TA in Sarajevo—
Multinational and Terrain Challenges of Operation Joint Endeavor

by Captain John H. Campbell, KSARNG

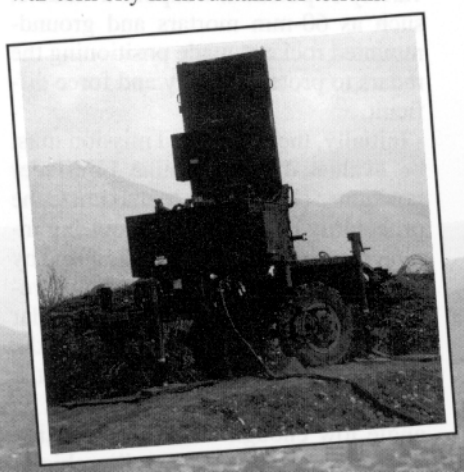
In February 1996, 30 soldiers of E Battery, 161st Field Artillery (Target Acquisition), 35th Infantry Division (Mechanized), Kansas National Guard, were mobilized for duty in Operation Joint Endeavor, a NATO peace enforcement mission in Bosnia-Herzegovina. A detachment—two of our Q-36 Firefinder radar 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.

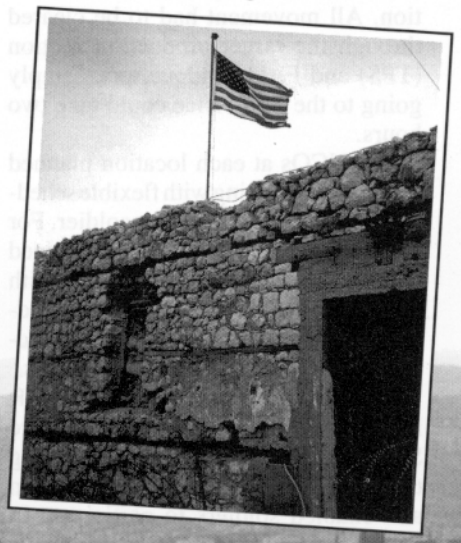
The challenges were considerable. For six months we performed TA in a multinational environment set in the midst of a war-torn city in mountainous terrain.

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).

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 con-

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.

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trolled 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.

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.

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

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.