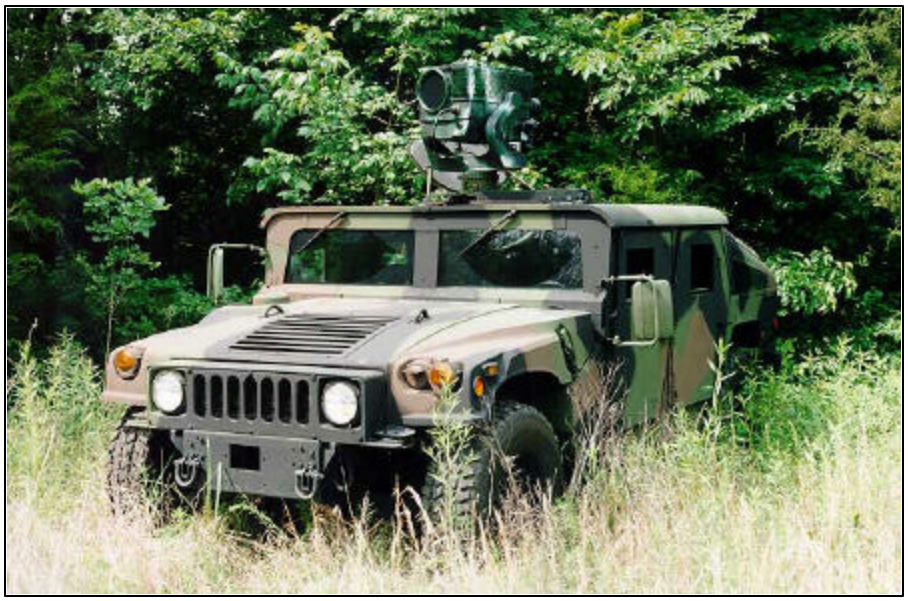
Long Range Scout Surveillance System (LRAS3)

by Captain Michel Jones and Sergeant First Class Christopher Wagner

The ground scout platoon's primary missions are reconnaissance and security in support of its parent unit. It can perform its missions mounted or dismounted, day or night, in various terrain conditions, and under all weather and visibility conditions. Currently 19D MOS scouts use the M1025/26 HMMWV and the M3 Cavalry Fighting Vehicle (CFV). Both of these vehicles were designed for other functions. The M3 Bradley is an infantry fighting vehicle that was modified for the scouts to carry more TOW missiles. The HMMWV is a logistics support vehicle that was adopted by the heavy task force units in 1992 because it is stealthier than the large M3 CFV. The HMMWV's reduced size and noise signatures allowed it to penetrate deeper into the enemy area of operations without detection. Based on a USAARMC analysis conducted by the Directorate of Combat Development, November 1992, the CFV and the HMMWV were both adopted and modified to meet some of the scout mission requirements. Neither one of these platforms by itself meets all the required sensor, mobility, survivability, or lethality capabilities required for scout missions.

The Long Range Scout Surveillance System (LRAS3) will partially fill a critical capabilities gap in tactical information dominance until the fielding of the Future Scout and Cavalry System (FSCS). Until then, the LRAS3-equipped scouts will provide the tactical commander with the ability to identify the enemy at greater ranges to achieve decisive results during operations.



(Photo courtesy of Raytheon)

Today's Capability

Imagine you are a scout for an armor or mechanized task force. You are the eyes and ears of the commander. The best night observation device you have can only detect out to 2500 meters. At 2500 meters you cannot confirm if an enemy is tracked or wheeled. A blurb of white starts moving across your sight picture. In the dark you look at your map and start figuring out the location of this moving target in your sector. Finally, success! You have a six-digit grid coordinate of where the enemy is located. Unfortunately, when you look for him again, he is no longer in your sight picture. All you hear in your radio hand mike is the voice of your platoon leader asking for a spot report to follow up the initial contact report that you gave him. As you start to reply you see a flash and hear a boom in the distance... Not only does the scout fail to get the needed information to the commander, but most important, another scout squad dies. The cost tonight is a scout crew; however, the price may be higher tomorrow if the commander stumbles into a fight because he has no eyes forward.

Current Scout Target Acquisition Deficiencies

The high correlation between scout mission success and BN/TF success is fully recognized. The Armor Center has examined scout capability shortfalls and mission effectiveness for many years. NTC rotation historical data clearly show that BN/TF scouts sustain a nearly 50% attrition rate in every battle they fight. A 1995 RAND study suggests scouts require a better sensor in order to survive and increase mission success. Adjustments in materiel, doctrine, training, and organizational design have all resulted in only limited success in addressing the scout survivability issue.

The Armor Center concluded that in order to make our HMMWV-equipped scout platoons more survivable, we must provide them with a target detection and identification system that has a significant capability improvement over the current and evolving threat. The LRAS3 is that system.

A study conducted, February 1998, at the Mounted Maneuver Battle Lab, Fort Knox, Ky., using Southwest Asia and European terrain, reinforces this conclusion. This study concluded that a six-HMMWV-equipped scout platoon[1] with six LRAS3 systems would:

- Provide 20-40% improvement in artillery kills

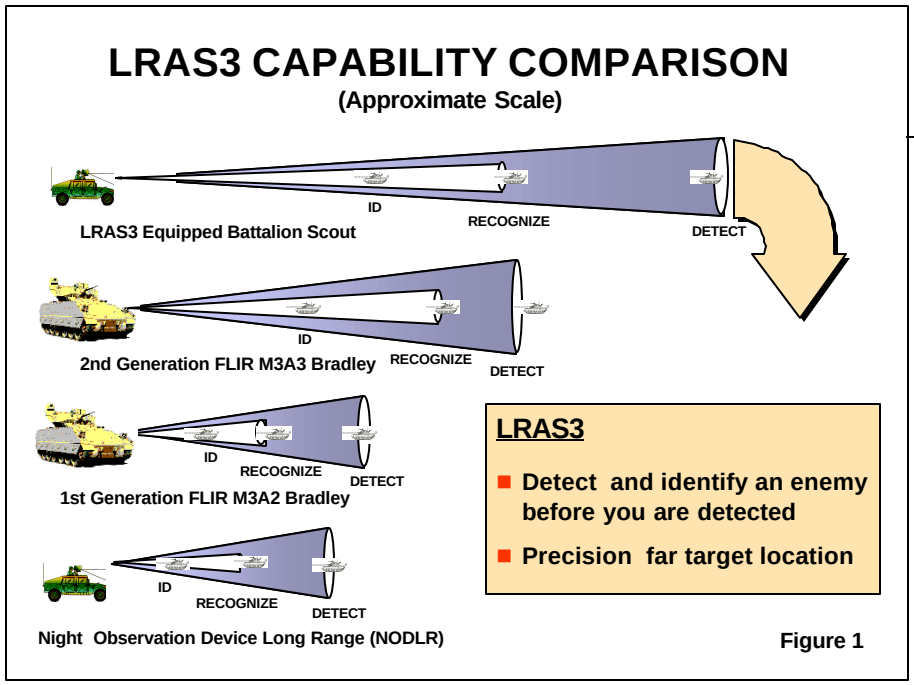


Figure 1

- Detect 60-64% more enemy
- Survive better
- Reduce detection by the enemy by 85-106%

Background

The idea for the LRAS3 system first surfaced in 1991 when the commander of the 4th Infantry Division asked if battalion HMMWV scouts could have FLIR and Far Target Location capabilities. The current AN/UAS-11 Night Observation Device Long Range (NODLR) failed to provide standoff capability outside threat direct fire/sensor ranges and had no far target location capability.

The Night Vision Lab at Ft. Belvoir subsequently built two LRAS3 prototypes that were used and tested in the 4th ID Task Force XXI Brigade Recon Troop and Task Force 1-22 IN. The LRAS3 prototypes performed exceptionally well during company lanes at Ft. Hood and the Advanced Warfighting Experiment at the National Training Center. For the first time in HMMWV scout history, scouts directed helicopter attacks and destroyed armored vehicles with artillery while remaining outside of direct fire/sensor range of the enemy.

The Sensor

The heart of the LRAS3 system is the advanced thermal imager Second Generation Forward Looking Infrared, (FLIR). This is the same Horizontal Technology Integration (HTI) FLIR to be fielded on the M2/M3A3 and M1A2. However, the LRAS3 will stand apart from these other systems in range due to higher transmission optics and a larger aperture afocal, (see Figure 1). This afocal lens will provide LRAS3 with a 15% increase in range capability over other 2nd Generation FLIR platforms utilizing the standard size afocal.

The LRAS3 has a built-in Global Positioning System Interferometer Subsystem (GPSIS). This allows the LRAS3 to determine target bearing and self-location, (see Figure 2). An eye-safe laser rangefinder, coupled with the GPS, will provide Far Target Location (FTL) and display a ten-digit grid coordinate of a target within 4/10 of a second after lasing. The scout operator will be able to update every second if needed. The FTL data will be accurate to within 60 meters at 10 kilometers. At lesser ranges the FTL error is considerably smaller. Using the FTL feature will allow scouts to call for more accurate and timely indirect fires. The LRAS3 will also have a back-up day video camera that allows the scout to compare FLIR to TV images. The LRAS3 hand stations are modified Improved Target Acquisition System (ITAS)[2] controls that will allow the operator to perform all LRAS3 functions without taking his eyes off of the display.

LRAS3 will almost triple the detect capability of the HMMWV scouts using the AN/UAS-11. The display options for viewing include a wide field of view (WFOV) with 4-power magnification, for scanning, and a narrow field of view (NFOV) with 12-power, providing more detailed scanning capability. The operator may also select an electric zoom feature that provides a 2X (8-power) capability in WFOV and both 2X (24-power) capability and 4X (48-power) capability in NFOV. These levels of zoom will be used primarily after a target is suspected or detected. If the target is still not recognizable, the operator may use the frame integration function to improve the sensitivity of the sensor. This function takes less than a second and involves the elec-

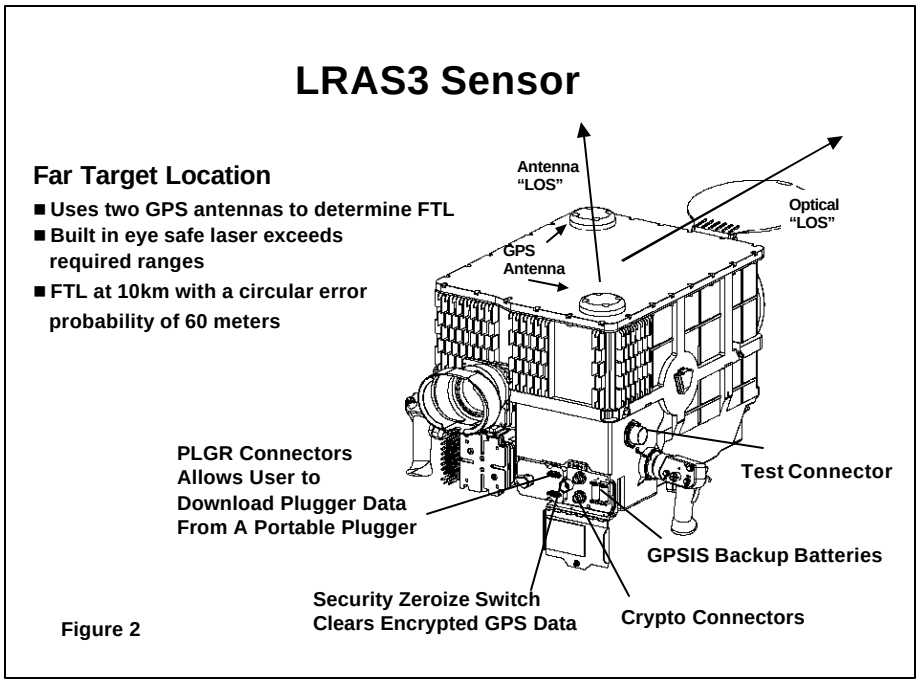


Figure 2

tronic integration of 2, 4, 8, or 16 frames and averages them to improve the image sensitivity, making the shapes of the target sharper and thus increasing range performance of the LRAS3.

LRAS3 will also interface with the Future Battle Command Brigade and Below (FBCB2). The scout will be able to detect an enemy, conduct a FTL, dump the enemy location into a spot report, and then send the report forward via FBCB2. FBCB2 will provide the scout a digital link for reporting, call for fire, and situational awareness.

Testing and fielding

The first Engineering and Manufacturing Development (EMD) LRAS3 was delivered by Raytheon in July 98. A total of 13 will be built in 1998-99. These units will be used for developmental and operational testing to ensure scouts receive a quality product that will be reliable, maintainable, and positively contribute to their already overburdened roles. Once it is proven that the LRAS3 meets all requirements, the LRAS3 will go into its full production cycle.

A Detect, Acquire, Recognize and Identification (DARI) test was to start in Yuma, Ariz. on 26 Oct 98 and conclude 21 Nov 98. This test will require the LRAS3 to conduct approximately 900 FTLs. This will evaluate the reliability and accuracy of the ten-digit grid given. The system will be mounted on an M1114 HMMWV for 6,000 miles at a mission profile of 0% primary road, 32% secondary road, and 68% off road. It will also be mounted and dismounted approximately 180 times to assess the human interface. The LRAS3 will be evaluated by scouts for reliability under different extreme environmental conditions.

A logistics demonstration was conducted in August at Fort Hood, Texas. This evaluation was to proof the technical manuals and evaluate the supportability and maintainability of the system.

The initial operational test and evaluation is scheduled to begin in May of 1999 at Fort Hood, Texas. The Test and Evaluation Command (TEXCOM) will test the LRAS3 and measure the operational impacts of the system on the scout platoon conducting typical scout missions. This test will ensure scouts can detect, recognize, and identify targets and that the LRAS3 provides the operator a ten-digit grid to targets within a 60-meter circular error probability (CEP). They will evaluate the interface with the FBCB2 system while in a field environment. This operational test will further refine any future doctrinal changes.

The LRAS3 basis of issue will be one per scout HMMWV, six systems per HMMWV scout platoon. It will be fielded to the armor and mechanized infantry battalion scout platoons, brigade reconnaissance troops, and light infantry division cavalry squadrons. The basis of issue is based on analysis from the JANUS study, conducted in Feb 98, mentioned earlier in the article. The LRAS3 is scheduled to begin fielding in 3rd quarter 2001 to active component HMMWV scout platoons and finish in FY07. The Army will start fielding it to the National Guard in FY07 as active component units receive the Future Scout and Cavalry System.

Tomorrow's capability using LRAS3 2001

You are on the same mission, except this time you are equipped with the LRAS3. In your LRAS3 sight, you detect a moving vehicle. You switch from WFOV to high magnification NFOV. Still unable to recognize the target, you determine that the vehicle is large enough in your sight to get a FTL. The 10-digit grid tells you the vehicle's current location. As the enemy vehicle continues to move in your direction, you send a spot report via FBCB2. Because you still cannot recognize the target, you zoom to 2X. It's a BMP. You then hit the E-zoom again, at 4X it appears to be a BMP. What type BMP is still questionable. The enemy vehicle is now closer and stationary, but you know you're still outside its direct fire range. You hit the frame integration button and in one second you have a still picture of a BMP 2. You select 8 frames and hit the frame integration button again and confirm a BMP 2 at Grid AB12345 12345. You send a digital spot report and a request for fire. This time you observe the BMP's destruction. With the aid of the LRAS3 you have destroyed the enemy without being decisively engaged and are able to continue your mission.

Notes

[1]Six HMMWV scouts were used, based on the new conservative heavy division redesign that standardized all scout platoons to contain six vehicles, M3 or HMMWV.

[2]ITAS (The 2nd Gen. FLIR TOW system).

Bibliography

Cox, Benjamin F., MAJ, *Battalion Scout Platoon Analysis,* Fort Knox, Ky., Nov 92

Goldsmith M. and J. S. Hodges, *Applying the NTC Experience: Tactical Reconnaissance,* Santa Monica, Calif., RAND, N-2628-A, Oct 1987

Goldsmith M., *Battalion Reconnaissance Operations at the National Training Center,* Santa Monica, Calif,, RAND, 1995

Headquarters Department of the Army, FM 17-98, *Scout Platoon,* USAARMC, Sept 1994

Waring, Robert, CPT and Kaake, William, CPT, *LRAS3 Scout Organization Janus Study,* USAARMC DFD, Feb 1998

Captain Michel Jones is a 1988 DMG of the Iowa State University ROTC program. He has served as a tank platoon leader, support platoon leader, HHC executive officer, and battalion S4 in 1-63 AR. He commanded a tank company and a headquarters company with 4-37 AR and 2-70 AR at Fort Riley, Kan. He is currently the Current Scout Branch Chief for the Director of Force Development, Fort Knox, Ky. E-mail: Jonesm@ftknoxdfd-emh13.army.mil

SFC Wagner entered the U.S. Army in 1979 and is currently serving as the project officer for the LRAS3. He has served in numerous cavalry and infantry units in the U.S., Germany, and the Persian Gulf as section leader and platoon sergeant. SFC Wagner also served as a small group instructor in the 19D-Advanced Noncommissioned Officer Course. His military education includes ANCOC, Bradley Master Gunner Course, and the Air Assault Course. E-mail: wagnerc@ftknoxdfd-emh13.army.mil