



Battle formation at National Training Center.

TSC Graphic Service Center (Jeff Melicosy)

Seeking Synergy

Joint Effects-Based Operations

By PRICE T. BINGHAM

In August, 2001, Paul Wolfowitz, the Deputy Secretary of Defense, said the Pentagon engaged in “a very significant paradigm shift” in the 2001 Quadrennial Defense Review.¹ As he later explained, “We are trying to move from a threat-based strategy to a capabilities-based strategy,” making it possible to fight any enemy.² Although he did not specify the type of capabilities

involved, DOD could quickly and substantially enhance its warfighting posture by focusing on defeating fielded land forces. The advantage is that, unlike missile defense, current technology makes it feasible and affordable to improve the Armed Forces dramatically. The benefits will be immediate and immense, making it possible to quickly win a major war even in a remote locale while also fighting smaller conflicts. But the challenges are also immense, in part because they require a fundamental change in focus. Such a paradigm shift will require a high level of civilian and military leadership.

Lieutenant Colonel Price T. Bingham, USAF (Ret.), formerly served as the chief of the Current Doctrine Division in the Airpower Research Institute at the College of Aerospace Doctrine, Research, and Education.

1st Infantry Division PAO (Larry Lane)

Stinger team rehearsing firing procedures.

Dramatically enhancing the ability to defeat enemy land forces is possible if commanders are prepared to exploit unprecedented airborne ground surveillance and precision targeting technologies with joint effects-based operations (joint EBO). A commander conducting joint EBO would use information on the vehicular movement of enemy and friendly land forces throughout a large area to integrate precision air and missile attacks with surface maneuver in dynamic ways. The complimentary effects can enable a powerful joint warfighting synergy that presents the opposing commander with an intractable operational dilemma: moving his units makes both them and their supporting nodes visible for precision air and missile attack. But if a commander tries to reduce losses by dispersing and not moving his units, he makes them vulnerable to being bypassed or overwhelmed in detail by powerful air and land forces. He faces defeat either way. The dilemma is likely to cause the collapse of organized resistance.

Joint EBO resembles *Blitzkrieg*, with its emphasis on exploiting movement and human factors (fear, fatigue, and uncertainty) to achieve quick success in land operations. It recognizes the

powerful synergy possible when land and air forces are integrated to influence both sets of factors. It also uses a small portion of the overall force to achieve disproportionate effects. Unlike *Blitzkrieg*, however, its success does not depend on high-risk maneuver and an inept opponent.

Compared to attrition-oriented employment, joint EBO enables faster defeat of land forces using fewer assets and risking fewer friendly military personnel and civilians. It derives its paradigm shift potential from the fact that today, all armies posing a major threat of aggression depend on vehicles to move units to the battlefield as well as on the battlefield—even Taliban forces in Afghanistan. Moreover, all modern armies rely on vehicles for heavy firepower, armored protection, supplies, and engineering support.

Following Every Move

Recent advances in persistent, high performance, wide-area airborne ground surveillance using ground moving target indicator/synthetic aperture radar (GMTI/SAR) sensors and exploitation toolsets are fundamental to joint EBO. They



Hunter UAV at
Skopje, Macedonia.

786th Communications Squadron (Jocelyn M. Broussard)



Manually launching
unmanned aerial
vehicle in Bahrain.

U.S. Navy (Ted Barthe)

offer the unprecedented ability to see and target enemy vehicles over a large area in all weather and from a significant stand-off distance. Seeing vehicle movement also makes it easy to locate, identify, and precisely target nodes that either support (refueling, repair, and transshipment points) or constrain (bridges, tunnels, and bypasses) enemy vehicular movement. Further, it defeats the camouflage, concealment, and deception measures that often frustrate the still imagery provided by electro-optical (EO) sensors and synthetic aperture radars (SAR).

The high-quality, movement-related information provided directly by GMTI/SAR surveillance also makes an indirect contribution when

commanders can treat enemy land forces as a system whose ability to function depends on movement and vehicles

used to support real-time decisions on where to employ other sensor systems, such as unmanned aerial vehicles equipped with high-resolution but very narrow field-of-view EO and SAR sensors. GMTI in-

formation on vehicular movement can also enhance the overall quality of information on enemy forces by helping prioritize the exploitation of previously collected data. The information provided by GMTI sensors directly and indirectly allows a commander to identify developing threats and opportunities created by enemy movement early enough to take action.

With the information made possible through the integrated employment of manned and unmanned sensors, commanders can treat enemy land forces as a system whose ability to function on either the tactical or operational level depends on movement and vehicles to create advantages such as superior force ratios, favorable positions, and surprise. And the importance of this movement is not limited to the battlefield. Campaigns are ultimately determined by the ability to move and sustain forces in order to engage opposing forces at the right place and time.

Developments in airborne battle management and all-weather, low-cost, stand-off fixed and moving target precision weapons provide the means for exploiting real-time information on vehicular movement with extremely destructive precision air and missile attacks. By targeting vehicles as well as the nodes supporting or constraining their movement, these attacks can quickly either stop militarily significant degrees of enemy movement or precisely inflict debilitating amounts of destruction on forces that continue to attempt movement. Either effect will quickly deny an enemy use of its vehicles, which will force it to fight like a 19th century army without the advantages of mechanization.

Equally important, stopping movement or inflicting destruction can be achieved at low risk to friendly personnel because U.S. air forces can not only quickly gain control of the air but conduct surveillance and precision attacks from a stand-off distance beyond the reach of non-radar guided surface-based air defenses. Further reducing risk is the fact that friendly land forces, unlike an enemy, would still have the advantages of

U.S. Navy



SEALs searching cave in Zhawar Kili, Afghanistan.



M-113 in combat maneuver training.

U.S. Army

vehicles and movement. A commander could then concentrate immensely powerful air and land forces against immobilized individual units.

The Fear Factor

Although precision weapons make joint EBO air and missile attacks far more efficient and effective in destroying targets with minimal collateral damage, their speed in stopping movement over large areas is due to their ability to create a powerful perception of danger. From Normandy to Kosovo, although air attacks generally destroyed relatively few vehicles, they convinced enemy soldiers that they faced immense risk if they attempted vehicular movement, which caused large numbers to remain stationary or abandon their vehicles. Rommel's chief of staff in Normandy revealed the impact of these decisions on German movement: "The technically superior enemy fighter-bombers neutralized practically all traffic during the day."³

The decision to abandon vehicles results not only from fear of attack on those vehicles, but also from the denial of fuel and munitions needed to continue moving and fighting. Air attacks contribute by destroying supplies or delaying their arrival by taking out crucial nodes and creating sufficient fear to stop drivers. This dynamic helps explain why advancing American forces have frequently discovered large numbers of unoccupied enemy vehicles.

The potential of joint EBO to transform land warfare has emerged only recently. In the past it was difficult to sustain enemy perceptions of danger because of the lack of precise information on vehicular movement which GMTI/SAR now provides and because precision air attacks generally required visual target acquisition and weapons employment and were thereby limited to daylight and good visibility. Even then the visual requirements meant that creating and maintaining the threat of attack depended on numerous armed reconnaissance sorties that faced high risk from flying within range of point air defenses.

But modern technology makes it possible to create and sustain sufficient perception of danger to stop most vehicular movement even in darkness and poor visibility. To an extent, the perception can be engendered and perpetuated by combining precision ground surveillance information with developments in global positioning system (GPS) guided munitions to eliminate the need for visual target acquisition and weapons employment against fixed targets like nodes vital to movement. And using this surveillance information to target GPS-guided wind corrected munitions dispensers filled with area munitions eliminates the need for visual target acquisition and weapons employment for attacks against large moving convoys.

Global Hawk UAV after coast-to-coast flight.



1st Combat Camera Squadron (Jack Braden)

the maneuver of friendly forces creates targets by causing an enemy to maneuver and mass its units

Of even greater import are the technologies recently developed under a Defense Advanced Research Project Agency/Air Force research laboratories affordable moving surface target engagement (AMSTE) contract. Their potential was demonstrated on August 28, 2001 when a vehicle moving on an Eglin Air Force Base test range was hit on the first try by a seekerless munition delivered from a significant stand-off distance.

Two high performance GMTI radars obtained precise location information on the moving vehicle, which was used to maintain track identification and guide the munition via datalink.

Apparent Advantages

Friendly land forces also play a vital role in joint EBO. One reason land forces are essential is that their presence requires an enemy to employ large numbers of vehicles which could be used as a mechanized army or, as in Vietnam, to provide logistic support for massive infantry. In either case the vehicles are vulnerable to detection and precision engagement.

Moreover, the maneuver of friendly land forces creates vulnerable targets for precision engagement by causing an enemy to maneuver and mass its units to achieve warfighting advantages against the friendly force. And if the commander

disperses his forces and stops their movement to reduce their vulnerability, friendly forces can use their own maneuver to either bypass or close with the isolated and immobilized units, assisted by close air support.

Developments in ground surveillance and precision attack can reduce friendly land force casualties. Thanks to reliable, real-time information on enemy and friendly movement, commanders can often avoid high-risk close combat with mechanized units except when their forces possess overwhelming advantages and such combat is essential. They can also exploit their information with precision air and artillery attacks that either destroy or slow adversary forces, preventing an enemy from closing with their forces except on their own terms.

The advantages provided by airborne ground surveillance's real-time information on movement were readily apparent in Desert Storm and Allied Force as well as in tactical ventures such as the All Service Combat Identification Evaluation Team exercises and the 4th Division warfighting experiments and capstone exercise. These efforts demonstrated that with wide-area GMTI ground surveillance information medium-weight Army and Marine units can prevail at low risk over heavier, more numerous opponents.

Marines searching
al Qaeda hideout.



U.S. Navy (Johnny Bivara)

It is important to note that these exercises and experiments did not exploit the same real-time information on the opposing force's movement to make precision attacks against them using fixed-wing aircraft. Also, since the drills had a tactical orientation, they did not show the powerful operational level possibilities when precision engagement is used to stop movement and combat support before enemy forces even reach the battlefield.

The capacity to conduct joint EBO will increase deterrence and, if deterrence fails, help quickly defeat enemy land forces while minimizing friendly casualties. The importance of achieving this paradigm shift is apparent in how Saddam Hussein, Slobodan Milosevic, and others depended on land forces both to seize and control parts of neighboring states and suppress their own populations. It is also seen in Afghan Taliban land force protection of Osama bin Laden's al Qaeda. Given the role these forces play in carrying out aggression, oppression, and protection of terrorists, deterring or stopping them quickly is vital. Strategic air and missile attacks can contribute and sometimes be sufficient, but the United States usually cannot rely only on those.

Events in the Balkans have shown that U.S. leaders can be deterred from taking timely actions or any actions at all due to fear of land combat, which has historically offered enemies their best hope of inflicting significant American casualties.

The importance this country assigns to casualties is well known. Before the Gulf War, Saddam Hussein believed that the prospect of fighting his army would deter the United States because of his assumption that Americans "cannot accept 10,000 dead in one battle."⁴ Reducing the risk of casualties is a key national security advantage that would result from implementing joint EBO.

Yet another benefit is the smaller number of air and land forces necessary to prevail. Reducing requirements also saves deployment time and needed support. These reductions decrease the requirement to forward deploy large forces for quick and effective threat response.

Implementing joint EBO can also enhance deterrence by making it less likely that an aggressor will have time to seize vital territories and populations before being decisively engaged.

Moreover, the paradigm shift will reduce the risk that the first forces to deploy will be so weak and dependent on large, vulnerable bases that they are likely to sustain significant casualties from anti-access capabilities.

Doctrinal Failures

Joint EBO is technically feasible and affordable in the near term. It is feasible because the paradigm shift relies on existing technologies, although key airborne ground surveillance and battle management systems are not available in the

required numbers. It is affordable because dramatically increasing overall military effectiveness and efficiency should lessen the combat forces needed to defeat enemy land forces compared to attrition-oriented concepts. Reduced requirements can quickly translate into support and transportation savings. For example, using AMSTE technology to eliminate the need for visual target acquisition and weapons employment allows use of bombers rather than many short-range, low payload fighters to target land forces. Since bombers can be based outside the theater, they not only reduce overall support and trans-

training should be more joint, with the Army and Marines providing units to represent opposing land forces

portation requirements but also the personnel exposed to anti-access capabilities. Similarly, by decreasing the need to find the enemy through contact with friendly land forces and to defeat powerful land units

in close combat, joint EBO should often lessen the number of land forces needed. The diminished close combat requirement also allows these forces to be lighter.

A number of challenges prevent the paradigm shift from being a sure thing despite its advantages. One is the need to institutionalize the joint EBO concept; but joint doctrine has serious flaws. Its guidance on how to create synergies through the integrated employment of forces provided by the various services is vague and provides for laborious processes that encourage service-centric rather than truly joint operations. Another flaw is its failure to call for the establishment of fully manned and trained joint force headquarters prepared to conduct joint operations. In the absence of such doctrinal guidance, joint headquarters become ad hoc and often dominated by a single service whose personnel are not prepared to dynamically integrate their own forces with those provided by other services. The conduct of joint operations in war becomes, in effect, on the job training and repeatedly reveals that lessons from previous conflicts in areas such as interoperability have not been fixed.

Joint doctrine problems are magnified by service doctrines, which underestimate the contributions of integrated employment. Doctrine with a parochial orientation leads to narrowly-focused equipment and training requirements that hamper interoperability and powerful joint warfighting synergies.

Other Concerns

Another challenge to joint EBO is the need for training that is more realistic. Training must

be conducted in more demanding terrain and weather. It should be more joint, with the Army and Marines providing units to represent opposing land forces, to include support assets, in order to train airmen and airborne battle managers in detecting and targeting moving vehicles and nodes supporting and constraining that movement. Realism demands that this training include simulated civilian vehicles.

Yet another challenge is the need to prepare commanders and their staffs, especially those onboard airborne command, control, intelligence, surveillance, and reconnaissance (C²ISR) systems, to integrate land and air operations more dynamically. This requires reversing the trend seen in Kosovo and in subsequent exercises of centralizing control of airpower operations against mobile targets—an approach that does not exploit real-time information through dynamic integration of air attacks with land maneuver. In addition, even with real-time information and modern communications, human factors such as limited span of control and the frictions of war will prevent any single commander from effectively exercising detailed control over large numbers of air attacks occurring simultaneously throughout a large area against dynamic targets moving on the surface or through the air.

Still another challenge is the need to procure the wide-area, real-time surveillance and battle management systems in the numbers needed to support intensive joint EBO training while simultaneously providing theater commanders with early and reliable indications of movement. Enhancements such as data links and sensor upgrades must be accelerated. For example, E-8C improved data modem connectivity to Longbow Apache and Link 16 connectivity to F-15Es has been demonstrated and should be incorporated. Expediting the procurement of the multi-platform radar technology insertion program will make it possible to track and target individual vehicles more reliably and precisely even in dense traffic. Enhancements are also needed so manned and unmanned systems can be employed as a closely integrated C²ISR team that can share information in near real-time.

Perhaps the biggest challenge to a paradigm shift is the requirement for a fundamental change in the warfighting focus of personnel. Air Force and Navy airmen have tended to concentrate on air combat, strategic attack, and strike operations but have not been as energetic at exploiting the airborne ground surveillance and targeting capabilities that enhance airpower's effectiveness against mobile land forces. Joint EBO requires that Air Force leaders no longer assume that defeating an enemy will be so costly in time and

1st Combat Camera Squadron (Scott Reed)

lives that strategic attack will usually be the best use of airpower.

Implementing joint EBO will also demand rethinking the assumption that close combat is the only way to defeat opposing land forces. The success of the concept depends on recognizing the advantage of making air attacks the initial and sometimes primary lethal means of preventing powerful land forces from conducting effective operations. Soldiers and marines must also recognize the importance of using maneuver to set up enemy land forces for precision engagement.

Overcoming obstacles to joint EBO will require extraordinary leadership throughout the Office of the Secretary of Defense, the Joint Staff, and the services. Leaders must ensure that the joint force headquarters responsible for employing joint EBO do not use ad hoc procedures. They must make the necessary changes in programmatic priorities for equipment, emphasizing systems such as airborne ground surveillance and battle management capabilities that have a historically lower priority than combat air forces. They must also ensure that equipment is interoperable

and training is realistic. Last but not least, they must institutionalize all these changes with promotion and assignment policies that guarantee that military operations are led by officers with demonstrated knowledge and judgment in conducting joint operations. **JFQ**

NOTES

¹ "Wolfowitz Promises Paradigm Shift with QDR But Offers Few Details," *Aerospace Daily*, August 9, 2001, p. 4.

² Jim Hoagland, "The Thinking Man's Military," *The Washington Post National Weekly Edition*, September 10–16, 2001, p. 5.

³ U.S. Department of the Air Force, Assistant Chief of Staff for Studies and Analysis, *A German Evaluation of Air Interdiction in World War II: SABER MEASURES (Echo)* (Washington: Headquarters, Department of the Air Force, 1970), p. 26.

⁴ Williamson Murray, *Air War in the Persian Gulf* (Baltimore: Nautical and Aviation Publishing Company of America, 1995), p. 58.