

Competitive Visualization: The Reconnaissance and Security Formation and What It Brings to Multi-Domain Operations

by MAJ Chris D. Thornton

Our enemies will be harder to find than they generally have been for the Joint force conducting multi-domain operations (MDO). Wide-area aerial intelligence, surveillance and reconnaissance (ISR) will be affected by anti-access and area denial systems at least part of the time, and unmanned aerial systems (UAS) may be shot down or impacted by cyber and electromagnetic activities (CEMA).

The space domain will also be contested. It is critical to friendly communications, the use of precision munitions and space-based sensors.

Given this inevitable reality, cavalry will continue to be a key tool for competitive visualization for commanders.

Formations dedicated to reconnaissance and security (R&S) – and cavalry at the division and corps echelons in particular – remain relevant despite increasingly sophisticated air- and space-based sensors. Their importance will only increase as the U.S. Army is increasingly challenged in the air- and electromagnetic-spectrum (EMS) domains. An R&S formation can protect a flank; conduct detailed reconnaissance of critical terrain such as wet-gap-crossing sites; or deliver targets concurrently with satisfying the commander's priority information requirements (PIRs).

The Army need not look too far into the past to see what a formation with a dedicated R&S mission can deliver in large-scale combat operations (LSCO). During Operation Desert Storm, 2nd Armored Cavalry Regiment, screening forward of VII Corps, destroyed a division of Iraqi army combat power while answering information requirements and shaping the corps fight¹ at the Battle of 73 Easting.² The 3rd Squadron, 7th Cavalry Regiment, played an equally critical role in 2003, fighting for information for 3rd Infantry Division and eliminating lead-echelon threats during the division's advance toward Baghdad.³

The preceding two examples illustrate the continued ability of cavalry formations to develop the situation for ground commanders at echelon in support of offensive operations in LSCO and their relevance to forces equipped with air- and space-based ISR. Whether penetrating the disruption zone of an enemy's deliberate defense or conducting detailed reconnaissance for a gap crossing, there is a continued need for an all-weather sensor and the Army to fight for the information needed to identify targets and visualize enemy activity.

Describing R&S toolkit

The current version of Field Manual (FM) 3-98, *Reconnaissance and Security Operations* (in revision), describes considerations for the required capabilities of a task-organized R&S formation. The guidance remains largely valid⁴ but deliberately lacks specificity because the formations are tailored to the supported echelon and mission. Task-organizations should be tailored to fit specific mission variables.⁵ Considerations of command and support relationships are also critical when posturing R&S formations for success in LSCO.

Potential task-organizations for division-cavalry squadrons have been devised with due attention to the considerations discussed in FM 3-98 and have had differing levels of success. Different divisions have described how they equipped and employed division-cavalry squadrons during warfighter exercises. Field artillery and attack aviation have been critical capabilities for these formations.⁶

While these enablers have often supported division-cavalry squadrons, considerations of support relationships and incorporation of these into the phasing construct are also critically important. This is particularly true when the staff of the R&S formation is a squadron supporting a division, which is less robust and lacks some of the specialists that a brigade tasked to provide R&S to a corps would have organically.

A challenge that division-cavalry squadrons have consistently faced is employing all their capabilities effectively. During Fiscal Year (FY) 2021 warfighter exercises, many division-cavalry squadrons provided with indirect-fire and air-defense assets as attachments or under operational control (OPCON) often struggled to employ them

effectively, as they lacked adequate specialists required on staff.⁷ This may be partially alleviated with the assignment of one or more air defenders and a liaison from the counterfire headquarters.⁸ However, as with any liaison exchange, the losing unit pays a price.

Key capabilities to consider for a division or corps R&S formation are ground-based radar systems such as the AN/TPQ-53 weapon-locating radar and the AN/TPQ-64 Sentinel.⁹ These systems not only enable effective counterfire against enemy long-range artillery, but they facilitate the protection of cavalry formations by cueing friendly short-range air defenses (SHORAD) and friendly firing batteries that are conducting indirect cannon and rocket fires against targets identified by R&S formations' sensors.

By having these sensors in a support rather than in an OPCON or tactical-control (TACON) role, the division cavalry benefits from the capability without being bogged down by the requirement to plan for, maintain and employ these sensors. Understanding where artillery and sensor enablers are on the battlefield will become increasingly important in the future as batteries become able to deliver not just munitions but also sensors into the enemy disruption and battle zone.

Attack aviation is another key consideration for a cavalry formation requiring specialized expertise to use effectively. Currently a troop from a heavy attack reconnaissance squadron (H-ARS) in direct support¹⁰ provides capabilities to the division cavalry that increases its agility in reconnaissance missions and its ability to rapidly identify high-payoff targets (HPTs). It comes with a planning burden that is likely best alleviated through specialists assigned to the division cavalry's staff to serve as planners, liaisons, or both.

The H-ARS troop facilitates aggressive squadron reconnaissance by allowing continuous coverage of one platoon of AH-64 Apaches and RQ-7B Shadow UAS to detect enemy systems out to the fire-support coordination line. Unlike larger UAS such as Gray Eagle, the Shadow is agile enough to displace frequently and keep up with the squadron. It also allows for a manned/unmanned teaming capability that increases the survivability of aviation assets against an enemy equipped with man-portable and SHORAD air-defense systems. The H-ARS' capabilities also facilitate intelligence and target handover, not only within the squadron but also in support of division dynamic targeting and PIR collection.

During warfighter exercises, cavalry squadrons are frequently tasked to conduct detailed area reconnaissance of potential gap crossing sites. Task-organizations with up to three engineer reconnaissance teams (ERTs) from the brigade engineer battalion to the squadron in a TACON or direct-support relationship could complete many tasks supporting the crossing, especially if ERTs have trained with the squadron before combat.¹¹ ERTs can validate assessments of roads and bridges, the status of banks and soil composition.

Unfortunately, initial assessments are sometimes based on months- or years-old information, or the initial collection has a limited level of detail. This capability is valuable to a division preparing for a gap crossing.¹² However, including them is sometimes omitted in exercise environments.

A final capability to consider is communications for the R&S formation, which must operate far forward to be effective in LSCO and MDO. Corps and divisions must be able to communicate using frequency modulation; longer-range radios such as high frequency and ultra-high frequency (UHF); or UHF satellite-communications-based systems, including Joint Battle Command-Platform.¹³ Also, supporting UAS must be prepared to act as a voice-communications relay, including Gray Eagle – whether or not it operates in support of the cavalry squadron, depending on terrain impacts to communications and platform location.

Planners must also consider how to push intelligence information they receive via the Tactical Intelligence Ground Station (TGS) or the Tactical Intelligence Targeting Access Node (TITAN) to its R&S formation. However, the right place for TGS (and TITAN) is not with the division cavalry or corps R&S formation because of the signature they present. Cavalry formations are not manned to conduct processing exploitation and dissemination of that data.

Ultimately, R&S formations must be equipped and supported to provide the capabilities required of the mission. They also needs specialists to augment lean staff to employ them. An appropriate task-organization can facilitate requirements without inflicting on commanders a burdensome span of control beyond what their staff can support.

Visualizing collection, replicating experience

Enemy sensors, whether or not they are backed by artificial intelligence, are likely to detect signatures from high-flying UAS visible to long-range radar, voice communications between command nodes¹⁴ and active emitters such as jammers. Understanding our detection capabilities and our enemies' capabilities is key to successful R&S tasks in MDO. Visualizing signatures across domains is the foundation of effective surveillance and reconnaissance, which requires experience.

It's significantly harder to model an enemy armor regiment conducting a movement-to-contact if you've never seen at least a battalion conducting a combined-arms live-fire exercise. However, we've seen junior analysts who are staffing our intelligence sections model armor regiments despite considerable doctrine-based¹⁵ preaching about leveraging the breadth of the staff's knowledge during mission analysis by conducting "reverse intelligence preparation of the battlefield (IPB)."¹⁶

It doesn't end there. Finding armor regiments generally requires integrating often poorly understood intelligence capabilities such as electronic-intelligence measures and signatures intelligence, delivering these to the analyst via a complex intelligence architecture and interpreting the observed indicators correctly. In addition to stepping into the boots of that enemy commander, that same analyst in the S-2 or G-2 may have to understand the terrain, enemy systems, electromagnetic spectrum, airspace, network routers and virtual machines to build the doctrinal product used to depict current and anticipated enemy activity in time and space.

Thankfully there are tools to leverage the staff's experience and communicate that experience down to the lowest level, provided they are used and disseminated. The staff must leverage these tools during mission analysis to improve collection plans and targeting and deception plans. Army Techniques Publication (ATP) 2-01, **Collection Management** (recently revised), recommends "collection management tools" for effective information-collection planning, including the information-collection synch matrix (ICSM), the information-collection matrix (ICM) and the information-collection overlay. These tools are often omitted, incomplete, used incorrectly or not disseminated beyond the intelligence section.¹⁶

While these tools can contribute to an effective information-collection plan, they neither represent the totality of the plan nor convey the relationship between the sensors available and the PIR and targets. Planning requirements tools created during the IPB process exist in a symbiotic relationship with the event template. If the collection plan is developed in a vacuum, or not updated as assessments are updated, it will consistently fall far short of expectations.

Ensuring whole-of-staff input into collection-plan components such as the collection-management tools, part of "reverse warfighting-function IPB" during the mission-analysis process, makes it more likely the list of indicators to confirm or deny PIR is complete. For example, an engineer staff can help the intelligence staff understand enemy-obstacles compositions in their emplacement process so the intelligence staff can incorporate this into the ICM, making the section more likely to recognize the construction of that obstacle when it happens.

Ideally this also includes leveraging functional and multifunctional brigades' expertise. A division collection manager may or may not understand survivability moves within a position area for artillery or where the enemy is likely to place radar systems. However, division-artillery staff planners will probably have a good idea and will have considered it during their mission analysis process.

Considering observables for key systems on high-payoff target lists (HPTL) and inclusion of these in the ICM was a recommended best practice¹⁷ that is now in doctrine. The change makes sense. Although PIRs will change during an operation, a division will still tend to have a HPTL that prioritizes enemy long-range artillery, air defense and radars because of its responsibilities in shaping enemy forces in support of its subordinate brigades and the criticality of these enablers. Warfighter-exercise observations had shown that even when well-developed ICSMs and PIRs were disseminated to the division-cavalry squadron, the staff sometimes did not understand the association between PIRs, indicators and specific information requirements, which seemed to happen when ICM was not developed or disseminated.¹⁸

An understanding of observable signatures based on a whole-of-staff effort and an understanding of the enemy's capabilities and limitations is the foundation of the collection plan and an effective deception plan. Intelligence

representatives with this understanding of the enemy must be present at working groups that consider deception and CEMA employment for these plans to be effective. Successfully fighting for information requires understanding what to look for and how to look.

Intelligence sections should produce an ICM that considers how, when and where to identify PIRs and HPTs and disseminate it to subordinates and collectors (such as division-cavalry squadrons) as part of the orders process. They should also brief key changes and expected target and intelligence handovers at the collection-management working group to ensure shared understanding. A good plan is of little use if not disseminated.

Benefits of ‘chief of reconnaissance’

Transitions between plans, future operations and current operations are not a challenge confined to the intelligence warfighting function or warfighter exercises. Divisions have taken many approaches to ease these transitions, including appointing an officer¹⁹ as the chief of reconnaissance for the division or corps, a practice proven to be successful with brigade combat teams.²⁰ The position can free collection management and dissemination or fusion sections of the need to manage the current fight while planning the next one.²¹

Similarly, at the corps echelon, the appointment of an experienced officer²² can increase the agility of collection on the current operations and integration cell (COIC) floor with an experienced person making sound recommendations on dynamic retasking of organic assets. Force-design updates to provide dedicated division-cavalry squadrons to divisions, if implemented, may result in wider adoption of the chief-of-reconnaissance role.

A chief of reconnaissance at echelon can also help integrate the collection plan and the decision-support matrix by assisting the chief of operations with interpretation of the reporting coming into the COIC. However, the individual needs a clear understanding of the division’s priorities and targeting plan, and comprehension of how to interpret intelligence information and reports. With the right experience, the G-2 operations section, armed with collection-management tools, could fulfill this role.

The potential advantages of a dedicated chief of reconnaissance to help assist in dynamic adjustments to the collection plan and rapidly interpret the intelligence picture are evident. Still, that individual must have the right mix of skill and experience to be able to visualize and interpret the reporting. Cavalry-squadron commanders typically have the right mix of talents but might find it challenging to divide his or her time between the chief-of-reconnaissance role and command of the squadron.

However, no matter who fills the role, the individual should be selected and integrated into the role early to ensure the new arrangement is well rehearsed before being executed because it affects the targeting process and how the battle is fought on the COIC floor.

Ultimately the intelligence and operations staffs retain their responsibilities whether or not there is a chief of recon. Producing sufficiently detailed PIR enables commanders’ decisions and targeting priorities. Even when backed by effective collection-management tools, it is not easy. The challenges are compounded by the need for clearly understood roles and responsibilities at echelon. Nevertheless, they are the most critical elements when successfully integrating cavalry into the deliberate and dynamic targeting process at the division and corps echelons. Without them, formations will continue to struggle to fight for information.

In execution, results at the division and corps have been mixed. Given the loss of dedicated R&S formations at key echelons and lack of practice using them, this is understandable. The reasons are not made entirely clear through exercise performance²⁴ but seem to be tied to insufficient training of non-cavalry formations in planning and executing R&S tasks. Reasons also include lack of intelligence sections’ ability to visualize the enemy in time and space²⁵ and therefore the ability to tie observables to PIRs. The solution is linked to an understanding of friendly capabilities and a shared understanding of what the staff believes a particular intelligence requirement means.

Ultimately, whether or not task-organized R&S formations’ key leaders and collection managers understand the cavalry “mindset” – for success in MDO, where ISR assets in the air and space cannot be assured – Army divisions and corps must have several options so they are able to fight for information.²⁶

Considerations for MDO R&S operations

The Army is already considering what the next generation of reconnaissance vehicles and ground-based sensors will look like. The Next-Generation Combat Vehicle family of programs currently in development provide for “optionally manned” vehicles with long-range thermal and other sensors equipped with artificial intelligence,²⁷ increasing the flexibility and standoff covered by the cavalry squadron.

Optionally manned fighting vehicles with longer-range sensors potentially increase the physical distance between platforms, known as dispersion, and therefore frontage covered by the cavalry squadron equipped with the capability. Future cavalry forces require the ability to tip and cue networked sensors by voice and digital means and to generate targets for cannon and rocket batteries and Joint fires and effects. However, that tipping and cueing of sensors must keep in mind the necessity of all forces, particularly cavalry forces, to conduct signature management across multiple domains. Camouflage might evade optical detection, but more sophisticated sensors are generally not fooled. A concealed vehicle may be visible to thermal sensors.

Signature management with sensor programs must be a key consideration in how systems are employed across the board. Command-and-control systems that rely heavily upon the Upper Tactical Internet and sensors that require continuous connection to a satellite will be vulnerable and must be mitigated with an effective signature-management and command-post displacement plan.

The Army’s 11th Armored Cavalry Regiment, the opposing force at the National Training Center, is experimenting with multi-domain signature management and is integrating multiple sensor types and non-lethal effects into operations. While cover and concealment increase survivability, tactics, techniques and procedures must also consider a force’s EMS footprint. It’s important to remember that the enemy is actively searching for them, a lesson better learned in training than in combat!

Increasingly, training audiences at our combat-training centers (CTCs) are working not only to integrate lethal and nonlethal effects but to manage their EMS footprint, too.²⁸ Division G-6 sections can produce products on organic systems such as the systems-planning engineering and evaluation device²⁹ that allow a division to “see itself” in terms of its command post’s EMS footprint. Ultimately, divisions can and should experiment with different options for mission command against peer threats.

In addition to courses about using exquisite theater and national ISR to answer the commander’s PIRs and identify targets, collection managers who don’t understand organic sensors must learn to use them to be effective. Spending a CTC rotation shadowing organic assets such as radar platoons, low-level voice-intercept teams and cavalry troops may be a greater benefit to a would-be collection manager than merely shadowing a division collection manager at the warfighter exercise.³⁰ Collection managers, particularly for armor and cavalry divisions, may also benefit from the Cavalry Leader’s Course³¹ to understand reconnaissance and counter-reconnaissance tasks.

Cavalry’s importance at the division echelon to enable MDO is increasingly being refined, driving doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy changes to the force as concepts and capabilities are reassessed and adjusted for Waypoint 2028-932. Ultimately the Army must recognize cavalry for what it is: a necessary component of competitive visualization.

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Notes

- ¹ MAJ Amos C. Fox, "The State of the Cavalry: An Analysis of the U.S. Army's Reconnaissance and Security Capability," Association of the U.S. Army (AUSA) Institute of Land Warfare, Landpower Essay No. 16-1, June 2016; retrieved from <https://www.ausa.org/publications/state-cavalry-analysis-us-armys-reconnaissance-and-security-capability>.
- ² Stephen Borque, *Jayhawk! The VII Corps in the Persian Gulf War*, U.S. Army Center for Military History; retrieved from <https://history.army.mil/html/books/070/70-73-1/index.html>.
- ³ Fox.
- ⁴ The capabilities are ground maneuver; manned and unmanned aircraft; mobility and countermobility assets; indirect-fires systems; ground-based intelligence collection teams; protection; sustainment; and mission command. FM 3-98, *Reconnaissance and Security Operations*, July 2015, describes these in detail.
- ⁵ FM 3-98.
- ⁶ Center for Army Lessons Learned (CALL), *Mission Command Training in Large-Scale Combat Operations, FY 19 Key Observations*; retrieved from <https://call2.army.mil/docs/doc18018/20-15.pdf>.
- ⁷ CALL, *Mission Command Training in Large-Scale Combat Operations, FY 21 Key Observations*; retrieved from <https://call2.army.mil/toc.aspx?document=18124>.
- ⁸ For the division, frequently the division artillery; for the corps, frequently the field-artillery brigade, but exceptions exist.
- ⁹ CALL, *Mission Command Training in Large-Scale Combat Operations, FY 20 Key Observations*; retrieved from <https://call2.army.mil/toc.aspx?document=18085>.
- ¹⁰ OPCON or TACON may be more appropriate, and like the task-organization, the command relationship is mission- and situation-dependent.
- ¹¹ ATP 3-34.81, *Engineer Reconnaissance*, March 1, 2016.
- ¹² Note that ERTs can also provide an initial assessment of a site for suitability as an airfield. If used for this purpose, augmentation from the combat-aviation brigade or even the Joint force may be advisable depending on the site's intended purpose in the division's plan.
- ¹³ CALL, *Preparing for Large-Scale Combat Operations*, publication 21-06, January 2021.
- ¹⁴ To include unrealistic use of "always-on" transmitters such as those used to deliver the Upper Tactical Internet.
- ¹⁵ ATP 2-01.3, *Intelligence Preparation of the Battlefield*, Jan. 6, 2021.
- ¹⁵ COL Thomas Feltey and CPT Lance Rae, "Military Deception and Reverse Intelligence Preparation of the Battlefield: How Staff Integration Creates Advantages for the Brigade Combat Team Commander," *ARMOR*, Fall 2018.
- ¹⁶ CALL, *Mission Command Training in Large-Scale Combat Operations, FY 21 Key Observations*; retrieved from <https://call2.army.mil/docs/doc18124/18124.pdf>.
- ¹⁷ CALL, *Mission Command Training in Large-Scale Combat Operations, FY 20 Key Observations*; retrieved from <https://call2.army.mil/docs/doc18085/18085.pdf>.
- ¹⁸ *Mission Command Training in Large-Scale Combat Operations, FY 21 Key Observations*.
- ¹⁹ The division-artillery squadron commander or expeditionary military-intelligence battalion (e-MIBn) commander have been used in this role by divisions in an exercise environment.
- ²⁰ CPT John F. Palmer, "The Squadron Commander as Chief of Reconnaissance," *ARMOR*, July–September 2016.
- ²¹ MAJ Paul E. Roberts, "Reconnaissance beyond the Coordinated Fire Line," *Military Review*, July-August 2018; retrieved from <https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/JA-18/Roberts-Division-Warfighter.pdf>.
- ²² While the leader chosen varies, at the warfighter exercise, the expeditionary military-intelligence brigade commander and a corps R&S formation commander have been demonstrated in the role at the corps echelon.
- ²³ Key leaders in the G-2 Operations section or E-MIBn augmentees could also fulfill this role.
- ²⁴ The warfighter exercise is a simplified simulation that does not realistically model most domains, and certain things are adjudicated by exercise controllers and adjusted via "white card." This, coupled with communications that are largely not disrupted or denied during the exercise, potentially makes a chief of recon on the COIC floor appear to be of greater value than it is.
- ²⁵ Fox.
- ²⁶ COL Rich Creed and MAJ Nathan Jennings, "Winning the Deep Fight: Why We Should Return to Echeloned Reconnaissance and Security," *Modern War Institute*, March 3, 2019; retrieved from <https://mwi.usma.edu/winning-deep-fight-return-echeloned-reconnaissance-security/>.

²⁷ Kris Osborn, "Army brings AI-Combat Speed to Tank Warfare," Security Television Network, Sept. 13, 2021; retrieved from <https://warriormaven.com/cyber/army-brings-ai-combat-speed-to-tank-warfare>.

²⁸ Joseph Trevithick, "This Is What Ground Forces Look Like to an Electronic-Warfare System and Why It's a Big Deal," *The Drive*, May 11, 2020; retrieved from <https://www.thedrive.com/the-war-zone/33401/this-is-what-ground-forces-look-like-to-an-electronic-warfare-system-and-why-its-a-big-deal>.

²⁹ Refer to ATP 6-02.70, *Techniques for Spectrum-Management Operations*, for the role of the Systems Planning, Engineering and Evaluation Device and similar tools in spectrum management.

³⁰ This is the current culminating event for the Army Intelligence Development Program-Intelligence Surveillance Reconnaissance program, designed to prepare future division and corps collection managers to conduct LSCO. There is significantly more flexibility in the program than years ago, but seeing the sensors in a field environment may be of more training value than a virtual/constructive environment.

³¹ Fox's "State of the Cavalry" discusses this course on Pages 3-4 of his paper, and it expresses concern that there are not enough slots for officers in cavalry squadrons; widespread attendance by division collection managers, however, would potentially exacerbate this issue.

³² Danae Johnson, "TRADOC LPD to Discuss Readiness through Waypoint 2028," October 2021; retrieved from https://www.army.mil/article/251507/tradoc_lpd_to_discuss_readiness_through_waypoint_2028.

Acronym Quick-Scan

ATP – Army techniques publication

CALL – Center for Army Lessons Learned

CEMA – cyber and electromagnetic activities

COIC – current operations and integration cell

CTC – combat-training center

E-MIBn – expeditionary military-intelligence battalion

EMS – electromagnetic spectrum

ERT – engineer reconnaissance team

FM – field manual

FY – fiscal year

H-ARS – heavy attack reconnaissance squadron

HPT – high-payoff target

HPTL – high-payoff target list

ICM – information-collection matrix

ICSM – information-collection synch matrix

IPB – intelligence preparation of the battlefield

ISR – intelligence, surveillance and reconnaissance

JSTARS – Joint Surveillance Target Attack Radar System

LPD – leader professional development

LSCO – large-scale combat operations

MDO – multi-domain operations

OPCON – operational control

PIR – priority information requirements

R&S – reconnaissance and security

SHORAD – short-range air defense

TACON – tactical control

TGS – Tactical Intelligence Ground System

TITAN – Tactical Intelligence Targeting Access Node

TRADOC – (U.S. Army) Training and Doctrine Command

UAS – unmanned aerial system

UHF – ultra-high frequency