Enhancing Combat Effectiveness:

Implementation of Collective Scanning Techniques

by SFC Jesse R. Craven

Armored vehicles are crucial to modern warfare, providing ground forces with mobility, protection, and firepower. Central to their effectiveness is the utilization of advanced optics that enable crewmembers to gather critical information about their surroundings, identify potential threats, and make informed decisions. Understanding scanning techniques and detection principles is vital for maximizing crew abilities and enhancing the combat effectiveness of armored vehicles across the force.

Situational awareness is central to combat effectiveness. While operating inside of an armored vehicle, crewmembers must rely on external optics to gain a picture of the world outside. These external viewing optics may have effective magnification and thermal imaging, but they are limited by their field of view. Effective scanning techniques are essential for understanding the entire battlefield. By continuously scanning their surroundings, crews can detect enemy positions, monitor friendly forces, and identify key terrain features. Scanning is a systematic approach to observe designated areas or an assigned sector. Five detection methods can identify potential threat locations: rapid, slow, horizontal, vertical, and detailed.[1] Small units or crews employ multiple scan and search methods simultaneously, varying them to maximize threat acquisition. Crewmembers should start with a rapid scan of the sector to identify irregularities. If an irregularity is detected, a more refined search or deliberate observation of the area is necessary.

Note: Soldiers scanning for aircraft may miss targets in the lower portion of their sector if they look too high above the horizon. The correct upper limit is 20 degrees.[2]

Detecting threats is paramount and requires utilizing available sensors, optics, and systems. Identifying potential threats quickly allows friendly forces to respond effectively. Crewmembers must learn optimal techniques to enhance target detection.

Today's battlefield presents various threats, but our primary concerns remain enemy combatants, hostile vehicles, and unmanned aerial vehicles. Thermal imaging systems detect heat signatures associated with threats, but scanning techniques empower armored crews to identify these threats and take proactive measures to neutralize or avoid danger. An effective search is a systematic approach that allows crews to apply their individual scan methods collectively. The primary goal of collective searching is to eliminate dead space and unobserved areas, maximizing crew threat detection capabilities. By applying collective scanning techniques, crewmembers effectively mitigate threats over a wider area of operation.

Three basic techniques are used for collective searching by small units or crews: overlapping sectors, dividing sectors, and sectors in depth (near or far).[3] Units may combine all three techniques into their threat detection procedures if necessary. Some threats are harder to detect than others. Soldiers must be well trained to detect and locate targets, including understanding detection challenges and how to overcome them. Overcoming detection challenges slows the target detection process, regardless of training level. Soldiers must understand why these challenges occur and how to overcome them. Difficult targets include small or single targets in complex environments, camouflaged targets, and peripheral targets (targets on the edge of the field of view). Challenges include observer's physical deficiencies (fatigue) or significant environmental changes (mirage or fog). Some of these challenges are overcome through training while others are overcome through recognition and planning.[4]

Threat detection is a critical skill, whether Soldiers are dismounted or mounted. It requires thoughtful application of available sensors, optics, and systems. Quickly and effectively finding potential threats maximizes the time friendly forces have to defeat them. An initial scan can be done with the naked eye, but Soldiers familiarize themselves with the best practices for target detection using advanced optics.

The key aspect of combat

Figure 1. U.S. Army SGT Chris Flores, left, and Jordan Byington, both assigned to 1st Battalion, 64th Armor Regiment, 3rd Infantry Division, operate a Bradley Fighting Vehicle at Fort Stewart, GA. *(U.S. Army photo by PFC Benjamin Hale)*

effectiveness is the ability to accurately acquire and engage targets with precision and speed. Scanning techniques play a pivotal role in this process by enabling crewmembers to identify and track enemy forces. Forward-looking infrared (FLIR) cameras provide enhanced target discrimination capabilities, allowing crews to differentiate between combatants and non-combatants. Additionally, laser rangefinders and ballistic computers facilitate precise weapon aiming, increasing the probability of successful engagements. Once a possible threat is detected in a general area during the search, crews must rapidly acquire the actual threat. Soldiers should employ all available assets and options to facilitate rapid target acquisition. To accomplish this, adequate training must be allotted for sight adjustment and range finding techniques. The complexity of the switches on crewmember's hand stations and sight control panels can hinder maximizing platform capabilities.

Current optics, thermals, sensors, and illuminators compound threat detection challenges by how they function. It is important leaders and Soldiers are extremely familiar with their assigned optics and which stimulant they are capable of detecting. This includes their ability to manipulate the optic's controls, switching between wide field of view (WFOV) and narrow field of view (NFOV), and transitioning between thermal and image intensifier (I2) optics. This builds Soldier proficiency in employing multiple sensors or optics to detect threats efficiently within their sector, as rapidly and accurately as possible.[5]

Scanning techniques and target detection principles are pivotal to enhancing the combat effectiveness of armored vehicles across the fighting force. When applied correctly, these techniques and principles allow small units and crews to maintain situational awareness and detect/acquire targets with precision. They empower crews to confidently and accurately navigate the complexities of the modern battlefield. As technology progresses, optics will assume a more prominent role in battlefield development. Units must invest substantial time and resources in training crewmembers to optimally utilize advance vehicle optics. This proactive approach ensures armored formations retain their position of advantage on the forefront of combat capability and remain prepared to confront the evolving challenges of future conflicts.

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Notes

1. U.S. Department of the Army, Training Circular 3-20.31-4, October 2024, https://rdl.train.army.mil/catalog-ws/view/100.ATSC/754BB14F-0662-4A69-9C25-78713EF98F0C-1729556078743/TC3_20x31_043.pdf.

2 Ibid

3 Ibid

4 Ibid

5 Ibid