Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS)

Executive Summary

- The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS) program experienced a critical Nunn-McCurdy cost breach due to an FY12 budget decision to eliminate procurement of all production systems. USD(AT&L) directed the Army to continue with a limited development program using the two existing JLENS developmental orbits, but did not restore funding for production systems. The Army is continuing to plan and execute a reduced JLENS test program to evaluate JLENS technologies and capabilities as directed by USD(AT&L). The Army Test and Evaluation Command (ATEC) will conduct a limited assessment of JLENS operational capabilities and limitations in FY13.
- During the initial phases of contractor functional verification and government developmental testing in 2011, the JLENS demonstrated surveillance and fire control radar detection and tracking performance that exceeded system technical specifications for fixed-wing and cruise missile air-breathing targets in a controlled test environment. The system was operated and maintained by contractor personnel during these test events. Testing identified problems with operator controls and displays, non-cooperative target recognition, friendly aircraft identification, and fire control radar software and track stability; these problems require future improvement.
- During the developmental integrated fire control test phase in April 2012, an integrated JLENS orbit supported a series of simulated missile flight test engagements of airborne targets with an operational Army air defense missile system. This phase concluded with a successful live missile flight test that destroyed a fixed-wing target drone aircraft in a controlled test environment.
- The Army and Navy conducted a joint JLENS Navy Integrated Fire Control – Counter Air (NIFC-CA) missile flight test event at White Sands Missile Range, New Mexico, in late September 2012. The JLENS provided integrated fire control targeting information to a Navy Aegis-based missile system using Cooperative Engagement Capability (CEC) datalinks to successfully engage and destroy a surrogate cruise missile aerial target.
- Based on data collected during developmental testing, JLENS system-level reliability is not meeting program reliability growth goals. Both software and hardware reliability problems contribute to low system reliability.

System

- A JLENS orbit consists of separate surveillance and fire control radar systems individually mounted on 74-meter

tethered aerostat balloons that operate at altitudes up to 10,000 feet above mean sea level.
- A 180,000-pound mobile mooring station and tether system is used to launch, recover, and secure each aerostat system. The aerostat tether system provides radar control and data transfer links to supporting ground control and data processing stations. JLENS is deployable to pre-planned operational sites that have been prepared to support mobile mooring station operations. Five days are required to transition between fully operational status and a transportable configuration. Operators control the radar, process data, and transmit radar track information from mobile communication and control stations co-located with the mobile mooring stations. A mobile power generation and distribution system and associated ground equipment support each JLENS orbit.

Mission

- Army air defense units equipped with the JLENS provide persistent air and missile threat warning to friendly forces, target identification, target cueing for airborne interceptor aircraft, and precision targeting information to ground-based air defense weapons systems.
- Primary JLENS air-breathing targets include all fixed- and rotary-wing aircraft, unmanned aerial vehicles, and land attack cruise missiles. Secondary targets include surface moving targets, large caliber rockets, and tactical ballistic missiles.

Major Contractor

Raytheon Integrated Defense Systems – Andover, Massachusetts

Activity

- The JLENS program experienced a critical Nunn-McCurdy cost breach due to an FY12 budget decision to eliminate procurement of all production systems. Following a Nunn-McCurdy review, USD(AT&L) rescinded the JLENS Acquisition Program Baseline and directed the Army to continue with a reduced JLENS test program using the two existing JLENS developmental orbits. The focus of the reduced test program is to improve airborne and surface moving target capabilities in advance of possible JLENS participation in an FY14 Combatant Commander exercise. USD(AT&L) did not authorize the program to complete the previously planned system development program or to proceed to a Milestone C or production decision.
- Based on the USD(AT&L) direction, the Army revised the JLENS operational test strategy, transitioning from the previously planned Milestone C operational assessment to a limited Early User Test (EUT) in FY13. The purpose of the EUT event is to assess JLENS operational capabilities and limitations in advance of the potential FY14 Combatant Commander exercise. During this limited assessment, Soldier operators will conduct missions with contractor support. All system maintenance support will be provided by contractor personnel. The Army has scheduled execution of EUT operational flight test scenarios for November 2012, with additional modeling and simulation events planned in March 2013. Since no further JLENS production is currently authorized, a JLENS IOT&E event will not be required.
- The Army completed the first phase of JLENS contractor functional verification testing and government test phase in December 2011 at the Utah Test and Training Range (UTTR). This phase included contractor and government developmental testing of the surveillance radar and fire control radars installed on their individual aerostat systems. The primary focus of these test events was to develop an initial capability for the surveillance and fire control radars to independently detect, identify, and track airborne targets. This phase also provided initial information on system reliability.
- From February through April 2012, the Army conducted a series of developmental integrated fire control tests with both radars operating as a single, integrated orbit to support simulated air defense missile engagements using an operational Army air defense missile system. This test phase concluded with a live missile flight test engagement against a target drone.
- The program entered the second phase of developmental testing in August 2012. This phase focused on improving orbit-level stability and technical maturity for airborne and surface moving target detection, identification, and tracking, including operations in a basic electronic attack environment. New capabilities under development in this phase included interoperability with additional datalink systems such as CEC, Integrated Broadcast Service (IBS), Joint Range Extension Application Protocol C (JREAP C), and Tactical Voice Communications. The phase also included Soldier operator and maintenance training activities, although contractor personnel continued to operate and maintain the system. This test phase was completed in September 2012 and data analysis is in progress.
- In September 2012, the JLENS system supported a NIFC-CA Live Fire Demonstration missile flight test event at White Sands Missile Range.

Assessment

- During the initial phases of contractor functional verification and government developmental testing in 2011, the JLENS demonstrated surveillance and fire control radar detection and tracking performance that exceeded system technical specifications for fixed-wing and cruise missile air-breathing targets in a controlled test environment. Contractor personnel operated and maintained the system during these test events.
- Testing showed that the fire control radar consistently provided fire control quality tracking data that were sufficient to support air defense missile engagements. The system also demonstrated a limited target identification capability that partially met requirements and basic interoperability with other air defense systems using Link 16 data transfer systems. Testing included a successful demonstration of the fully-deployed aerostat tether system, including power and fiber-optic data transmission paths. The test also identified critical performance areas for improvement to include: non-cooperative target recognition, friendly aircraft identification capabilities, fire control radar software stability, and target track consistency. During this test phase, the system was operated primarily by contractor personnel using non-production representative engineering control systems and operator interfaces.
- During the developmental integrated fire control test phase in April 2012, an integrated JLENS orbit supported a series of simulated missile flight test engagements of airborne targets with an operational Army air defense missile system. These tests verified that JLENS detection and tracking technical performance continued to mature and were sufficient to support basic air defense missile engagements. This phase concluded with a successful live missile flight test that destroyed a target drone aircraft in a controlled test environment. During this phase, the JLENS system was operated primarily by contractor personnel using non-production representative engineering control systems and operator interfaces.
- During the joint JLENS NIFC-CA missile flight test at White Sands Missile Range, the JLENS provided integrated fire control targeting information to a Navy Aegis-based missile system using CEC datalinks to successfully engage and destroy a surrogate cruise missile aerial target.
- Based on data collected during developmental testing, JLENS system-level reliability is not meeting program growth goals. At the beginning of the DT-2 test phase in August 2012, the Army assessed orbit level reliability to be 21 hours Mean Time Between System Abort (MTBSA), well below the 108 hours MTBSA necessary to meet operational reliability

and availability requirements. Both software and hardware reliability problems contribute to low system reliability.

Recommendations
- Status of Previous Recommendations. This is the first annual report for this program.

- FY12 Recommendations. The Army should:
  1. Complete the planned JLENS EUT and provide an operational capabilities and limitations report prior to initiating a Combatant Command exercise.
  2. Develop a reliability improvement plan to address poor system-level reliability prior to a JLENS fielding decision.