High Mobility Artillery Rocket System: Increased Crew Protection Cab (HIMARS: ICP)

Executive Summary

- The Army completed the High Mobility Artillery Rocket System (HIMARS) Increased Crew Protection (ICP) Cab Enhanced Field Exercise (EFEX) in July 2008 to evaluate the operational effectiveness and operational suitability of the ICP-configured HIMARS launchers.
- EFEX results indicate that the ICP-configured HIMARS launcher continues to meet the operational effectiveness, accuracy, and overall mission completion requirements.
- The Army completed LFT&E of the ICP cab in 2QFY08 and DOT&E delivered the LFT&E Report to Congress in March 2008. Testing included armor characterization, ballistic exploitation of seams and welds, and full-up and system-level tests against the ICP cab.
- During the EFEX, some HIMARS crewmembers reported difficulty seeing through the transparent armor with its Mylar protective film using night vision goggles. The commander's seat configuration caused more exposure of the commander's torso when standing up in the top hatch, which makes his stance less stable.

- The ICP cab with appliqué armor meets Standard NATO Agreement protection levels and is C-130 transportable when the armor is mounted on a pallet and not installed on the vehicle.

System

- HIMARS entered full-rate production in June 2005. It fires the entire family of Multiple Launch Rocket System (MLRS) rockets to ranges over 60 km, and Army Tactical Missile System (ATACMS) missiles to 300 km.
- Each HIMARS system includes a wheeled launcher, two resupply vehicles, and two resupply trailers.
- Each launcher carries six rockets or one ATACMS missile.
- The Army plans to buy 375 launchers to field 18 HIMARS battalions. The Marine Corps plans to buy 40 launchers to field two battalions.
- The ICP cab program is an evolution of previous armored cab efforts to provide protection from small arms and IEDs consistent with tactical wheeled vehicle protection requirements.

Mission

- Commanders will use HIMARS to attack enemy command and control nodes, artillery, air defense sites, light armor, and other high-value targets at long-range and in urban and open terrain.
- Commanders can use the HIMARS deployment and mobility capabilities (transportable in C-130 aircraft) to:
  - Provide early deploying forces with long-range rocket and missile fires against area and point targets
  - Provide Special Operations Forces with the ability to attack high-value targets at long range

Prime Contractor

- Lockheed Martin

Activity

- Between 1QFY08 and 3QFY08, an ICP-equipped HIMARS launcher fired 54 M26 basic rockets and four Guided MLRS rockets to demonstrate the new cab does not degrade accuracy. The Army has scheduled an ATACMS flight test in October 2008 to complete the flight test series.
- In July 2008, the Army conducted the HIMARS EFEX at White Sands Missile Range, New Mexico. The combined developmental and operational test included live fire missions with 102 Reduced-Range Practice Rockets. One of the launchers participating in the EFEX also employed the Universal Fire Control System. The ICP-configured launchers successfully processed 99 percent of the fire missions it received, including the live missions.
- The Army completed LFT&E of the ICP cab in 2QFY08, and DOT&E delivered the LFT&E Report to Congress in March 2008. Testing included armor characterization, ballistic

exploitation of seams and welds, and full-up and system-level tests against the ICP cab. The Army Research Laboratory and Survivability/Lethality Analysis Directorate used modeling and simulation to assess personnel incapacitation and support the evaluation of crew survivability. The ICP's transparent armor did not meet the multi-hit requirement. Increasing the thickness of the glass would cause an unacceptable increase in front axel weight, which already requires a waiver for C-130 transport. The Army is considering using Sapphire glass, which showed promise in coupon tests for meeting the transparent armor requirement with less weight.

- In 1QFY08, the Army awarded the third full-rate production contract to build launcher modules and integrate them in 57 HIMARS launchers. In 1QFY09, the Army plans to award a contract to purchase the ICP cabs and chassis for those launchers.
- The Army conducted monthly assessments of HIMARS field reliability. The August 2008 assessment reported that fielded launchers have accumulated more than 48,579 operational hours with an overall 331 hours Mean Time Between System Aborts (MTBSA) (requirement is 58 hours). Top failure items include the travel lock actuator, cable assembly, launcher hydraulic swivel, and flex shaft assembly. Reliability tracking has led to design improvements in travel lock actuators and other components.

Assessment

- EFEX results indicate that ICP-configured HIMARS launchers continue to meet the operational effectiveness criteria specified in the Operational Requirements Document (ORD) and system Critical Operational Issues and Criteria (COIC).
- ICP-configured HIMARS launchers demonstrated they meet or exceed ORD requirements for accuracy and overall mission completion. The launchers completed 255 of 257 dry fire missions (99.2 percent) and 17 of 17 live fire missions (100 percent).
- The HIMARS total mission cycle times and reload times achieved during the EFEX demonstrated the system can meet the ORD requirements in an operational environment.
- The Army Reliability, Availability, and Maintainability scoring conference assessed that the MTBSA and the Mean Time Between Essential Function Failures were not met. During the assessment conference, voting members noted that none of the failure modes experienced during EFEX were attributable to the ICP modifications.
- During the EFEX, some HIMARS crewmembers reported difficulty seeing through the transparent armor with its Mylar protective film using night vision goggles. The commander's seat configuration caused more exposure of his torso when he stands up in the top hatch, which makes his stance less stable. The heavy ICP cab doors cannot be secured in an open position, and could injure a Soldier's hands or legs if they closed unexpectedly. Soldiers cited the environmental control unit as an important improvement to the launcher cab.
- HIMARS ICP provides armor protection to the crews against the likely threats while still maintaining mission capability.

Recommendations

- Status of Previous Recommendations. The Army has addressed all previous recommendations.
- FY08 Recommendations. The Army should:
  1. Investigate ways to provide the vehicle commander increased stability while standing in the commander's hatch.
  2. Add a latching device to hold the ICP cab doors open as needed.