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Field Artillery

A Joint Magazine for US Field Artillerymen January-February 2006

Merging the ADA & FA Branches

Is it time?

Inside:

NetFires Center of Excellence: An *Exciting* Place to Be
Interview with BG Lennox, Chief, ADA

Is It Time?
By COL Mark McDonald

Networked Fires
By COL John L. Haithcock, Jr.

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(Organization, Material, Doctrine and Training)
DSN 639-4020 or (580) 442-2204 (24-Hours)
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By Order of the Secretary of the Army:
Peter J. Schoomaker
General, United States Army
Chief of Staff

Official: Sandra R. Riley
SANDRA R. RILEY
Administrative Assistant to the Secretary of the Army, 0526310

David C. Ralston
Major General, United States Army
Field Artillery School Commandant

Editor: Patrecia Slayden Hollis

Art Director: Fred W. Baker III

Managing Editor: Reta L. Rogers

Assistant Editor: Tonya S. Goforth

Major General David C. Ralston
Chief of Field Artillery

Reflecting on 2005 and Looking Ahead to 2006

Thank You Field Artillerymen

At the beginning of a new year, people around the world pause to reflect upon the past year and look to the year ahead. As I look back, I see the actions of dedicated, flexible and creative Field Artillery Soldiers and Marines executing many standard and nonstandard missions in 2005—and executing them very well. From humanitarian missions and natural disaster relief here at home to fighting in the Global War on Terrorism (GWOT) abroad, I thank all Field Artillery Soldiers and Marines for their talent, commitment and sacrifices in accomplishing these missions superbly.

In support of GWOT, many Field Artillery units must be proficient in fire support and maneuver tasks since they are being given their own areas of operations and must perform the full range of maneuver missions. Many of these FA task forces (TFs) include Navy, Air Force and(or) Special Forces personnel. Two excellent examples of maneuver-fires FA TFs with joint personnel in Iraq are TF 1-10 (1st Battalion, 10th Field Artillery, 3rd Infantry Division) and TF Thunder (4-11 FA, 172nd Stryker Brigade Combat Team). In a complementary effort, combat training centers (CTCs) are training our maneuver-fires units for these dual missions via tough scenarios in complex environments.

The FA also has some impressive fire support officers (FSOs) down range making a difference, notably, at the company level. They've come up with innovative approaches to what they call "tactical-level information operations (IO)." They're developing tactics, techniques and procedures (TTPs) to gather and integrate IO and intelligence into their units' operations and contribute to their units' civil-military operations (CMO) and civil affairs (CA).

There is no finer example of an FA unit's setting the standard in accomplishing nonstandard missions than the 82nd Airborne Division Artillery's (Div Arty's) participation in relief efforts for Hurricanes Katrina and Rita. The Div Arty Commander, Colonel Vic Petrenko, and his Redlegs rapidly deployed to Louis Armstrong International Airport in New Orleans, assessed the situation, took charge and then coordinated and executed relief efforts.

The 82nd Div Arty now is executing another nonstandard mission: transforming into the modular 82nd Division's fourth and the Army's newest airborne brigade combat team (ABCT).

During the past year, much of III Corps Artillery has trained diligently to convert its batteries into medium truck companies, recently deploying 13 of them to Iraq. For example, in November and December, 2-5 FA, 212th FA Brigade, completed 23 missions while traveling more than 51,000 miles and encountered improvised explosive devices (IEDs), mines, etc., in more than half of those missions.

C Battery, 1-147 FA, 147th FA Brigade, South Dakota ARNG, deployed to Iraq last October to serve as a military police unit. From providing security for a base and prison to training the Iraqi Police in Baghdad, C Battery has excelled.

Also, in Iraq this year, 3-13 FA, 214th FA Brigade, III Corps, first validated the precision guided multiple-launch rocket system (GMLRS) rocket in Iraq. These rockets were designed to greatly reduce collateral damage. When the GMLRS was used in Tal Afar in support of the 3rd Armor Cavalry Regiment (3rd ACR) on 9 and 10 September, the rockets destroyed the target with almost nonexistent damage to the surrounding buildings. The 3rd ACR Commander Colonel H. R. McMaster said, "GMLRS proved itself in combat in Tal Afar and provided the regiment a tremendous capability. It not only was able to hit enemy positions with a great deal of precision, but also was able to limit collateral damage."

All these missions demonstrate our branch's "Pentathelete" mindset—the US FA's excellent execution of any nonstandard mission while providing timely and accurate fires.

And we have other examples of excellence in our branch. "Congratulations!" are in order for 2005 award winners: the Knox Active Component Best Battery, A/2-17 FA, 2nd Infantry Division; the Hamilton Best ARNG Battery, A/2-162 FA, 92nd Separate Infantry Brigade; and the Gruber Award for innovativeness, Sergeant First Class Craig A. Brown, Fire Support NCO, 1-319 AFAR, 82nd Division.

Also, 3-7 FA, 25th Infantry Division, was the first Army combat unit to win the Secretary of the Defense's Phoenix Trophy for Excellence in Maintenance (field-level weapons and equipment) since the award's inception in 1985. 3-7 FA won the awards while deployed for exercises and missions, including to Afghanistan for Operation Enduring Freedom.

And back at Fort Sill, we are working to support US FA efforts worldwide. In addition, the Chief of Air Defense Artillery (ADA) and I are developing a plan to consolidate the ADA and FA schools at Fort Sill, melding as many functions as feasible. As our plan develops, I will discuss it in future columns.

Very few times in our history has America asked as much of her servicemen and women as she does today. As I look ahead through 2006, I see FA Soldiers and Marines continuing to set the standard for excellence as they answer her call. It makes me *proud* to be Field Artillery.

Responses to: "Patriot Fratricides—The Human Dimension Lessons of Operation Iraqi Freedom"

Today We Can Automate Complex Procedures

From a networked fires perspective, the author Dr. John K. Hawley [of the article in this edition] brings up a point we must address. Where and how much human intervention is required in any fires chain, regardless of whose it is?

In the case of the Patriot fires chain, the author has taken the position that additional human intervention is required because it is too difficult to automate complex procedures. I disagree with this analysis on the basis that I don't think it is too hard to automate complex procedures.

The author has an accurate assessment that artificial intelligence (AI) is still an undeveloped concept. However, great strides have been made in cognitive reasoning. This is basically complex algorithms programmed into a system to allow it to make decisions based on inputs. We can automate the process with cognitive reasoning. Yes, automating complex procedures is hard, but doable.

The key point in the article is that the current man-machine interfaces have to be improved. The decision really is about speed of service. The better the automated system, the faster we can accomplish the mission. This is not the only consideration, but it is the main one.

We also have to consider fratricide, clearance procedures, ROE [rules of engagement], collateral damage, etc. Future automated systems will be successful if they can prove to be trustworthy and are accepted by commanders.

As the TRADOC [Training and Doctrine Command] Systems Manager for FATDS [FA tactical data systems], I work on automating complex procedures and determining if, when and where the system needs a human IP [intervention point]. I can foresee in the not too distant future the capabilities to design a safe, efficient and fast (collectively also very effective) NetFires system of systems.

COL John L. Haithcock, Jr.
TSM FATDS, Fort Sill, OK

Automated C^2 Has Fratricide Implications for the FCS Force

I agree with Dr. Hawkley's premise that, "Soldiers and not the automated system must be the ultimate decision makers in air and missile defense engagements." I think his assessment also applies to NetFires [networked fires].

But we (the Field Artillery) already know this—have known it for some time. We have an artillery C^2 [command and control] system—AFATDS [advanced FA tactical data system]—that will allow automated (no-man-in-the-loop) fire support, control and direction from sensor-to-shooter.

In our pre-NetFires environment, once a fire mission gets to the shooter (howitzer or launcher), it is fired; our crews are not charged with decision making. (It's different for Patriot sections because our crews don't operate independently as a Patriot section does.) Yet, with this capability, we have purposely built in IPs that allow human decision making to provide oversight to the automated process.

Dr. Hawkley rightly asserts that, "Driven by advances in technology and mission changes, Patriot crewmember roles have evolved from traditional operators to supervisors of automated processes. The job of supervisory controller is different from that of traditional operator, and these differences must be reflected in system design, performance support features (decision aids), and training and professional development."

I believe we already are validating Dr. Hawkley's assertion through our work in current and future systems designs, decision and performance support aids, and training and professional development. We realize we have moved beyond "operators" to "supervisory controllers." I always have thought that we have to stop thinking of AFATDS and our other ABCS [Army battle command system] pieces as something run by an "operator."

AFATDS is a command and control system and should be controlled by a leader who uses it to assess the situation, make decisions and direct actions. Yet in the past, we routinely put a very junior operator on the system who could set the machine up and run it well but couldn't leverage the C^2 and decision support capacities of the system. This is changing as units realize there is too much lost by taking leaders out of the loop in the process—units are now asking for more experienced Soldiers slotted against the battle command systems.

In the modular force, substitute FEC [fires and effects cell] and AFATDS FDC [fire direction center] for the Patriot crewmember in the article and we have the same responsibilities for Field Artillery Soldiers. In the NetFires world, substitute FEC (and possibly the entire battlefield command network) and we get the feel for the "supervisory controller" aspect that he describes.

Our Soldiers and leaders, who are so integral to the evolving NetFires systems, must be empowered with the ability (training and system design) to use these systems as leadership enablers, not leadership substitutes. There are not many degrees of separation between a good decision to fire a mission and a bad decision to fire a mission—and if a bad decision is made, the excuse cannot be, "The network made me do it."

Much of the talk about "the network" and all of its mysterious technological workings gives me pause to think about some analysis of the early going in WW II provided by Major Ferdinand Miksche in 1941. Major Miksche was a Czech artillery officer who was directed to gather and publish lessons learned from the early fighting in World War II—sort of an early CALL

[Center for Army Lessons Learned] mission.

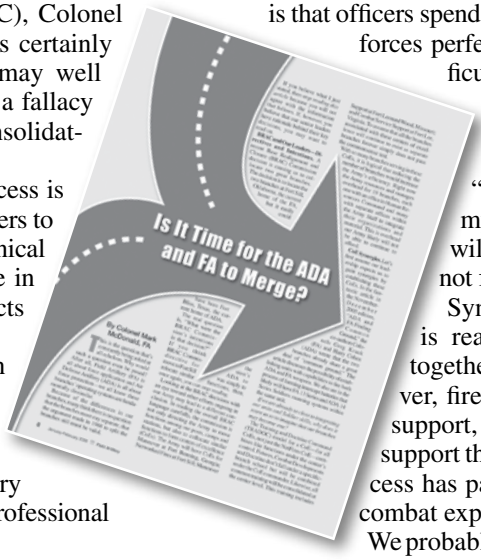
In contrasting the German and French artillery, he wrote, "The German artillery officer is permeated by the spirit of the infantry. He is capable of appreciating the needs of the infantry and using his own initiative to provide support when and where it is most urgently needed.

"The French gunner officer—once so dashing and audacious—has now become a geometrician and over-theoretical mathematician. He devotes his attention far more to the technical aspects of planning artillery than to the tactical needs of the infantry, of which he has little understanding" (F.O. Miksche, "Attack—A Study of Blizkrieg Tactics," 1941).

We must caution ourselves against becoming enthralled with the "technical aspects" of NetFires and ensure leaders can exercise the "art" of war, using their "initiative to provide support when and where it is most urgently needed."

LTC Samuel R. White, Jr., FA
Futures Concept Integration Officer
Concepts Division
Futures Development and Integration Directorate (FDIC),
Fort Sill, OK

Response to: "Is It Time for the ADA and FA to Merge?"



The article by our Assistant Commandant (AC), Colonel (Promotable) Mark McDonald, in this edition is certainly most interesting and thought-provoking—and may well indeed foretell the future. But I believe there is a fallacy underlying the potential Army-wide theme of consolidating branches.

The assumption made in this consolidation process is that, institutionally, we can train and educate officers to become proficient and multi-faceted in fairly technical and complex skill sets. These skill sets are those in the Field Artillery, Air Defense Artillery and effects coordination/integration.

However, institutional training and education are only a part and, although vitally important, a small part of the development process. Service in the operating forces, learning and honing those skills within each separate but vital MOS [military occupational specialty], is what separates the professional from the amateur.

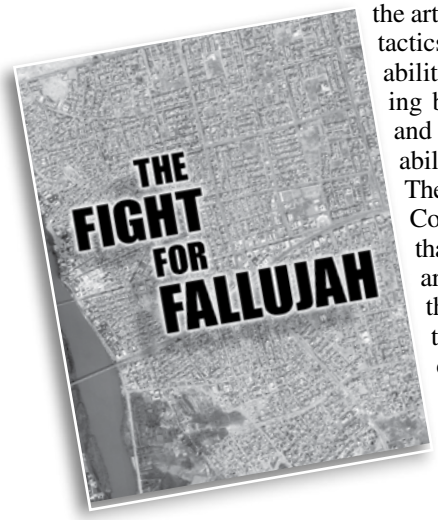
The fallacy in this potential consolidation proposition is that officers do not spend enough time in the operating forces to perfect such skills sets. During the course of a military career, if all an officer did was serve in the operating forces perfecting his warfighting skills, then maybe he could become the multi-faceted officer articulated in the AC's article. However, reality is that officers spend far too little time in the operating forces perfecting those skills, making it difficult, if not impossible, to become experts in their trades. To add the skill set of another technical MOS, such as ADA, into the FA "kit bag," given the realities of the myriad of assignments FA officers will fill during their careers, is simply not feasible.

Synergy within a combat command is realized when true experts come together from various skill sets (maneuver, fires, aviation, Air Defense, service support, etc.) and bring their expertise to support the one fight. This formula for success has passed the test in our most recent combat experiences.

We probably should take a critical look at the rationale for splitting the FA and ADA back in 1968 before we embrace consolidating the branches. I'd bet some of the rationale for the split remains valid today.

Col James A. (Al) Pace, USMC
Commanding Officer, USMC Detachment
Fort Sill, OK

Response to: "TF 2-2 IN FSE AAR—Indirect Fires in the Battle of Fallujah"



I read the article in the March-April 2005 issue with great interest and, in part, with utter amazement. It appears, from the article, that the new artillery tactics are to leave behind the ability to mass fires by deploying batteries with task forces and then further diluting that ability by deploying sections. The authors [Captain James T. Cobb, et. al.] also indicated that the tactics included other artillery support available that was not used because they "didn't trust the accuracy" of the support in danger-close missions. By the end of the article, I had visions of "flying artillery unlimbering to fire grape shot at the flank of the advancing infantry."

While it is obvious that artillery tactics and deployment in post-invasion Iraq and a MOUT [military operations in urban terrain] battle like in Fallujah would not require Cold War battalions of artillery, I was concerned in reading the AAR [after-action review] that the ability to mass fires, quickly coordinate those fires and keep up with ammunition planning and resupply has also been diluted. Is this from the dispersion of batteries with the concurrent loss of adequate artillery staff?

The strength of the US Field Artillery has been its ability to coordinate massed artillery fires quickly and accurately. Reading this article, I had the impression that this ability is being lost.

LTC(R) Robert L. Greene, FA, USAR,
Glen Allen, VA

Brigadier General Robert P. Lennox
Chief of Air Defense Artillery and Commanding General of Fort Bliss, Texas

NetFires Center of Excellence

An Exciting Place to Be

Interview by Patrecia Slayden Hollis

Q *What do you see as the strengths of the Air Defense Artillery [ADA] and Field Artillery [FA]? Is it time to merge the two branches? If so, why and in what time frame? If not, why not?*

A Before I answer, I want to say that the Lennoxes already are a NetFires family. My brother and two nephews are Field Artillerymen, and we work well together. So I think that's a sign for the future.

Strengths of the US Air Defense Artillery? We are the only branch in the world that can execute the ballistic missile fight—use Patriot missiles to shoot down theater ballistic missiles [TBMs]. No other Army in the world has that capability, even those that have the missile systems. So I think we are very good in our lane, which is a defensive lane that enables maneuver commanders to complete their operations.

Field Artillerymen also do what they do better than Redlegs in any other Army in the world: influence the battle with cannon, rocket and missile fires and stand arm-in-arm with their maneuver commanders, ensuring success on the battlefield.

So in terms of professionalism, in terms of commitment to doing the right things, I think both branches are world-class. I'm excited about the opportunity to work with Field Artillerymen to write new doctrine and develop new concepts.

About merging the two branches into one…from the Army's perspective, there's a lot to be said for merging the two branches. I think that as we move forward in collocating the Air Defense with the Field Artillery at Fort Sill, Oklahoma, as the Netfires Center of Excellence, it will become evident there are benefits to having one branch.

If you look at the Combined Arms Support Command, CASCOM [Fort Lee, Virginia], it has been a center of excellence for as long as I can remember, but Quartermaster, Ordnance and Transportation have retained their branch identities.

Now in the case of the Air Defense and Field Artillery, the "whole may be better than the sum of our individual parts." But, at this point, we don't know if that's the way to go. As General Ralston [Major General David C. Ralston, Chief of Field Artillery] and I move forward on establishing the NetFires Center, we'll recommend that ADA and FA become one branch if it makes sense for the Army.

> ***Counter-Rocket, -Artillery and -Mortar (C-RAM)*** *is a multi-branch program to counter enemy indirect fires in the Global War on Terrorism (GWOT). Its purpose is to improve persistent surveillance on the enemy, enhance the fusion of sensors that acquire the enemy and facilitate both proactive and reactive responses to enemy indirect fire. The tenets of the program and the branch responsibilities are as follows: Field Artillery (in consultation with Military Intelligence)—Shape, Sense, Respond, Warn, and Command and Control; Air Defense Artillery—Intercept; and Engineers—Protect.*

Q *Please explain the overall operations of the C-RAM program, including the general responsibilities of FA and ADA and how they are integrated.*

A I'm excited about C-RAM. Part of the Field Artillery's mission is counterfire. So it's logical that in the last couple of years we've integrated ADA and FA capabilities into one unit under one unit commander to conduct C-RAM.

We have integrated the FA sensors—Q-36, Q-37 Firefinders and lightweight countermortar radar, the LCMR—and coupled them with other sensors that can identify an incoming threat with such precision that only a portion of a FOB [forward operating base] needs to be warned to take cover. Everyone else can keep working. Based on the sensor piece alone, the threat of a mortar attack does not paralyze an entire unit or base anymore.

The Air Defense's piece is to clear the airspace. We're tied into the joint air picture, so we know what's flying up there. That is coupled with both ADA and FA strike capabilities—striking the threat round in the air, if possible, or counterstriking the threat firing unit, both with munitions or ground forces. Taking out a projectile in the air coming at you, which is what C-RAM's Phalanx gun does, is our forte. [Phalanx is a land-based version of the Navy's six-barrel, 20-mm gun, which is similar to the ADA's Vulcan gun.]

So what we've done is optimize the best of both branches in one program. Together, we are like a boxer, each of us with one hand: the FA throws the punch and the ADA blocks. Those capabilities are now inside one thinking C-RAM *team.*

If you expand that concept across the battlefield, we could build such a team for the operational and strategic levels of the counter-Scud fight we've been conducting with Patriots and joint fires for years—not just at the tactical level for C-RAM. So C-RAM has got a lot of

implications for NetFires. C-RAM is a "seed" that we can grow the two ends of the spectrum into NetFires. For me, that means getting our command and control systems right. I think C-RAM is very relevant and timely.

Q *What is your immediate vision for ADA as part of the Army's NetFires Center of Excellence at Fort Sill? What kinds of synergy and shared functionality do you envision?*

A Critical for ADA is developing a system of systems capability inside ADA systems. Right now, I can sense a target with the Patriot radar, but I can't pass that to the developmental SLAMRAAM [surface-launched advanced medium-range air-to-air missile] to intercept a target. I'm not netted, even internally to ADA systems. [See Page 6 for descriptions of SLAMRAAM and other developmental systems.]

We have a path ahead, what we call "Increment II," to design and procure systems to give us an integrated fire control capability that will allow us to see with any sensor and strike targets with any platform. And that goes across our weapons systems, from the future JLENS [joint land-attack cruise missile defense elevated netted sensor] to Patriot and SLAMRAAM.

The NetFires Center concept has opened up new doors for us. How do we expand our strike capabilities? How do we ensure we can talk seamlessly from a sensor, for example, JLENS, an elevated system that will be able to sense moving targets, and send that data to a shooter—*any* shooter? How do we build those capabilities into and share information with other Army and joint systems? What is the right command and control solution? That last piece is critical.

General Ralston and I have talked about locking all our smart people in a room to brainstorm where our two branches go from here. I think that establishing the "virtual" NetFires Center of Excellence on 1 June will cause a virtual "walk down the hall with a cup of coffee in hand" to talk about what each branch is doing, how we can operate together and share ideas to make NetFires grow. We will see benefits from and synergies develop as our junior officers and field grades work closely together for the first time.

Photo courtesy of Raytheon

SLAMRAAM, shown here, and JLENS will give the ADA the ability to attack incoming cruise missiles at greater ranges.

Q *What are your other priorities for the next five or so years?*

A Everything we do is joint in air defense. Most of our firing is by permission of the joint force air component commander (JFACC), through his chain of command, through regional and sector air defense commands. So everything we do *must* be tied into the joint network and joint command and control.

Then we're developing new concepts. For example, C-RAM fills a combat requirement. Another gap for ADA is cruise missile defense. Worldwide, the cruise missile threat is growing exponentially.

Because cruise missiles come in very low, they are hard to detect or strike until they are close to our Soldiers, systems or other national assets we're trying to defend. How do we "buy back" that battlespace and hit them at longer ranges? JLENS and SLAMRAAM will give us the ability to attack incoming cruise missiles at much greater ranges.

Another material priority for the ADA is MEADS, the medium-extended air defense system we are building with the Italians and Germans. But we need MEADS capabilities now. So, we are accelerating MEADS technologies as they become available and putting them into Patriot. In effect, we are morphing Patriot into MEADS over the next several years.

In terms of organizational priorities, we are transforming the ADA force, building air and missile defense [AMD] battalions. We're building these modular composite battalions with Patriots and Avengers to allow commanders at all levels to fight those systems.

Could we send a Patriot-Avenger battalion to work with a Fires Brigade? Absolutely. What's the right command and control system for that to happen? Could the FA have a fires capability that works with the Air Defense brigade? Absolutely. These are some of the areas we need to explore as part of the NetFires Center.

When ADA physically moves to Fort Sill in the next couple of years, my goal is to integrate the schools, not just collocate them. For example, we need battle labs next to battle labs and combat developments next to combat developments, so we can grow them together very rapidly.

If there is value added in integrating some aspects of the schools before we actually move to Fort Sill, then we need to make it happen. If it doesn't make sense to integrate something, then we won't do it. We owe it to the Army to get it right.

Q *Field Artillerymen are performing a variety of nontraditional missions in Afghanistan and Iraq. What nontraditional missions have Air Defenders performed in the Global War on Terrorism?*

A Our nontraditional missions are similar to some of the FA's. We have a gun-truck battalion deployed in Iraq now, 2-44 ADA [2nd Battalion, 44th Air Defense Artillery] in the 101st Airborne Division. It provides convoy escorts. Last year, 4-5 ADA defended and cleared the route from Baghdad International Airport to the Green Zone.

Also like the FA, we've had some circumstances where our Air Defenders have had to conduct traditional missions simultaneously with the nontraditional missions, such as manage airspace or monitor our elevated sensor in Iraq. Our Air Defenders had to adapt back and forth very rapidly. We're *incredibly* proud of our officers, NCOs and Soldiers for getting the job done—whatever job was demanded of them. I think that's a common theme across both branches.

Q *How does ADA leverage fires during joint AMD operations?*

A Our 32nd AAMDC, which stands for the 32nd Army Air and Missile Defense Command, conducts joint

AMD. Each theatre has an AAMDC, which is commanded by a brigadier general who is dual-hatted as the Air Defense commander for the joint force land component commander [JFLCC] and also works for the JFACC.

The JFACC has an ISR [intelligence, surveillance and reconnaissance] team that searches for Scuds. Integrated with the ISR team in the combined air operations center [CAOC], AAMDC personnel take the lead on the Scud missile searches. When the team finds a target, it nominates the Scud for execution through the regular air operations center processes with the BCD [battlefield coordination detachment] involved in the decision as to which Army or joint fires asset will strike the target. So we work hand-in-hand with Field Artillerymen in the BCD to bring fires to bear on the Scuds.

At the tactical level, we work C-RAM; at the theater level, we work targeting for joint air-missile defense. It's up to us to integrate these two ends of the spectrum into what will become the NetFires concept. There has been some discussion about integrating FA and ADA personnel on the ISR team in the CAOC and in the BCD to enhance the linkage and improve the organizations as part of NetFires.

Q *What are the most significant changes in ADA as part of the Army's transformation?*

A As mentioned earlier, the composite Patriot-Avenger battalion is one of our biggest changes. We have taken all our SHORAD [short-range air defense] battalions out of the divisions and are forming these composite AMD battalions that, today, have four Patriot batteries and a large Avenger battery. Tomorrow, SLAMRAAM will replace Avenger, giving us the ability to conduct TBM defense and cruise missile defense in one package. So based on the threat, we will be able to provide the warfighter a modular package capable of deploying as a battalion or as part of an AMD brigade.

We've stood up two composite battalions already: 1-44 ADA at Fort Bliss and 1-43 ADA in Korea. Our plan is to stand up a total of five battalions in the next two years.

Early in OIF [Operation Iraqi Freedom], we still were organized as SHORAD and HIMAD [high-to-medium air defense] battalions. But we didn't have the command and control systems to work across the two types of units. SHORAD and HIMAD had distinct cultures that supported different levels. The short-range SHORAD units supported divisions while the HIMAD Patriot Air Defenders supported corps and theater commands. So now we have the shorter and longer range capabilities internal to the same unit.

Today, we're training officers in the combined skills needed for both systems and are planning to realign our enlisted MOS [military occupational specialties] to ensure leaders and Soldiers can move from one system to the other within the same unit. Right now, we have MOS for SHORAD and MOS for HIMAD.

We are looking at three MOS: launcher, sensor, and command and control. The vision is to have one set of launcher experts for SLAMRAAM, Patriot or THAAD, the latter our future theater high-altitude air defense system; one set of sensor experts on the Sentinel radar at the short range to our Patriot sensor, JLENS, MEADS sensors, and to our THAAD sensor; and command and control that spans these systems as well. This realignment of MOS will give us more flexibility to assign people. Ultimately, it will reduce the number of ADA MOS.

Surface-Launched Advanced Medium-Range Air-to-Air Missile System (SLAMRAAM) will begin replacing the Avenger in FY09 in composite Patriot-Avenger battalions, extending the short-range air defense engagement envelope beyond visual identification range. It will address the threat posed by cruise missiles, unmanned aerial vehicles and unmanned combat aerial vehicles. SLAMRAAM will be able to destroy aerial targets being masked by terrain or clutter, operating in reduced visibility or employing standoff capabilities beyond the range and altitude of our current Stinger-based weapons. In attacking cruise missiles or other targets over-the-horizon, it will use an elevated sensor platform—the joint land-attack cruise missile defense elevated netted sensor (JLENS).

Joint Land-Attack Cruise Missile Defense Elevated Netted Sensor (JLENS) will be able to detect small aerial targets at long ranges and provide precise fire control data to Air Defense units. JLENS elevated dual-aerostat system provides two radars, one for wide-area surveillance at long ranges and one for shorter ranges with precision tracking for long duration missions. The focus is on providing data for attacking cruise missiles and other moving targets, such as large-caliber rockets. JLENS will be able to detect the target's ascent phase, track the target and determine the launch-point estimate. It will be fielded in FY11 in batteries assigned to brigade combat teams (BCTs).

Medium-Extended Air Defense System (MEADS) is being developed in cooperation with Germany and Italy. MEADS technology is being spiraled into Patriot missiles incrementally rather than waiting 15 years for a total missile replacement. In the first phase, Patriots will receive a battle management command, control, communications, computers and intelligence (BMC4I) station to improve situational awareness and allow for force operations and engagement operations from a single shelter. Phase two is the fielding of a lightweight launcher capable of near-vertical tube positioning that facilitates 360-degree coverage. In the third phase, Patriot batteries will receive two multifunctional fire control radars and one sensor radar, all mounted on the family of medium tactical vehicles (FMTVs). This will allow for a mobile 360-degree defense against medium and short range tactical ballistic missiles, unmanned aerial vehicles, hostile aircraft, jammers and cruise missiles.

Terminal High-Altitude Area Defense System (THAAD) is a ground-based terminal phase launcher-radar to defend against short- and medium-range ballistic missiles, both inside and outside the atmosphere, significantly mitigating the effects of weapons of mass destruction (WMD). It has the growth potential to defeat intermediate-range ballistic missiles. It's launcher is in a mobile, tactical fire unit with eight missiles per launcher and three launchers per fire unit. It's radar provides early warning to the specific location threatened by a ballistic missile and precise tracking of the missile, including in flight data updates, plus an accurate determination of the missile launch point. THAAD will be able to operate as a stand-alone fire unit or, more often, with a Patriot battalion, forming an AMD task force. The first fire unit will be fielded in FY09.

Also, we are standing up Air Defense airspace management [ADAM] cells in the modular BCTs [brigade combat teams] and divisions. The cells analyze the fight from the perspective of the third dimension, and for the brigade and division commanders, they provide airspace situational awareness and manage the commanders' airspace.

Right now, the ADAM cell is not in the BCT's FEC [fires and effects cell] or the division's JFEC [joint FEC]. In the BCTs, they work in the S3 shops, and in the divisions, they work in the TACs [tactical command posts]. Could the FEC or JFEC be the place for the ADAM cell in the future? Maybe.

Q *What message would you like to send Field and Air Defense Artillerymen stationed around the world?*

A Historically, we're out of the same branch, the Artillery, because the Army needed people smart enough to compute mathematical solutions for a variety of targets and firing assets in multiple dimensions. At the same time, the Artilleryman had to be pretty tough to handle powder bags and shells and wrestle the guns into positions to engage the enemy. So, from our common stock of smart, tough warriors, we've got a great future ahead of us.

The NetFires Center of Excellence will be an *exciting* place to be.

Brigadier General (Promotable) Robert P. Lennox is the Chief of Air Defense Artillery and Commanding General of Fort Bliss, Texas, where he also served as Deputy Commanding General in an earlier tour. His previous assignment was as the Deputy Commanding General and Chief of Staff of the Army Accessions Command, Training and Doctrine Command, Fort Monroe, Virginia. He also served as the Deputy Commanding General for the Army Space Command/Deputy Commanding General for Operations in the Army Space and Missile Defense Command, both in Colorado Springs, Colorado. He commanded the 108th Air Defense Artillery Brigade at Fort Bliss; and the 1st Battalion, 2nd Air Defense Artillery (1-2 ADA), an Avenger battalion organic to the 108th Brigade at Fort Stewart, Georgia. He deployed to Saudi Arabia as the Executive Officer for 4-43 ADA (Patriot) for Operation Determined Resolve. He holds two master's degrees, including one in National Security Strategy from the National War College in Washington, DC.

2005 Hamilton Award Winner

B/2-162 FA, 192nd SIB, PRANG

B Battery, 2nd Battalion, 162nd Field Artillery (B/2-162 FA), Puerto Rico Army National Guard (PRARNG), has won the Alexander Hamilton Best ARNG Battery Award for 2005. Captain Jose J. Cruzado commands the battery with NCO leader First Sergeant Jorge Diaz. Bravo Battery has performed extremely well and clearly will maintain its excellent attitude and motivation for future missions. 2-162 FA supports the 92nd Separate Infantry Brigade (SIB).

Named for Alexander Hamilton, a Revolutionary War artilleryman and American statesman, the Hamilton Award was established in 2002. It annually recognizes a high-performing ARNG battery based on specific criteria and a performance narrative. (For more information, see the website "Knox, Hamilton and Gruber Awards" at http:// sill-www.army.mil/awards/default.htm.)

B/2-162 FA is Number One in Quality Force Indicator (QFI) percentages for 2005, a measure of unit readiness in the National Guard. For example, the battery's reenlistment rate was 99 percent—thanks to the participation of the unit's families. One hundred percent of the battery's personnel are military occupational specialty qualified (MOSQ).

Because of their high motivation, B/2-162 FA's Soldiers are well trained and take responsibilities leading to promotions. The unit's promotions include one staff sergeant promoted to sergeant first class, five sergeants promoted to staff sergeant, and five specialists promoted to sergeant. Also, 18 Soldiers earned Army Achievement Medals this past year.

B/2-162 FA live fires during Annual Training 2005 in Florida.

B Battery has consistently "gone the extra mile" and won the Best Firing Unit for two consecutive years at Annual Training (AT) 2004 and AT 2005 at Camp Blanding, Florida. During AT, B Battery conducted realistic and relevant training as a team.

B Battery also earned the Best Unit in Administration award during 2005.

All Soldiers maintain the Army and civilian values. These values help develop a cohesive, well prepared and motivated team that can accomplish any mission.

The Soldiers have unique pride and are as committed to equipment readiness as they are to Soldier readiness. Five areas were inspected during a command maintenance evaluation team (COMET) inspection by the Deputy Chief of Staff for Logistics (DCSLOG) on 13 October. During the battery's inspection, all five areas were in compliance with Army and local inspection standards with four of those areas deemed commendable. This kind of result is always a team effort.

During 2005, the battery was involved in several non-mission-essential task list (METL) missions. One of these missions included supporting security units and helping to build schools in Nicaragua in April. Then, B Battery deployed to Europe to secure Air Force bases in support of Operation Enduring Freedom (OEF). B Battery Soldiers also were involved in support and security operations for areas affected by Hurricane Katrina in New Orleans, Louisiana.

B Battery, with its high-performing Soldiers and leaders, will lead the battalion to win in combat.

Is It Time for the ADA and FA to Merge?

By Colonel Mark McDonald

This is the question that's constantly being asked at all echelons. Why would such a question even be posed? After all, Field Artillery (FA) is all about force application and Air Defense Artillery (ADA) is all about force protection—we all know these branches' operating systems are fundamentally dissimilar.

Because of the differences in our branches, many think there is no question that the branches must stay separate, that the argument made in 1968 to split the branches still must be valid.

If you believe what I just stated, then *stop reading this article* because you will not agree with the information that follows. If, however, you believe that our senior leaders have rationale behind their key decisions, you may want to read on.

BRAC and Our Leaders—Directives and Intentions. A recent Base Realignment and Closure (BRAC) Commission decision is causing us to collocate two great branches. The decision is to locate the two branches at Fort Sill, Oklahoma, the current home of the FA, but it easily could have been Fort Bliss, Texas, the current home of ADA.

The real question is, "What were the BRAC Commission's intentions in that decision?" If you think the BRAC Commission's directive for ADA to move to Fort Sill was simply to relocate similar functions, then, once again, *you can stop reading.*

Looking at the BRAC decisions with an eye toward other efforts ongoing in our Army may lead to a different conclusion. In reading the overall BRAC language carefully, the commission is not only directing the Army to move functions among our posts, camps and stations, but also to collocate similar functions to form centers of excellence (CoEs). The Army will have CoEs for Maneuver at Fort Benning, Georgia; Networked Fires at Fort Sill; Maneuver Support at Fort Leonard Wood, Missouri; and Combat Service Support at Fort Lee, Virginia. To assume that all the branches associated with these centers of excellence will continue to exist as separate branches forever simply does not pass the commonsense test.

With so many branches serving in these CoEs, it is logical that reducing the number of branches would increase the Army's efficiency. Right now the Army resources and manages overhead for 19 branches, each one with an office in Human Resources Command and many with separate offices within the Army Staff to integrate their organizations and material. This is overhead our Army likely will not be able to continue to afford.

CoE Synergies. Let's first assume our leadership expects us to gain synergies by establishing these CoEs. In the fantastic article in the November-December 2005 edition, "ADA and FA: Finding Common Ground," the co-authors Colonels Greg Kraak (FA) and Harry Cohen (ADA) wrote that the two branches already share a great deal of "common ground." The article discusses the possibility of establishing units with capabilities to fire both ADA and FA weapons. We also are in the process of forming intercept batteries that likely will have FA 13 Series and ADA 14 Series Soldiers manning systems within the same unit.

If we are already so close to integrating our units and Soldier skills, why does it scare us so to imagine that our branches may become one?

The Training and Doctrine Command (TRADOC) model for a CoE—for all CoEs, not just the NetFires CoE—combines like functions under the center's control. Futures, Combat Developments and Doctrine don't fall under a specific-branch school but will be combined under the CoE commander. Likewise, all common training will be consolidated at the center level. This training includes

Basic Combat Training, NCO Academy, International Student Detachment, Basic Officer Leader's Course (BOLC) II (the replacement for the Officer's Basic Course, or OBC) and the Captain's Career Course (CCC).

What will remain under branch control will be branch-specific training only. For Field Artillery, that will include Advanced Individual Training (AIT), BOLC III, Basic NCO Course (BNCOC), Advanced NCO Course (ANCOC) and portions of CCC. The Air Defense Artillery will have similar courses. So in the simplest of terms, our branches' training is already merging—with only specific courses for specific weapons systems remaining separate.

One area that is not weapons-specific and that would be shared by both ADA and FA as a merged branch is effects coordination. This could become the "crown jewel" for all Soldiers and leaders in a new and combined branch. Consider, for example, that an officer in our new branch could be trained first as a leader, second as an effects coordinator (ECOORD) and lastly as a specialist in a delivery system or several closely related systems. These multi-capable officers then would be qualified to serve in all our maneuver formations as ECOORDs as well as serve on their weapons systems.

This model is similar to the way Artillerymen in both branches are tracked today. Currently, most officers serve their first assignments based on weapons-specific training received in their OBCs. If they are to go to a unit with a different system after CCC, they may require weapons-specific training before this new assignment. The same would be true of the entire "artillery" branch—officers, NCOs and Soldiers would receive weapons-specific training as they needed it.

Combining our branches only will pave the way for ... multi-disciplined Soldiers and leaders in lethal formations.

This approach would create a "level playing field" for all Artillerymen, formerly Field or Air Defense, by providing maximum opportunities to serve in maneuver formations while still having opportunities to serve in weapons-specific assignments. When our future combat systems (FCS) come on board and networked fires are realized fully, it may be feasible for a unit to have multiple Air Defense and Field Artillery attack systems collocated or possibly have multiple capabilities integrated into the same platform.

Combining our branches only will pave the way for such multi-disciplined Soldiers and leaders in lethal formations. Having officers trained on several systems and competent in effects coordination would allow them to gain the joint and combined arms experience that is so critical for preparation for command at all levels.

Okay, so when do we merge the two branches? I am not sure exactly when, but I am sure of one thing. We can take "the bull by the horns" and move out on a plan to merge the two schools and branches or we can wait until we are directed from above to implement what is clearly the Army's vision for transformation—then "play catch up." As for me, I would rather set the conditions for the success of our branches and start moving out.

If you have read this far, I congratulate you.

The possibilities I present in this article are simple and may be flawed to some degree. However, the bottom line is ultimately the same whether we implement now or later: *one day, in the not so distant future, we will be one branch.*

I urge you to take off your branch cap, put on your thinking cap and start the debate. I challenge you to write thought-provoking articles to appear in both the ADA and FA magazines. If we explore all possible synergies and potential pitfalls, our ultimate merger can only be the better for it. And, so will the Army.

Photo by Keith Pannell, *the Cannoneer*, Fort Sill

Sergeants David Butcher, left, and Jeremy Hartman, Warrior Leadership Course students, work on evacuating an "injured" Soldier during an exercise at Camp Eagle, Fort Sill. The ADA and FA integrated NCO Academies will combine "generic" courses, such as this one.

Colonel (Promotable) Mark McDonald is the Assistant Commandant of the Field Artillery School and Deputy Commanding General of Fort Sill, Oklahoma. In his previous assignment, he served at the Chief of Staff of the Field Artillery Center, Fort Sill. Prior to coming to Fort Sill, he was the Executive Officer to the Army G3 at the Pentagon. He commanded the 82d Airborne Division Artillery, Fort Bragg, North Carolina. He was a Division Chief in the Office of the Deputy Chief of Staff for Operations and Plans, also at the Pentagon, and deployed to the Stabilization Force (SFOR) in Bosnia for six months. He commanded the 3rd Battalion, 321st Field Artillery, part of the 18th Field Artillery Brigade, XVIII Airborne Corps, also at Fort Bragg, and two batteries in the 82d Airborne Division. He is a graduate of the Army War College, Carlisle Barracks, Pennsylvania, and holds a Master of Military Arts and Science from the Command and Staff College, Fort Leavenworth, Kansas.

The Recognition-Primed Decision Model

An Alternative to the MDMP for GWOT

By Lieutenant Colonel David A. Bushey and Major Michael J. Forsyth

The 3rd Infantry Brigade Combat Team (3rd IBCT), 10th Mountain Division, was activated on 16 September 2004 at Fort Drum, New York. The brigade's 4th Battalion, 25th Field Artillery Regiment (4-25 FAR), organized along modular lines, is its organic fires battalion.

Soon after activating with the brigade, the fires battalion leaders realized they needed a planning process that could leverage the battalion's modular capabilities and enable them to develop plans and orders rapidly in the current operating environment: the Global War On Terrorism (GWOT). The battalion commander agreed to an experiment with a new planning model, the recognition-primed decision model, to determine if it could provide the fires battalion enough agility to be effective in GWOT.

Since 4-25 FAR stood up more than a year ago, we have used this model very successfully to prepare for a future deployment to Afghanistan—including during a rotation to the Joint Readiness Training Center (JRTC) at Fort Polk, Louisiana. We recommend the model as an alternative to the traditional military decision-making process (MDMP) for GWOT.

The Army's needs in GWOT require rapid planning to produce agility and flexibility. The MDMP does not produce plans and orders quickly enough for the GWOT environment.

This article describes the recognition-primed decision model and how other battalions can use this model.

Recognition-Primed Model and MDMP Research. The recognition-primed decision model is a new planning methodology for standard orders development that is gaining a foothold in the Army. This model allows units to develop feasible plans and orders in time-constrained environments and enables friendly forces to act faster than the enemy.

As described in *FM 5-0 Army Planning and Orders Production*, the MDMP has been the Army's decision-making model for more than two decades. With seven steps and 117 sub-steps, it is an analytical process designed to generate the best solution from a series of options. Theoretically, the MDMP enables a commander to employ tactically sound plans that result in success on the battlefield.[1]

However, recent research reveals that the MDMP actually has the opposite outcome in many cases. The MDMP is a staff-driven regimen that inadvertently isolates the commander from developing the plan.

US Air Force Photo by SrA Ave Pele

A group of research scientists from Klein Associates in Fairborn, Ohio, conducted studies of military organizations and planning. It made some startling discoveries.

First, the group found that, with its focus on the staff process, the MDMP separated the commander from planning in most of the reviewed cases. Thus, junior staff officers, the least experienced individuals, had to conceive a workable plan.

Second, contrary to conventional thought, the MDMP produced cautious plans that were poorly suited to the demands of the situation. Researchers attributed this to slavish compliance with the doctrinal planning template.

Lastly, the MDMP slowed an organization's operational tempo (OPTEMPO) and stifled its ability to react to rapidly changing situations.[2]

By contrast, the Klein researchers observed that the recognition-primed decision model is a dynamic alternative that can produce solutions adapted to the situation.

Model Overview. This planning model is based on a theory known as "recognition-primed decision making," which is an intuitive process through which leaders naturally make decisions. The recognition-primed decision model leverages the experience of seasoned commanders whose education and training enable them to assess situations rapidly through pattern recognition, mentally wargame courses of action (COAs) and make timely decisions.

Dr. Gary Klein and Klein Associates have conducted research for military organizations for more than two decades, focusing on how individuals and organizations make decisions. To begin his research, Dr. Klein's premise was that organizational decision making works best when systematically staffed and developed within a group. But his research led to a different conclusion, shattering preconceived views. Here is what Klein Associates found.

First, intuitive decision making uses experience to recognize the patterns in a given situation, such as for example, terrain and an enemy defensive position. Based on pattern recognition gained through training, education and experience, the leader quickly develops a COA in his head to reduce the enemy position.

Through mental wargaming, decision makers usually search for the first COA that will work in a given situation. It is experience—intuition—that enables the leader to imagine how solutions will work.

The Klein researchers found that this is a natural mode of decision making for most individuals. In contrast, the MDMP makes many leaders uncomfortable with making decisions because its formalization tends to shield the leader from the process.[3]

In light of these findings, Dr. Klein sought to develop a method of military decision making that leveraged natural human tendencies. The result was the recognition-primed decision model outlined in Figure 1.

The recognition-primed decision model is a four-step process driven by the commander. The staff helps ensure the plan is feasible, acceptable and suitable to the situation. Steps 1, 3 and 4 are similar to the respective steps of mission analysis, wargaming and orders production in the MDMP. The difference is in Step 2. As a tactical planning model, the recognition-primed decision model depends on the commander's input to push the process and save time.

Step 1. Identify the Mission and Conceptualize the COA. In this step, the traditional MDMP mission analysis remains critical to the planning process because it provides the organization and commander an understanding of the situation and the ability to visualize how to win. Based on this analysis and then his visualization of the end-of-mission, the commander can provide a single, directed COA to solve the problem at hand and press planning forward.

At the conclusion of mission analysis, the commander must provide guidance

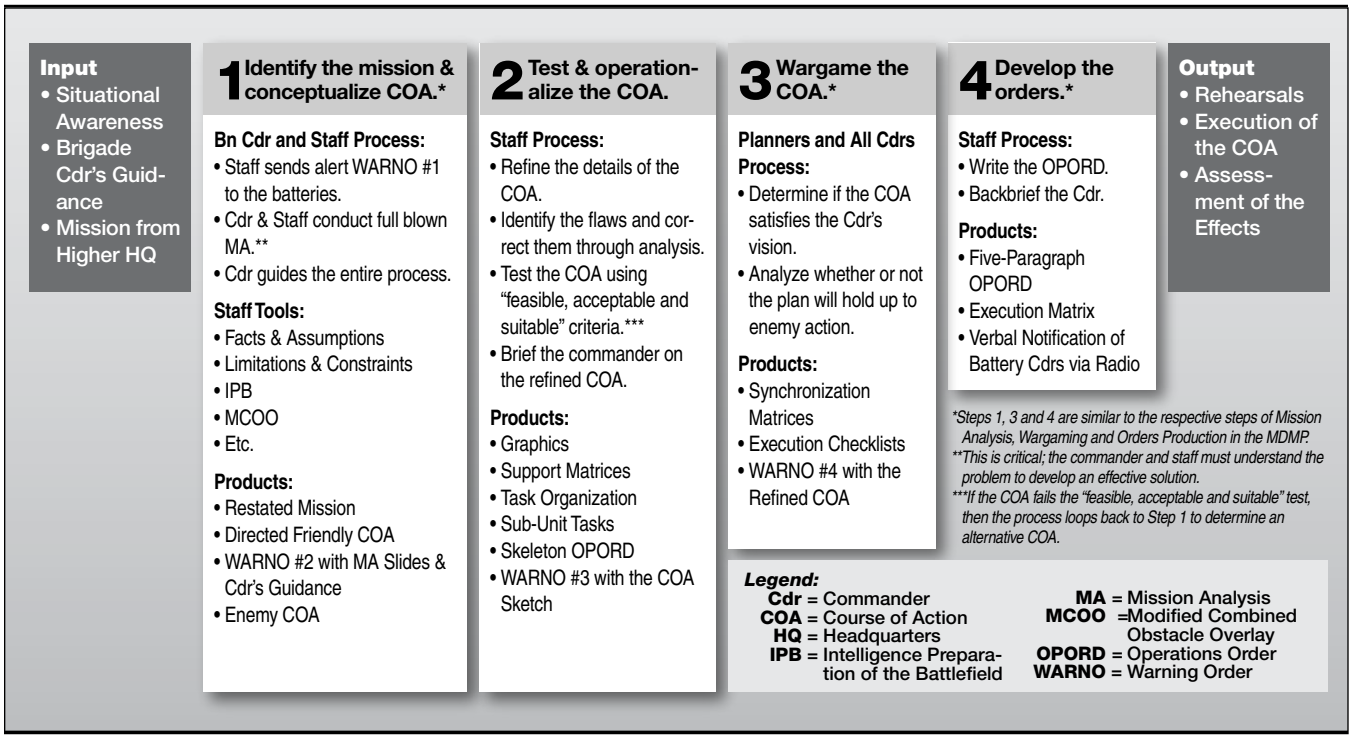


Figure 1: Recognition-Primed Decision Model. This model is an alternative to the more complex and time-consuming military decision-making process (MDMP) in the Global War on Terrorism.

to the staff as to his vision of the battlefield. The commander's mission analysis worksheet (visualize, describe and direct) shown in Figure 2 is a tool to help him do that.

This worksheet provides the framework to help guide the commander's thoughts so he can present them in a coherent manner that makes it easy for his staff to understand. Armed with a clear statement of intent and proposed action, the staff then can move forward to Step 2.

Step 2. Test and Operationalize the COA. This step is a major departure from MDMP. Rather than the staff developing and comparing COAs, which is the major time-consumer of the MDMP, the staff adds details to the directed COA to make execution possible and then tests its validity.

Also, instead of the least-experienced leaders in the unit struggling to develop COAs, they work to operationalize the plan.[4] The staff members gain experience vicariously through observation and analysis, thus building their abilities to recognize patterns and devise solutions to complex problems.

The initial COA presented by the commander necessarily will be a skeleton and lack details. Therefore, the staff fleshes out the skeleton with details, such as timing, logistical support, decision points (DPs) and troop-to-task analysis.

It is during the development of the intricacies that the staff identifies flaws in the plan and refines it to ensure it works.

At the conclusion of Step 2, the staff tests the COA against the "feasible, acceptable and suitable" criteria. This is the same test used in the MDMP to determine the validity of a COA.

Visualize

1. Enemy COA and Current Friendly Disposition (Sketch of Situation)
2. Requirements (What We Must Do)
3. Limitations/Constraints (What We Cannot Do or Restraints on Our Freedom of Action)
4. Capabilities (What We Can Do)

Describe

5. Commander's Battlespace—Description of What is Envisioned (Endstate Graphic with Decisive, Shaping and Sustaining Operations Descriptions)
6. Commander's Intent: Purpose, Key Tasks (3-5 Max) and Endstate (Enemy, Friendly, Terrain)

Direct

7. Mission (Directed COA Sketch with Deployments, Dispositions, T&P)
8. Task
9. Purpose
10. CCIR: Info the Cdr Must Have to Make Decisions (PIRs and FFIRs)

Legend:
CCIR = Commander's Critical Information Requirements
FFIR = Friendly Force Information Requirements
PIR = Priority Intelligence Requirements
T&P = Task and Purpose

Figure 2: Commander's Mission Analysis Worksheet

Leaders of the 4th Battalion, 25th Field Artillery Regiment (4-25 FAR), work through an urban operations exercise at the Joint Readiness Training Center, Fort Polk, Louisiana.

If at this time the staff cannot reconcile the plan, it develops a workable alternative to satisfy the commander's intent. If the plan is satisfactory, the staff presents it to the commander in a COA briefing with an updated enemy situation, to include most likely and dangerous COAs; a COA sketch; a written concept statement and concept of support; a command and control architecture; and task and purpose for each subordinate unit.

Step 3. Wargame the COAs. The recognition-primed decision model progresses to wargaming in Step 3 to test the validity of the detailed COA against a thinking enemy. This step is virtually no different than wargaming in the MDMP. The key is to conduct a thorough evaluation of the COA with an unbiased enemy.

Wargaming identifies the DPs, branches and sequels to the plan. Using one of the standard methods in doctrine—box, belt or avenue-in-depth—the staff ensures the COA stands up against enemy actions.

The current environment sometimes makes it difficult to wargame because of the varied nonlinear nature of the enemy and the slow, unpredictable environment. To deal with these challenges, our experience in GWOT and planning operations has led us to recommend the DP method of wargaming, as shown in Figure 3.

In this construct, the staff uses the DPs identified in Step 2 to refine the COA. The facilitator, together with the S2, uses the If-And-Then methodology to detail the potential situations in the execution of the COA and determine the information required for the commander's decisions in each of those situations.

As the staff conducts this drill, all members synchronize and integrate their operating systems and begin building the products that will be incorporated into the operations order (OPORD), such as the synchronization matrix.

Step 4. Develop the Orders. This is the final step. The staff has steadily developed its products during the process, so by Step 4, the final order is easily collated and formulated. The assistant S3 assembles the parts into a coherent, doctrinal five-paragraph order with applicable annexes for issue at the orders briefing

The studies Klein Associates conducted have demonstrated that the recognition-primed decision model increases the tempo of developing plans and orders by

about 20 percent over the MDMP.[5] The four-step recognition-primed decision model should take about six to eight hours and, under constrained conditions, four hours.

GWOT is forcing the Army to become more agile and flexible as a force. The force requires a planning process that meets those needs and enables rapid development of feasible plans and orders.

We believe that the recognition-primed decision model is a practical solution that can be implemented immediately by any unit. This model compresses planning timelines, gets the commander involved and better facilitates the natural human approach to decision making. Therefore, we offer the recognition-primed decision model as an alternative to the MDMP that can help units become more agile and flexible in prosecuting GWOT.

Endnotes:

1. Department of the Army, *FM 5-0 Army Planning and Orders Production* (Washington, DC: US Government Printing Office, 2003), 3-1–3-4.
2. Karol G. Ross, Gary A. Klein, Peter Thunholm, John F. Schmitt and Holly C. Baxter, "The Recognition-Primed Decision Model," *Military Review* (July-August 2004), 6.
3. Ibid. and Gary Klein, *Sources of Power: How People Make Decisions* (Cambridge, MA: MIT Press, 1998), 30.
4. Ross, 7.
5. Ibid., 6.

Lieutenant Colonel David A. Bushey commands 4th Battalion, 25th Field Artillery Regiment (4-25 FAR), 3rd Infantry Brigade Combat Team (3rd IBCT), 10th Mountain Division, at Fort Drum, New York. Among other assignments with the 10th Division, he was the Chief of Fires for the Combined Joint Task Force 180 (CJTF-180) in Bagram, Afghanistan; the Division Artillery S3; Battalion S3 for 3-6 FA; Brigade Fire Support Officer (FSO); and Assistant Fire Support Coordinator. He also was a Fire Support and Battery Observer/Controller (O/C) at the Joint Readiness Training Center, (JRTC) at Fort Polk, Louisiana. Additional deployments include Operations Hurricane Andrew Relief at Homestead, Florida; Uphold Democracy in Haiti; Joint Forge in Bosnia; and Joint Guardian in Kosovo.

Major (Promotable) Michael J. Forsyth is the Effects Coordinator for the 3rd IBCT in the 10th Division. Until recently, he had been serving as the Executive Officer and, before that, S3 for 4-25 FAR. Among other assignments, he was a Plans Officer for CJTF-180 during Operation Enduring Freedom IV; Small Group Instructor at the Field Artillery School, Fort Sill, Oklahoma; Fire Support and Battery O/C at the JRTC; and Battalion FSO and Battery Commander in the 101st Airborne Division at Fort Campbell, Kentucky.

A 4-25 FAR Soldier works through the "shoothouse" during training at Avon Park, Florida.

Decision Point	Event/Conditions	*If*	*And*	*Then*
Commit SSE force to HVT. DP	**Event:** ID HVT in accessible location. **Conditions:** *Intel* 1. Established special SIGINT pattern was executed on signature less than 24 hours ago with 8-digit grid. or 2. HUMINT information from source assessed with moderate reliability is less than 48 hours old. *Lift Avn*—QRF is available. *Man*—QRF is available. *Fires*—Assets are readily available or easily shifted to cover the mission; tanker support is available. *Assumable Risk—* • Illum window is below 30%. • Shift air QRF pilots to day/night. • Reconstitution of QRF is not required. • Weather is marginal.	**PIR 1.** The HVT security is less than 20 fighters. **PIR 2**. There is no SAM threat at the HVT location.	**FFIR 1.** Friendly force is postured for the operation. **FFIR 2.** ISR elements/platforms are available or easily re-tasked to support. **FFIR 3**. CAS/EA-6B/AH-64s are available or easily repositioned. **FFIR 4.** Weather minimums/illumination is acceptable below 30%. **FFIR 5.** Target is within 150 NM of BAF, KAF or FOB Salerno.	**Decision:** Commit SSE force to target. **Effects:** • Capture or destroy HVT. • Exploit for intel value.

Legend:

Avn = Aviation
BAF = Bagram Airfield
CAS = Close Air Support
DP = Decision Point
FOB = Forward Operating Base
HUMINT = Human Intelligence
HVT = High-Value Target
ISR = Intelligence, Surveillance and Reconnaissance
KAF = Kandahar Airfield
Man = Maneuver
NM = Nautical Miles
QRF = Quick-Reaction Force
SAM = Surface-to-Air Missile
SIGINT = Signals Intelligence
SSE = Sensitive-Site Exploitation

Figure 3: Decision Support Matrix

Field Artillery Cannon Systems Update

By Colonel
John A. Tanzi and
Lieutenant Colonel
Robert D. Harper

The Training and Doctrine Command (TRADOC) System Manager-Cannon (TSM-Cannon), Fort Sill, Oklahoma, maintains current cannon programs and develops relevant and ready systems to support the future military. TSM-Cannon's mission is to be the Army's centralized manager for all combat developments user activities related to the non-line-of-sight cannon (NLOS-C), Excalibur 155-mm precision-guided munitions and M777 lightweight 155-mm howitzer system with towed artillery digitization (TAD) and modernization activities associated with the current fleet of cannon artillery systems. We, at TSM-Cannon, support a current and future Army that is capable of success in any contingency, from humanitarian assistance to full tactical operations in joint and combined environments.

Many Field Artillerymen are unaware of recent fieldings in cannon artillery programs, unsure of the direction cannon artillery is headed in support of modularity and the future combat system (FCS), and uncertain of what capabilities soon will be available to support our maneuver brethren. TSM-Cannon recently has answered many questions that indicate the field's lack of knowledge about our programs. The questions most often are based on rumors, someone's opinion or myths. This article dispels some of those misconceptions and briefly defines the azimuth for cannon programs and ammunition.

Artist's Rendition of the Non-Line-of-Sight Cannon (NLOS-C)

Current Cannon Systems. The following is an update on existing systems.

• *M119.* By the end of 2005, all Active Component (AC) and Army National Guard (ARNG) M119A1 105-mm towed howitzers were modified into M119A2s. The upgrade enhances the guns' handles and fittings to make them easier to operate and maintain—in short, make them more user friendly.

We also are manufacturing 385 new M119A2s. Deliveries will begin in January 2008.

The new guns will come off the assembly line as M119A2s and will include additional modifications requested by the field to improve the guns' maintainability and durability.

These modifications include improving the firing platform by enlarging the drain holes, increasing the swivel clearance to prevent binding and assembling the howitzer with screws instead of rivets to facilitate repair work.

The new guns will complete the M119A2 modular force fielding to both AC and ARNG units.

We also are exploring the viability of adding a light digitization package similar to the M777A1's digital fire control system to the M119A2 to give it self-locating and laying capabilities. The package will allow the gun to fire global positioning system-(GPS)-guided munitions.

• *M109.* A team from the Unit Training and Equipment Site (UTES) in Columbia, South Carolina, began retrofitting the South Carolina ARNG 1-78 FA Paladins and FA ammunition support vehicles (FAASVs) for the modular artillery charge system (MACS) and Excalibur on 13 September 2005.

At Fort Hood, Texas, a retrofit team installed the Paladin digital fire control system (PDFCS) in 4th Infantry Division Paladins and is in the process of installing the system in 1st Cavalry Division Paladins.

PDFCS is replacing the Paladin's automated fire control system (AFCS). It will allow units to input data for guided projectiles, such as Excalibur. It also has Force XXI brigade and below (FBCB^2) technology embedded, which gives the howitzer section significantly enhanced situational awareness.

The next division to be retrofitted with the PDFCS will be the 3rd Infantry Division when it returns from Iraq in 2006. Future funding will determine the fielding schedule for the rest of the force.

Currently, all AC and ARNG Paladins are being retrofitted with a storage capacity for 10 Excalibur (not in containers).

• *M198.* The M198's firing mechanism has been modified to allow the system to fire Zone 5 MACS. The retrofit of all howitzers was completed in December 2005.

• *M102.* Currently there are 216 M102 105-mm towed howitzers still in service in the ARNG. M119A2s will begin replacing these systems in 2008, as currently scheduled.

Future Cannon Systems. The following are cannons being fielded or about to be fielded.

The lightweight 155-mm (LW155) joint towed howitzer eventually will replace all Marine Corps and Army M198 howitzers.

• *Lightweight 155-mm (LW155).* This is a joint towed howitzer that eventually will replace all Marine Corps and Army M198 howitzers.

The Marines are fielding the basic M777, which uses conventional optical fire control. A total of 94 M777s will be fielded to the 11th Marines at Camp Pendleton and 29 Palms, California, and the Marine Detachments at the Field Artillery School at Fort Sill, Oklahoma, and the Ordnance School at Aberdeen Proving Ground, Maryland. Fielding will be completed this year.

When the digital fire control system (DFCS) is integrated into the M777, the howitzer will be redesignated the M777A1. It will provide location, directional reference and digital communications for the fire direction center (FDC). It will provide close and deep fire support, counterfire and interdiction fires and be rapidly deployable to any region and operable in most climates.

The first M777A1s will be fielded to 2-11 FA, 25th Infantry Division, Schofield Barracks, Hawaii, in August 2006.

In early 2007, software and hardware upgrades will make the M777A1 Excalibur-capable, redesignating it as the M777A2.

At the same time, the Marines will begin fielding the M777A1 to the 10th Marines at Camp Lejeune, North Carolina, and retrofitting their M777s to M777A1s. When the Marines Corps acquires Excalibur projectiles, its M777A1s will be brought up to a common M777A2 configuration.

The Marines will field a total of 356 LW155 howitzers (including the 94 original M777s), completing fielding in 2009. The Army currently is looking to buy at least 252 M777A2s, completing fielding in 2010.

• *NLOS-C.* This system is a variant in the FCS family of systems. The NLOS-C will have a chassis in common with the FCS family of vehicles and have similar interoperability, mobility and survivability characteristics. This program leverages

Training and Doctrine Command (TRADOC) Systems Manager for Cannons (TSM-Cannon)—What It Is. TSM-Cannon is a client-oriented Commanding General, TRADOC, program responsible for managing and developing all current and future cannon and munitions systems. It integrates the warfighting requirements for all assigned systems into the domains of doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF). TMS-Cannon represents the cannon artillery warfighter.

TSM-Cannon is authorized by the Commanding General, TRADOC, to assume all responsibility for total systems management of assigned systems. The TSM-Cannon acts on behalf of the Commandant of the Field Artillery School on matters such as chartered cannon artillery and munitions systems.

the work of the Crusader program and will have similar advanced capabilities on its platform.

Beginning in 2014, the NLOS-C system will provide networked, extended-range fires and precision attack of point and area targets to support the FCS brigade combat team (FBCT) or legacy modular BCTs. The NLOS-C will provide sustained fires for close support and destructive fires for tactical standoff engagements and have a suite of munitions, including special purpose munitions. Its primary purpose will be to provide responsive fires in support of BCTs and their subordinate units in concert with line-of-sight (LOS), beyond-line-of-sight (BLOS) and other NLOS systems, including those external and joint.

The NLOS-C will have the flexibility to change effects round-by-round and mission-by-mission. Combined with the system's ability to respond to calls-for-fire rapidly and its rapid rate of fire, the NLOS-C will be able to provide a variety of effects on demand.

The FCS program recently underwent a dramatic revision of its fielding schedule. At its original Milestone B approval, the first BCT to be fielded would have achieved its initial operational capability (IOC) in 2010; the prototype NLOS-Cs would have been delivered in 2008. The new BCT fielding schedule is in the draft stage, but overview briefings now show the first BCT IOC in 2014 with the BCT fully operational in 2017.

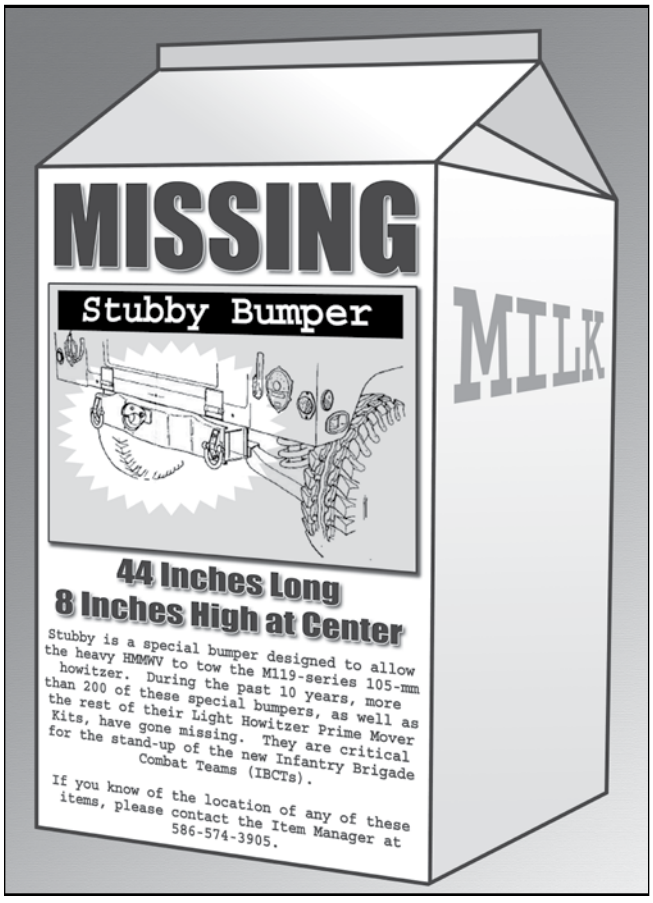
Munitions, Charges and Fuzes. The following are future munitions and related support systems.

• *Excalibur.* Excalibur is an extended-range projectile that attacks high-payoff targets (HPTs) and the most dangerous targets in all weather and all terrain types in the close fight. It minimizes collateral damage through concentrated lethality and increased precision. It is GPS-guided, making it a fire-and-forget munition—the first ever US cannon fire and forget munition.

Excalibur

Excalibur can attack a full range of targets, including reinforced bunkers and buildings, delivering a large amount of firepower into a small space at ranges exceeding the current 155-mm munitions. Excalibur reduces the dispersion or circular error probable (CEP) from the current maximum of 370 meters to 10 meters at all ranges.

In March 2005, the Army Resource and Requirements Board approved early fielding with rounds scheduled for delivery in the Central Command (CENTCOM) theater in March. Excalibur requires a revision to the advanced FA tactical data systems (AFATDS) software and a portable fuze setter.



Excalibur has proven to be very accurate in testing. Two rounds (minus the warheads) were fired at Yuma Proving Ground, Arizona, in November and December 2004. They landed 3.4 and 6.9 meters from the targets. In September 2005, Yuma conducted an integrated warhead shoot. The gun-to-target range was 15.2 kilometers, and the round landed seven meters from the target.

The Fire Support Test Directorate, Fort Sill, demonstrated Excalibur 13-16 June 2005 to validate the AFATDS software and tactics, techniques and procedures (TTPs) for Excalibur. The directorate found some minor deficiencies with the AFATDS software and suggested revisions to the TTPs.

The 1st Cav, 4th Infantry and 1st Armored Divisions will receive Excalibur familiarization training before deploying to the CENTCOM theater and new equipment training (NET) in theater to introduce the projectile, updated AFATDS software and TTPs to the operators. The Army's procurement objective currently is 30,000 projectiles.

• *MACS.* This uses a "build-a-charge" concept in which increments are identical to all others in the same lot designation, eliminating the need to dispose of unused increments. Unused increments are held for future use.

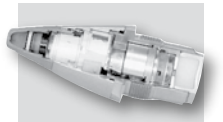
Modular Artillery Charge System (MACS)

MACS consists of two propelling charges, the M231, M232/M232A1 and associated packaging. It is compatible with all current and planned 155-mm FA weapons systems.

The M231 MACS is for "low zone" (shorter ranges) and M232 MACS is for "high zone" (longer ranges); both have been optimized for 52-caliber 155-mm tubes and "materiel released." This means the propellants have been tested and evaluated and have met all operational requirements. Both propellants are now in the inventory (war reserve) and will replace the existing bag propellants as the low stocks are depleted.

The M232A1, optimized for 39-caliber 155-mm howitzer tubes, has been type-classified and will be materiel released along with AFATDS Block II software in December 2006, as currently scheduled. Recent testing of the M232A1 has shown a significant reduction in tube wear (approximately doubles tube life) and a decrease in tube residue.

• *Multi-Option Fuze Artillery (MOFA).* The M782 MOFA fuze is an inductively set fuze used with bursting projectiles. It has four functions: point detonating, delay, time and proximity.



Multi-Option Fuze Artillery (MOFA)

Its multiple options simplify the burden of tracking multiple fuzes in the logistics train.

MOFA will replace eight fuzes currently in the inventory as the stockpiles of those fuzes are depleted.

The fuze will be set with the portable inductive fuze setter (PIAFS). The fuze will be compatible with automated ammunition handling equipment on the NLOS-C.

Currently 600,000 fuzes are being produced, all slated for war reserve.

• *Precision Guidance Kit (PGK).* The PGK is a fuze-sized "module" that will have GPS to provide the location of the round and time during its flight while an inertial navigation system (INS) will determine the trajectory and continuously correct the round for increased accuracy. It will have all the capabilities of the MOFA fuze plus the precision guidance of GPS/INS.

Precision Guidance Kit (PGK).

PGK will reduce delivery errors significantly. PGK is being designed for less than a 30-meter CEP at all ranges. In short, PGK will transform a "dumb projectile" into a "smart projectile" and significantly reduce the number of rounds required. Currently, the PGK is projected for fielding in 2009.

PGK will be complementary to Excalibur, not a competitor. It will provide more efficient suppression vice the point precision of Excalibur.

PGK testing demonstrated consistent performance in predicted range and deflection. The GPS, control system and brake deployments functioned as designed. Additional testing achieved a precision of a 20-meter CEP versus a 55-meter CEP for the control rounds. Evaluation of test data and additional aerodynamic work on the PGK is ongoing.

• *Advanced Cannon Artillery Ammunition Program (ACAAP).* ACAAP is a product-improvement program for the 105- and 155-mm cannon ammunition. The entire ACAAP suite of munitions will have ballistic similitude, which means it will have one set of firing tables for all projectile types.

ACAAP also will provide the ability to change all rounds from boat-tail configuration to base bleed in the field. This will allow a commander to increase the range of each projectile at his discretion.

Funding has been approved to begin production of ACAAP 105-mm rounds in 2008.

The TSM-Cannon site on the Fires Knowledge Network (FKN), part of Army Knowledge Online (AKO), will keep the community updated on the future of cannon artillery. But the field should not hesitate to contact the TSM-Cannon and give us feedback—give us your "wish list." We will discuss your ideas and pass them on to the relevant project managers. Contact us at commercial (580) 442-6902 or DSB 639-6902 or via email at tsm.cannon@us.army.mil.

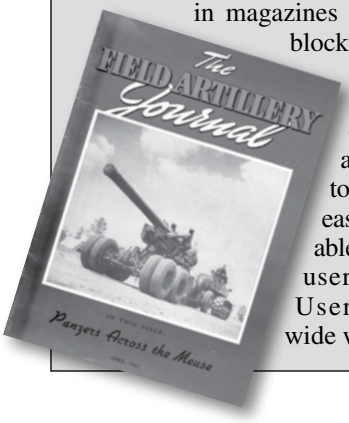
To determine the best cannon capabilities for the field, we also analyze other governments' weapons and ammunition systems for developments. In addition, we meet with industry to explore new technologies and discuss requirements and with project managers to discuss the way ahead. In every case, they listen. We want to convey the right message, the right requirements, and with your help, that's exactly what we'll do.

Colonel John A. Tanzi has been the Training and Doctrine Command (TRADOC) System Manager for Cannons (TSM-Cannon) in the Futures Development and Integration Center, Fort Sill, Oklahoma, for eight months. In his previous assignment, he was the Director of Support Operations in the Center for Strategic Leadership at Carlisle Barracks, Pennsylvania. He commanded 3d Battalion, 82d Field Artillery (3-82 FA), part of the 1st Cavalry Division at Fort Hood, Texas. He deployed with his battalion to the Afghanistan with Task Force Blackjack in support of Operation Enduring Freedom. While in the 2nd Infantry Division in the Republic of Korea, he also commanded Service Battery, 1-4 FA and, then, A Battery, 1-4 FA. Among other assignments, he was the Deputy Fire Support Coordinator for III Corps and Executive Officer for 2-82 FA and Division Artillery Assistant S3 in the 1st Cav, all at Fort Hood; and Reinforcing Team Trainer and Assistant Deputy Fire Support Observer/Controller at the National Training Center, Fort Irwin, California.

Lieutenant Colonel Robert D. Harper has been the TSM-Cannon Executive Officer for one year and eight months. In his previous assignment, he was the Test Officer for the Bradley Fire Support Team Vehicle (BFIST) and Improved Position and Azimuth Determining System (IPADS) Programs as part of the Fire Support Test Directorate at Fort Sill. He also served three years in TSM-Cannon as the Crusader Action Officer and managed the Modular Artillery Charge System (MACS), Multi-Option Fuze Artillery (MOFA) and Portable Inductive Fuze Setter (PIAFS) Programs in their infancy. He commanded Headquarters and Headquarters Service Battery in 2-8 FA at Fort Lewis, Washington, part of the 25th Infantry Division (Light).

Google Search Coming to *Field Artillery* Archives

By the end of February, you will be able to search our magazine archives online with Google Mini software—search for key words in magazines by year or blocks of years. We are redesigning our archives and website to make them easily searchable and more user friendly. Users worldwide will be able to search for key words and download entire magazines or specific articles using less bandwidth.



Currently, we have the most recent edition of the magazine back through1959 in our archives online: sill-www.army.mil/famag.

Help! We Need 1913 *Field Artillery Journals*

We are preparing to let a contract to scan magazines from 1911, the first year of *Field Artillery Journals*, through 1958 and post them on our website. When the contract is complete, you will be able to access and Google search all magazines from 1911 through the current edition.

However, the Rare Books Section of the Morris Swett Library at the FA School is missing both copies of its bound 1913 magazines. We need copies to scan.

If anyone has a 1913 *Field Artillery Journal* and would be willing to ship it to us for scanning and return, call us at (580) 442-5121/6806 or DSN 639-5121/6806 or email us at famag@sill.army.mil. Please call us before you send the magazine, so we don't end up with duplicate editions.

Patriot Fratricides:

The Human Dimension Lessons of Operation Iraqi Freedom

This article identifies network design and operator-controller training problems that have implications for networked-centric operations in the future combat system (FCS) Army. This article is courtesy of the Air Defense Artillery magazine and is appearing in the ADA January-March edition.

Editor

By John K. Hawley, PhD

Soldiers and not an automated system must be the ultimate decision makers in air and missile defense (AMD) engagements. Nearly everyone in the AMD community is aware of the Patriot fratricide incidents that occurred during Operation Iraqi Freedom (OIF). During major combat operations (MCO), two separate fratricide incidents each resulted in the destruction of a friendly aircraft: a British Tornado and US Navy F-18.

The Army has done much to address the perceived causes of these incidents. Now, more than two years after the fact and with many hardware, software, training and procedural changes in the offing, there is a natural tendency to view the problem as "fixed." However, before declaring the "case closed," it may be instructive to look again at what the various official inquiries and the Defense Science Board (DSB) said about the fratricide incidents in its 2004 study[1] and explore the longer term implications of those findings.

Personnel from the Army Research Laboratory's (ARL's) Field Element at Fort Bliss, Texas, started looking into the Patriot system's performance at the invitation of Major General Michael A. Vane, then Chief of ADA [Air Defense Artillery] and Commander of the ADA Center and Fort Bliss. After discussions with the Chief of ADA, we structured an effort named "Patriot Vigilance." The charter was to explore four broad topics: vigilance and situational awareness, trust in automation, Patriot and AMD training effectiveness and efficiency, and AMD leader development. We spent most of the summer and fall of 2004 reading documents, interviewing knowledgeable personnel from around Fort Bliss and observing training and operations.

Our objective in the Patriot Vigilance project was not to conduct another exercise in "Monday-morning quarterbacking." Rather, we wanted to look into the deeper story behind events leading to the fratricides from a human performance perspective. Our focus was on determining the path forward.

Our initial report went to the Chief of ADA in October 2004.[2] Less than a month later, we learned that several of our conclusions were mirrored by the DSB study.

Two DSB Human Performance Conclusions. Two recommendations from the DSB report on Patriot system performance summarize the path forward from a human performance perspective. Although the full report is classified, the following extracts are not.

- "The Patriot system should migrate to more of a 'man-in-the-loop' philosophy versus a fully automated philosophy—providing operator awareness and control of engagement processes."
- "Patriot training and simulations should be upgraded to support this man-in-the-loop protocol, including the ability to train on confusing and complex scenarios that contain unbriefed surprises."

The central notion in the first DSB recommendation is captured in the phrase "providing operator awareness and control of engagement processes." Simply put, Soldiers and not the automated system must be the ultimate decision makers in AMD engagements. Decisions to shoot or not to shoot must be made by crews having adequate situational awareness for the situation at hand and the expertise to understand the significance of the information available to them.

Putting human decision makers back into the control loop does not mean that we try to "turn the clock back" to the good old days of Nike Hercules and Hawk and merely reemphasize traditional control strategies and procedures. The Patriot environment is too complex for that simplistic solution.

Driven by advances in technology and mission changes, Patriot crewmember roles have evolved from traditional operators to supervisors of automated processes. The job of supervisory controller is different from that of a traditional operator, and these differences must be reflected in system design, performance support features (decision aids), and training and professional development.

Moreover, system designers and users are not free to opt for or against casting

operators as supervisory controllers. Operators must be augmented by technology in the form of automation. The contemporary AMD environment is simply too complex and demanding to consider any other approach.

Various organizations have conducted considerable work on the problem of developing an effective man-in-the loop strategy. Specific products in this regard include a new software build, Post Deployment Build 6, which emphasizes and facilitates positive human control, and revised tactical standing operating procedures (SOP) and tactics, techniques and procedures (TTPs) to complement the software changes.

The next step in this process will be to validate and debug the revisions in a series of operational tests and usability assessments. Human Research and Engineering Directorate staff members will be lending their technical expertise to these events scheduled for the summer of 2006.

The second DSB recommendation that has major significance for human performance in contemporary AMD operations concerns training. Here, the DSB was reacting to the AMD community's own conclusion that it is necessary to relook the "level of expertise necessary to operate such a lethal system on the modern battlefield."[3] The AMD community has responded to this challenge with the new Master Gunner and Top Gun Courses. Other training changes are also in process or under consideration.

Navy Fratricide Training Lessons. The Navy faced a similar reconsideration of training practices in the aftermath of the shoot-down of the Iranian airbus by the *USS Vincennes* in 1988. After more than 10 years of research, the Navy reached several conclusions that also are relevant to the AMD setting.

First, the Navy's research indicated that situational awareness is the key factor in determining decision quality in battle command.[4] Situational awareness is built upon in-depth technical and tactical expertise. The primary implication of this conclusion is that marginally skilled or apprentice operator-controllers cannot develop the situational awareness necessary for effective supervisory control, regardless of the sophistication of the battle command hardware suite provided to them.

Technology is important, but it is only part of the solution. Relevant and in-depth operator expertise is an equal factor in developing situational awareness and providing effective human oversight of system operations. Technology can amplify human expertise, but it cannot substitute for it.

The Navy also concluded that Aegis operator-controller training must emphasize the development of adaptive decision-making skills.[5] Adaptive decision-making skills (the ability to "think outside the box" defined by routine crew drills) are key to effective operator-controller performance in ambiguous situations.

The DSB's recommendation to include "unbriefed surprises" in training does not mean that it is sufficient merely to insert anomalous events like those encountered in OIF into training scenarios. In advanced AMD training, the scenario is the curriculum. And to properly prepare operator-controllers for combat, scenario designers must bear in mind that the "surprises" of OIF are representative of a class of potential anomalies. Selected anomalies occurred then; others—some similar, some different—will occur on future battlefields.

Thus, operator-controllers must be imbued with a sense of mindfulness that automated battle command systems are fallible. These systems' recommendations will be correct most, but not all the time.

The third major conclusion was that shipboard training (i.e., unit) must address the team in addition to individual performance.[6] Competent crews are the basis of effective unit performance, and crews are more than the sum of their individual members.

Training must foster the development of the expertise essential to recognize potential anomalies and the skills necessary to determine an appropriate course of action. Operator-controllers must "walk the fine line" between blind faith and wholesale mistrust, but they must not become tentative or "gun-shy."

Patriot is representative of the new class of systems that are more knowledge-intensive than previous generations of military equipment. For the foreseeable future, much of the intelligence necessary to employ such systems effectively must come from the human component. Research and experience have consistently shown that effective automation of knowledge-based functions, such as decision making, planning and creative thinking, remains elusive.

Despite more than three decades of research on artificial intelligence (AI), neural networks and so forth, transfer of "thinking" skills to machines has proven difficult.[7] This reality will require increased emphasis on facilitating essential human oversight for these new systems. Proper oversight is a function of both system design and user training and professional development.

Failure to fully address both these issues means that the fratricide events of OIF, or worse, may recur the next time the system is used in combat. Much has been done to address the problems that occurred during OIF, but the task is not completed.

The motto of the ADA is *First to Fire*. In a sense, a variant of this motto applies to the effective use of automated battle command systems. Problems similar to those Patriot encountered during OIF will face the rest of the Army as the emerging generation of network-centric systems, such as FCS, comes of age. Lessons learned now in ADA can point the way for the Army at large. Because of its technology and operating environment, Air Defense Artillery just got there *first*.

Endnotes:

1. Defense Science Board (DSB) "Patriot System Performance," November 2004
2. ARL, Fort Bliss, also prepared a companion report: "The Human Side of Automation: Lessons for Air Defense Command and Control" (ARL-TR-3468), March 2005. This report is available from the Army Research Laboratory's Fort Bliss Field Element or online through the Defense Technical Information Center (DTIC).
3. Ibid.
4. Janis A. Cannon-Bowers and Edwardo Salas, "Making Decisions Under Stress: Implications for Individual and Team Training." This is a summary report of the US Navy's Tactical Decision Making Under Stress (TADMUS) Project, American Psychological Association, Washington, DC, 1998.
5. Ibid.
6. Ibid.
7. Raja Parasuraman and Victor Riley, "Humans and Automation: Use, Misuse, Disuse, Abuse," *Human Factors*, Volume 39, Edition 2, 1997, 230-252.

Doctor John K. Hawley is Chief of the Army Research Laboratory (ARL) Field Element at Fort Bliss, Texas, working on the Patriot Vigilance Study. As part of ARL's Human Research and Engineering Directorate, Aberdeen Proving Ground, Maryland, he specializes in design and training to support effective human supervisory control. Among other studies, he was Co-Lead on the FCS Human Dimension Integrated Product Team and Co-Lead on the FCS Manpower, Personnel and Training Working Group, both at Aberdeen. He was commissioned as an officer in the Field Artillery in 1968, and, later that year when the branches split, was assigned to Air Defense Artillery (ADA). Later he served on active duty as an ADA officer for two years. He holds a PhD in Psychology from the University of North Carolina at Chapel Hill.

2005 Knox Award Winner

A/2-17 FA, 2nd ID

A Battery, 2nd Battalion, 17th Field Artillery (A/2-17 FA), Paladin, 2d Brigade Combat Team (BCT), 2nd Infantry Division (2nd ID), Fort Carson, Colorado, is the winner of the 2005 Henry A. Knox Best Active Component (AC) Battery Award. A/2-17 FA's commander is Captain William H. Snook with NCO leader First Sergeant Keith Long.

A/2-17 FA's Soldiers epitomize the professionalism and expertise that perpetuate the Artillery's status as a formidable player on the battlefield. Last year, A Battery deployed and fought in support of Operation Iraqi Freedom (OIF). In an impressive feat, A Battery Soldiers patrolled the dangerous streets of Ar Ramadi, Iraq, under intense small arms and sniper fire, improvised explosive device IED attacks, car bombs and indirect fires. They provided responsive counterfires and stood guard over Forward Operating Base (FOB) Ramadi, the main FOB for the 2nd BCT.

For the past decade, A Battery has been prepared to conduct combat operations on the Korean peninsula. On 8 September 2004, A Battery assumed control of the areas of Tammin and 5 Kilo, both southwest of Ar Ramadi in Iraq's Al Anbar Province. A Battery joined with 1-9 IN and 44 EN and conducted more than 25 combat missions in these areas. They targeted insurgents and established a presence in the urban areas. The units' commanders remarked on the audacious tenacity with which A Battery took the fight to the insurgents.

The battery also supported 2/5 Marines on many occasions, providing additional combat power and securing key terrain. While executing its combat operations in the Tammin and 5 Kilo areas of Ar Ramadi, A Battery sustained six killed-in-action (KIAs) and five non-return-to-duty wounded-in-action (WIAs). Despite these losses, A Battery persevered and successfully accomplished its non-standard missions.

After completing its patrolling mission, A Battery transitioned to the brigade's counterfire fight on 12 February 2005. Given the size of the area of operations, A Battery was split to conduct decentralized platoon operations. One platoon was located on FOB Ramadi and the other on Camp Habbaniyah (a Coalition base 30 kilometers east of FOB Ramadi) to provide artillery fires throughout the brigade's sector.

> The annual award is named for the first Chief of Field Artillery Major General Henry A. Knox, a Revolutionary War hero, and recognizes an outstanding Active Component (AC) battery based on specific criteria and a narrative of performance. A similar award was established in 1924 but was phased out in 1940 as World War II loomed. The award was reestablished in 2002. (For more information see the link "Knox, Hamilton and Gruber Awards" on the Fort Sill website at http://sill-www.army.mil/awards/default.htm.)

Both platoons excelled at counterfire operations, firing 105 missions (88 counterfire missions and 17 close support and illumination missions).

The battery consistently achieved acquisition-to-fire times of between one minute and one and one-half minutes. Its fastest firing time was 42 seconds. The sections honed the crew drill to fire four rounds per howitzer in less than one minute.

The platoons also established and refined firing plans for degraded operations. Each fired the Paladin in a degraded mode and at least one mission completely degraded, using hand-cranks and voice commands and firing off aiming posts.

Tragically, on 16 April, an enemy 122-mm rocket struck Howitzer 13, destroying the howitzer, killing three of its crew and severely injuring the remaining Cannoneer. Yet the battery leadership quickly reconstituted the lost cannon and crew and kept the artillery in the fight with no degradation in counterfire coverage for the brigade.

On 29 May, A Battery again changed missions and assumed responsibility for base defense operations at FOB Ramadi. A Battery was entrusted with the security of the brigade headquarters and the home of more than 4,000 Soldiers, Sailors, Marines and Airmen. Rising to the challenge, A Battery began reconstructing the FOB's perimeter, rebuilt the main gate and enhanced the FOB's security measures, posted critical vigilant observation posts, improved the key weapons systems' positions and applied many other site improvements. This yielded far-reaching effects and led to zero breaches of the FOB's perimeter.

A Battery has conducted itself with dignity and professionalism since redeploying to Fort Carson on 26 July. It has achieved 100 percent accountability of all sensitive items upon redeployment, in spite of the fact it recently had performed diverse missions in two disparate theaters of operations.

A Battery's leaders embraced the challenges of transitioning from combat to a new garrison in Colorado and is in the midst of reorganizing to become an M119A2-equipped unit.

No other artillery battery in the Army has achieved what this battery has during the past year, deploying from its forward base in Korea to tough combat in Iraq and then to its new home at Fort Carson and reorganizing into an M119A2 battery. Through it all, A/2-17 stood tall as a high-performing unit, focused on accomplishing the mission and taking care of its Soldiers.

CPT Snook reenlists PFC Jerrell Barber at FOB Ramadi on 5 July.

2005 Gruber Award Winner

SFC Craig A. Brown, HHB/1-319 AFAR, 82nd Abn Div

Sergeant First Class (SFC) Craig A. Brown, Headquarters Service Battery, 1st Battalion, 319th Airborne Field Artillery Regiment (HHB/1-319 AFAR), 82nd Airborne Division, Fort Bragg, North Carolina, has won the US Army Field Artillery's Gruber Award for the outstanding FA professional of 2005. He is the Regimental Fire Support NCO for the 82nd Division's 505th Parachute Infantry Regiment (PIR).

SFC Brown was instrumental in the 82nd Airborne Division's success during operations supporting Hurricane Katrina Relief in New Orleans, Louisiana. While serving as the 505th PIR Fire Support NCO, his perseverance and in-depth knowledge of effects-based operations helped the 505th execute several complex civil-military and information-based operations throughout the regiment's area of operations (AO) with elements from the Navy, Marines, Air Force, Coast Guard and many government organizations. His detailed effects-based data analysis showing trends and their impact on current and future operations gave the regimental commander the timely and accurate information he needed to evacuate 4,903 displaced Americans from the Orleans Parish area.

His FA battalion commander considers SFC Brown the best NCO in the battalion, "a superstar" performer who will enrich any organization he is a part of. The commander reports he is highly competent, aggressive and dedicated with an exceptional sense of mission accomplishment. SFC Brown always places his men's welfare above his own. By virtue of his leadership traits, he has enhanced all units, community organizations and personnel he has led.

Lead-from-the-front qualities have exemplified SFC Brown's character throughout his career. He has made the commandant's list in every NCO education system (NCOES) school he has attended. In the FA Basic NCO Course (BNCOC), he was selected by his peers to receive the Leadership Award for superior

performance and contributions to the class environment.

SFC Brown has attended some of the toughest schools in the US Army and has graduated with distinction. Ranger School; Survival, Evasion, Resistance and Escape (SERE); Emergency Medical Technician (EMT); Joint Firepower Controller's Course (JFCC); Naval Gunfire School; and Airborne and Jumpmaster Schools are some of the most notable. As a result, SFC Brown is well grounded in the fundamentals of training, maintaining, leading and caring for Soldiers. He is far ahead of his contemporaries in all areas and enhances the capabilities and readiness of all fire supporters in the 319th AFAR and 82nd Airborne Division.

From 1995 through 2001 while he was in the 1st Battalion, 75th Ranger Regiment at Hunter Army Airfield, Savannah, Georgia, SFC Brown's fire support team (FIST) won the Battalion Best FIST Competition every year. In July 1995, the team finished second by one point in the 75th Ranger Regimental Competition. The team won the regimental competition in June 1997 "hands down" due to SFC Brown's enhancement to the team's training methods; personnel and equipment readiness; and superior team *esprit de corps*.

In March 2002, SFC Brown once again demonstrated his leadership and ability to enhance FA readiness and capabilities by aggressively training and preparing his Stryker FIST (1-15 FA) while in Korea. As a result, the team won the Best FIST Competition with one of the largest margins of victory in recent competition history. The command routinely chose his platoon to execute the battalion's and brigade's high-visibility missions.

After coming to the 82nd Airborne Division in October 2002, SFC Brown served as both the 1-17th Cav and then the 1-82 Avn Fire Support NCO for HHB, 319 AFAR. He deployed to Iraq twice, once with 1-17 Cav and once with the 82nd Avn.

He became 505th PIR's Fire Support NCO as a result of his outstanding combat performance. During his deployments, SFC Brown mentored and developed his junior leaders to improve the lives of Iraqis in his unit's AO and ensured all his Soldiers came home safely.

Throughout 2005, SFC Brown has coached and mentored his fire support subordinates in individual preparations for professional development events. The FIST selected from his platoon placed first in seven of nine events in the 2005 82nd Division Artillery Best FIST Competition. He mentored two Soldiers to pass the Ranger indoctrination program and helped four other Soldiers pass the Special Forces assessment selection process.

SFC Brown has continued to lead by example. He won the 1-319 AFAR NCO of the Year Competition in February 2005 and the 319th AFAR NCO of the Year Competition in March 2005. He was on his way to compete in the 82nd Airborne Division NCO of the Year Competition in May but withdrew to be with his wife when his son was born.

Throughout his career, SFC Brown has excelled technically, tactically and as a leader, using his competence and creativity to improve units and train and care for Soldiers.

The Gruber Award was established in 2002 to recognize outstanding individual thought and innovation that results in significant contributions to or enhancement of the FA's warfighting capabilities, morale, readiness or maintenance. It is named after Brigadier General Edmund L. Gruber, 1879-1941, who, as a First Lieutenant in 1908, composed the Caisson Song that the Army adapted as The Army Goes Rolling Along in 1952.

NETWORK F·I·R·E

By Colonel John L. Haithcock, Jr.

Network-centric warfare (NCW) broadly describes the combination of strategies; emerging tactics, techniques and procedures; and organizations that a fully, or even partially, networked force can employ to create a decisive warfighting advantage. The *future joint command and control* (JC^2) network, a system of systems, will enable NCW, supporting Army, joint and coalition operations.

The JC^2 will be the Department of Defense's (DoD's) primary command and control information network. It will give commanders unprecedented decision superiority using advanced collaborative information sharing via vertical and horizontal network interoperability.

As one of the JC^2 subsystems, the Army's *future combat system battle command system (FCS BC)* will provide the services to enable networked fires. These services will be a combination of sensors (manned and unmanned), automated C^2 systems, and lethal and nonlethal platforms and capabilities networked to achieve shared awareness, speed of command, high operational tempo (OPTEMPO) and nearly autonomous operations—ultimately, supporting real-time Army, joint and coalition fires for the force commander.

The 2005 version of the "Unit of Action Organization and Operation" document used the acronym "NWF" for networked fires. As the Army designated the Field Artillery and Air Defense Artillery merger at Fort Sill, Oklahoma, in 2005, it also has considered naming Fort Sill the NetFires [Networked Fires] Center of Excellence (CoE). The term "NetFires," which once was more narrowly defined, has come to represent the NWF concept.

To understand how NetFires works, we first must understand the development of the broader JC^2 network and its subsystems that will enable NetFires.

Joint Battle Management. Throughout history, armed forces have modified and adapted to their changing environments. Today, the US military is undergoing a transformation not only to account for current conditions, but also to visualize the future environment. "The National Military Strategy," "Joint Vision 2020" and "Joint Operations Concept" describe future force operations.

The Joint Forces Command (JFCOM) in Norfolk, Virginia, is working with the Chairman of the Joint Chiefs of Staff and geographical combatant commanders to develop the "Joint Battle Management Command and Control ($JBMC^2$) Roadmap." This is the plan to implement NCW. In the roadmap, the joint force will incorporate advanced technologies into current systems, "spinning out" these improved capabilities to move the systems forward to the objective JC^2 system. The plan projects establishing the Army's FCS BC under JC^2, Version 5, in 2019. (See the figure on Page 24.)

The $JBMC^2$ Roadmap combines several related programs and initiatives to support improved joint interoperability and integration. The result of merging these programs will be a seamless, secure and interoperable global network that will allow the task force commander access to the information he needs to successfully plan, command and execute integrated maneuver and fires from anywhere in the world.

JC^2 will support force-level planning, executing, monitoring and assessing of joint and multinational operations using net-centric enterprise services to exchange data across multiple security domains. ("Enterprise services" are those applications available to anyone with access to the network.) JC^2 also will be the net-centric migration path for the current *global command and control system (GCCS)* family of systems. The GCCS-Army (GCCS-A) is the Army's subsystem of GCCS.

The GCCS-A "Acquisition Decision Memorandum," 28 May 2002, directed the development of a block implementation plan, identifying operational requirements to implement the Army's part of the $JBMC^2$ Roadmap. The figure shows the Army's battle command systems' migration in block implementations from

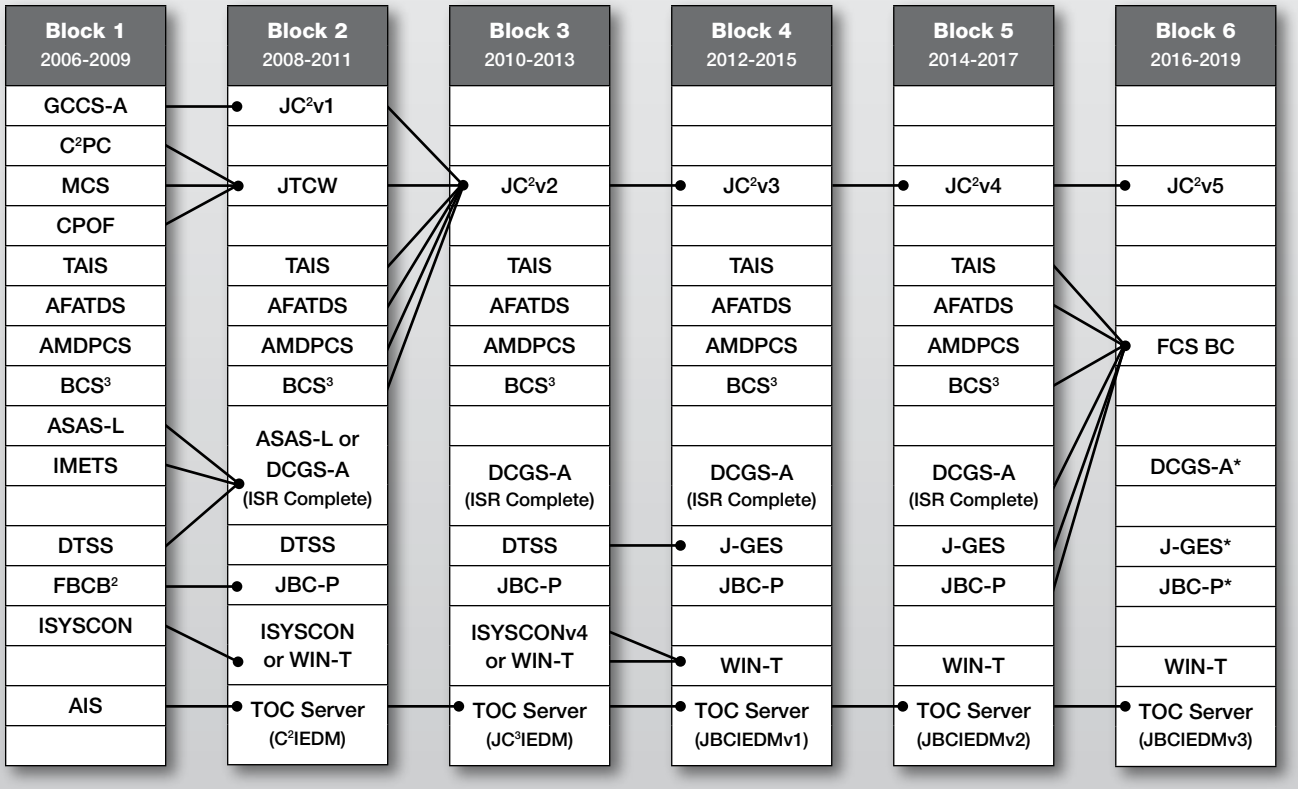
2006 until 2019.

GCCS-A begins the transition to the *global information grid (GIG)*, which is the communications centerpiece of the future network, and the *Army battle command system (ABCS)*. The GCCS and GIG and the common operational picture (COP) they provide will form a solid foundation for evolving command and control capabilities.

The armed services understand that they must link their systems to improve JC^2. "Joint Vision 2020" and the "Joint Operations Concepts" describe the operational context for transformation by linking strategic guidance with the integrated application of joint force capabilities. Current systems support the commander's needs but in a disjointed manner that requires operators to have detailed technical knowledge of the systems and spend an inordinate amount of time on them.

The Army has invested a great deal of time, effort and money to develop its robust command and control systems. The Army must address joint architectures, protocols and systems for a redundant, non-terrestrial-based network to provide the focused bandwidth needed to support mobile battle command and joint blue force tracking.

Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF) in Afghanistan continue to highlight the successes and potential of network-enabled operations. The advantages of the network in OIF and OEF are powerful—shared situational awareness, enhanced command speed



**These systems will remain for the current/modular brigade combat teams (BCTs) yet to become future combat system (FCS) BCTs (FBCTs).*

Legend:

AFATDS = Advanced Field Artillery Tactical Data System
AIS = Automated Information System
AMDPCS = Air and Missile Defense Planning and Control System
ASAS-L = All-Source Analysis System-Light
BCS³ = Battle Command Sustainment Support System
C²PC = Command and Control Personal Computer
C²IEDM = Command and Control Information Exchange Data Model
CPOF = Command Post of the Future
DCGS-A = Distributed Common Ground System-Army
DTSS = Digital Topographic Support System
FBCB² = Force XXI Battle Command Brigade and Below
GCCS-A = Global Command and Control System-Army
IDM-T = Information Dissemination Manager-Tactical
IMETS = Integrated (Mobile) Meteorological Systems
ISR = Intelligence, Surveillance and Reconnaissance
ISYSCON = Integrated System Control
JBC-P = Joint Battle Command-Platform
JBCIEDM = Joint Battle Command Information Exchange Data Model
JC³IEDM = Joint Consultation Command and Control Information Exchange Data Model
J-GES = Joint-Geospatial Enterprise Service
JTCW = Joint Tactical COP (Common Operational Picture) Workstation
MCS = Maneuver Control System
TAIS = Tactical Airspace Integration System
TOC = Tactical Operations Center
WIN-T = Warfighter Information Network-Tactical

Battle Command System Migration. Starting in 2006 with the Army Battle Command System (ABCS), Version 6.4, and transitioning to fewer but more capable systems until 2019, the Army's Future Combat System Battle Command System (FCS BC) will be included in the overall Joint Command and Control System (JC²). Note that this chart shows only the migration of Army systems, not all the joint systems that will be under JC².

and the force's ability to synchronize complex full-spectrum operations.

Networked Fires. NetFires operations are enabled by the future force battle command network and supporting communications architecture. Netfires requires access to a combination of relevant sensors, effects capabilities, the battle command system and communications capabilities available across the FBCTs and legacy BCTs.

NetFires will enable the dynamic application of lethal and nonlethal destructive and suppressive effects. It will be integrated fully from the theater level to the tactical platform level, allowing the commander to establish, alter and terminate linkages between sensors and line-of-sight (LOS), beyond-line-of-sight (BLOS), non-line-of-sight (NLOS) division/corps and joint systems to achieve a wide set of lethal and nonlethal effects.

The battle command network will allow the commander to tailor his guidance dynamically and refocus sensors and effects to meet the requirements of the changing situations. With all elements of the FBCT networked, the FBCT will be able to achieve virtual teaming and mutual support and rapidly massed effects without massing forces.

The FCS BC services and its communications architecture will enable NetFires to integrate strike solutions that apply the commander's intent as the "decider." The fires and effects requestor won't need to be concerned about which platforms or units will provide the effects. NetFires automatically will determine the sensor-weapons-target combination to achieve the most responsive and sufficient effects on the target. However, the user will be able to choose the option of reviewing the automated solution before the system implements it or the option of automatic implementation.

NetFires will leverage all relevant Army and joint, interagency and multinational (JIM) sensors and effectors to locate and strike targets with a wide set of lethal and nonlethal effects. This will exploit the entire force's capabilities.

The future force will have access to manned and unmanned ground, air and space Army and JIM sensors collecting information for distribution, processing and use by multiple users. Commanders and staffs at all echelons will have access to this information.

Sensors will gather, transmit and receive very large amounts of data for processing and fusing for the data user. Some information will be of immediate use, such as to strike high-payoff targets (HPTs), time-sensitive targets (TSTs) and most dangerous targets (MDTs). Other information will be less time-sensitive, perhaps used to build an enemy order of battle or forecast the next day's weather.

The FBCT's battle command system will achieve these functions through automation, allowing real-time targeting to support the delivery of responsive fires and effects. The future force battle command network will improve coordination and clearance of fires. Accurate knowledge of the locations of friendly ground forces with the automated execution of policies and attack guidance will allow more rapid responses to enemy targets.

The commander will be able to maintain visibility of Army and JIM manned and unmanned aerial assets (including indirect fire munitions) and the Army airspace command and control (A^2C^2) element, which will be part of FCS BC. This will facilitate the FBCT's ability to rapidly prioritize, optimize and deconflict airspace for all its users. Simply put, the battle command network will enable rather than restrict all combat elements' use of airspace.

Sensor-to-Shooter Link. Based on mission, enemy, terrain and weather, troops, time available and civil considerations (METT-TC), commanders will be able to establish dedicated sensor-to-shooter links when situations warrant immediately responsive fires to attack HPTs vital to the FBCT's or division's mission. This technique requires a direct link from a target acquisition asset to a dedicated fires platform to engage the target.

Establishing a sensor-to-shooter link will make some sensors and shooters unavailable to the overall network. Therefore, commanders will have to consider the impact on the network when establishing a dedicated sensor-to-shooter relationship.

Nevertheless, this technique, for example, could enable an automated fires link from a sensor to an NLOS launch system (NLOS-LS) to engage a TST. The sensor could be a counterfire radar; an unmanned aerial vehicle (UAV); an attack aviation platform; a near-space platform; another reconnaissance, surveillance and target acquisition (RSTA) system; and (or) a maneuver FCS platform or Soldier. That sensor then would have priority for calls-for-fire to that specific NLOS-LS through battle command NetFires services and its communications architecture.

The following hypothetical scenario illustrates when a commander might employ a sensor-to-shooter link during operations. An armed reconnaissance helicopter (ARH) is on a mission to search for a surface-to-surface missile reloading point deep in enemy territory. The network establishes sensor-to-shooter links between high-mobility artillery rocket system (HIMARS) launchers and the ARH. If the ARH encounters enemy air defense sites, HIMARS can respond immediately with suppression of enemy air defense (SEAD) fires.

Future Force Targeting. Future targeting will be similar to the current decide, detect, deliver and assess (D^3A) methodology employed today. The battle command system will automate target development by processing and fusing the enormous number of data points gathered. It will use data from all available Army and JIM sensors and existing targeting information for planned, on-call or immediate attack.

The future force battle command system automatically will process calls for effects and fuse information from multiple sources to determine the appropriate entity (unit, system, platform or individual) to achieve the desired effects.

The future force battle command system will enable the effects-based approach to targeting and integrate all effects, including those of maneuver. This cohesive targeting system will apply a wide range of options from a variety of effects providers, generating a synergism that exceeds the application of the parts in isolation.

Consider a lethal effects package of fires from three NLOS-LS, two NLOS-cannons and two Air Force tactical strike aircraft planned in near real-time to attack an HPT. Together, they will be able to provide effects on the target more quickly and effectively than we can today.

Additionally, the future battle command system will precisely track incoming enemy aerial vehicles or missiles (such as medium- and short-range tactical ballistic missiles, cruise missiles, combat aerial vehicles or hostile aircraft). This will allow the Air Defense Artillery's medium-extended air defense system (MEADS) to eliminate these threats. (In the next 15 years, the Patriot missile will incorporate new technologies and morph into MEADS.)

Fires and Effects Coordination. Fires and effects coordination will be enabled

by the battle command system and is critical to the success of future force operations.

Perhaps the most significant change from the way we currently coordinate effects will be the consolidation of fires and effects with the command and control of effects delivery platforms. The battle command system not only will fuse sensor data, rapidly producing targetable data, but also route the targeting data to the appropriate fires system. NetFires will balance the need for responsive tactical fires with the most effective application of systems and munitions. Facilitating rapid clearance of fires and airspace coordination is and will remain a key aspect of this process.

The future battle command network will have visibility of all LOS, BLOS and NLOS engagements. This ensures that other resources do not reengage neutralized or destroyed targets. Additional assets then can be directed against targets that were not suppressed or destroyed.

NetFires will execute operations in accordance with the commander's guidance input into the battle command system. Based on the guidance, it may execute operations automatically without human intervention. The guidance may stipulate a human decision for certain conditions, such as violations of restricted targets. The system also may call for human intervention when the situation does not meet the parameters established in the commander's guidance.

Using the services of the battle command network, the Army will be able to protect the force during operations. For example, the future battle command system will use a fratricide avoidance application that checks the locations of friendly units. Current fratricide avoidance procedures focus on established fire support coordinating measures (FSCM). The application will use data about friendly units from Force XXI battle command brigade and below (FBCB^2), blue force tracker, and C^2 personal computer (C^{2}PC) to identify targeting conflicts that could lead to fratricide or unwanted collateral damage.

The battle command system will use the services of other software applications integrated into the FCS system of systems to conduct attack analysis and determine sensor-weapons-target combinations that are fused with data about the locations of friendly forces. This will provide a detailed analysis of surface fire asset capabilities in engaging and defeating targets. It automatically will consider available sensors, weapons and munitions, response times, commander's guidance, desired effects and time constraints.

Photo by Fred W. Baker III

A 13P instructor for the New Equipment Training Division at the FA School sends fire missions to an M270A1 launcher using a battery AFATDS "box." Future users will be able to access AFATDS from their computers over the net concurrently with other applications.

Other NetFires-Related Web-Based Capabilities. Computer systems distributed throughout the force will be able to access current and future applications via FCS BC. Examples of current applications are the web-based joint automated deep operations coordination system (JADOCS), C^{2}PC and the Air Force's theater battle management core system (TBMCS).

Another capability will be the incorporation of tactics, techniques and procedures (TTPs) for the common geographic reference system (CGRS). The CGRS will provide a common frame of reference for joint force situational awareness and attack coordination. It also will increase interoperability as various joint systems share data based on the common reference system.

These are just a few of many web-based applications that will be available to anyone with network connectivity and access permission authorized.

Current Fort Sill Actions. Fort Sill is looking at technologies to improve the capabilities of current fires systems and, possibly, leverage them for future systems, enhancing NetFires operations. For example, the developmental fire-and-forget Excalibur family of precision-guided munitions (PGMs) will provide tactical munitions with a circular error probable (CEP) of 10 meters or less at all ranges. The Excalibur unitary 155-mm round soon will be fielded in the Central Command (CENTCOM) theater. Another PGM—the guided multiple-launch rocket system (GMLRS)—is already in theater and being employed very successfully.

We also are working with the FCS developmental communities to advance NetFires operational concepts as technologies will allow. To enable our PGMs, precision strike suite-special operating forces (PSS-SOF), which is a proven windows-based software that is part of a future advanced FA tactical data system (AFATDS) release, will allow tactical observers to determine coordinates to employ weapons requiring very accurate target locations.

Our AFATDS has several enhancements under development, including its migration to a windows-based platform, projected for 2008. This will allow units to use AFATDS to access newly developed software and interface more easily with other new C^2 systems. These new systems include the command post of the future (CPOF), the web-based execution management capability (WEEMC) and JADOCS. (WEEMC will replace JADOCS.)

In the future, AFATDS users will not require an AFATDS "box." Users will be able to access AFATDS from their computers over the net concurrently with other applications on the battle command network. In addition, units will be able to establish a webpage and post AFATDS information on it for others to access.

An updated version of the forward observer software (FOS) with Excalibur as an option for a call-for-fire will accompany the release of the AFATDS' PSS-SOF application. AFATDS will release a service pack with the Excalibur technical data and an automated message to deconflict airspace and transmit the message to the tactical airspace integration system (TAIS) and TBMCS to help speed airspace deconfliction.

Other capabilities of the battle command network that will help to enable NetFires include an "internet-like" architecture that will allow systems to receive information from other systems and post

information for other systems to access. An example of this is AFATDS' effects management tool (EMT) software. It can access UAV video, ground moving-target indicators, synthetic aperture radar and signal intelligence information from the common ground station.

The Joint Battle Command Network Issues. We must resolve several issues to implement JC^2 and the FCS BC, which enable NetFires operations.

• *Joint philosophy must allow true joint interdependence.* Current FCS concepts envision joint assets being available to whoever needs them. If a ground maneuver element decides to engage a target, the network will provide the proper platform to achieve the desired effects. It could be an airplane, ship, reaction team or even leaflets, depending on the requested effects. It could entail several joint platforms or capabilities.

To achieve this, the armed services, basically, must relinquish control of their resources to JC^2. The joint services also must be familiar with how to employ all assets. For example, the Army is training some 13F Fire Supporters as joint fires observers (JFOs) to provide data to help Air Force personnel terminally control attacking aircraft in close air support (CAS) and to access other joint fires.

Another consideration is joint equipment. The future joint force must have equipment that is interoperable and not specific to a single service.

• *The joint force must physically establish the network, to include its hardware and software.* The joint force must first establish the hardware for the communications from one node to another. But the battle command network system is much more than communications.

We must develop the software to make the decisions for NCW and, ultimately, NetFires. For example, the network must provide the services to access targeting information and decide whether or not to engage the target, automatically clear the target and then decide to whom to send the target for engagement. And the network must be able to send targeting information simultaneously to whoever needs it quickly and accurately.

To build these NCW/NetFires capabilities, we must move toward an internet-like architecture.

• *The joint force must trust the system.* For the networked battle command system to be effective, the armed services will have to trust the system.

In terms of NetFires operations, the joint network must have the software to connect platforms at the different levels and determine restrictions and permissions for human intervention. There is a balance we must maintain: human intervention slows the process, which, at some point, negates the advantages of having the joint battle command network. The determination of the numbers and levels of human intervention may be one of the hardest issues to resolve in the development of the systems to support NetFires.

There has been much discussion about the network providing the means for sensor-to-shooter operations. The first issue to resolve will be to establish a robust clearance of fires application. This application will check the request for effects against not only FSCM already in effect, but also friendly unit locations and restricted and protected target lists, plus assess the potential for collateral damage.

We must integrate systems into the joint network to allow these checks. This will include having fixed-wing aircraft that can display ground forces in their cockpits and have fire control systems able to conduct checks before engaging.

To build commanders' trust in the automated system, the system must be tested thoroughly and commanders must be familiar with its capabilities. Commanders also will have to understand that they will not have "direct support" systems—that the network will be able to choose a platform in their battlespace to engage targets outside their sectors to execute NetFires. Likewise, the network may task systems outside of their sectors to support their operations.

Commanders will have the ability to stipulate whether or not their BLOS weapons can be tasked by the network. Although the network maintains visibility of LOS engagements, it won't task the commanders' LOS weapons.

• *Network implementation will require changes to joint doctrine, organizations, training, leadership and education, materiel, personnel and facilities (DOTMLPF).* The joint force will be able to implement JC^2 and NCW as technology allows and the armed services are willing to make DOTMLPF changes.

The armed services all are undergoing transformation. Army units are experiencing high OPTEMPO—not only fighting a war, but also becoming modular while moving toward an FCS-based Army. As we move toward a net-centric environment, we must update training and doctrine rapidly, the latter initially in the form of TTPs—in fact, consider all the DOTMLPF.

As part of network-centric operations, NetFires has the potential for future commanders to apply full-spectrum Army, joint and coalition fires and effects across all levels of conflict in real-time. NetFires will be a critical enabler for rapid and decisive outcomes.

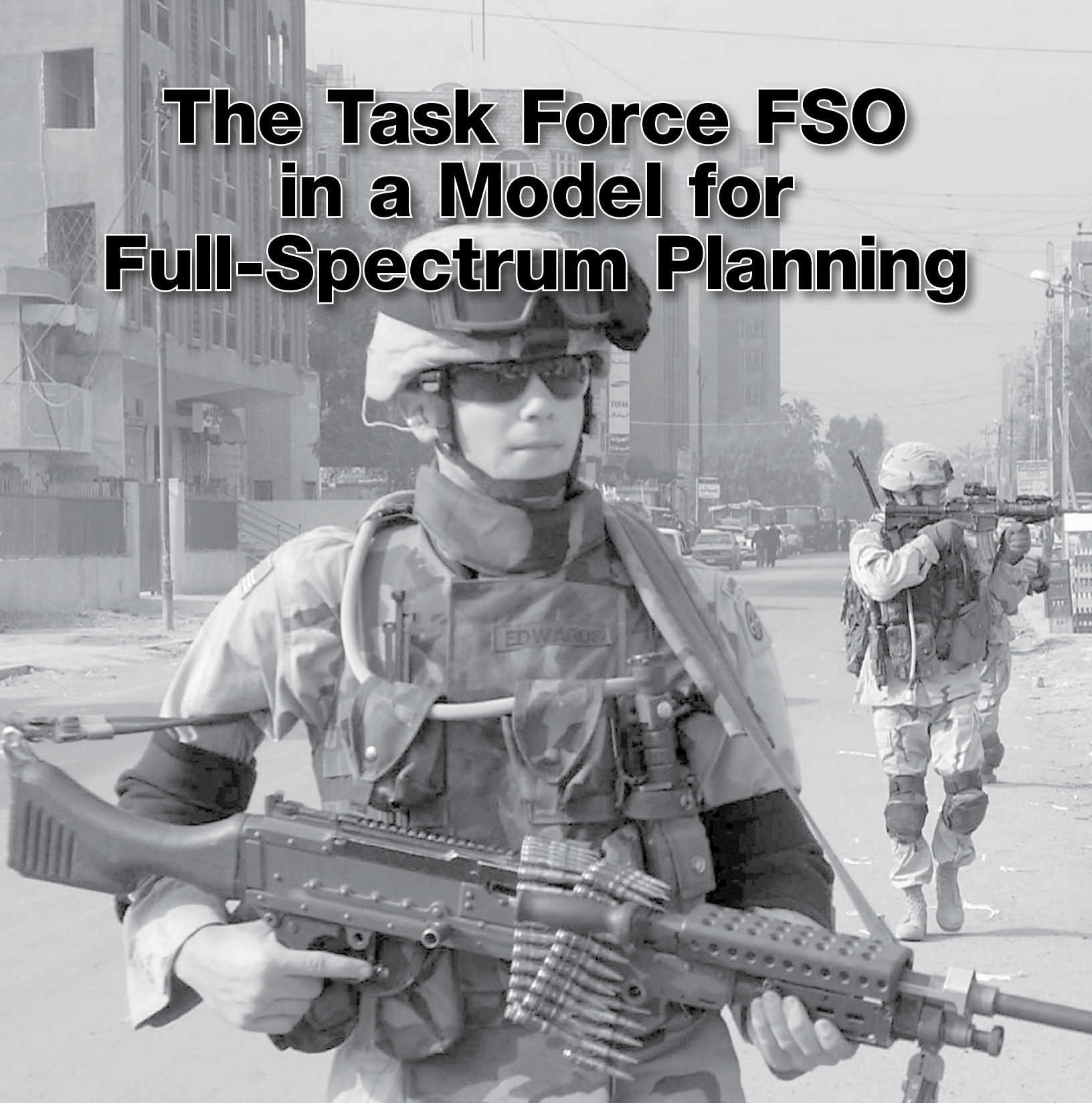
However, to migrate from today's capabilities to tomorrow's NetFires operations, we must execute a comprehensive joint strategy. This calls for implementing the JBMC^2 Roadmap and enhancing current and developmental joint C^2 and communications systems, and platform and capabilities to interface with JC^2. This will provide the Army decision-making and information services via FCS BC—services that will enable NetFires.

The armed services must cooperate to ensure that future Soldiers, Sailors, Airmen and Marines have the tools they need to accomplish any future mission, including the tools to execute Army, joint and coalition NetFires.

Colonel John L. Haithcock, Jr., is the Training and Doctrine Command (TRADOC) Systems Manager for FA Tactical Data Systems (TSM FATDS) at Fort Sill, Oklahoma. In a previous assignment, he served as the Assistant TSM FATDS. As the TSM FATDS, he helps develop the Advanced FA Tactical Data System (AFATDS) from the user perspective, which will evolve to be part of the future Joint Command and Control System (JC^2). Also at Fort Sill, he was the Deputy Director of the new Joint and Combined Integration Directorate (JACI) in the Field Artillery School. He was the Plans Officer for the 3rd Battlefield Coordination Detachment (BCD) for the Joint and Combined Forces, Korea. He commanded 3rd Battalion, 30th Field Artillery (3-30 FA) at Fort Sill, and A Battery, 6-41 FA, in the 3rd Infantry Division (Mechanized) in Germany. Among other assignments, he was the Deputy Fire Support Trainer and S3 Combat Trainer at the National Training Center (NTC), Fort Irwin, California. He is a graduate of the Army War College at Carlisle Barracks, Pennsylvania.

The author wishes to acknowledge the contributions to this article of Lieutenant Colonel (Retired) Timothy R. Puckett, the Advanced Warfighting Solutions and Battle Command Representative for Raytheon at Fort Wayne, Indiana.

The Task Force FSO in a Model for Full-Spectrum Planning



By Major Christopher D. Compton

The fire support officer (FSO) always has been a crucial player in a maneuver battalion task force's ability to synchronize combat power at the critical time and place on the battlefield. As the US enters the fourth year of fighting the Global War on Terrorism (GWOT), it is increasingly important to examine the task force FSO's role as it applies to the conditions in which leaders must plan, prepare, execute and assess combat operations in the contemporary operational environment (COE).

While the FSO remains an important member of the task force battle staff, the scope of his duties and responsibilities has changed. Several major factors are driving this change. First, as the Army moves through the full range of military operations in the COE and finds itself somewhere between war and peace, conditions have demanded all leaders focus on both lethal and nonlethal effects.

Second, Army leaders have made several radical changes in organization and doctrine to make the force more effective in the COE. Most notably, the modularity concept has changed the focus of attention at the tactical level from division to brigade. Modular brigades are better

Photo by PFC Mike Pryor, 82nd Airborne Division Public Affairs

resourced to take on the elements of both the lethal and nonlethal fights and are now more capable of conducting full-spectrum operations for a sustained period of time.

Third, the volume of information collected and analyzed from the bottom up has increased dramatically in the COE. This important factor has caused leaders to engage nearly all available assets in the collection and analysis of information. At the task force level, commanders are forced to organize their staffs to more effectively manage information collected throughout their battlespace. Fire supporters certainly play a key role in this process on their maneuver battle staffs.

In the task force, the FSO no longer is responsible only for performing the traditional duties of planning, coordinating and synchronizing lethal fire support. While this remains the FSO's primary focus in the COE, the task force commander sees his FSO as a critical link to integrating and synchronizing lethal and nonlethal effects. He relies heavily on the FSO to fulfill this vital role on the battle staff.

Defining the Problem. As task force FSOs assume this expanded role, they face several sources of friction that hinder their abilities to coordinate successful effects on the battlefield. Lack of training at both the collective and individual levels causes most of this friction.

First, most battalion-level staffs do not have experience in planning full-spectrum operations in a sustained high-operational tempo (OPTEMPO) environment. Task force staffs are very good at planning sequential, short-duration, lethal-focused missions; however, they lack the management systems, (primarily for establishing organization and routine) to conduct sustained planning that focuses on accomplishing the commander's objectives through the integration and synchronization of lethal and nonlethal effects. This training and experience gap results in a plan that is neither fully integrated nor synchronized across all battlefield operating systems (BOS) and, ultimately, fails to achieve the commander's intent fully.

Second, Field Artillery (FA) officers assigned to traditional FSO positions do not train adequately to fulfill this redefined role on the battle staff. Likewise, although most maneuver commanders recognize their FSO is uniquely qualified to understand doctrinal planning processes and the importance of coordination and synchronization, they don't fully understand how to employ an FSO in this role.

As a result, the FSO doesn't know how to communicate his new responsibilities to the commander, and the commander doesn't know what to expect from the FSO. This leads to obvious command and control problems, including, but not limited to, a lack of prioritization, unfocused taskings, the misuse of assets, poor intelligence collection and overall missed opportunities for success.

Evidence of these problems is becoming increasingly more noticeable, especially at the task force level, as commanders realize the importance of synchronizing lethal and nonlethal effects to accomplish an objective. This has a tremendous impact on decisive and shaping operations.

The Solution. Because these problems stem from a lack of doctrinal-based training, we must reexamine our doctrine to ensure it remains relevant to today's environment where units at all levels must integrate and synchronize lethal and nonlethal effects. While the doctrinal framework for planning and decision making remains unchanged, commanders and staffs must adopt new techniques for conducting the operational process to fit the continuously changing environment.

Field Manual (FM) 5-0 Army Planning and Orders Production provides the doctrine for decision making that helps commanders and staffs assess a situation, reach logical conclusions and make informed decisions. We need to revisit the fundamentals discussed in FM 5-0 and synthesize methods that apply to doctrinal decision-making processes to meet the demands of the evolving COE. We must learn how to apply doctrine in full-spectrum operations.

The military decision-making process (MDMP) and the *decide-detect-deliver-assess* (D^3A) or targeting process are our doctrinal planning methods. They guide commanders and staffs to logical, informed decisions to accomplish the missions while concurrently mitigating unnecessary risks and most effectively using limited assets. See Figure 1 for an illustration of how these processes are

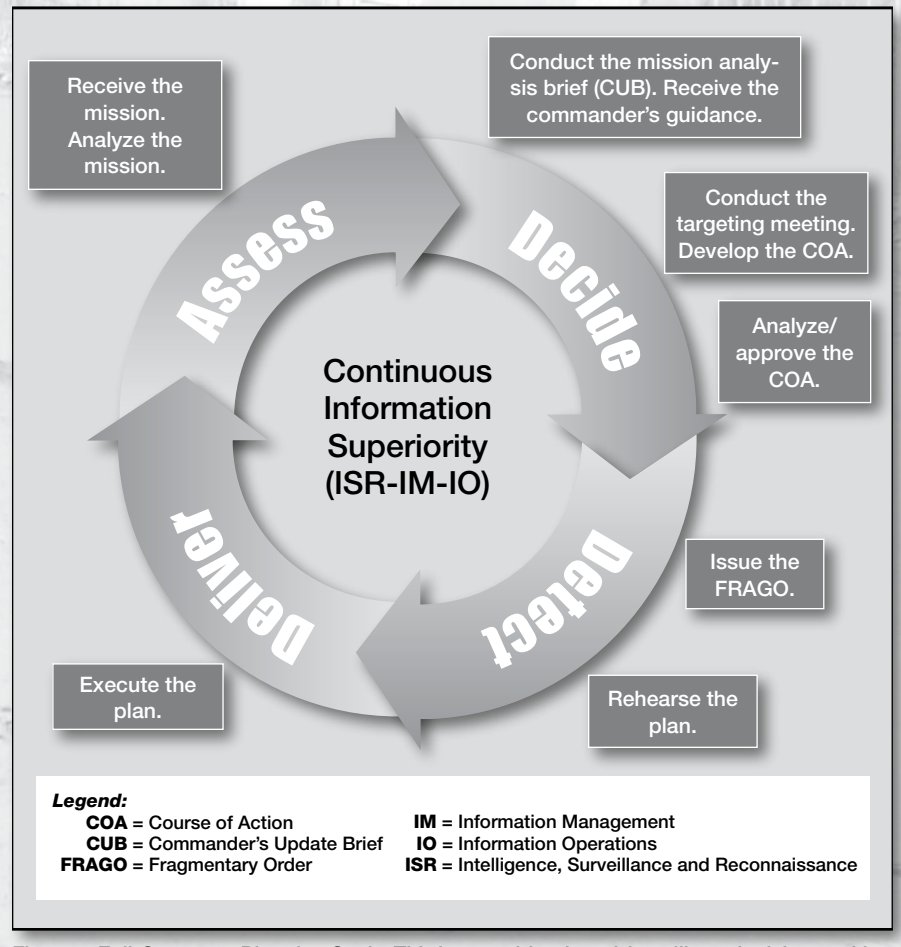


Figure 1: Full-Spectrum Planning Cycle. This is a combination of the military decision-making process (MDMP) and the decide, detect, deliver and assess (D^3A) targeting process.

1. Receive the mission./Conduct mission analysis.[a]

- Integrated BOS analyze the data.
- Staff updates the estimates.
- Intel updates the IPB.

FSO: Running Estimate

- Determine the specified/implied/essential tasks.
- Determine the facts/assumptions.
- Determine the constraints/restrictions.
- Determine the available lethal/nonlethal assets.
- Conduct a targeting assessment.
  - Assess the HPTs (TSM).
  - Review or refine the HPTL.
  - Review or refine the MOEs.
- Conduct a fire support assessment.
  - Refine/establish the targets.
  - Refine the observation plan.
  - Refine/establish the FSCMs.
- Conduct a nonlethal assessment.
  - Town's status (CMO analysis)
  - IO themes
  - Negotiations Required
  - Projects and Funds
- Recommend the EETs.

2. Brief the mission analysis (CUB)./Receive the commander's guidance.

- Staff briefs the estimates to the commander.
- BOS make recommendations.
- Commander issues/updates his guidance.

FSO: Information for the CUB

- Lethal/Nonlethal Asset Status
- Fire Support Plan Update
  - Targets
  - Observers
  - FSCMs
- Nonlethal Information Update
  - Town's Assessment (CMO Analysis)
  - IO Themes and Messages
  - Negotiations
  - Projects and Funds
- Targeting Update (HPTL)
  - TSM
  - HPTL
- Recommended EETs (Task and Purpose)

Commander's Guidance for the FSO

- Approve/refine the targeting objectives.
- Approve/refine the HPTL.[b]
- Approve the EETs.
- Issue the BOS' planning guidance.

3. Develop the COA./Conduct the targeting meeting.[c]

- Develop the integrated COA concept.
- Draft the TSM.
- Draft the products/annexes.
- Write the COA statement and produce the sketches.

FSO: Targeting Meeting

- Draft the fire support plan.
  - Targets
  - Observers
  - FSCMs
- Draft the nonlethal plan.
  - Town's Assessment (CMO Analysis)
  - IO Themes and Messages
  - Negotiations
  - Projects and Funds
- Draft targeting decisions (complete the TSM).
- Draft the EETs.

4. Analyze the COA.[d]/Receive the commander's COA approval.[e]

- Conduct an integrated wargame.
  - Finalize the TSM.
  - Finalize the products/annexes.
  - Brief the COA to the commander for his approval.

FSO: Wargame

- Synchronize the fire support plan.
  - Targets
  - Observers
  - FSCMs
- Synchronize the nonlethal plan (TSM).
  - Town's Assessment (CMO Analysis)
  - IO Themes and Messages
  - Negotiations
  - Projects and Funds
- Finalize the targeting decisions (TSM).
- Finalize the EETs.

5. Issue the FRAGO.

- Develop the FRAGO in the doctrinal OPORD format.
- Include annexes, as needed.
- Brief subordinates on the FRAGO.

FSO: Orders Production Checklist

- EETs—Paragraph 3 (a) (2)
- Annex D
  - Target List Worksheet
  - Fire Support Execution Matrix
  - TSM
  - Fire Support Overlay
- Annexes R, U, V (As Needed)[f]
  - Nonlethal Effects Support Matrix
  - Town's Assessment (CMO Analysis)
  - IO Themes and Messages
  - Negotiations Schedule/Guidelines
  - Projects and Funds

6. Rehearse the Plan.

- Conduct a combined arms rehearsal of lethal and nonlethal effects.
- Conduct a fire support rehearsal.

FSO: Products for Rehearsals

- EETs
- Fire Support Pan
  - PLOT-CR Format
  - FSCMs
- Nonlethal Effects Plan
  - Concept of Support (by Asset)
  - IO Themes and Messages
  - Negotiations
  - Projects and Funds

7. Execute the plan./Assess the results of the plan.

- Execute the plan.
- Conduct MOE analysis.

FSO: Execution/Assessment Considerations

- FSO's Location during Execution
- Command and Control of Fires and Assets
- Reporting/Information Management
- Continued Analysis

Legend:

BOS = Battlefield Operating Systems
CMO = Civil-Military Operations
COA = Course of Action
CUB = Commander's Update Briefing
EETs = Essential Effects Tasks
FRAGO = Fragmentary Order
FSCMs = Fire Support Coordinating Measures
FSO = Fire Support Officer
HPTL = High-Payoff Target List
HPTs = High-Payoff Targets
IO = Information Operations
IPB = Intelligence Preparation of the Battlefield
MDMP = Military Decision-Making Process
MOEs = Measures of Effectiveness
OPORD = Operations Order
PLOT-CR = Purpose, Location, Observer, Trigger, Communications and Rehearsal
TSM = Target Synchronization Matrix

End Notes:

a. This step and the staff running estimates are a continuous process after the initial mission. As new missions are received or the effectiveness of old missions are assessed, Step 2, "Brief the mission analysis./Receive the Commander's Guidance," for all intents, becomes the first step in the MDMP/targeting cycle.

b. Because of the nature of a sustained high-operational tempo (OPTEMPO) environment where the commander must focus on specific objectives and prioritize limited assets, targeting drives the COA. Specifically, the HPTL becomes the "directed COA."

c. Note that the medium to develop the COA for lethal/nonlethal military operations is the targeting meeting.

d. "Analyze the COA," which synchronizes the COA, can be conducted immediately following the targeting meeting in Step 3 or as a continuation of the meeting with all BOS present.

e. Because the nature of the operational environment demands a directed COA, a decision briefing for the commander may not be necessary. However, he must approve the plan.

f. The FSO gathers these annexes or writes them as directed by the S3.

Figure 2: The Battalion/Task Force FSO's Role in Planning Integrated Lethal and Nonlethal Military Operations—Full-Spectrum Operations

integrated in full-spectrum planning.

How commanders choose to integrate these processes and apply them to given situations depends on the operational environments in which they find themselves. This article proposes a model to integrate the MDMP and targeting processes. See Figure 2 for the steps in the full-spectrum planning process at the task force level and the FSO's role in each step.

An EBO Approach. During the last several years, leaders at all levels across all branches have discussed the applicability of EBO to describe the process by which tactical units plan, prepare, execute and assess combat operations in the COE. Put simply, EBO focuses on integrating and synchronizing lethal and nonlethal *effects* in a continuous operational process to achieve the commander's objective(s).

There also has been much discussion about what level of the chain of command conducts EBO and to what operations the term applies. Regardless of what we call it, the effects-based approach is critical to the success of the task force in full-spectrum operations.

Here are some fundamentals for full-spectrum planning.

• *Establish information superiority.* Leaders agree that control of the information environment is the foundation for success in full-spectrum operations. *FM 3-0 Operations says*, "information superiority is the operational advantage derived from the ability to collect, process and disseminate an uninterrupted flow of information while exploiting or denying an adversary's ability to do the same."

A commander who is expecting to achieve desired effects on the battlefield must make an intensive effort to gain the operational advantages derived from information superiority: better, faster friendly decisions; degradation of enemy decisions; and consideration of his actions' impact upon the enemy and others' perceptions and attitudes. But he must focus his staff properly to do it.

First, the commander must push his staff routinely to collect, process, integrate, analyze, evaluate and interpret information to generate actionable intelligence. Second, each staff member must focus on how he specifically supports the three components of information superiority: intelligence, surveillance and reconnaissance (ISR); information management (IM); and information operations (IO).

• *Maintain a running staff estimate.* To make informed decisions, the commander relies on his staff's recommendations based on an analysis of the most current information available. In a sustained high-OPTEMPO environment, the staff must maintain a running estimate that tracks and analyzes information over a long period of time. This is critical to the unit's ability to gain and maintain information superiority and provides the foundation for each staff member to participate effectively in each step of the doctrinal planning process.

Developing specific information covered in a running estimate is critical and addresses another key problem identified earlier. Through a clearly defined running estimate, the FSO will be able to communicate his responsibilities to the commander, and the commander will understand what to expect from the FSO.

• *Develop the FSO's estimate.* The FSO must design his running estimate to employ the fires BOS in a way that achieves the commander's intent. Additionally, as the battle staff's resident expert on the targeting process, the FSO must gather information from each BOS and other tactical enablers that work to achieve specific lethal and nonlethal targeting objectives. This includes managing information for the commander that's collected and analyzed by nonlethal assets, if the task force is allocated any nonlethal assets.

Maintaining a situation map and briefing boards with available fire support assets is not enough. The estimate must link to the running operations estimate, supporting the commander's ability to make decisions during maneuver operations so he can gain information dominance. See "FSO: Running Estimate" in Step 1 of Figure 2 for the information that may be included in an FSO's running estimate.

Because a maneuver task force staff has no organic S5 or S7, commanders often call on their FSOs to coordinate and synchronize these critical nonlethal functions. Regardless of whether or not the commander pins this responsibility on the FSO, a good fire supporter must balance the scope of his estimate to address both traditional lethal fire support duties and the elements of the nonlethal fight.

This requires the FSO to understand the capabilities of nonlethal effects-producing assets. Just as the FSO must understand the use of artillery, mortars, close air support (CAS) and attack aviation to achieve desired lethal effects, he also must understand the use of psychological operations (PSYOP), civil affairs (CA) and IO to achieve the desired nonlethal effects. The information is an important part of the FSO's running estimate.

Information in the FSO's estimate is tracked continuously and analyzed during each step of the FSO's planning process. The tracked information also serves as his scope of responsibility, clearly defining his role in supporting the commander on the battle staff. Ultimately, the FSO uses the estimate to recommend and develop essential effects tasks (EETs) discussed in greater detail later in this article.

The FSO's running estimate, along with the rest of the staff's running estimates, serves as the foundation for the commander's initial visualization of the battlefield and eventual intent to accomplish the mission by achieving desired effects. Solid running estimates enhance the commander's ability to focus planning and the staff's ability to develop a logical and complete plan.

• *Effects planning starts with the commander.* Chapter 1, FM 5-0 discusses the fundamentals of planning for full-spectrum operations. The first is that "Commanders focus planning." This is the most critical fundamental and the entry point of the doctrinal planning process.

Commanders continually focus planning by providing an objective-focused visualization to supply answers to key questions that emerge from staff planning: "Where are we now?" "Where do we want to be?" and "How do we get there?"

The first visualization question—"Where are we now?"—is *information* focused. The FSO and the rest of the staff help the commander answer this question by providing him timely, analyzed information in the running estimates. This leads to situational understanding and a common operational picture (COP) and gives the commander the ability to focus planning by developing his commander's critical information requirements (CCIR) that will guide his decision making throughout the operation.

The second visualization question is *objective* focused. The commander must focus planning by visualizing the end state. Answering, "Where do we want to be?" gives the staff the ability to develop a course of action (COA) focused on the commander's objective. This

objective becomes the targeting focus for the staff by which desired effects are determined for approved high-payoff targets (HPTs).

The final visualization question is *effects* focused: "How do we get there?" To achieve the commander's objective (Where do we want to be?), a series of desired effects must be achieved (How do we get there?). Commanders focus planning by establishing targeting priorities and providing the staff guidance on what effects must be achieved to be successful.

The FSO helps in this process by recommending targeting priorities and desired effects, but the commander must approve these recommendations. The approved priorities form the HPT list (HPTL), and the approved effects become the foundation for the FSO's EETs.

The FSO and the Planning Cycle. Full-spectrum planning occurs in a continuous cycle as units execute the two doctrinal planning processes: MDMP and targeting. These processes drive the task force commander and staff to a final product that is fully integrated and synchronized, and, at the same time, focused on achieving objectives through a series of desired lethal and nonlethal effects.

The following are some principles that integrate the two processes for full-spectrum planning.

• *Integrate MDMP and targeting.* While the MDMP is a proven problem-solving process, targeting focuses specific assets on specific targets in accordance with the priorities and objectives established by the commander to solve the problem.

The targeting process distracts many people by inducing a false perception that it is based on the completion of a complex matrix. Targeting is certainly more than a matrix; however, the most effective tool to manage the commander's targeting objectives is the target synchronization matrix (TSM).

The TSM is simply a graphic representation of the unit's plans to achieve the commander's targeting objectives. Figure 3 is an example of a TSM for full-spectrum operations.

The TSM is neither a synchronized COA nor an execution matrix. It is, however, a valuable planning tool for the commander (and subordinate commanders) that displays useful information about his targeting priorities (HPTs); the assets and methods used to detect, deliver and assess each HPT; and the quantifiable effects to be achieved to satisfy his requirements for success. Ultimately, the

Item #1

	Unit	AO	Target Objective/ LOO Category	MOE	HPT
Decide	TF 1-1 IN	Scorpion (Medinal Jabal)	Defeat insurgents.	Reduce mortar attacks on FOB Denver by 75%.	AIF Mortars

	Asset	Method	When
Detect	1. A FIST 2. Q-36 Radar 3. A Co Cdr	1. Occupy OP1 NLT 070600MAR05 and observe TAI 1 (AB2012). 2. AOS is 4800 mils from 2100-0100. 3. Coordinate joint patrol with the Iraqi Police.	7 Mar 05
Deliver	1. A Co 2. Mtr Plt 3. PSYOP Team	1. Conduct combat patrol in TAI 1 from 2100-0100. Conduct joint patrol from 1900-2300 in Medina Jabal. 2. Fire AB2012 when mortars are detected. 3. Deliver leaflets (focus on AIF mortar activities) NLT 1300.	7 Mar 05

	Asset	Method	When	MOE Indicators
Assess	A Co	(If fired) patrol the CF grid and assess the BDA; debrief with S2/FSO upon completion; negotiate with the mayor, focusing on the success of the joint patrols and status of the AIF mortar activities.	8 Mar 08	Number of acquisitions, amount of weapons and ammunition found, number of reports of mortar or related insurgent activities.

Item #2

	Unit	AO	Target Objective/ LOO Category	MOE	HPT
Decide	TF 1-1 IN	Scorpion (Al Sharq)	Provide essential services.	Increase availability of electricity from 50% to 100%.	Talaat Shameel Ajja'Fari (Mayor)

	Asset	Method	When
Detect	1. TF Cdr 2. TF S4/CA	1. Negotiate with the mayor to verify the town's need for a generator. 2. Determine the size and type of generator needed.	7 Mar 05
Deliver	TF S4/BMO/ CA	Receive and install the generator.	TBD

	Asset	Method	When	MOE Indicators
Assess	CA	Poll the citizens to determine the initial effects of the new generator.	TBD	Number of hours of electricity per 24-hour period, number of complaints or accolades received by the town leadership; number of positive/negative responses during CA polling.

Legend:

AIF = Anti-Iraqi Forces
AOS = Azimuth of Search
BDA = Battle Damage Assessment
BMO = Battalion Maintenance Officer
CA = Civil Affairs Team
Cdr = Commander
CF = Counterfire
Co = Company
FIST = Fire Support Team
FOB = Forward Operating Base
HPT = High-Payoff Target
IN = Infantry
LOO = Line of Operation
MOEs = Measures of Effectiveness
Mtr = Mortar
NLT = Not Later Than
PL = Platoon Leader
Plt = Platoon
PSYOP = Psychological Operations
OP = Observation Post
TAI = Target Area of Interest
TBD = To Be Determined
TF = Task Force

Figure 3: Two Sample Items of a 24-Hour Target Synchronization Matrix (TSM) for Lethal and Nonlethal Effects

TSM becomes the source for developing EETs. The FSO's role in developing the TSM and subsequent EETs is a key part of the planning process.

Units typically struggle in their attempts to integrate the MDMP and targeting into one smooth process that both maximizes the time available to the commander and staff and produces an acceptable, complete product for subordinate units. Implementing a battle rhythm eases this struggle by lending efficiency to an otherwise difficult-to-manage OPTEMPO.

• *Establish a sustained high-OPTEMPO battle rhythm.* As one applies a doctrinal planning framework to this environment where information superiority is critical, the first step is to develop a battle rhythm. Establishing a battle rhythm always has been an important ingredient in making any staff effective.

In the COE, full-spectrum planning is an information-intensive and long-term process. It requires a unit to plan continuously over a sustained period of time (at least 365 days, in most cases) for a wide range of military operations, most likely in the same general geographical location.

Battle rhythm allocates specific times to perform each step of the doctrinal planning process in a routine way, allowing the staff to establish a fully integrated and synchronized plan that uses actionable intelligence and focuses on achieving desired effects. The cycle time can (and should) be modified to meet the unit's operational demands.

The unit's ability to accomplish routine tasks routinely is key to success. Without routine, a unit is unable to plan proactively and conduct operations focused on achieving the commander's objectives. It will be reactive to guidance from higher headquarters and critical events occurring in its area of operations (AO).

The most important command/staff action in establishing a battle rhythm remains fielding sound standing operating procedures (SOP). Units must evaluate their SOPs to validate their utility for continued use in sustained high-OPTEMPO environments.

Once the battle rhythm is established, the FSO and each staff member must understand what he brings to the table for each step of the process. This includes understanding what input and output products are necessary for each staff member and what decisions must be made during each step. Figure 2 includes the FSO's inputs and outputs for each step of the planning cycle model.

• *Maximize the value of the commander's update brief (CUB)—situational update/mission analysis.* When entering the planning cycle, beginning with the initial mission receipt and mission analysis (Step 1 of Figure 2) is logical in the MDMP. In this model, the staff's responsibilities remain unchanged from the guidelines established in FM 5-0.

However, in a sustained operational environment, staffs must revisit this first step on a recurring basis—they are constantly analyzing information related to a new or old mission. If a unit receives a new mission from higher headquarters, the staff analyzes the information and, in Step 2, makes new recommendations to the commander based on its analysis. This running mission analysis consists of the integrated updated staff estimates, provides the foundation for the commander's visualization and answers the first critical question: "Where are we now?" The CUB presents the products of a running mission analysis within the framework of a battle rhythm.

In other words, the CUB plays a double role as the subordinate unit leader's situational update briefing and the staff's mission analysis brief to the commander. The briefing must be a coordinated effort across all BOS in which each participant presents analyzed information to the commander, emphasizing the impact on current and future operations. Input from both the staff and subordinate unit leaders gives the commander the clearest operational picture available and puts the unit's leaders and staff on the "same sheet of music."

From a targeting perspective, aspects of the assess function and the initial requirements for the *decide* function occur at this point in the cycle. Although assessment is a continuous process, staff must provide feedback to the commander on his targeting objectives because the plan hinges on the unit's ability to accomplish those objectives. Likewise, as new and relevant information from the targeting assessments is analyzed continuously, the commander validates his objectives and priorities.

As expected, the task force FSO plays a key role in this part of the planning cycle. As the commander's targeting expert, he not only recommends targeting objectives, but also comprehensively lays out both lethal and nonlethal considerations for the commander, based on analyzed information from his running estimate. At a minimum, the FSO briefs the commander on the information listed in "FSO: Information for the CUB" in Step 2.

After the CUB, the commander approves any changes to the recommended HPTL and EETs and issues planning guidance to the staff concerning new or revised targeting objectives. This guidance is the foundation for the targeting meeting/COA development in Step 3.

• *Develop the COA (targeting meeting) with a high payoff.* Once the staff receives the commander's planning guidance, it is ready to move to Step 3 in the planning cycle: COA development. This step is best achieved through a fully integrated targeting effort by the staff—a targeting meeting.

Because the nature of a sustained high-OPTEMPO environment forces the commander to focus on specific objectives and prioritize the use of his limited assets, targeting drives the COA. Therefore, COA development begins with the staff addressing the commander's targeting objectives, specifically the approved HPTL with effects from the CUB, which serves as a "directed COA."

The targeting meeting is a focused effort by the entire battle staff and not the responsibility of a select few individuals under the FSO's control. While the FSO certainly plays a key role in targeting, the task force executive officer (XO) should lead the staff through these planning steps.

The targeting meeting begins where the CUB left off: restating the commander's priorities in the form of the approved HPTL and desired effects for each target. The battle staff then proceeds through the doctrinal steps of COA development, simultaneously addressing each targeting function (*decide, detect, deliver and assess*).

The end state must be an integrated COA that is feasible, acceptable, suitable, distinguishable and complete. In addition to COA statements and sketches, a completed draft of the TSM shows how the COA addresses each targeting function and, ultimately, achieves the commander's targeting objectives. The FSO translates these targeting objectives into EETs.

• *Develop EETs.* For the FSO, the most important output of the targeting meeting is the list of draft EETs communicating the commander's targeting objectives in a format subordinates will understand.

For more than a decade, instructors at the Field Artillery School, observer/controllers (O/Cs) at each of the combat

training centers (CTCs) and fire support coordinators (FSCOORDs) at the brigade level and below emphasized the importance of the essential fire support task (EFST). Officers attending the FA Captain's Career Course (FACCC) learned the intricate details of how to develop, implement and execute an EFST. Students quickly understood that the EFST plays a vital role in the maneuver plan, even causing the commander to change his plan if the EFST is not accomplished.

Just as the COE has demanded a change in the task force FSO's scope of responsibility, it also has demanded a change in the products required to capture the commander's intent regarding lethal and nonlethal effects. It's necessary to communicate a concept for accomplishing the commander's targeting objectives, using the same basic methodology used to develop the EFST.

The impact of the new EET stays the same. Just as failure to accomplish an EFST forces the commander to change his plan, the same is true about the EET. Moreover, the general format of the EET also remains consistent: Task, Purpose, Method and Effect.

So, what has changed? With the unit focused on accomplishing the commander's targeting objectives, EETs capture the details required to achieve desired lethal and (or) nonlethal effects on HPTs established by the commander. A properly completed TSM provides much of the detail needed to develop an EET. (See Figure 3 on Page 26.) An EET's Task, Purpose and Effect are derived from the *decide* function identified at the top of Figure 3. The Method is derived from the *detect, deliver* and *assess* functions, also in Figure 3. For an example of an EET derived from the TSM in Figure 3, see Figure 4. Note that Figure 4 integrates lethal and nonlethal actions to accomplish the targeting objective.

The Task of an EET describes the desired targeting objective on a specific HPT and is formulated by using the familiar Objective-Formation-Function format.

The Purpose statement continues to be maneuver-focused like the EFST. The Purpose is tied to the commander's targeting objective or a specific line of operation (LOO). This ensures the EET is nested with the commander's intent.

When determining the Method, the FSO again refers to the completed TSM. The TSM's *detect, deliver* and *assess* functions all specify which asset(s) accomplish the function, the method used (in the form of task and purpose) and when the function will be accomplished. The EET Method paragraph must describe in detail how and when specific assets will affect an HPT through the targeting functions of *detect, deliver* and *assess*. A completed Method paragraph provides subordinates with a detailed concept of how specific actions fit into the plan to achieve a desired effect.

The Effect, determined during the *decide* function, describes in quantifiable terms what results define success in relation to the overall targeting objective. The measure of effectiveness (MOE) or measure of performance (MOP) indicators establish the standards by which the task will be accomplished. This provides clear guidance to subordinates to determine mission success.

It's important to note that the FSO is *not* deriving the information for EETs on his own or in a vacuum. Rather, it is the work of an integrated staff, led by the task force XO. The FSO merely compiles the information into a familiar format that is easily understood by subordinate leaders.

The FSO's critical output from the targeting meeting is draft EETs, which he helps develop during the meeting. These tasks are the cornerstone of the commander's plan to achieve specific targeting objectives. They are refined throughout the planning process and published in the fragmentary order (FRAGO), Paragraph 3a, Concept of the Operation, to tell subordinates how synchronizing lethal and nonlethal effects works to accomplish the commander's targeting objectives.

Wargaming: Achieve Synchronization of Effects. Unfortunately, many units stop planning after developing the COA. If COA development is done correctly, the plan is integrated, but it is not synchronized. If the goal of full-spectrum planning is to integrate and synchronize lethal and nonlethal effects on the battlefield to achieve the commander's intent, then the staff must synchronize the plan by conducting COA analysis or wargaming.

In the battle rhythm, Step 4 should be completed immediately after, or as a

Task = *Decide* (Focused on an HPT from the TSM)

Objective	Formation	Function

Disrupt the ability of AIF mortars in AO Scorpion to engage US forces with indirect fire.

Purpose = *Decide* (Maneuver-Focused)

To defeat AIF operating in zone.

Method = *Detect-Deliver-Assess* (From the TSM)

Detect: A FIST occupies OP 1(NP136987) NLT 070600MAR05 and observes TAI 1, primary observer AB2012 (Mtr 3 HE, AMC); Q-36 AOS 4800 mils from 2100-0100L from 7-9 Mar 05. A Co coordinates with Police Chief for joint patrol with Iraqi Police in Medina Jabal on 7 Mar 05.

Deliver: A Co conducts simultaneous combat patrol in TAI 1 and joint patrol with Iraqi Police from 2100-0100 to locate AIF mortar teams and equipment. Mtr Plt laid on AB2012 (Mtr 3 HE, AMC). PSYOP team delivers leaflets in Medina Jabal NLT 1300 7 Mar 05, describing how AIF mortar activity in Medina Jabal puts innocent people in danger.

Assess: A Co conducts a patrol to counterfire grid (if fired) and assesses BDA and conducts debrief with TF S2/FSO upon completion. A Co negotiates with the mayor of Medina Jabal NLT 1300 8 Mar 05, focusing on continued joint patrols and status of AIF mortar activity in Medina Jabal.

Effect = *Decide* (MOE from TSM)

AIF mortars are disrupted by 75% reduction of indirect fire attacks in AO Scorpion.

Legend: **AMC** = At My Command **HE** = High Explosive

Figure 4: Sample EET derived from Item #1 of the TSM in Figure 3. Note that the "Method" includes nonlethal as well as lethal actions to accomplish the targeting objective.

continuation of, the targeting meeting. The entire battle staff must be present as each BOS synchronizes its efforts to accomplish the plan to counter the enemy's most probable COA.

While participating in the wargame, the FSO focuses on the fire support plan but must understand how critical nonlethal assets will be employed during the operation. Key doctrinal products that should emerge from the wargame are the S3's operations synchronization matrix, a refined TSM and refined EETs.

Because the nature of the operational environment generally demands a directed COA, a decision brief to the commander may not be necessary. However, the commander approves the plan before it is disseminated to subordinates in a FRAGO.

Complete the cycle. Completing the cycle requires publishing a detailed FRAGO that provides clear task and purpose to subordinate units, conducting detailed rehearsals to further synchronize the plan, executing the plan through the focused delivery and coordination of lethal and nonlethal effects and assessing the effectiveness of the plan (Steps 5, 6 and 7 of Figure 2).

Given the nature of the operational environment, it's important that commanders quickly and effectively communicate changes in the plan to subordinates. While tasking matrices are useful tracking tools, they are not doctrinal methods for communicating a plan. The FRAGO following the doctrinal five-paragraph format is the proven method to communicate a plan effectively to subordinates. This FRAGO should include all the annexes that provide the details necessary for subordinates to execute the plan.

After issuing the order, units rehearse the plan. The rehearsal should emphasize achieving the desired effects during the operation, to include the delivery and control of assets.

A combined arms rehearsal must include all assets participating in the operation. Each subordinate leader must understand how and when each asset supports the mission in time, space and purpose. Additional rehearsals may be needed to further synchronize the actions of specific assets (i.e. fire support, combat service support, ISR, etc.).

FSOs participate in rehearsals. At a minimum, the FSO must cover EETs and the fire support plan (purpose, targets, observers, communications, triggers, and fire support coordinating measures, or FSCMs). The FSO also must be prepared to rehearse the nonlethal effects concept (asset, task and purpose, IO themes and messages, negotiations, and projects and funds).

Photo by SPC Charles Gill, 55th Combat Camera (COMCAM)

A Soldier from 1st Battalion, 320th Field Artillery Regiment, 101st Airborne Division, hands out humanitarian and esprit items in Iraq. The FSO focuses on the fire support plan but must understand how critical nonlethal assets will be employed during an operation.

Successful execution often depends upon effective command and control. As the operation reveals the true nature of the battlefield, causing possible plan adjustments, key leaders must be positioned to control assets to adjust to the changing situation.

Clearly the commander's location is critical during execution, but he also must consider the FSO's location. With communications platforms and personnel assigned at the company level and higher, the FSO brings a unique and desired capability upon which the commander can capitalize. Task force commanders gain more visibility and control of assets if assets are coordinated through their fire support organization.

Full-spectrum operations require commanders and staffs at all levels to apply the elements of combat power in a way that ultimately synchronizes effects on the battlefield. The constantly changing operational environment requires leaders, including the FSO, to anticipate change and adapt to the situation. However, they can implement change without losing sight of the current doctrinal framework in which they plan, prepare, execute and assess combat operations. Units likely will achieve success in full-spectrum operations by focusing on gaining and maintaining information superiority through the continuous integration of the MDMP and targeting processes and in the context of a cyclic battle rhythm that addresses each phase of the operations process.

Likewise, the FSO must recognize his evolving role on the maneuver task force battle staff and exactly how he fits into each phase of this complex process. He must not lose sight of his ultimate purpose as the commander's representative for coordinating fires on the battlefield, but he must understand how to fulfill his role in the ever-changing operational environment.

A confident task force FSO, competent in his duties, is key to achieving desired effects in full-spectrum operations.

Major Christopher D. Compton is a Small Group Instructor for the Field Artillery Captain's Career Course (FACCC) assigned to 1st Battalion, 30th Field Artillery (1-30 FA), at Fort Sill, Oklahoma. In his previous assignment, he was the Mechanized Infantry Task Force Fire Support Trainer (Scorpion 27) at the National Training Center in Fort Irwin, California. He commanded C/1-94 FA (Multiple-Launch Rocket System, or MLRS), 1st Armored Division in Germany where he deployed to Iraq in support of Operation Iraqi Freedom (OIF) 1. He also served as the Adjutant for the 1st Armored Division Artillery. Among other assignments, he was a Battalion Fire Support Officer (FSO), Battery Executive Officer, and Battery Fire Direction Officer (FDO) in 2-8 FA, 1st Brigade, 25th Infantry Division, Fort Lewis, Washington.

The author wishes to acknowledge the contributions to this article of Major Steven T. Rehermann, a former Company and Battalion FSO and Brigade Targeting Officer; Lieutenant Colonel (Promotable) David L. Blain, Senior Mechanized Infantry Trainer (Scorpion 7) at the NTC; Lieutenant Colonel (Promotable) James L. Miller, Senior Fire Support Trainer (Wolf 07), also at the NTC; and Lieutenant Colonel Matthew R. Anderson, FA Operations Trainer (Fox 3), Joint Readiness Training Center, Fort Polk, Louisiana.

Training ARNG FA Units for Full-Spectrum Operations

A 29th Infantry Division (Light) Artillery (Div Arty) Soldier participates in a four-day full-spectrum operations exercise during annual training. Each battalion cycled through the three evaluated training lanes each day.

The Marcalastan commander never had led his battery through an urban environment before. Intelligence estimates assured him the town was not a threat and the local MP [military police] battalion had secured the host nation's refueling point in the area. He still felt uneasy as he began to lead the battery convoy through the relatively quiet streets of Marcalan in the fictional country of Marcalastan. He reflected on how his artillery mission had changed.

Suddenly, he heard an explosion to the rear of the column, and his SINCGARS [single-channel ground and airborne radio system] chirped to life.

"Easy 06, IED [improvised explosive device] exploded near the XO's [executive officer's] vehicle, and we are being engaged to the rear of the column by small arms fire…we need to get out of here!"

By Lieutenant Colonel Steven T. Scott and Major Scott F. Bartlett

The Field Artillery mission truly is changing. Army National Guard (ARNG) artillery units countrywide are training not only for traditional fire support roles but also to operate as combat support (CS) and combat service support (CSS) elements. In addition, they are training in infantry tasks like their active brethren, such as conducting patrols, clearing buildings, conducting vehicle checkpoints and working with the media.

This article discusses training the 29th Infantry Division (Light) Artillery (Div Arty) conducted in June 2005 to meet the demands of the contemporary operational environment (COE). It provides a framework for other ARNG FA commanders and staffs to develop training for the full-spectrum environment while simultaneously preparing FA units to execute their mission-essential task lists (METLs).

Commander's Vision. The division commander established training guidance focused on developing enhanced sections to deploy rapidly. He directed that all subordinate elements develop multifunctional squads and sections.

Multifunctional squad training is based on the division's Warrior Task List, a set of individual and collective tasks aimed at preparing a multi-skilled, highly adaptive force. (See Figure 1.) Division units that mobilize must have the skills to adapt to the COE.

Road to War. The Div Arty staff developed a Warrior Task evaluation lane training exercise for the 2005 annual training (AT) cycle. The exercise was to include many of the problems deployed units are facing in Southwest Asia. Initial planning began during AT in June 2004.

The S2 developed a scenario based on events and operations in Afghanistan and Iraq. The Div Arty staff planned the scenario while allowing subordinate batteries to continue training on standard METL tasks throughout the balance of that year and AT.

The scenario had the batteries taking part in coalition stability and support operations (SASO) in the fictional country of Marcalastan (Virginia ARNG Maneuver Training Center at Fort Pickett). Marcalastan was a fledgling transitional Islamic state in the Persian Gulf region. The country was emerging from a long civil war that saw the rise of a dictator who bankrupted the country and turned on his neighbors.

A US-led coalition sanctioned by the UN was sent to intervene and restore democracy and ensure stability in the oil-rich region. An insurgency of Islamic fundamentalists surfaced, bent on destabilizing the new government and installing a Mullah-based theocracy.

The Div Arty units' mission was to deploy in support of the Marcalastan Defense Force (MDF) in SASO operations and provide the independent peoples of Marcalastan the ability to hold free and fair elections.

This scenario forced units that spent most of their time in field environments to train in urban terrain while resolving complex issues, such as civilians on the battlefield, embedded reporters, IEDs, snipers and hostage situations. The training consisted of three lanes with individual and collective tasks evaluated in each lane. (See Figure 2 on Page 36.)

The plan was for each firing battery to enter the first lane of the exercise during the AT cycle on its way to conduct firing operations. This allowed better command and control (C^2) of the exercise and the availability of headquarters and headquarters battery (HHB) personnel to support the resource-intensive military operations in urban terrain (MOUT) part of the exercise.

Operation Marcalastan Freedom. The exercise was developed in three phases. This development process provided opportunities to train the Div Arty staff, observer/controllers (O/Cs) and the opposing force (OPFOR).

In Phase I, the staff developed the operations order (OPORD) in the fall of 2004 and briefed it to the division commander, battalion commanders and their key staff members in January 2005. Attendees were limited to ensure that the plan would maintain some element of surprise and maximize training effectiveness when the training was executed.

The briefing included a comprehensive intelligence update by an enthusiastic S2 dressed as an insurgent leader. Attendees received copies of the order and several intelligence summaries and graphics products, such as overlays and satellite images of the area of operations (AO) and the MOUT site. This allowed the fairly new Div Arty staff to train on and use the military decision-making process (MDMP).

Phase II focused on reconnoitering the training sites at Fort Pickett, selecting and training the OPFOR and the O/Cs, and developing an evaluation checklist and O/C certification. During February and March inactive duty training (IDT) weekend drills, the staff established the evaluation criteria the O/Cs were to use during the exercise.

The O/Cs selected training sites and visited them to validate the sites'

Urban Movement
- React to a sniper.
- Conduct tactical movement in urban terrain.
- Breach obstacle.
- Prepare for combat.
- React to ambush.

Conduct Casualty Evacuation (CASEVAC)
- Treat casualties.
- Evacuate a casualty.
- Request medical evacuation.

Nuclear, Biological and Chemical (NBC) Survival
- Decontaminate self and individual equipment.
- Protect self from a chemical/biological agent with mask.
- React to a chemical/biological hazard.
- Protect self from NBC injury with mission-oriented protective posture (MOPP) gear.

Traffic Control Operations
- Operate a checkpoint.
- Conduct patrols and squad movements.
- Conduct a tactical movement.
- Navigate point to point dismounted.

Convoy Operations
- Defend convoy elements.
- Plan convoy security operations.
- Navigate point to point mounted.

Figure 1: 29th Infantry Division Warrior Task List. This list is the basis for training multifunctional squads.

feasibility for the training. These included not only the MOUT site, but also a tactical assembly area (TAA) for combat preparation and a main supply route (MSR) where units could conduct convoy operations and react to an ambush while mounted.

During this phase, the Div Arty tactical operations center (TOC) selected and occupied an urban TOC site. This was the first time this group had undertaken this task.

Also, the O/Cs and the OPFOR received advanced training in tasks that they would have to observe. O/Cs took classes on reacting to a sniper, convoy operations, room-clearing procedures and IED identification. They then conducted their own rehearsals through each of the lane training sites.

Phase II closed with a briefing for the Div Arty commander on the progress of the OPFOR and O/C training as well as revisions to the operations concept based on lessons learned during the rehearsals.

Lane I: Tactical Assembly Area (TAA)
- Occupy an assembly area.*
- Establish a TAA.
- Prepare for combat.*
- Issue an operations order (OPORD).
- Work with an embedded reporter.
- Conduct tactical movement.*

Lane II: Military Operations in Urban Terrain (MOUT)
- Conduct tactical movement in urban terrain.*
- React to an improvised explosive device (IED).*
- React to sniper.*
- Conduct CASEVAC. (Treat casualties.*)
- Clear a building.*

Lane III: Main Supply Route (MSR) Operations
- Establish and protect an MSR.
- React to an unblocked ambush.*
- Fire from a moving vehicle.*

Figure 2: Individual and Collective Tasks Performed During Warrior Task Lane Training. Tasks with an asterisk were evaluated.

In May, the staff executed Phase III, a dress rehearsal to certify the O/Cs and refine the MOUT site operation. Test convoys consisting of O/Cs and senior leaders rode through each lane, allowing the OPFOR and O/Cs to rehearse their assignments. The O/Cs and OPFOR used multiple-integrated laser engagement system (MILES) gear and blank ammunition.

During this phase, the TAA NCO-in-charge (NCOIC) established his TAA position and the test convoy entered the TAA. The convoy then moved to the MOUT site and rehearsed the MOUT lane. The OPFOR attacked, and the unit practiced battle drills. Then the convoy assembled and conducted a tactical march to the MSR lane. The MSR officer-in-charge (OIC) prepared the lane and executed the OPFOR's attack on the convoy.

The participants conducted an after-action review (AAR) for each training site and identified improvements. The test convoy then moved back to the MOUT site and rehearsed the lane a final time, incorporating lessons learned in the AAR. The Div Arty Commander then certified the O/Cs.

Full-Spectrum Operations. During AT05, the Div Arty task organized into three FA battalions and an attached Air Defense Artillery (ADA) battalion. These units came from Massachusetts, Maryland and Virginia.

The four-day exercise began on the third day of AT. A battalion (less its headquarters battery) cycled through the three evaluated lanes each day—taking about six hours for each battery to complete the entire course.

Units arrived at the TAA at a prescribed time based on a movement order the Div Arty TOC issued. The TAA NCOIC and the two designated ride-along O/Cs met the unit.

In addition, an embedded reporter and cameraman played by Soldiers from the division's public affairs office (PAO) were assigned to the batteries. These Soldiers replicated 24-hour media coverage. The reporters also were integral in causing stress on the leaders and testing their abilities to maintain control of the situations.

Once the commander and his staff settled the battery into the TAA and the section chiefs began their pre-combat routine, the NCOIC briefed them on the enemy situation. He then issued an OPORD directing the battery to convoy in an administrative column to a firing point to support the upcoming elections. According to the scenario, the battery was to use the firing point as a center from which to project force against the insurgency while reassuring the population that it was safe.

To get to the firing point, the unit went to a fueling point operated by a host nation contractor in the town of Hafira al-Batina. The unit's headquarters issued the movement order that would take them to the MOUT site. The O/Cs called pause of exercise (PAUSEX) and conducted an AAR on observations of the unit's preparations in the TAA.

For command and control purposes, the Div Arty established its TOC in the MOUT site's central building, which also was the tallest facility. During intelligence briefings, units were advised that this was a mosque and off limits as well as a no-fire area (NFA). From the mosque, the TOC managed the flow of the scenario and developed the situation to maximize the exercise's training potential.

The S2 directed the OPFOR cell from atop the mosque. The batteries were told that he was the insurgent leader, distinguished by his traditional headdress. Being in the mosque, he was protected from direct fire. From this vantage point, he directed the friendly and hostile civilian population in the town and maneuvered his OPFOR cells to engage the battery at key points, attempting to exploit the battery's weaknesses.

Civilians moved throughout the town and interacted with the Soldiers. Some were hostile, while others offered key information when approached by the troops. Roaming civilians met the battery in the streets as it entered the town and attempted to navigate the main road.

The key to operations at the MOUT site was realism. This meant that there was trash in the streets, rusted vehicle hulks on the roadside and Islamic chants and music playing over loud speakers in the MOUT village. This raised the Soldiers' awareness and stress levels.

As the convoy approached the town, an MP met the battery commander and advised him the town was safe and they should proceed to the fueling point. The trigger for the OPFOR to engage the entire column was the first vehicle's reaching the fueling point. At the head of the convoy, a simple toy rocket engine on a fishing line running across the street was followed by a series of pyrotechnic blasts to signify a rocket-propelled grenade (RPG) attack on one of the vehicles. The O/Cs immediately rendered the vehicle inoperable and designated casualties.

From the mosque, the insurgent leader initiated IED blasts to the center of the column while snipers from the surrounding buildings engaged Soldiers. A small roving OPFOR team attacked the rear of the column while the O/Cs evaluated the commander's ability to gain situational awareness, report to his higher headquarters and develop the situation

on the ground.

The culminating point of the lane was clearing a building occupied by a sniper and rescuing an American hostage.

PAUSEX was called when the unit had established a security perimeter and was beginning to call in reinforcements and evacuate casualties. An AAR was conducted over a sand table where battery commanders and key leaders walked through and discussed their actions at the MOUT site. The batteries then were issued a movement order to take them along an MSR to their final destination.

Units reached the last lane along a route of march through an unblocked ambush. The OPFOR used pyrotechnics, smoke, flares and M249 squad automatic weapons (SAWs) to engage the moving column. The O/Cs evaluated the battery on its ability to return fire, send a situation report (SITREP) to the battalion, treat casualties and quickly clear the kill zone. The O/Cs again conducted an AAR after the exercise.

Lessons Learned. The tasks of full-spectrum operations are inherently difficult to perform, especially for a unit whose primary task has been delivering indirect fires and has had relatively limited training opportunities. ARNG units preparing to deploy to Southwest Asia must focus on the skills necessary to increase survivability and combat effectiveness in the COE. This means there must be a balance between METL tasks and critical individual and collective tasks, such as those on the 29th Division's Warrior Task List.

We learned several lessons during this exercise that could help other units with their training.

• *Close quarters operations, such as those conducted in urban settings, require an enhanced ability to maintain situational awareness and open communications between all elements of an organization.* Key leaders must develop the capacity to remain calm in the heat of combat, accept and process information as it is made available and learn to make lifesaving decisions quickly.

These skills can be honed only through repetition. A leader must develop the ability to react intuitively to the situation and apply the measured response. He only can develop this capacity when exposed to several training events that stress the senses and test decisiveness.

• *Batteries must rely on junior leaders.* A battery scattered throughout a city might need to conduct multiple levels of operations simultaneously. While the front of the column is conducting refueling operations, the center could be involved in a fire fight as the rear conducts building clearing operations. The battery commander must be able to establish an operations center on the fly from which he can orchestrate the response, but he also must rely on his junior leaders to develop the situation.

Successful batteries relied heavily on motivated junior officers and NCOs who demonstrated their initiatives to solve problems. Strategically placed throughout the convoy, these individuals returned fire, established a perimeter, consolidated forces and executed an immediate plan to repel hostile forces.

The key to any ambush scenario is to return fire immediately and clear the kill zone. It is the junior NCO or lieutenant who gets his Soldiers up and moving toward hostile fire, movement that is counterintuitive to human survival instinct.

• *The most junior Soldier must understand the operation.* It is key that every Soldier in the battery understand the operation and actions on the objective and be able to conduct the mission if he is the last Soldier standing.

Often the private pulling security in the TAA is overlooked and not briefed on the operation or the area in which he is being deployed. Thus he does not fully understand what he is to face or what the rules of engagement (ROE) are.

Without this understanding, he might fire on the mosque or be inhospitable to the locals or inconsiderate of the embedded reporter. Units operating in foreign areas must be sensitive to the people's culture and traditions. A Soldier's misjudgment can have far-reaching political consequences and severely hamper the battery's mission and the world's perception of the United States' efforts.

The training event was a huge success overall and inspired battery commanders to find alternate methods to train their units on key individual and collective Warrior Tasks. Increasingly, ARNG FA units find themselves parking most (or all) of their howitzers and picking up their rifles to support humanitarian operations or nongovernmental organization (NGO) missions. They must prepare now to conduct full-spectrum operations in the COE.

29th Inf Div Arty Soldiers participate in urban operations training conducted in June 2005 to meet the demands of the contemporary operational environment (COE).

Lieutenant Colonel Steven T. Scott is the Executive Officer (XO) of the 29th Infantry Division (Light) Artillery in the Virginia Army National Guard (ARNG) in Sandston. He commanded the 1st Battalion, 246th Field Artillery (1-246 FA) and served as a Brigade Fire Support Officer, both in Danville. He also commanded the Headquarters and Headquarters Service Battery in 2-110 FA in Pikesville, Maryland, and has held several assignments while on active duty with the 24th and 2nd Infantry Divisions. He is an Assistant Professor of Military Science at Duke University in North Carolina.

Major Scott F. Bartlett is the S4 for the 29th Division Artillery in the Virginia ARNG in Sandston. He also has served as the Plans and Operations Officer for 1-246 FA and commanded B/1-246 FA. He has held several fire support positions with the 2-110 FA in the Maryland ARNG. He is a Technical Director for ManTech International Corporation in Chantilly, supporting voice and data networks for the US Southern Command (USSOUTHCOM).

The FSO's AO Database for the Stryker Company

By First Lieutenant
Jeffrey J. Bouldin

A platoon leader in a new Stryker reconnaissance, surveillance and target acquisition (RSTA) troop deployed to Operation Iraqi Freedom (OIF) is tasked to meet with local inhabitants and search some buildings in a particular part of the troop's area of operations (AO). This is his first patrol, but he is not as nervous as one would think, thanks to the troop fire support officer's (FSO's) AO database.

Before planning the mission, the platoon leader went to his computer, opened a folder and selected files on the buildings in his patrol area, based on his map recon. The file contained the names of the heads of the two families in one building with hyperlinks to the respective profiles. He learned the men in the families are both Sunni Arabs. One is the father of four and works as a mechanic; the other is a construction worker with seven children. Both reported they have lived in the area for 10 years and originally are from a town 20 miles away.

The platoon leader knew he had enough information to begin his recon patrol and to make "small talk" with the men when questioning them about activities near the other building, an abandoned warehouse.

This platoon leader's troop FSO had created an AO database for quick, significant intelligence on his and the other platoon leaders' AOs.

The company FSO in OIF wears many hats, including one for information operations (IO) at the company level. With minimal experience or training, an FSO can make an impact on his company by organizing data and generating intelligence for company patrols. He does this by creating an easy-to-use AO database that anyone can open and find exactly what he needs with little or no assistance.

The battalion S2 cell cannot provide this kind of platoon-level intelligence constantly because it lacks the time and manpower to update such a database. FSOs can build a database and pass it up to the battalion but also throughout their companies—supporting the folks who need the updated information immediately. The AO database provides applicable intelligence to maneuver platoons before they go on patrols or conduct cordon and search operations. The database must be a thorough yet easily managed reference that, basically, is a trimmed-down collection of all information gathered on the AO.

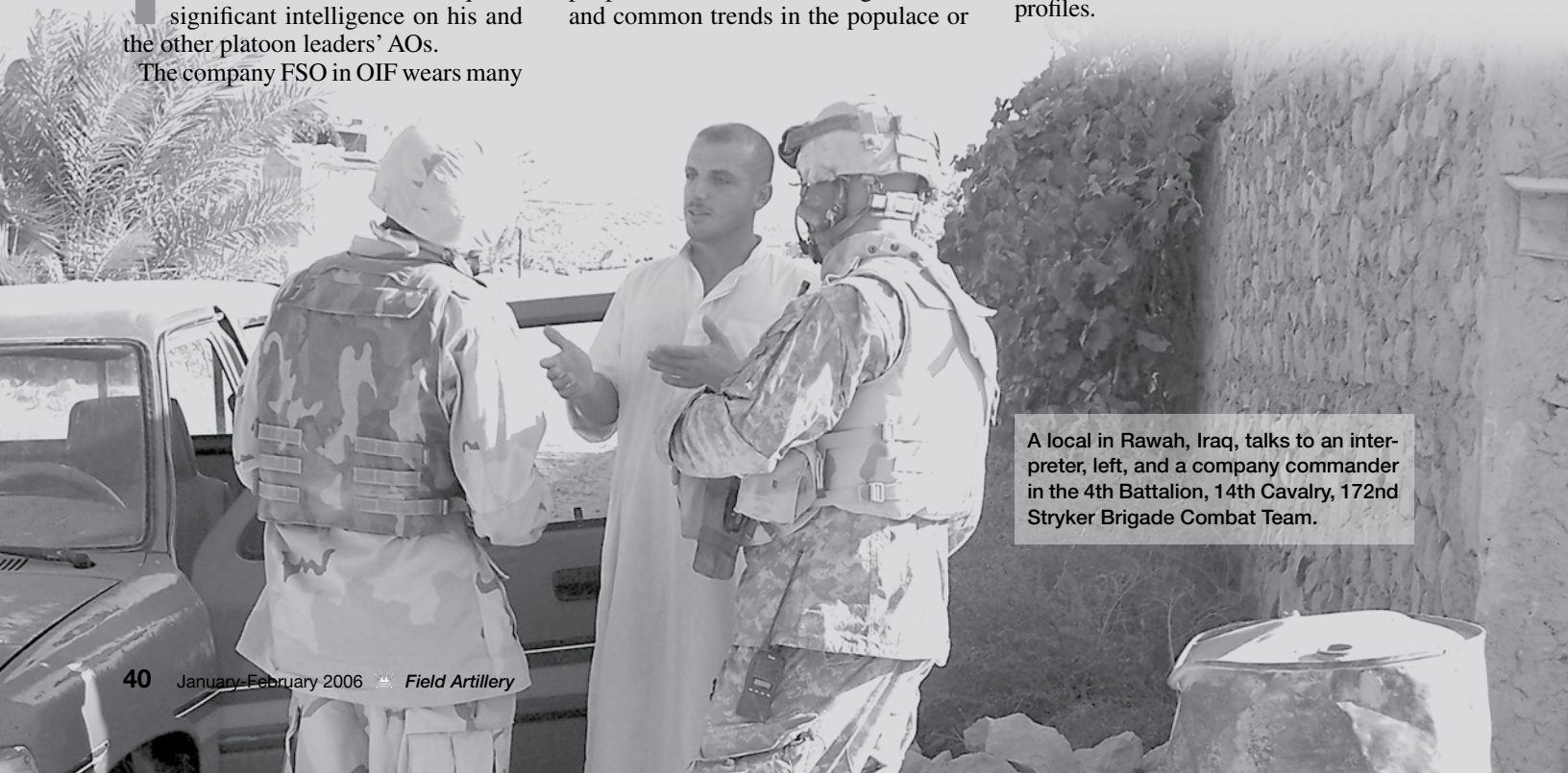
The FSO must review large amounts of raw information from platoon patrol debriefings for significant data, such as people encountered, buildings entered and common trends in the populace or economy. Then this information is separated into categories and each person or place saved under a specific file using a profile template.

The FSO only has to fill in the blanks of the profile template. He usually will have some blanks in the profiles. Few maneuver leaders have time to question individuals thoroughly, asking all the right questions, or take note of the details of buildings or the area to update old or fill out new profiles completely.

Three steps make this system work properly: gather raw data, organize the data into intelligence categories and make the intelligence easily accessible.

1. Gather the data. This first step is done by debriefing platoon leaders after missions and through information gathered by the FSO's conducting missions.

The best way to debrief platoon leaders is to ensure that everyone has a digital copy of the battalion's debriefing format. Then each leader can fill in the information on a computer in the company command post and pass a copy to the FSO and battalion S2. The company FSO must ensure that the platoon leader saves pictures taken during the mission on the computer and that he understands the debriefing process, helping to ensure the platoon leader asks the right questions to fill in gaps in the profiles.



A local in Rawah, Iraq, talks to an interpreter, left, and a company commander in the 4th Battalion, 14th Cavalry, 172nd Stryker Brigade Combat Team.

To keep from wasting the platoon leader's time, the FSO focuses the debriefing on information about people to whom the platoon leader talked, buildings searched and the locations of enemy activities, including any improvised explosive devices (IEDs) and unexploded ordnance (UXO) the platoon leader found. The FSO also encourages platoon leaders to take pictures of the people they meet as well as outside views of the buildings.

When the FSO goes out on missions, he also can gather data. It's important for the FSO to have a "feel" for the AO by experiencing it as much as possible.

2. Organize the data. The easiest way to create the database is to compile the information, put it into a profile and save it. With profile templates already prepared, this should take about 10 to 15 minutes per debriefing.

A good format for a people profile template is to have the person's picture (taken with a digital camera) on the right of a document with the individual's statistics on the left. A building profile can have a similar format with a picture and information. See the figure for the categories of information in the people and building profiles.

3. Make the information accessible. Probably the hardest part is putting the information into a format that platoon leaders can quickly and easily reference before missions.

One problem with gathering data is that when too much is received at once, it often is dropped in a computer file somewhere and forgotten. At the battalion level, there seems to be such a constant dump of vast amounts of information that the intelligence cell does not have the manpower to adequately organize, process and disseminate it as solid intelligence. What intelligence the cell does organize and process goes into the military decision-making process (MDMP) and is put out through operations orders (OPORDs) and fragmentary orders (FRAGOs). Thus the FSO saves copies of all information sent to the battalion S2 so he has the information for his line companies.

At the company level, the FSO must not tuck information away, get bogged down in it or not make it easily accessible by someone unfamiliar with the database. Accessing intelligence from a database should require little effort—sort of like going to the library and finding a particular book.

People Profile
- Name, Age, Height, Type of Build and Eye Color
- Ethnicity (Arabic, Turkmen, Kurdish, etc.)
- Religion (Sunni or Shi'a)
- Location, Occupation, Place of Origin (City and Country*)
- Family Size and Position of the Person in the Family and Community (Father, Head of Household, Patriarch, Clan leader, etc.)
- Additional Information**

Building Profile
- Building Number and Type (Mosque, House, School, etc.)
- Location and Quality (Disrepair, Intact, Ruined, etc.)
- Occupant(s)
- General Description
- Additional Information**

**Don't confuse country of origin with ethnicity.*
***This is important information that does not fit into other categories of the profile.*

Information for the People and Building Profiles in the Fire Support Officer's (FSO's) AO Database

The FSO must "think like the user" when he organizes his information. If a platoon leader opens the AO database and finds a maze of files named "003," "004," "005," etc., or "Mosque 1," "Mosque 2," etc., he may click on a few files and give up. He doesn't have time to sort through all the files to find the information he needs for his particular patrol.

Instead, he should see three folders labeled "People," "Buildings" and "AO Map." When he clicks on the buildings folder, he should see a list of files named for their building numbers in the AO. If he wants to search, say, Building U-5, he can click on the file with the corresponding name or, if no file exists with that name, click on files of buildings near the target building to get an idea of what he might find in the area.

When he clicks on the file, he should see a photo of the building on one side of the document and all the known statistics on the building on the other side. The block of "Additional Information" in the profile might tell a history of the company's experience with the building: how many times it has been searched and when, what sort of activity has been going on in the area, etc.

The profile also lists the person or people living in the building with name(s) highlighted and hyperlinked to the corresponding people profile(s). When the platoon leader clicks on the hyperlink, the relevant person's profile opens up in the people folder. He sees what the occupant looks like, his occupation, family size and other information. The people folder has each profile saved according to the person's name and the building number where he lives, if known.

The platoon leader can click on the AO map folder and see the location of every IED, UXO or enemy activity in his patrol area marked in color with a key explaining what each mark and date represents.

Platoon leaders will see the value of this easy-to-use AO database if it gives them up-to-date information they can access on computers. It's up to the FSO to ensure they know about the database and how to use it. Intelligence is useless if it isn't used in troop-leading procedures.

One fear is that the database will cause unnecessary work for platoon leaders. Using the AO database, platoon leaders will have information that gives them an idea who or what they might encounter while accomplishing their missions. Even a platoon leader who submitted information on a particular building or area might not need the information in the near future. But after other missions, he might need to return to the area and have forgotten what he input weeks ago. The AO database can refresh his memory and provide up-to-date information input by others.

This database should be saved and passed during battle handover to the next company that takes over the AO.

The key is to inform platoon leaders about the purpose of the database: to provide concise, accurate intelligence on the people and places in their AO so they can plan patrols accordingly.

First Lieutenant Jeffrey J. Bouldin is the Fire Support Officer (FSO) for C Company, 4th Battalion, 14th Cavalry, 172nd Stryker Brigade Combat Team (C/4-14 Cav, 172nd SBCT) in Combat Outpost Rawah in support of Operation Iraqi Freedom (OIF) II. He served as an FSO in A Troop, 4th Reconnaissance, Surveillance and Target Acquisition Squadron (4 RSTA), also with the 14th Cav. Previously, he was an M198 Platoon Leader in B/4-11 FA at Fort Wainwright, Alaska, where he participated in three major field exercises in Alaska's Donelly and Yukon Training Areas. He has a Bachelor of Arts Degree in History with a Minor in Anthropology from Texas Christian University.

Iraq's First Saint Barbara Inductees

"Are you Infantrymen or Artillerymen?" The question often is asked of members of 4th Battalion, 11th Field Artillery (4-11 FA), known as Task Force (TF) Thunder. The TF commander Lieutenant Colonel (LTC) Scott G. Wuestner answers, "We're both; we're '24 Bravos' [13B plus 11B]." This is the standard reply from members of this diverse Army unit that includes members of the Navy, Air Force and Special Forces.

Four months into their deployment from Fort Wainwright, Alaska, the service members of 4-11 FA, 172nd Stryker Brigade Combat Team (SBCT), perform a mixture of non-standard missions. They provide fire support in Mosul, base defense to Forward Operating Base (FOB) Courage and personal security details to the Provincial Reconstruction Team. Organized as an infantry TF, 4-11 FA's mission is counterinsurgency operations in the Tigris River Valley. The valley includes roughly 11,000 square kilometers in north central Iraq between Baghdad and Mosul.

On 19 December 2005, members of the battalion and 172nd SBCT (TF Freedom) attended the Saint Barbara's Day Ball. The Deputy Commanding General of TF Freedom Brigadier General (BG) Kevin J. Bergner was the guest speaker. Other guests included members of Headquarters, 153rd FA Brigade, serving as the FOB Q-West Garrison Command; 3-13 FA and members of 2-20 FA, who provide convoy security, force protection and multiple launch-rocket system (MLRS) fires in support of the Multi-National Force Iraq (MNF-I); and members of the 3rd Brigade, 2nd Division, Iraqi Army.

This year's ceremony honored 13 Saint Barbara inductees. Among the honorees were three Iraqi Army battalion commanders who were inducted into the Honorable Order of Saint Barbara. They were honored for their work with three US artillery battalions during the last two and a half years. The inductees worked side-by-side with 1-37 FA, 2-8 FA and 4-11 FA. They were instrumental in killing or capturing anti-Iraqi forces (AIF) while working to ensure a free and stable Iraq, specifically in the Tigris River Valley. All three have endured attacks on themselves and their families.

BG Ali Atullah Mullah Al Jaboori is from the Al Qayarrah area. He graduated from the Iraqi Military College in 1979 and was commissioned as an Infantry Lieutenant and assigned to the 3rd Artillery Division. He served in the Iran-Iraq War and was promoted to Captain for bravery. He attended the Iraqi Army Staff College and was promoted to Major in 1987. As the commander of a battalion in the 3rd Artillery Division, he again distinguished himself in the Iran-Iraq War. From 1991 to 1996, BG Ali was assigned to the 1st Infantry Division. In 1997, he was promoted to his present rank and served as Commandant of the Iraqi Military College in Baghdad.

Photo by SGT Jackson, TF Thunder

The first Iraqi Army inductees into the Honorable Order of Saint Barbara. From Left, LTC Scott G. Wuestner, LTC Hoggar Salahaddin Abdul, LTC Ra'ad Naif Haroosh, BG Ali Atullah Mullah and BG Kevin J. Bergner.

In 1998, BG Ali was jailed by Sadam Hussein for 10 months for failing to attack Kuwait and was forcibly retired in 2001. From 2001 to 2003, he was an adviser to Kurdish resistance forces. In 2003, he organized local Iraqi Army and civilian leaders to welcome the Coalition Forces.

BG Ali commands 1st Battalion, 3rd Brigade, 2nd Division. He has been awarded 16 medals for bravery and one Purple Heart.

LTC Ra'ad Naif Haroosh hails from the Al Hadr area. He has served in the Iraqi Special Forces for 14 years, 10 of which were during the Iran-Iraq War. After leaving the Iraqi Army, LTC Ra'ad assumed command of the local Oil Protection Battalion.

During the chaos that followed the 2004 elections, he led his soldiers against the AIF. His courage and dedication earned the respect of both the Coalition Forces and Iraqi people.

He assumed command of the 2nd Battalion, 3rd Brigade, 2nd Division, in November 2004. He has survived a sniper attack and a suicide vehicle-borne improvised explosive device (SVBIED) attack on his vehicle.

LTC Hoggar Salahaddin Abdul comes from the Dahouk area. He graduated from the Iraqi Military College in 1980 and was commissioned as an Infantry Lieutenant and assigned to the 4th Division in Zakho.

LTC Hoggar left active duty in 1993 when he joined the Peshmerga. He was an Instructor at the Peshmerga Training Center from 1993 to 2000. In 2000, he joined the Peshmerga Special Forces, and in 2003, he fought beside the US 10th Special Forces Group (SFG) during Operation Iraqi Freedom (OIF).

He became Commander of the 3rd Battalion, 3rd Brigade, 2nd Division, in January 2005. His battalion will be the first in the Iraqi Army to transition with US forces to control its own battlespace in Northern Iraq.

When asked about the experience of being inducted into the Honorable Order of Saint Barbara, the three Iraqi artillery commanders said they were honored to be included in this unique Field Artillery tradition. But the honor actually was the other way around—the American Artillerymen were honored to present these distinguished Iraqi freedom fighters with a medal named after their patron saint, Saint Barbara.

SFC Jason A. Arneson, FA
4-11 FA Fire Direction NCO and
Assistant Effects Coordinator
FOB Q-West, Iraq

FA School & FA SMEs Directory

(580) 442-xxxx or
DSN 639-xxxx

As of 1 January 2006

Command Group, Fort Sill

http://www.sill.army.mil

Chief of Field Artillery
MG David C. Ralston
redleg@sill.army.mil 3006/3709
FAX 4700

CSM of the Field Artillery
CSM William E. High
william.e.high@us.army.mil 3205/3105
FAX 7134

Deputy Commanding General/ARNG
BG Robert T. Bray
robert.bray@us.army.mil 3058
FAX 7134

Chief of Staff 3005/3105
FAX 7134

Strategic Communications 3944/8075

Secretary of the General Staff 3005/3105

Protocol 3902/2346
FAX 7134

Assistant Commandant
COL(P) Mark McDonald
james.mcdonald@us.army.mil 6604/3622
FAX 7191

CSM of the Field Artillery School
CSM Armando Ramirez
armando.ramirez2@us.army.mil . 6935/6604
FAX 7191

Deputy Asst Cmdt/ARNG
COL(P) Ricky G. Adams
ricky.adams1@us.army.mil 4587
FAX 1635

XO Field Artillery School 3622

FA Proponency Office
sill-www.army.mil/fa
Chief 3820/5220
FAX 7118

Directorate of Training and Doctrine (DOTD)

redleg@sill.army.mil
atsf@sill.army.mil

Director 2301
Deputy 4233
SGM 3022
FAX 5616

Operations Division
atsf@sill.army.mil
Chief 1527/5771
FAX 7494
NCOIC 1546
Taskings 3518
Scheduling 2520
Academic Records 3447
ATRRS/AIMS 2199
Special Actions Office (VIP Visits) . 3323

FA Master Gunner Division
famastergunner@sill.army.mil
Chief 2831
Redleg Hotline (24 Hours) 2204

Training Development Division
atsfdt@sill.army.mil
Chief 3427
FAX 7464

Analysis Branch
atsfdt@sill.army.mil
Chief 3611
FAX 7464
Collective Training 4225
OES/WOES 3809
STRAC 4225
ARTEP/MTP 4225
FA Tables 3809
CATS 4225
ISD 4050

Knowledge Management Branch
atsfdi@sill.army.mil
Chief 8360
FAX 7149
Multi-Media Development 8357/8319
FKN 8322/8353

Training Development Branch
atsfdt@sill.army.mil
Chief 2824
FAX 7464
POIs 2335
Individual Training Plans 4225
TRAS Coordinator 2335
CADs 2335
SMs/TGs 2824

Fires Integration Division
atsfd@sill.army.mil
Chief 8365

New Systems Division
atsfdn@sill.army.mil
Chief 5089
FA Tactical Data Systems 4197
Cannons and Munitions 3454
Rockets and Missiles 5574
Sensors 6690
Non-System TADSS 1083
PEO-STRI(Rep) 8265

Doctrine Division
doctrine@sill.army.mil
Chief 5644/2834
FAX 7085
FMs 5664
Joint Pubs 5664
TTPs 5664
Multi-Service TTPs 5664
STANAG/QSTAG 2834

New Equipment Training Division
atsfdn@sill.army.mil
Chief 2400/2014
FAX 4966
NETT (HIMARS, Profiler, IPADS, M777, Stryker, CFFT, M270A1, LCMR, MLRS) 5415

Morris Swett Technical Library
Librarian 4525/4477
FAX 7300
Command Historian 3804

Joint and Combined Integration (JACI) Directorate

http://sill-www.army.mil/jcid/

Director 1701/8671
Deputy 1701/8671
FAX 7036

Joint Operations and Training Division
Chief 6245/6488
Joint Fires 6680
Joint Targeting 3394
Joint Fires and Effects Course 3385
BCD 3855
Special Operations 2353
Joint Fires Observer 2353
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USAF Detachment
Commander 3897
FAX 7036

Allied Liaison Officers
British 4309
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German 4003
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Korean 4816

30th FA Regiment

http://sill-www.army.mil/30th_fa

Commander 4704
Deputy 3995/6824
CSM 6424
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S1 4822
S2 5201
S3 4077
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Chaplain 4557
Reenlistment NCO 3910
HHB Btry 2300
International Student Div. 4600/3322/5683
FAX 5142
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2-2 FA (Live-Fire Support)
Commander 2803/4339
XO..... 2803/8984
CSM 2803/3265
FAX 4744
Staff Duty NCO..... 2803/3265
S1 ..... 5813/3592
S3 ..... 6600/4717
S4 ..... 4287/1530
FAX 4744
Chaplain 5189
Reenlistment NCO 4673
Commo (S6)..... 6143
HHS 2825/3188
A Btry..... 4812/2984
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1-30 FA (Officer Instruction)
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XO..... 5337
CSM 5088/2009
FAX..... 7613
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S1 5139
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S4 5104
FAX 7136
Chaplain 5801
Reenlistment NCO..... 4660
Commo (S6)..... 3763
HSB 5713/2247
A Co (BOLC)..... 5315
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D Co 0989/1867
Fire Direction/13C..... 4888
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FAX 4202
Cannon Operations/13B (FATC Det)
..... 2611/5022
FAX 7907

1-78 FA (Enlisted Instruction)
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XO..... 5818
CSM 5818/6272
FAX 7600
S1 4413
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S4/Reenlistment 4124
Chaplain 4722
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Fire Support/13F..... 6379
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BFIST/Interim Armored FSV
Stryker/BFIST 6224/4973
FAX 7683

Futures Development & Integration Center (FDIC)

fa.future.sill@us.army.mil
Director..... 2604
Deputy..... 8728
XO..... 6309
SGM 3702
FAX..... 7216

CounterStrike Task Force
https://counterstrike.army.smil.mil
atsf-1@sill.army.mil
Director 5989
Deputy..... 5829
Operations..... 5919
FAX..... 5908

USMC LNO..... 8787

Future Force Integration and Concepts
https://www.us.army.mil/suite/portal.do?$p=110807
Director..... 1798
Deputy..... 5206
FAX..... 4802

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FAX..... 7813

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Director..... 6954
Toll Free 1-800-284-1559
Deputy..... 2928
FAX..... 5028

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TRADOC Proponency Office for Sensors
Director..... 8738/2045
Deputy..... 2045/8738
FAX 4300

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MMS 8762
Q-36/Q-37 Firefinder Radar 3652
LCMR 3652
Phoenix Radar..... 3652
MMR 3652
GLPS 8762

TRADOC System Manager-Cannon
tsm.cannon@us.army.mil
TSM..... 6902
Deputy..... 4451
FAX 7792
NLOS Cannon 3716
M109A6/M198/M119/M102 3803
Lightweight 155-mm Howitzer 6178
Munitions 6634
Excalibur 1885
Training 3454

Picatinny Arsenal Liaison at Fort Sill
picatinny.liaisonftsill@us.army.mil
(ARDEC: PEO for Ground Combat Systems and PEO for Ammunition)..... 2028
FAX 7008

TRADOC System Manager RAMS
tsm.rams@us.army.mil
TSM 8749
Deputy..... 8771/8749
FAX 6126
M270A1/HIMARS 8739/8754
Rockets 4896/8481
ATACMS 2588/2587
NLOS-Launch System 5205/8897

TRADOC System Manager FATDS
www.army.mil/tsm_fatds
TSM..... 6836
Deputy..... 6837
FAX 2915

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AFATDS CECOM NETT 6362/4461
FAX 5612

Field Artillery Training Center (FATC)

sill-www.army.mil/atc

Commander..... 1261
Deputy..... 1262
CSM 1262
FAX 1279
S3 2011
FAX 6118
Sr ARNG Liaison NCO..... 6107/4168
FAX 3525
SR USAR Liaison NCO..... 2610
FAX ..... (580) 581-1267

1-19 FA (BCT)
Commander..... 1401
XO..... 1404
CSM 1403
FAX..... 7601

1-22 FA (OSUT)
Commander..... 1261
XO..... 3057
CSM 2345
FAX..... 7117

1-40 FA (OSUT)
Commander..... 1200
XO..... 1203
CSM 1202
FAX..... 7120

1-79 FA (BCT)
Commander..... 1301
XO..... 1303
CSM 1302
FAX 7121

95th AG (Reception)
Commander..... 2523
XO..... 2981
CSM 4576
FAX 7974

NCO Academy

sill-www.army.mil/usancoa

Commandant..... 2417/3141
Deputy Commandant..... 2417/3141
FAX 8290
Adjutant/S1 ..... 2886/3466
Staff Duty NCO 2417/3141
Battle Staff NCO Course 1740
Warrior Leader Course 4241/3562
BNCOC 2097/8480
ANCOC 2619/6970
FA Master Gunner Course (MGC) .. 1879
FAX 5724

Marine Corps Detachment

sill-www.army.mil/usmc/index.htm

Commanding Officer..... 6311
XO..... 6498
SgtMaj 3873/4204
FAX 5127
Personnel Officer/Adjutant ... 4204/3979
Training/Education (Courses) 2307
Marine Personnel Locator 6188/6187
Btry Cdr/1stSgt/GySgt 5615/2467
Enlisted Instruction Br 2408/6111
Officer Instruction Br 5819/6192/3000
HIMARS..... 3654/5573
M777 NETT..... 4418
AFATDS NETT 2501/5811

Quality Assurance

sill-www.army.mil/qa

Director 2687/2002
Deputy 2002/2005
Accreditations 4138/4902/2745

This directory is on Fires Knowledge Network (FKN) on Army Knowledge Online (AKO) with the names of the directors of departments and directorates with their deputies, chiefs of major subdivisions and their NCO leaders, and Army Training Center and 30th FA Regiment commanders, battalion and above, plus their NCO senior leaders.

Air Force Met Data Online—Viable Secondary Source for FA Fires

In response to questions from the field, the Field Artillery School, Fort Sill, Oklahoma, conducted an informal study of the Air Force Weather Agency (AFWA) meteorological (Met) data and validated that the data is a viable secondary Met source for artillery fires.

The March through May 2005 study captured firing data using the agency's data as the Met source and compared it to firing data, using other sources of Met. During the dry-fire assessment, the FA School compared the AFWA data to data generated using Pibal, the meteorological measuring set (MMS) and standard (default) Met. During the live-fire assessment, the school compared the AFWA data to live-firing data generated using MMS-produced Met.

The results of the study are as follows.

• FA units should use data from MMS or MMS-Profiler as their primary source of Met, when available.

• Units should consider AFWA data as a secondary source for cannon and rocket Met; standard Met is not as accurate as AFWA data, so units should use standard Met as the last choice.

• AFWA Met data supports the five requirements for accurate predicted fire. However, when the tactical situation permits, units using AFWA data should *register to mitigate risk during danger-close missions.*

• The Operational Test and Evaluation Command (OTEC) will be conducting further tests on the AFWA Met data's being used for artillery fires.

The website and the procedures for accessing AFWA Met data are shown in the figure. If units have questions, they can contact me at the FA School Meteorological Section at (580) 442-2406 or DSN 639-2406 or at smithe@sill.army.mil.

MSG(R) Ernest D. Smith, FA
FA Met Training Specialist,
30th FA Regt
Fort Sill, OK

1. Go to the AFWA website at https://www.login.afwa.af.mil/front_door/knock.cgi. The log-in (Welcome) screen will appear.
2. Click on the picture in the center of the screen. The AFWA log-in (User Name and Password) screen will appear.
3. Enter your User Name and Password and click on the log-in button.
4. New users should click on the New User area of the screen, complete the New User Request Form and submit it. Your User Name and Password will be provided via email in 24 hours.

Steps to Access Meteorological (Met) Data on the Air Force Weather Agency (AFWA) Website