not in live-fire testing, and the current antenna trailer has weight limits that mean a user must choose between adding on the MTSS tracks or the survivability suite—not both.

Current Q-36 Improvements

The smaller Q-36 also has its share of upgrades, some of which are fielded while others are under development.

The Q-36 Block II Materiel Change Program has two phases. The first phase fielded Version 7 and switched the S250 shelter-mounted operations control group (OCG) from the five-ton prime mover to a high-mobility multipurpose wheeled vehicle (HMMWV). This phase also added MAPS to a modified M116 trailer and an inclinometer to the reconnaissance vehicle in each Q-36 detachment, helping in site selection. These first-phase ugrades are now fielded to active Army divisions.

The second phase of Block II will be the fielding of Version 8 in 1998 after the low-rate initial production of 8 systems and testing. Version 8 will run on new high-speed processors with enhanced programs and memory that allow the operator to track mortars at increased ranges. Version 8 also will reduce false locations, handle more targets at a time, allow for quicker set-up time and increase the probability of target locations.

New hardware in the OCG will include a user-friendly lightweight computer unit (LCU) using Windows and a CD ROM drive for digital terrain data. The new LCU will allow the Q-36 to operate from either the OCG or remotely at a distance of up to 100 meters from the OCG using a portable control display terminal (CDT).

Version 8 will modify the Q-36's configuration further by replacing the S250 shelter with the new Army lightweight multipurpose shelter (S-788 LMS) on the HMMWV. The vehicle will tow the radar antenna trailer group (ATG) on a modified M116A2E1 trailer. In this configuration, a second HMMWV will transport a mobile electric power 122A generator (MEP-122A) and tow an additional M116A2E1 cargo trailer.

Future Q-37 Improvements

PM Firefinder has begun work on the Q-37 Block II program, formerly called the Q-37 pre-planned product improvement (P^3I) program. Starting in 2003, a Q-37 Block II radar will be fielded that doubles current range coverage and improves location accuracy. Maximum ranges will be extended by 60 to 80 percent, and accuracy of location will increase by 15 to 30 percent. The improved radar also will have increased target throughput to handle multiple and simultaneous trackings—as many as 50 per minute.

Mobility and transportability will be even further enhanced by fitting the Q-37's OCG subsystem in the smaller vehicle shelter now used in the Q-36 Versions 7 and 8 models. The entire system will have C-130 roll-on/off capability. The system will take only 15 minutes to emplace, even with fewer members than the current Q-37 radar crew.

Q-37 Block II automatically will communicate with the latest versions of Air Defense Artillery, theater missile defense (TMD), intelligence nets and the AFATDS and commander's tactical terminal (CTT) systems. And of course, the radar will use the latest combat identification devices, reducing the risk of fratricide.

The Q-37 Block II agenda is ambitious but attainable. Government and contractor designers will use recent materiel acquisition reforms to streamline the development program in which the combat user, the Army materiel developer and the engineers and scientists of private industry work in close partnership. Integrated product teams (IPTs) will include all players in the acquisition and development process, making it possible to discover and resolve technological problems confidently and in a timely manner. At all levels of the program, the impact of shrinking budgets and manpower resources are considered.

Today, the US Field Artillery has a combat-proven, highly reliable, accurate and versatile family of target acquisition radars—but has even better capabilities on track for the 21st century.

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FA Road Map on the Internet

The Field Artillery Road Map is a "living" plan that charts the King of Battle's course to Army XXI and beyond. The map basically functions as a decision aid for evaluating and resolving conceptual issues and then determining the capabilities required to make Army XXI a reality.

The FA Road Map compiles all we know about Field Artillery modernization and future developments into an electronic package that is now available on the Internet via the Fort Sill Home Page. For more information on the FA Road Map, see the Chief of Field Artillery's article "Mapping the Future: FA State of the Branch 1996," on Page 1 of the November-December 1996 Red Book.

The Fort Sill Home Page can be found at http://sill-www.army.mil/index.htm.

Red Storm

The Russian Artillery in Chechnya

Russian 2S3 152-mm Self-Propelled Akatsiya

by Major Gregory J. Celestan

You can't describe the moral lift,
When in the fight your spirit
weary Hears above the hostile
fire Your own artillery.

From the native poem "Vasily Terkin"
by Aleksandr Tvardovskiy[1]

The conflict in Chechnya provides the first view of Russian artillery tactics since the war in Afghanistan ended in 1989. Lessons from the Russian experience in Chechnya are relevant to many armies due to the changing nature of warfare on the eve of the 21st century. Increasing urbanization guarantees that, regardless of the region, conflict in the future will involve the use of artillery in close proximity to civilians.[2]

The Russian Army depends on its artillery assets, not only as combat support, but also as a shock weapon to demoralize and break opposing forces. Fighting in Chechnya supports this view.

During World War II, the Red Army used its artillery to achieve stunning victories over German forces on the Eastern Front. The current commander of Artillery and Rocket Troops of the Russian Ground Forces, Colonel-General (Lieutenant General) Niklolai M. Dimidyuk, stated that during World War II, "Artillery rightly was named the 'God of War' for the fact that its fire destroyed 80 to 90 percent of enemy targets in the tactical zone."[3]

At that time, the Red Army depended on the firepower provided by artillery brigades, divisions and corps. This reliance continued into the Cold War when the Soviets stationed large amounts of artillery in Eastern Europe in anticipation of a future conflict with NATO forces.

Chechnya—Urban Combat

Several recent articles in Russian military publications discuss artillery employment in the cities and villages of Chechnya. The common theme throughout these articles is the realization that the quantity of fire employed during a battle depends on the situation and can't be planned using standard rules of engagement.

This is a radical departure from traditional Russian normative fire planning. One Russian, Colonel Sergey Leonenko, stated bluntly in his 1995 article for *Armeyskiy Sbornik* [*Army Digest*] that "It is obvious there can be no recommendations for employing artillery in taking a city either in terms of duration or method of fire. The fact is that in one case, troops take a city using all weapons without restriction and, in another case, under orders to preserve the city as a cultural and economic center."[4]

Urban combat is extremely manpower-intensive. No military force today has a workable doctrine on how to fight in

built-up terrain with the population in place without inflicting heavy civilian casualties and causing heavy collateral damage.[5] Additionally, combat in cities typically generates large numbers of casualties for the attacking forces. The fighting in Grozny, the capital city of Chechnya, was no exception.

The units that the Russian government deployed to Chechnya in December 1994 were thrown together piecemeal. The Russian forces fighting in Chechnya were composed of units from the Russian Ground Forces, the Ministry of the Interior (MVD) and Naval Infantry forces. Most of these units had not trained together prior to entering combat.[6]

As in the past, Russian artillery destroyed the bulk of the targets on the battlefields of Chechnya. (See Figure 1 listing the Russian artillery systems employed in Chechnya.)

2S1 122-mm Self-Propelled Howitzer
2S3 152-mm Self-Propelled Gun-Howitzer
2S19 152-mm Self-Propelled Gun
2S23 120-mm Self-Propelled Howitzer-Mortar
BM-21 Grad 122-mm Multiple Rocket Launcher
BM-22 Uragan 220-mm Multiple Rocket Launcher

Figure 1: Russian Artillery Employed in Chechnya

The main difference in Chechnya was the use of artillery as a means, in itself, as opposed to being used as part of a combined arms team. Commanders were reluctant to assault Chechen positions without large quantities of artillery "support."

Russian Artillery Tactics and Techniques

Soviet doctrine stated that the artillery battalion was the most effective means of attacking targets.[7] Massed, centralized artillery was recognized as the best means to destroy targets on the battlefield. The reality of modern urban combat, however, led the Russians to employ previously developed methods.

Large armored formations proved impossible to control in the streets of Grozny. The initial disastrous assault on the city of Grozny on New Year's Day 1995 was blamed on the decision to send armored columns into the city without adequate fire preparation or infantry support. One of those units, the 131st Motorized Rifle Brigade, had 102 out of 120 of its armored vehicles destroyed during the New Year's Day assault.[8]

After the first month of combat, the Russians modified their tactics to avoid suffering the same level of casualties. Russian commanders decided to break up the larger combat formations and assign small artillery sub-units to these miniature task forces. The task force commander assumed responsibility for the artillery sub-unit as he employed it by platoons or individual pieces during the street fighting.[9]

This method is in contrast to the Russians' highly centralized tactics in conventional warfare doctrine. The decision to employ artillery units in this fashion was based on the mission and enemy situation. These same methods were used by the Soviet Army during World War II. During the battle for Berlin, the Soviet Army deployed artillery batteries as part of "storm groups" to take individual buildings or city blocks.[10]

Soviet doctrine designates the artillery *battalion* as the lowest tactical unit.[11] The rationale behind the doctrine was that the increasing number of armored targets on the battlefield required large concentrations of fire to destroy. An artillery battalion could supply the minimum amount of firepower necessary to destroy these targets yet still remain flexible.[12]

In Chechnya, each battalion-sized task force had a battery of self-propelled howitzers, one to two batteries of mortars and one to two batteries of divisional artillery, which were broken down into smaller detachments to fight. (Only Russian Ground Forces units have organic artillery assets; therefore, the MVD units had to depend on attached artillery assets.[13])

The Russians thought this amount of artillery was necessary to counter the fortifications the Chechens built in the Grozny. The Chechens built fortified strongpoints in the city "a la Stalingrad" in buildings and along crossroads.

After the disastrous New Year's assault, the Russians used artillery pieces to pave the way for the rest of their forces along city streets. Direct fire became the approved method to destroy strongpoints and fortified buildings.[14] Inside Grozny, the Russians typically employed their artillery pieces at a range of 150 to 200 meters.[15] The prominent use of direct fire by the Russians reflects that this method was the easiest to control with unskilled personnel and weak communications.

Outside of Grozny, the Russians have used artillery fire almost exclusively as a substitute for maneuver. Past doctrine stated they would first fire an *artillery preparation of the attack* followed by *supporting fires* until the maneuver units closed with the enemy defenses.[16]

In Chechnya, on most occasions, the entire operation consisted of Russian artillery and aviation units conducting several hours of bombardment until the local commander felt all resistance had been destroyed. A mounted patrol was dispatched, and if it encountered any return fire, it withdrew and the bombardment commenced again.

This method became so predictable that Chechen fighters abandoned the village as the Russian artillery forces emplaced and then filtered back before the Russians conducted patrols. There is little, if any evidence, of coordinated maneuver unit and artillery assaults on villages.

The Chechen operation posed several problems for fire support coordination. During the initial assault into Chechnya, Russian forces approached Grozny on three axes with four task forces. These units were formed into temporary organizations that did not have a habitual working relationship and had never trained together. Under ideal conditions, fire coordination is difficult to achieve among units, but under combat conditions with no prior training and coordination, synchronized fire support is almost impossible. As a result, the Russians were unable to mass their significant artillery assets.

Target acquisition appears to have been conducted by artillery unit commanders in conjunction with maneuver unit officers. On many occasions, Russian units came under fire and deployed personnel to attempt to determine the shooter's location. There has been no evidence of sophisticated fire location systems being employed and interconnected into an integrated counterbattery system.

In one instance, a military lawyer on a fact-finding mission helped to locate a Chechen Grad BM-21 122-mm multiple rocket launcher (MRL).[17] In most cases, however, the artillery unit commander served as the observer. During operations outside of one Chechen village, the commander of a Grad MRL

battery left his unit's position with the chief of intelligence of the Army-level artillery to observe fires for his battery.[18]

Due to the lack of consistent Chechen counterbattery fire, the Russians didn't habitually conceal their positions or displace their artillery after firing. When Russian forces were static, artillery units could fire harassment and interdiction missions on possible Chechen lines of communication. Designated sections of Russian artillery units remained on three-minute call, and the entire battalion had to be ready to fire in 15 minutes.[19] The operational tempo of some units was so great that artillery crews rarely left the turrets of their self-propelled howitzers.[20]

The poor level of training among the Russian soldiers is a common theme in the Russian military press. In one artillery unit, the 805th Guards Artillery Regiment, the chief of staff complained that his battalions had only received a small percentage of the trained crew members necessary to fire the weapons. The rest of the crew members were taken from whatever sources were available. Many of the unit's members, to include the officers, learned their trade "on the fly."[21]

During the battle for Grozny, the main losses suffered by the Russian forces came from Chechen artillery and mortar fires.[22] (See Figure 2 for a listing of Chechen artillery assets.)

2S1 122-mm Self-Propelled Howitzer
2S3 152-mm Self-Propelled Gun-Howitzer
BM-21 Grad 122-mm Multiple Rocket Launcher

Figure 2: Chechen Artillery Systems

Grad 122-mm (40 round) MRL in Traveling Configuration

Russian forces had the opportunity to reduce these losses through counter-battery fire. Even though they had counterbattery radars, there is no evidence the Russians employed them to locate Chechen artillery. Considering the poor level of training of the soldiers fighting the battle and the lack of coordination between the various Russian units, trying to use the radars may have been counterproductive as there would have been no clear method to verify friendly firing locations.

The Russians' IL219 artillery target acquisition radar can pinpoint the shooter of incoming artillery fire within 30 meters.[23] This asset could have been quite effective when paired with the 2S19 MSTA 152-mm self-propelled howitzer, a highly accurate weapon that can fire laser-guided munitions such as the *Krasnapol* projectile.

The 2S19 MSTA 152-mm self-propelled howitzer is a highly accurate weapon that can fire laser-guided munitions such as the *Krasnapol* projectile.

Two other precision artillery munitions, the *Smelchak* mortar round and the *Santimetr* artillery round, are also in the Russian inventory but were not employed in Chechnya. *International Defense Digest* reported that "the word in the higher command is that these highly advanced armaments were too expensive to be 'wasted' in Chechnya and needed to be kept for more serious contingencies."[24]

Chechen Tactics and Techniques

During the initial assault into Chechnya and the fighting in Grozny, the Russians experienced difficulties in coordinating and massing their artillery assets. The Chechens exploited this weakness by employing hit-and-run tactics with their artillery. By ambushing Russian forces with one or two artillery pieces, they could disperse their assets quickly after an attack.[25] These tactics precluded the Russians from organizing or launching preplanned artillery strikes on enemy artillery formations, as dictated by their doctrine.

Another popular tactic the Chechens used was to monitor the Russian forces' radio transmissions (which implies the Russians routinely transmitted in the clear) and determine Russian unit locations. They would then quickly displace several Grad launchers and fire a volley at the Russian forces.[26] Throughout the fighting, the Chechens rarely fired more than a couple of salvos of either rockets

Uragan BM-22, 220-mm (16 round) MRL

or cannon rounds before displacing their pieces.

Conclusion

The fighting in Chechnya has exposed several problems in the Russian armed forces. Some of the worst criticism of tactics and capabilities has come from within the Russian forces. Weeks after the conflict began, Russian military officers were questioning the disjointed manner in which the operation was conducted. Deputy Defense Minister Colonel-General Boris Gromov commented that "the operation was carried out without the relevant study and in a hurry because any other result was hardly possible. And the considerable forces that were mustered piecemeal across Russia were simply unable to collaborate without training."[27]

Initial assessments of equipment employed in Chechnya indicate the Russians are pleased with the performance of their multiple launch rocket systems Grad and Uragan, the latter, the BM-22 220-mm MRL. Overall, the shock effect of these weapons combined with their ability to destroy large areas with one volley complemented the Russian style of combat in Chechnya.[28]

A book containing several Russian lessons learned has already appeared in Moscow.[29] Two of the most relevant comments from the book are that city fighting is the most difficult form of combat activity and that reliable destructive fires on the enemy are necessary for success.[30]

As time passes and the Russian military reflects on its performance in Chechnya, we'll get a clearer picture of the impact of artillery forces in the conflict.

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Notes:

1. Translated by Chris Bellamy, *Red God of War*, (London: Brassey's Defence Publishers, 1986).
2. In a recent article in *Parameters*, author Ralph Peters describes how most military organizations are ill-equipped to fight in cities and villages: "The US military, otherwise magnificently capable, is an extremely inefficient tool for combat in urban environments. We are not doctrinally, organizationally or psychologically prepared, nor are we properly trained and equipped for a serious urban battle, and we must task organize radically even to conduct peacekeeping operations in cities." Ralph Peters, "Our Soldiers, Their Cities," *Parameters* (Spring 1996), 43.
3. Colonel-General Nikolai Mikhaylovich Dimidyuk, "*Bog Voinii Na Perelome*" ["The God of War at the Turning Point"], *Armeyskiy Sbomik* [*Army Digest*], No. 7 (July 1995), 10.
4. Colonel Sergey Leonenko, "*Ovladenie Gorodom*" ["Capturing a City"], *Armeyskiy Sbornik* [*Army Digest*], No. 3, (1995), 31-35.
5. Dr. Jakob Kipp, a Senior Analyst at the US Army Foreign Military Studies Office, Fort Leavenworth, Kansas, pointed out that no military force currently has a working doctrine to fight insurgents in a modern city. The US Army's doctrine on fighting in an urban environment is already 17 years old and does not fully address the problems that would be encountered while fighting a three-dimensional battle in a city. Our army's experience in Mogadishu demonstrates the difficulty of fighting in a city with the population in place.
6. Anatoly S. Kulikov (Translated by R. Love), "Russian Internal Troops and Security Challenges in the 1990s," *Low-Intensity Conflict and Law Enforcement*, Volume 3, (Autumn 1994) Number 2, 209.
7. *"Artilleriyskiy Divizion v Boyu"* ["The Artillery Battalion in Combat"], (1984) as reported in Foreign Broadcast Information Service, JPRS-UMA-85-012-L (1 May 1985), 7.
8. Viktor Litovkin, "*Rasstrel 1311 Maikopskoi Brigadii"* ["Shooting the 131st Maykop Brigade"], *Izvestia* [*News*], 11 January 1995, 4.
9. Leonenko, 32.
10. Bellamy, 204.
11. "*Artilleriyskiy Divizion v Boyu*," 9.
12. "By making the battalion the main unit, but at the same time giving its commander more authority and perhaps independence, the Soviets have created a unit which achieves the right balance between power and manageability." Bellamy, 186.
13. Kulikov, 209.
14. N. Novichkov, V. Snegovskii, A. Sokolov and V. Shvarev, *Rossiiskie Voopyjenniie Silii V Chechenskom Ronflikte: Analiz, Itogi, Vivogi* [*Russian Armed Forces in the Chechen Conflict: Analysis, Results, Conclusions*], (Holveg-Infoglov: Moscow, 1995), 54.
15. Ibid. 64.
16. Translated by Chris Bellamy, *Red God of War,* (London: Brassey's Defence Publishers, 1986), 169.
17. Lieutenant-Colonel Nikolay Astashkin, "*Likvidipovano eshye odno logovo 'cherhykh volkov'*" ["One More Den of 'Black Wolves' Eliminated"], *Kraznaya Zvezda* (*Red Star*), February 22, 1996, 1.
18. Mikhail Lukanin, "*Napravlenie-Shatoy!"* ["The Axis-Shatoy!"], *Kraznaya Zvezda* (*Red Star*), June 14, 1995, 1.
19. Captain Artur Gulko, *"V Gorakh Pod Vedeno"* ["In the Mountains Near Vedeno"], *Kraznaya Zvezda* (*Red Star*), 2 February 1996, 2.
20. Ibid.
21. Lieutenant-Colonel Sergei Knyazkov, *"Artilleriya ne Znaet Tishinii"* ["The Artillery Does Not Know Silence"], *Kraznaya Zvezda* (*Red Star*), 15 March 1995, 1.
22. Novichkov, 161.
23. Ibid.
24. "Russian Military Assesses Errors of Chechnya Campaign," *International Defense Digest*, No. 4 (1995), 6.
25. The Chechens also used automobiles as mobile mortar platforms for their ambushes. Colonel Aleksandr Kostychenko, *"Uroki Groznogo"* ["Lessons of Grozny"], *Armeyskiy Sbomik* [*Army Digest*], No. 1 (1995), 29.
26. Novichkov, 99.
27. Livia Klingl, "Idiots Are Responsible for the Organization,"*Kurier* (Courier), (5 January 1995), 5, as reported in Foreign Broadcast Information Service Eurasian Report, FBISSOV-95-003, 10.
28. Novichkov, 138.
29. Ibid, 54.
30. Ibid, 65.