

The Artillery S2's *Intelligent* Preparation of the Battlefield

by Captain Ralph A. Patelli, MI

If you ask what area the artillery battalion S2s have the greatest difficulty with at the National Training Center (NTC), Fort Irwin, California, the answer is easy: the intelligence preparation of the battlefield (IPB) process. Often, the difference between the success and failure of an artillery operation is due to either the S2's failure to perform the IPB or his inability to perform it to standard.

"Artillerizing" this intelligence process is critical to performing the IPB correctly. Several products in the Field Artillery tactical orders process will fail if the IPB is not done correctly. These include mission analysis, course of action (COA) development, the decision support template (DST) and any synchronization or execution matrices. Field Artillery rehearsals (technical and fire support) and radar planning, employment and cueing also are affected.

In all military operations, preparation before the battle sets the stage for success. The IPB process really begins during pre-deployment operations.

Pre-Deployment Preparations

The intelligence section must check its load plans like any other organization. Often key references are overlooked. The following are the minimum references needed to perform artillery IPB properly: *FM 34-130 Intelligence Preparation of the Battlefield* (July 1994); *FM 34-81-1 Battlefield Weather Effects* (December 1992); *FM 6-20-1 Tactics, Techniques and Procedures for Field Artillery Cannon Battalions* (November 1990); *FM 6-121 Field Artillery Target Acquisition* (September 1990); and *FM 34-3 Intelligence Analysis* (March 1990). You also need the appropriate doctrine and tactics manuals for the threat you face. The Training and Doctrine Command (TRADOC) Pam 350 series are the standard for the level of detail needed.

While reviewing these references with your section, determine the strengths and weaknesses of your section. Focus your training on the following areas (not listed in priority).



- *Terrain and Weather.* Current information is critical in developing the foundation product of IPB: the modified combined obstacles overlay (MCOO). The better you know the terrain, the weather conditions and their effects on ballistic solutions and firing battery positioning, the more pertinent your analysis will be to planning and execution.

- *Enemy Task Organization.* As the artillery S2, you must know the enemy's artillery organization from the division-level down to the company level. You focus on numbers and types of armored and (or) mechanized equipment. The artillery S2 must be an expert on threat equipment capabilities and limitations in both day and night operations.

- *Doctrine.* You must know the enemy's rates of march as well as formations: depths and widths of the division, brigade (or regiment), battalion and company in both the offense and defense. It's vital to understand how the enemy adjusts his formations in respect to friendly force deployment and actions.

- *Artillery-Specific Information.* As the artillery battalion S2, you're expected to be the subject matter expert on enemy artillery and tactics. At a minimum, you must know artillery types and calibers in

use; the number of tubes in a battery, battalion and groupings; munitions used by type and their ranges (conventional as well as extended ranges); disposition of firing units in relation to maneuver forces in the offense and defense; conduct of fire support in both counterfire and direct support (DS) roles; the intentions the enemy artillery fires telegraph (e.g., phases of fires); and the counterfire assets the enemy has and their capabilities and limitations.

- *Air Defense Artillery (ADA)-Specific Information.* This includes the enemy's equipment capabilities and limitations, employment and doctrinal considerations and the composition of ADA platoons and batteries as well as their locations on the battlefield in the offense and defense.

- *Intelligence Threat Against Artillery and Countermortar/Counterbattery Radars.* You must understand what collection systems and agencies are positioned to target friendly artillery systems. That includes what electronic intelligence (ELINT) systems and reconnaissance units can detect, report and destroy one of your most valuable intelligence/targeting systems, the Q-36/37 Firefinder radar. You must know what countermortar/counterbattery radars the enemy has to detect your battalion, how many he has, what their capabilities are and where they are positioned doctrinally on the battlefield. The local military intelligence (MI) unit, division artillery and (or) the MI battalion liaison officer (LNO) at the brigade tactical operations center (TOC) can answer these questions.

The IPB Process

IPB is a continuous process consisting of four steps.

Step 1: Define the battlefield environment. For the most part, this step is done for you. The brigade or higher headquarters defines your area of operations (AO) and area of interest (AI), which focus the firing units' reconnaissance and surveillance (R&S) efforts and radar deployment order (RDO). The critical pieces of information you need to identify are what the outer limits of the brigade zone are and how far your radar will have to move for-

ward to "see." In the realm of R&S, the width of the battlefield and your flank security issues will determine whether you have a wide or narrow front.

Last, you need to know when the brigade line-of-departure (LD) or defend-no-later-than (NLT) time is. This tells you how long you have to develop an operations order and, to a greater extent, how long you have to produce IPB products. This information also aids you in providing guidance for the warning order (WARNO) and forward positioning of the radar.

Step 2: Describe the battlefield's effects. This includes weather analysis; MCOO; observation, cover and concealment, obstacles, key terrain, and avenues of approach (OCOKA); and artillery-specific considerations. The defining product in this step is the MCOO. It must be produced at home station and updated after you arrive in the deployment area. Time and mission demands won't allow you to develop a detailed MCOO in the "war zone."

The MCOO. This product depicts the battlefield's effects on military operations (see Figure 1). Note the symbols for the various forms of the avenues of approach are specific in the figure (air avenues, mobility corridors, etc.). Too often, units use large, sweeping arrows on their overlays to represent the avenues of approach, which are less informative and obscure the subtleties of the terrain.

The MCOO normally shows all obstacles to mobility, modified to include—

- Artillery-specific considerations, such as sight-to-crest, intervening crest, cant, intervisibility lines (discussed later), mask angles, track volume, mobility corridors, ground and air avenues of approach and possible position areas (PAs).

- Special areas that will cause problems for firing units or affect firing computations (low- and high-angle fires) and radar observation.

- Areas through the AO that can support firing battery, TOC, radar and combat service support (CSS) sites. These survivability positions are identified by looking for areas of intervisibility.

- Key terrain features. These are features that afford either friendly or enemy forces a clear advantage—good observation over battle positions, position areas or objectives; chokepoints along the routes of march; or critical manmade or natural logistics areas.

- Likely ground and air avenues of approach and mobility corridors. Figure 1 illustrates the minimum requirements to produce the "artillerized" MCOO.

Steps in Producing the MCOO. As the artillery S2, you produce the MCOO in several steps.

- Determine the terrain features affecting artillery. First, you highlight areas on the map that can cause problems for firing units. You look at the battlefield differently than armor or infantry S2s. For example, they view restricted and severely restricted terrain from the aspect of negotiating it. The artillery S2 also must see that terrain from the fire direction officer's (FDO's) point of view: range-to-target, elevation-to-target and terrain or ridges that will cause problems with sight-to-crest, etc.

In addition, the artillery S2 must see terrain features and PAs from the radar technician's point of view, determining optimum mask angles and if there is enough track volume to follow the enemy artillery rounds both on ascending and descending arcs.

After you visualize the unique challenges of the terrain, you address any gun-to-target issues that can arise. These steps can prevent many fire direction center (FDC) ballistic computation problems as well as identify the minimum quadrant and elevation problems for the batteries early.

You graphically depict the terrain features on the map much as you would "Restrictive" and "Severely Restrictive"

terrain, but you focus on variations in elevations. You just adjust the legend on the MCOO to reflect which features cause sight-to-crest or other problems. Finally, you identify built-up areas as well as bodies of water that will cause trafficability problems.

This first critical analysis of the terrain starts the IPB process out on the right foot. It sets the stage to provide the commander information that directly affects the mission and satisfies the "So what?" test.

- Determine observation and concealment locations. In this step, you locate areas on the map that indicate an intervisibility line. This is an area where terrain masks your unit from enemy ground observation. Wadi systems, fingers and gentle slopes in the terrain will cause intervisibility lines. These lines become survivability enhancers for the enemy as well as friendly units.

Artillery units can capitalize on intervisibility lines by using them for PAs. Additionally, fire support teams (FISTs) can predict observing or lasing problems when enemy forces occupy terrain on the other side of such a line.

With a single line on the map, you indicate the crest line of the terrain causing the intervisibility. You can verify your analysis through a local engineer terrain team's or the brigade S2 shop's Terrabase

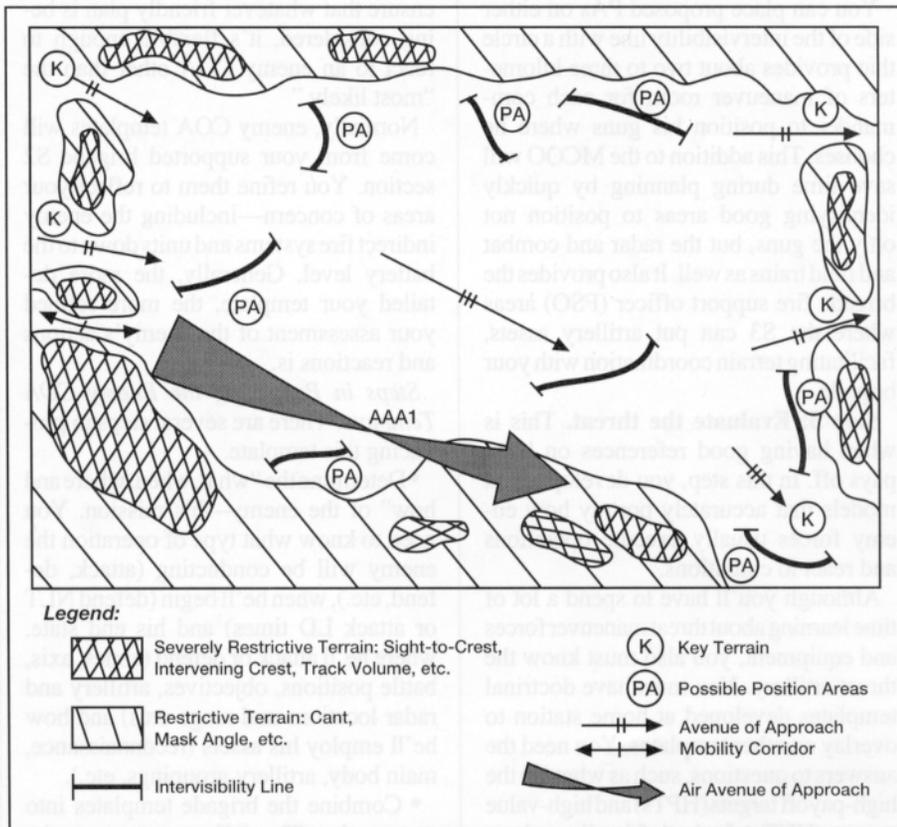


Figure 1: Sample Modified Combined Obstacle Overlay (MCOO)

program or with a more detailed, smaller scale map—a 1:24,000 scale map as opposed to the 1:50,000 scale map of your MCOO.

- Determine ground and air avenues of approach. Don't fall into the trap of using your higher headquarters' ground avenue of approach without refinements. Your focus needs to extend down to the regiment-, battalion- and company-level mobility corridors. Also, use standard symbology.

- Identify key terrain features. The mission and AO/AI dictate key terrain and decisive features. Using standard symbols, indicate chokepoints, road intersections and commanding terrain features. During mission analysis, you determine decisive terrain features and indicate them on the MCOO with a circled "D."

- Analyze the terrain. This is critical to the executive officer (XO), S4, S3, radar technician and the battery commanders in terms of determining the best PAs. Your terrain analysis combined with intervisibility lines provides a unique picture of potential sites for battalion sub-units. Your overlay shows where units can shoot most effectively (intervening crest, cant, etc.) and where terrain will obscure batteries from direct observation.

You can place proposed PAs on either side of the intervisibility line with a circle that provides about two to three kilometers of maneuver room for each commander to position his guns where he chooses. This addition to the MCOO will save time during planning by quickly identifying good areas to position not only the guns, but the radar and combat and field trains as well. It also provides the brigade fire support officer (FSO) areas where the S3 can put artillery assets, facilitating terrain coordination with your brigade.

Step 3: Evaluate the threat. This is when having good references on hand pays off. In this step, you develop threat models that accurately portray how enemy forces usually execute operations and react to conditions.

Although you'll have to spend a lot of time learning about threat maneuver forces and equipment, you also must know the threat artillery. You must have doctrinal templates developed at home station to overlay on other templates. You need the answers to questions, such as what are the high-payoff targets (HPTs) and high-value targets (HVTs) for both friendly and enemy forces? How will the artillery group-

ing, target acquisition systems and electronic intelligence (ELINT) systems array themselves based on enemy objectives and maneuver? What phase of fire will the enemy use based on friendly maneuver force actions? To which areas can the enemy artillery and mortars range with conventional and rocket-assisted projectiles (RAP)? Where will the enemy artillery, mortar units, ELINT and counterfire acquisition assets reposition? At what point will the enemy firing units need to resupply?

Doctrinal templates for both the offense and defense produced at home station are ready for you to overlay onto your MCOO and weather analysis.

Step 4: Determine threat COAs. There are two products developed in this step: the enemy COA template (formerly called the situation template) and the event template. These products are critical during COA development and the war-gaming portions of the tactical orders process. The overlays show the enemy's strengths, weaknesses and the timing of his plan.

The most important aspect of these products are that they show the S3 and fire support coordinator (FSCOOD) the "least likely," "most likely" and "most dangerous" enemy COAs. The key here is to ensure that whatever friendly plan is being considered, it's flexible enough to react to an enemy COA other than the "most likely."

Normally, enemy COA templates will come from your supported brigade S2 section. You refine them to reflect your areas of concern—including the enemy indirect fire systems and units down to the battery level. Generally, the more detailed your template, the more refined your assessment of the enemy's actions and reactions is.

Steps in Producing the Enemy COA Template. There are several steps in producing this template.

- Determine the "what, when, where and how" of the enemy—his mission. You need to know what type of operation the enemy will be conducting (attack, defend, etc.), when he'll begin (defend NLT or attack LD times) and his end state, where he'll attack or defend (zones, axis, battle positions, objectives, artillery and radar locations and range arcs) and how he'll employ his assets (reconnaissance, main body, artillery groupings, etc.).

- Combine the brigade templates into one overlay. The differences among the COAs can be narrowed down to one or

more, as determined by certain considerations. In the offense, you analyze the enemy's avenues of approach to his objectives and his formations per COA (one up and two back, two up and one back, column formation, etc). In the defense, you analyze the alternate battle positions around a kill sack, potential positions for enemy reserve forces along friendly avenues of approach, obstacle belts reflecting either a forward or reverse slope defense, etc.

- Refine the templated artillery groupings into battalion and battery locations. These groupings include regimental and divisional artillery groups (RAGs and DAGs) and mortars. You must be sure to template primary and alternate positions.

You also correlate the artillery range fans and the particular phases of fire they support. You depict on the overlay the range fan for each weapon system (e.g., 120-mm mortars, 2S1s, 2S3s, 2S5s, BM-21s, etc).

All this information should be readily available in your section enemy database. At this point, you're developing information critical for managing a radar plan.

- Depict on your overlay the ground and air avenues of approach and the enemy's immediate and subsequent objectives (regiment and division). You should annotate on the overlay the enemy's indirect phases of fire throughout the width and depth of your AO—including your maneuver forces' objective areas.

- Depict reconnaissance and special operations units' likely insertion sites (if the brigade omitted them from its overlays). These sites will have a critical effect on batteries, combat and field trains as well as the radar. The information will come in handy when you begin working on the event template.

- Depict special munitions, such as likely family of scatterable mines (FASCAM) and nonpersistent and persistent strikes (if not on a brigade overlay). You should review these with the chemical officer to see how much down-wind hazard would exist per strike. Also, you review the templated FASCAM minefields with the brigade FSO to determine the type and duration of the minefield(s).

Showing more than one COA on an enemy COA template saves time and acetate yet clearly shows the enemy's options. If you're really in a time crunch, depict only the "most likely" and "most dangerous" COAs. But ensure that at least the five aspects of the enemy are represented in

each COA: enemy mission, artillery grouping (phases of fire), avenues of approach, reconnaissance and special munitions. Some aspects may not change from one COA to another.

After you've completed the enemy COA template, you have the information to produce the final IPB product, the event template. It's important to note that the event template is the foundation document for the decision support template (DST), a template developed during the targeting process. Additionally, the event template drives your input into the various battalion rehearsals.

Steps in Producing the Event Template. There are several steps in developing the event template.

- Determine your named areas of interest (NAIs). Copy all the pertinent information from the brigade's event template, including NAIs you're tasked to cover. Next, add the NAIs you generate, based on your analysis of the enemy forces and their proximity to your subunits.

- Conduct time-phase line (TPL) analysis. You do this by using the lines on your overlay to "walk the enemy" through the AO (during the enemy's offense) or "walk the friendly forces" through the AO (during the friendly offense). All S2s perform this function during this phase of the IPB process.

The difference between the artillery and infantry or armor analyses is that you measure your TPL in 5- to 15-minute increments, not 30- to 60-minute increments. You're interested in the amount of time the enemy can move per kilometer. In the offense, you track the friendly force movements. Based on OCOKA and doctrinal movement rates, you draw a line on the overlay for each time increment from the tactical assembly area (TAA) to the objective. You must factor in the effects of the time of day, weather conditions, terrain constraints, obstacles and mission of the unit you're analyzing (reconnaissance, security forces, main body or counterattack forces). FM 34-130 has charts with march rates and other useful information.

- Next, you annotate on the overlay the enemy's phases of fire (based on whether he's in the offence or defense). Also, you annotate the TPLs and the templated enemy artillery positions, which define vital information for the cueing schedule and the RDO.

As you can see, the RDO becomes more concrete as time goes on and your infor-

mation is further refined. You solidify where the radar is positioned, what its cueing schedule is per phase of fire and when it repositions. You put the radar zones on the event template. From the brigade FSO, you get the radar's critical friendly zones (CFZs) that satisfy the commander's intent for force protection. In this step, the battalion R&S effort and battalion perimeter defense plan also are solidified.

The bottom line in developing an event template is not only to have graphics that tie an enemy event to a location, but also show what triggers fires, thereby, helping to synchronize fires on the battlefield. The template allows you to gauge the pace and

tempo of the battlefield and identify targets (type and number) that will present themselves.

The IPB and Friendly COA Development

The graphic nature of IPB products aids the staff planning process. The graphics eliminate wasted efforts and facilitate accurate, knowledgeable decisions—time is always short.

The IPB process should take no more than three to four hours. This assumes all members of the S2 section are contributing. Figure 2 shows a sample time line of

| Orders Process | Time | S2 Products/Actions Required |
|--|--------|---|
| Receive order from the brigade headquarters (LD time in 24 hours). | H-24 | <ul style="list-style-type: none"> • Receive products from the brigade S2: <ul style="list-style-type: none"> – Refine enemy COA/event templates. – Combine most dangerous and most likely COAs. – Add NAIs, TAIs, CFFZs and CFZs. |
| Issue warning order. | H-23.5 | <ul style="list-style-type: none"> • Include radar initial location based on artillery enemy COA template (enemy artillery/mortar locations). |
| Analyze the mission. | H-23 | <ul style="list-style-type: none"> • MCOO (done earlier). • Enemy COA template (refined). • Event template (brigade's copy). |
| Develop COAs. | H-21 | <ul style="list-style-type: none"> • Refine and consolidate enemy COA/event template (COAs 1,2,3). |
| Conduct decision briefing. | H-19 | <ul style="list-style-type: none"> • Enemy COA and event templates. • Prepare the RDO. |
| Issue second warning order. | H-18 | <ul style="list-style-type: none"> • Issue RDO to radar section (verify feasibility from current site). |
| Prepare order. | H-17 | <ul style="list-style-type: none"> • Write/graphic matrix, the intelligence annex, R&S plan and RDO. |
| Reproduce order. | H-16 | <ul style="list-style-type: none"> • Make copies of products for all batteries, radar and R units. |
| Brief order. | H-14 | <ul style="list-style-type: none"> • Brief MCOO, enemy COA/event templates, R&S plan and RDO to the DS or R battalion chains of command. |
| Conduct FA rock drill. | H-8 | <ul style="list-style-type: none"> • With the final enemy COA/event templates, brief the enemy scheme of maneuver and the corresponding phases of fire. Include the numbers/types of enemy systems the FOs can expect to engage for each CFST. The radar WO should review the RDO and the movement plan. |
| Rehearse fire support. | H-6 | |

Legend:

| | |
|------------------------------------|---|
| CFST = Critical Fire Support Tasks | MCOO = Modified Combined Obstacles Overlay |
| CFZs = Critical Friendly Zones | NAIs = Named Areas of Interest |
| CFFZs = Call-for-Fire Zones | TAIs = Targeted Areas of Interest |
| COAs = Courses of Action | R = Reinforcing |
| DS = Direct Support | RDO = Radar Deployment Order |
| FOs = Forward Observers | WO = Warrant Officer |
| LD = Line of Departure | R&S Plan = Reconnaissance and Surveillance Plan |

Figure 2: Sample IPB Time Line in the Tactical Orders Process

the tactical orders process with the IPB products needed for each step.

The meat of the tactical orders process is COA development. The following paragraphs show the usefulness of IPB products during COA development.

MCOO. This product helps the battalion quickly determine locations for positioning critical nodes and firing units as well as the radar. It helps the FDO determine low- and high-angle positions and the charge requirements for various missions.

The MCOO helps the S3 determine ideal locations for positioning batteries, based on their critical fire support tasks (CFST) and future positioning requirements, and the battery commander determine areas that have sight-to-crest and intervening crest problems. There are many uses for the MCOO in the operations order (OPORD) team. The bottom line is that, used correctly, the MCOO can eliminate errors early on in the process.

Enemy COA Template. You can deconflict the projected PAs on the MCOO with the enemy positioning on the enemy COA template, ensuring you look carefully at both enemy and friendly range fans.

You also examine the avenues of approach. Are the battalion's critical nodes and firing units in harm's way? If so, are those acceptable risks? The battalion XO, S4 and S1 should look at the overlay to see

if their elements are forward enough or too far forward. Is the main supply route (MSR) on the enemy's avenue of approach—what are the risks?

The radar technician should consider areas where the enemy would have to fire high-angle shots, facilitating acquisitions. Is the radar positioned far enough forward to acquire phases II and III fires? Are the appropriate censor zones established?

The S3 validates the Field Artillery support plan based on the refined enemy COA template and the operations graphics (PAs taken from the MCOO). This ensures he can range or reposition assets to satisfy the CFST.

Event Template. One area in which the event template helps is with unit movement planning. It allows planners to see how they can move assets through the battlefield while still maintaining an accurate, timely and consistent volume of fire to support the commander's guidance. The template identifies where the critical enemy formations will be in time and event increments (kilometers/minutes). Knowing the CFST, you can "see" missions and identify where your firing and acquisition assets need to be. The S2 then can identify when pauses and breaks in action will be as well as the culminating points. It will not be easy to identify when pauses will occur, but at least the staff will

have some idea as to when risks will probably be highest for moving and repositioning firing batteries.

In conclusion, this article has presented a "thumbnail sketch" of the IPB process for the artillery S2. The most important thing you and your section can do is to produce the intelligence products in harmony with the tactical orders process—to stay relevant. Remember, while you're toiling at your map, each product you develop must pass the "So what?" test.



Captain Ralph A. Patelli, Military Intelligence, was the Fire Support Division's S2 Trainer at the National Training Center (NTC), Fort Irwin, California, for 13 months. Recently, he became a G2 Planner in the Plans and Operations Division of the NTC Operations Group. His previous assignments include serving as S2 for three years in the 2d Battalion, 39th Field Artillery (later 6th Battalion, 41st Field Artillery), part of the 3d Infantry Division (Mechanized) in Germany; and Armor Brigade S2 and Electronic Warfare Company Commander in the 24th Infantry Division (Mechanized) at Fort Stewart, Georgia. Captain Patelli is a graduate of the Military Intelligence Advanced Course, Fort Huachuca, Arizona.

Strike/Reconnaissance Team

The STRIKER concept being tested in the Army's advanced warfighting experiments (AWEs) relooks the "eyes" of the heavy force close fight and calls for doctrinal and organizational changes in forward observation to conquer tomorrow's battlefield. STRIKERs are dynamic, mission-adaptive target acquisition/execution teams the heavy brigade commander can allocate to any unit or location on the battlefield.

In the STRIKER concept, all forward observers (FOs) and combat observation lasing teams (COLTs) are organized into two STRIKER platoons, each with six teams, and consolidated at the brigade or battalion level; each three-man team is headed by a staff sergeant or one of the platoon sergeants or platoon leaders. The teams operate in pairs to provide continuous operations and security. Their success comes largely from the stealth pro-

vided by their high-mobility multipurpose wheeled vehicles (HMMWVs) that are mission-tailored with the latest FO and communications equipment.

STRIKERs allow fire support elements (FSEs) and company fire support officers (FSOs) to concentrate on planning, coordinating and clearing fires—plus advising the maneuver commander on how to fight the battle. The STRIKER platoon headquarters executes critical fire support tasks (CFSTs) and coordinates team movements and also coordinates with other sensors to collect and report information. STRIKER employment is centralized or decentralized, based on the mission.

STRIKERs can be task-organized to give the commander the flexibility to concentrate his "eyes" on the battlefield where and when he wants. For example, a battalion task force commander with three STRIKER teams from brigade can allo-

cate two teams to his overwatch company and one to his assault company. During defensive operations, the commander can allocate all three teams to protect high-speed avenues of approach. This flexibility allows the scouts to concentrate on intelligence collection and the STRIKERs on target acquisition and engagement.

COLTs have evolved into the "deep eyes" of the brigade with the lasing mission secondary. Likewise, the STRIKERs' primary mission is detection and attack while also providing lasing.

Ground observation in the 21st century will remain a necessity. If approved, STRIKER teams will allow the commander to tailor his ground observations assets to his best advantage.



CPT Salvatore J. Petrovia, FA Action Officer, Task Force 2000 FA School, Fort Sill, OK