Future Combat Systems: Non-Line-of-Sight Cannon (FCS: NLOS-C)

Executive Summary
- The Defense Acquisition Executive approved the Non-Line-of-Sight Special Interest Program (SpI) Acquisition Decision Memorandum, in August 2008, directing the Milestone C decision to be no later than 1QFY09.
- BAE Systems delivered the P1 NLOS-C prototype vehicle for lethality testing at Yuma Proving Ground, Arizona, in August 2008 and the P3 NLOS-C Prototype for mobility testing to Camp Roberts, California, in October 2008.

System
- NLOS-C, XM1203, is a tracked, self-propelled, hybrid electric drive 155 mm Howitzer with a two-man crew.
- NLOS-C is the lead Future Combat Systems (FCS) Manned Ground Vehicle (MGV). Three MGV are designed to be deployable on one C-17 aircraft (before installing extra protective armor) to support early deploying forces with cannon fires.
- The Army will:
  - Procure eight prototypes in FY08 and FY09 for testing
  - Procure up to 18 Initial Production systems under a separate program called the NLOS-C SpI, in FY10-FY13 for fielding to the Army Evaluation Task Force for experimentation and training
- The cannon will fire six standard artillery rounds or four Excalibur munitions per minute to ranges of 30+ km leveraging its automated ammunition handling system and laser ignition.
- NLOS-C battalions, composed of 18 cannons, are expected to achieve improved accuracy with unguided projectiles.
- NLOS-C battalions are expected to respond to fire mission requests within 20 seconds when stationary and within 30 seconds when moving.

- NLOS-C is expected to have six times the reliability Paladin howitzers demonstrated during Initial Operational Testing.

Mission
- NLOS-C battalions provide area and precision fires in support of FCS Brigade Combat Teams and other mechanized brigade combat teams.
- NLOS-C battalions are capable of firing the entire suite of Army 155 mm munitions, including Excalibur precision munitions, to attack point and area targets.

Prime Contractors
- BAE Systems
- General Dynamics

Activity
- The Army continued their 2008 weapons firing test program of the NLOS-C Firing Platform at Yuma Proving Ground, Arizona. The Firing Platform is a surrogate chassis with a mounted Mission Module containing the gun mount, cannon, aiming, and ammunition handling systems that closely resembles mission equipment in the early prototype vehicles. The program has fired more than 2,000 rounds since 2006 from the Firing Platform to gather data for risk reduction in cannon and mount development, safety certification, and improving reliability.
- In December 2007, the Army conducted compatibility testing with the Firing Platform and the Excalibur precision munition. The Firing Platform fired Inert Excalibur rounds supporting redesign of the NLOS-C muzzle break and new base for the Excalibur.
- In May 2008, the program obtained a safety release allowing Soldiers to perform maintenance and rearm activities with the Firing Platform.
- The Army continues to test the NLOS-C subsystems on the Mission Equipment Integration Test Stands in Minneapolis, Minnesota, gathering development and reliability growth data. The shock simulator test stand has emulated more than 1,800 firings, while the vibration table has subjected

ammunition-handling equipment to the equivalent of more than 7,000 miles traveled and 14,000 operational cycles.
- BAE Systems delivered the P1 NLOS-C Prototype vehicle for lethality testing at Yuma Proving Ground, Arizona, in August 2008, and the P3 NLOS-C Prototype for mobility testing to Camp Roberts, California, in October 2008.
- In August 2008, the Defense Acquisition Executive approved the NLOS-C SpI Acquisition Decision Memorandum, directing the Milestone C decision be no later than 1QFY09 in order to maintain compliance with the congressional direction to field NLOS-C by FY10. The NLOS-C SpI program will produce up to 18 vehicles in three sets, funded with procurement appropriations that are separate and distinct from the NLOS-C core FCS program. The Army Evaluation Task Force, Fort Bliss, Texas, will receive the first set of NLOS-C trainers under a training release in FY10. The delivery of the last set is scheduled for FY13.

Assessment
- NLOS-C performance may be compromised in order to meet C-17 aircraft weight and size restrictions for the standard deployment of three howitzers on one aircraft.
- Using the currently designed breech chamber and 38-caliber cannon tube, the Army reduces the NLOS-C range for most munitions by 3 to 5 km compared to the current 155 mm Paladin breech chamber and 39-caliber cannon tube.
- The two-man NLOS-C crew's endurance and mission focus will be challenged conducting continuous 24-hour operations while performing fire missions, maintenance, resupply, and security associated with combat operations.
- The increase in the reliability requirement to 512 hours between system aborts during operational missions compared to the 87 hours demonstrated by Paladin in its operational test is an area of concern given NLOS-C's automated ammunition handling system, sophisticated automation, and communications equipment.
- Some core NLOS-C FCS capabilities will not be available or sufficiently mature for production integration and fielding of the NLOS-C SpI vehicles. This will limit the Army Evaluation Task Forces' ability to fully evaluate operational concepts, conduct testing and training of FCS equipment, and development of tactics, techniques, and procedures until delivery of FCS Core NLOS-C platforms.

Recommendations
- Status of Previous Recommendations. The Army is addressing the three previous recommendations.
- FY08 Recommendation.
  1. The Army should conduct an operational assessment of the first set of NLOS-C Special Interest trainers in conjunction with their fielding to the Army Evaluation Task Force.