

Spider Increment 1A M7E1 Network Command Munition

Executive Summary

- The Program Office conducted a Production Reliability Test (PRT) with technical experts and a Force Development Test (FDT) with soldiers in 2018.
- The Army Maneuver Support Center of Excellence lowered the reliability requirement in June 2018. The Remote Control Station (RCS) is now required to operate a Spider munition field for a 72-hour mission with a 91 percent chance of not having an Essential Function Failure (EFF). The original requirement was 96 percent chance of no EFFs.
- Spider Increment 1A has yet to meet the lowered reliability requirement. DOT&E assesses current demonstrated reliability is 81 percent based upon developmental testing. The Army reliability estimate is higher, which will preclude its application of successful corrective actions. The FDT demonstrated that units could employ Spider Increment 1A.
- During the August 2017 Cooperative Vulnerability and Penetration Assessment (CVPA), the Army demonstrated mitigation of most of the cyber vulnerabilities reported in the January 2017 DOT&E operational assessment. The Adversarial Assessment in October 2018 is intended to assess a unit's ability to operate in a cyber-contested environment.
- The Army conducted the Spider Increment 1A IOT&E in October 2018 at Fort Campbell, Kentucky.

System

- The Army uses Spider as a landmine alternative to satisfy the requirements outlined in the 2004 National Landmine Policy that directed the DOD to:
 - End use of persistent landmines after 2010
 - Incorporate self-destructing and self-deactivating technologies in alternatives to current persistent landmines
- A Spider munition field includes:
 - Up to 63 Munition Control Units (MCUs), each housing up to 6 miniature grenade launchers or munition adapter modules (the modules provide remote electrical firing capabilities)
 - An RCS consists of a Remote Control Unit (RCU) and RCU Transceiver (RCUT). An operator uses the RCS to maintain "man-in-the-loop" control of all munitions in a field. The RCU is the component upgraded in Spider Increment 1A.
 - A repeater or communications relay device for use in difficult terrain or at extended ranges



- Spider incorporates self-destructing and self-deactivating technologies to reduce residual risks to non-combatants and has the capability to use non-lethal munitions such as the Modular Crowd Control Munition that fires rubber sting balls.
- The Army fielded Spider Increment 1 systems in FY09 under an Urgent Materiel Release. The system reached Initial Operational Capability in FY11 and obtained its Full Materiel Release in FY13.

Mission

Brigade Combat Team commanders employ engineer units equipped with Spider to provide force protection and counter-mobility obstacles using lethal and non-lethal munitions. Spider functions either as a stand-alone system or in combination with other obstacles to accomplish the following:

- Provide early warning
- Protect the force
- Delay and attrite enemy forces
- Shape the battlefield

Major Contractor

Command and Control hardware and software: Northrop Grumman Information Systems Sector, Defense Systems Division – Redondo Beach, California

Activity

- The Army released several software updates for Spider Increment 1A since completing the LUT in 2016. In 2018, the Army made no software changes to address problems

identified in testing. The Army made a hardware change to address a reliability issue. Other problems were addressed by changing the operating procedures and documenting those

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changes in the operator manuals and training programs of instruction.

- The Program Office conducted the Production Reliability Test (PRT) from January 29 through February 9, 2018, at Fort Leonard Wood, Missouri. The test was conducted in accordance with the DOT&E-approved Test and Evaluation Master Plan (TEMP).
- The Maneuver Support Center of Excellence conducted the FDT at Fort Hood, Texas, in April 2018. The FDT tested a unit's ability to operate Spider Increment 1A.
- The Army Engineering School lowered the Spider Increment 1A reliability requirement on June 26, 2018. The system is now required to operate a munitions field for 72 hours without an EFF, with 91 percent reliability rather than the original requirement of 96 percent.
- The Army Test and Evaluation Command (ATEC) delayed the IOT&E by 3 months to allow the Program Office to improve reliability and the operating manuals. ATEC continued planning for the IOT&E based on FDT results, validation tests of the operating manuals, and the reduction of the reliability requirement.
- The Army conducted the IOT&E in October 2018 in accordance with the DOT&E-approved TEMP and test plan.

Assessment

- The DOT&E operational assessment from the 2016 Limited User Test (LUT) found that a unit could employ Spider Increment 1A as a component of protection and

counter-mobility missions, but not meet the Army reliability requirement.

- The CVPA found the updated software addressed many of the vulnerabilities identified in the 2017 DOT&E operational assessment. The Adversarial Assessment will provide information on the unit's ability to operate Spider Increment 1A in a cyber-contested environment.
- Spider Increment 1A did not meet its reliability requirement in developmental testing. DOT&E assesses Spider Increment 1A as having an 81 percent probability of completing a mission without a failure, which is below the adjusted 91 percent requirement. Spider Increment 1A is no longer required to send digital obstacle reports to the classified mission command system. At this time, there is no approved cross-domain solution allowing the unclassified Spider to pass digital information to the classified mission command system. This makes it more difficult for units to update the mission command system, which adversely affects the ability of units to know in real time where Spider fields are located on the battlefield.

Recommendation

1. The Army should update the current Increment 1A software to address known reliability problems rather than rely on changes in the operating procedures.