Integrating Tactical UAVs Into Armor and Cavalry Operations

by Lieutenant Colonel Jeffrey R. Witsken

Unmanned aerial vehicles (UAVs) are frequently featured in headlines as key weapons in Operation Enduring Freedom. They are providing critical intelligence and targeting information to joint forces. Despite the current publicity, UAVs have been in use by all military services for decades, as a means for reconnaissance, surveillance, and targeting. For example, the Army used UAVs during Operation Desert Storm and during operations in Bosnia and Kosovo. But generally, UAVs were limited and special purpose assets, providing intelligence and targeting for echelons well above the brigade level.

This is all changing. The Army is in the early stages of providing maneuver forces —armor, infantry, and mechanized brigades, as well as cavalry regiments — a valuable ally: the tactical unmanned aerial vehicle (TUAV). In addition, the Stryker Brigade Combat Teams (SBCTs) boast organic TUAV platoons within the reconnaissance, surveillance, and target acquisition (RSTA) squadrons. The TUAV is expected to be a key enabler in improving situational awareness and expanding battlespace for maneuver brigades. Recent studies and operational experience point to the potential of this new, brigade level combat multiplier. Recognizing this promise, this article highlights attention on proper integration of the TUAV into armor, cavalry, and RSTA operations. Observations stem from training center experience, recent experimentation, and recent studies.

TUAV Description

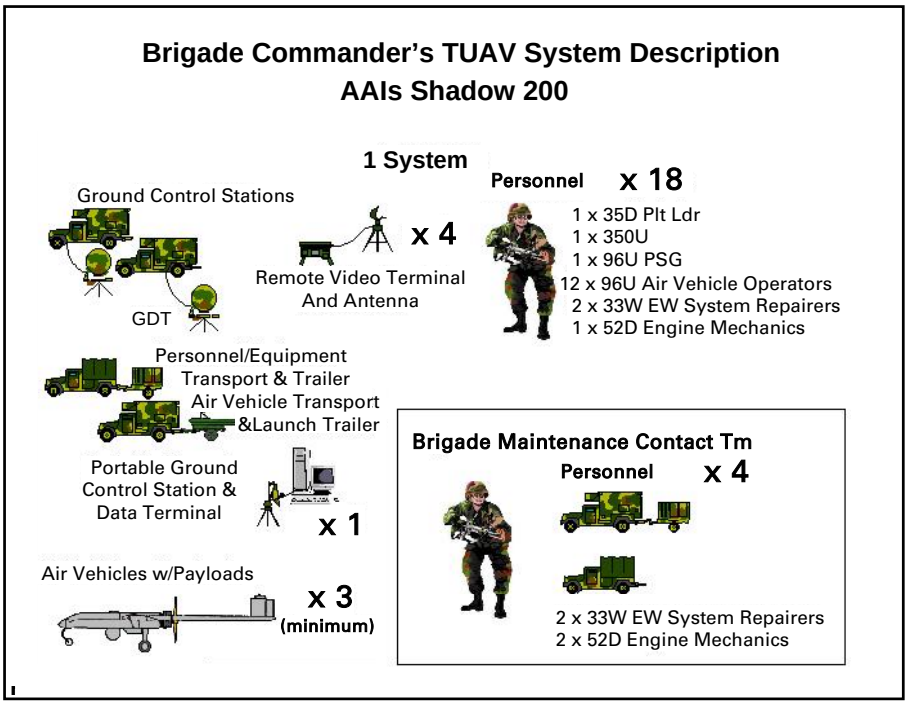
The TUAV system is the Shadow 200 TUAV, recently approved for full-rate production. It can carry a 60-pound payload, has a range of up to 125 kilometers, and its flight duration is 4 hours at a 50km radius. Currently, the TUAV is equipped with an electro-optical/infrared (EO/IR) sensor payload and additional payloads are planned in the future.[1]

These TUAVs are being fielded in a platoon-sized element to maneuver brigades, providing a capability for 12 hours of operations every 24 hours, with a surge capability for limited periods of time. The TUAV system sends video from its sensors to the ground control station, and to four remote video terminals (RVTs). RVTs are positioned where needed to best support operations, providing that line of sight communications with the TUAV is maintained. The TUAV interfaces with the all source analysis system (ASAS), and is also being developed to interface with the Force XXI Battle Command Brigade and Below (FBCB2) system. These interfaces will allow TUAV-derived information to be quickly disseminated.[2]

Because of the potential suggested by previous UAV experience and studies, the Army is aggressively fielding the TUAV. Current fielding plans hope to provide a TUAV system to nearly every maneuver brigade in the Army within the next 6 years. The TUAV will therefore be and Objective Forces.

The TUAV System That Matters

The TUAV airframe is not very remarkable. But, it is part of a larger "system" that can have a profound impact on unit performance. The actual TUAV system includes the airframe, the ground station, the analysts interpreting the sensor's raw information, the unit com-



mander, his staff, and the command, control, communications, computer and intelligence (C4I) system that is used to disseminate the acquired information. Both field experience and simulation experience point out that the key factor in the usefulness of the TUAV is how well its information is analyzed, interpreted, and disseminated. Essentially, the TUAV must be embedded into a unit's command and control processes.

The true impact of the TUAV is a product of how many leaders in a unit receive TUAV-acquired information and can act on it. Robert Leonhard notes that the correct way to assess the value of a system is, "focusing not on a weapon's lethality, but rather on its complementary effects on other friendly weapons."[3] In this regard, although a TUAV is not lethal, it can profoundly affect the lethality and survivability of every other system within the brigade. This is a matter of key tactics, techniques, and procedures (TTP) development, and is a critical issue for any unit equipped with TUAVs.

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CTC Experience with UAVs

For several years now, Hunter UAVs employed at the brigade level during combat training center rotations reinforces the versatility of UAVs. Obviously, the primary benefit of a UAV is that it offers a "bird's-eye view" to the unit. This capability allows a unit to extend its situational awareness further than possible before. Units can also use this bird's-eye view for any aspect of their operations, such as intelligence, confirming targets, observing for indirect fires, and providing critical "eyes-on" information to unit leaders. As a result, a TUAV-equipped unit can employ its weaponry out to maximum range, and dominate more battlespace than previously possible. In fact, this versatility causes considerable competition within the brigade for use of the UAV.

The brigade staff is continually torn between the demands for intelligence, fire support, and situational awareness. Each subordinate unit desires some degree of UAV support, often simultaneously. Clear and tough decisions have to be made regarding when and how to employ a UAV within a given operation. he TUAV is a valuable tool, much in demand by all echelons for multiple purposes.[4]

Perhaps the key lesson from early experience is that the UAV collection and targeting effort has to be focused, and always tied to a main effort. UAV employment has to be carefully planned and monitored during the operation to ensure proper use. Experience has also shown that the UAV is best used to look at specific areas based on other intelligence sources, rather than searching large areas single-handedly. Searching a large area without clues can be time consuming and has little benefit. The UAV needs to be cued by other systems.[5]

During reconnaissance missions, UAV derived information needs to be quickly passed to ground reconnaissance elements. Units have used the UAV as part of reconnaissance "waves" and to "recon pull" ground reconnaissance elements forward. Ground reconnaissance elements picked up surveillance of enemy elements after initial detection by the UAV, permitting employment of the UAV elsewhere.[6]

It should be noted that these insights were gained from units with partial fielding of modern C4I systems. UAV information was generally provided to the brigade staff through RVTs. Because of the limited dissemination means, UAV-derived information was generally confined to the brigade staff.[7]

Initial SBCT Experience

As the Army's Stryker brigades proceed in their training cycles, they are

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building their own UAV experience. Since SBCTs rely on information dominance for successful execution of their operations, reconnaissance and surveillance are incredibly important. The TUAV is one of the SBCT commander's primary RSTA systems for gaining information dominance.[8]

Recent SBCT field experience confirms much of the experience with the UAVs discussed above. A primary issue for the Stryker brigade is who controls the TUAV, given its importance to brigade operations, and how to share its information. These early SBCT exercises have preceded the full integration of FBCB2 and other digital command and control systems. As noted earlier, when dealing solely with RVTs, leaders must carefully consider information flow management within the headquarters, and establish procedures for sharing situational awareness. This is easier with careful TUAV management and close attention to image analysis and information flow. This is an essential consideration, one that will still remain as use of the Army Battle Command System and FBCB2 continues to increase within the IBCT.[9]

These IBCT exercises reinforced the importance of TUAV integration with other recon platforms.[10] TUAVs need to be integrated into reconnaissance operations with the same level of care that divisional and regimental cavalry units currently integrate their air and ground scouts.

The Division Capstone Exercise

The Division Capstone Exercise (DCX), conducted in two phases during April and October 2001, represented the first large-scale exercise marrying UAVs with a digitized brigade, capable of rapidly disseminating information internally.[11] In addition to the RVTs used previously in other training exercises, UAV-generated information was quickly analyzed and passed into the All Source Analysis System. This information, in turn, was forwarded to the FBCB2 systems throughout the brigade. This linkage of the TUAV with advanced command and control systems made the TUAV a key source for brigade situational awareness.[12]

Integrated with other battlefield sensors, such as joint surveillance and target attack radar system (JSTARS), TUAVs played a critical role in building situational awareness for the brigade and division. They helped extended situational awareness beyond the area covered by ground reconnaissance assets. In addition, TUAVs were used to "intensify" the level of situational awareness at critical events in each battle. The Blue Force commander was able to shape the battle, adjust his scheme of maneuver, deny opportunities to the enemy, dominate key terrain, and mass necessary combat power at the decisive point. TUAVs also served to enable indirect fires and close air support.[13]

DCX highlighted the complexity of integrating TUAVs into the brigade warfight. To attain information superiority, the brigade had to integrate internal and external intelligence, surveillance, and reconnaissance (ISR) assets to observe its battlespace continuously — in spite of enemy action and environmental conditions. The brigade also had to fix responsibility for this integration and management of all available ISR assets to ensure the success of the mission.[14]

The Combined Arms Reconnaissance Study

So what might happen as brigades receive highly capable, robust C4I systems, enabling even closer integration between weapons systems and supporting TUAVs? The U.S. Army Training and Doctrine Command Combined Arms Recon Study used constructive and virtual simulation to explore how fully internetted combined arms teams would perform. These simulations permitted use of advanced, highly robust C4I systems to integrate sensors and weapons platforms.

Study findings aligned with the combat training center experience outlined above, while providing further insights regarding the potential uses of TUAVs. During the study, TUAVs — highly integrated with other sensors — greatly aided ground and air reconnaissance. Reconnaissance units performed their jobs faster, directed lethal fires, enabled maneuver out of contact for the brigade, and improved survivability across the force. The TUAV was a means to raise the level of situational awareness in any specific area, thereby supporting the overall reconnaissance effort, enabling fires, and supporting overall mission success. Interestingly enough, even in a robust C4I environment, the study noted the need for intensive TUAV management.[15]

Keys to Success

This brief review of TUAV-related experience highlights several important principles relevant to TUAV integration. These principles are:

- Integrate the TUAV with all other sensors and reconnaissance means. Cue it, have it confirm information and support other systems, and use other systems to cover areas the TUAV sensors cannot reach or see.

- Closely manage the TUAV. Ensure it is always at the critical portions of the battlefield, and closely supporting the commander's intent. Be able to quickly switch the TUAV from one function to another such as switching from intelligence gathering to observing for fires. The level of synchronization and teamwork linking the TUAV and the rest of the unit should be of the same quality as cavalry units have achieved with air and ground scouts.

- Have trained personnel watch the video. RVT only helps if you know what you are looking at. Focus standard operating procedures on having the analyst's assessment or "running commentary" disseminated immediately to all relevant leaders.

- Tie the TUAV into the unit's command and control processes, as well as command and control systems. TUAV-derived information needs to get out quickly to the right people. Frequent

training ensures quick dissemination of information by voice and digital means.

- Employ the TUAV where you need the highest level of situational understanding developed. Note that "situational understanding" in this case does not mean "video." It refers to situational understanding about current battlefield conditions, provided by skilled analysis of the TUAV sensors. The situational understanding gained may be used for further maneuver by reconnaissance forces, to employ fires, to support combined arms maneuver, or a combination of all. Restated, this principle says "employ the TUAV, with supporting analysts, tied deeply to your C2 system, where you need the highest level of situational understanding."

In sum, leaders and staffs at the brigade/regiment and battalion/squadron levels must pay attention to properly exploiting TUAVs. The TUAV must be understood as a means to enable the reconnaissance effort, as well as one of its primary means of reconnaissance. The TUAV is not just another "collector," but a system that must synergistically work with other reconnaissance means to provide situational understanding for the entire force.

The TUAV is not just another sensor platform. It is part of a complex system of operators, analysts, and TTPs that must be integrated into the force. The TUAV has to be properly placed on the battlefield, properly cued by other sensors, and the information it provides must be properly disseminated to key leaders. Armor leaders must consider the TUAV not as a platform, but as a connected, integrated system.

The TUAV represents a critical intelligence, situational awareness, and targeting system. Because of this, no unit can just let the TUAV "bore holes in the sky." It is of such value that its employment should be closely planned and directed. The TUAV should be heavily used in reconnaissance and surveillance planning. It should also be considered a key means of directing effects. But its key strength is providing situational awareness, and it should be used to support the creation of situational understanding at each critical phase of the battle. During the decisive phases of the operation, the commander and staff should manage the TUAV and the information it produces with the same effort as any critical weapons system.

TUAVs should be considered part of the scheme of maneuver and not pigeonholed within a single battlefield operating system. It is clear that this asset must be considered an integral part of the scheme of fires and maneuver, not simply a collection tool or an indirect fire sensor. The challenge for future operations is to best exploit the TUAV system for battlefield dominance. For an armor cavalry officer, a TUAV does not directly change the way you do your business. What it *can* do is dramatically change the circumstances under which your business is done.

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Notes

[1]Headquarters, US Army Intelligence Center and Fort Huachuca, *Tactical Unmanned Aerial Vehicle (TUAV) Concept of Operations (CONOPS)* (Draft, Version 1.1), 10 May 2000, p. 8.

[2]Ibid., 7.

[3]Robert R. Leonhard, *The Principles of War for the Information Age*, Presidio Press, Novato, CA, 1998, p. 221.

[4]Major Charles W. Innocenti, " Applying the Unmanned Aerial Vehicle (UAV) to Brigade Reconnaissance & Surveillance (R&S) Operations," *CTC Quarterly Bulletin*, Center for Army Lessons Learned (CALL), Combined Arms Center, Fort Leavenworth, KS, March 2000, p. 41.

[5]Ibid., pp. 37-39.

[6]Ibid., p. 39.

[7]Ibid., p. 36.

[8]Major Brad C. Dostal, "Enhancing the Situational Understanding through the Employment of Unmanned Aerial Vehicles," *CALL Newsletter, No. 01-18*, July 2001, Fort Leavenworth, KS, p. 71.

[9]Ibid., pp. 75, 80.

[10]Ibid., p. 75.

[11]In this exercise, Hunter UAVs again performed as a surrogate TUAV system.

[12]TRADOC Analysis Center, Final Report for the Division Capstone Exercise (DCX), TRAC-F-TR-02-006, Fort Leavenworth, KS, March 2002, pp. C-23, C-107.

[13]Ibid., pp. C-5 to C-7, C-13 to C-14, C-83 to C-85, C-91 to C-93, and C-97 to C-100.

[14]Ibid., pp. C-23 to C-26.

[15]TRADOC Analysis Center, TRADOC Combined Arms Reconnaissance Study Phase II (TRAC-L-TR-01-005), Fort Leavenworth, KS, 15 December 2000, pp. 81, 94-101, 109-116, 118-127, 129-135, 149-151, 153-161, and 237-242.

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