

## Stryker Double V-Hull A1 (DVH A1) Engineering Change Proposal (ECP)

### Executive Summary

- The Army Test and Evaluation Command (ATEC) conducted a side-by-side test of Infantry Carrier Vehicles from the legacy Stryker Double V-Hull (DVH) fleet and the future Stryker DVH A1 Engineering Change Proposal (ECP) fleet at Aberdeen Test Center (ATC), Maryland, in March 2016. The purpose of the event was to collect early feedback on the differences between the Infantry Carrier Double V-Hull (ICVV) and the ECP-modified ICVV (ICVV-A1).
- The ICVV-A1's automotive performance and engine power is superior to that of the ICVV based on collected soldier feedback and instrumentation data. Soldiers noted the ICVV-A1 improved drivetrain easily negotiated steep grades with decreased engine load, which should result in greater mobility in combat.
- ATC completed full-up system-level (FUSL) live fire testing for the Stryker ICVV-A1 in 1QFY17 in accordance with DOT&E-approved test plans. ATC also completed Automatic Fire Extinguishing System (AFES) testing for the Stryker DVH A1 ECP in 1QFY17. Testing revealed that ECP modifications did not result in any new, critical vulnerabilities for the Stryker DVH A1 ECP.

### System

- The Stryker DVH A1 ECP Family of Vehicles (FoV) consists of seven variants on a common vehicle platform, each of which replaces a legacy Flat-Bottom Hull (FBH) Stryker:
  - Anti-Tank Guided Missile (ATVV-A1)
  - Commander's Vehicle (CVV-A1)
  - Engineer Squad Vehicle (ESVV-A1)
  - Fire Support Vehicle (FSVV-A1)
  - Infantry Carrier Vehicle (ICVV-A1)
  - Mortar Carrier Vehicle (MCVV-A1)
  - Medical Evacuation Vehicle (MEVV-A1)
- The ICVV-A1 can be equipped with a scout Mission Equipment Package (MEP) modification. The ICVV-A1 with the scout MEP replaces an eighth legacy FBH variant, the Reconnaissance Vehicle (RV), providing Stryker infantry and cavalry scouts with RV functionality on a unique DVH A1 ECP-based platform.
- The Army intends to implement the following Stryker DVH A1 ECP configuration upgrades:

#### Mechanical Power Upgrade

- Replaces a 350 horsepower Caterpillar C7 engine with a 450 horsepower Caterpillar C9 engine
- Integrates improved power pack thermal management and additional environmental conditioning



#### Electrical Power Upgrade

- Replaces a 570 amp alternator with a 910 amp alternator capable of supporting electrical power required for future network upgrades and 20 percent growth
- Replaces the Power Distribution Panel (PDP) and Power Distribution Panel 2 (PDP2) with the Enhanced Power Distribution Unit (EPDU)

#### Chassis Upgrade

- Increases chassis payload capacity from 55,000 pounds Gross Vehicle Weight Rating (GVWR) to 63,000 pounds GVWR
- Optimizes the driveline to match the new mechanical power upgrade

#### Implementation of an In-Vehicle Network Architecture

- Establishes the framework for future embedded, VICTORY compliant, Army Network integrations, and provides for sharing of platform data among the Stryker's common crew stations
- Provides gigabit Ethernet capability

#### Mission

Units equipped with the Stryker DVH A1 ECP FoV will provide Combatant Commanders a medium-weight force capable of rapid strategic and operational mobility to disrupt or destroy enemy military forces, to control land areas including populations and resources, and to conduct combat operations to protect U.S. national interests.

# FY17 ARMY PROGRAMS

## Major Contractors

General Dynamics Land Systems – Joint Base Lewis-McChord,  
Washington; Sterling Heights, Michigan; Anniston, Alabama

### Activity

- ATEC conducted a side-by-side test of Infantry Carrier Vehicles from the legacy Stryker Double V-Hull fleet and the future Stryker Double V-Hull A1 ECP fleet at ATC in March 2016. The Army published its final report in December 2016. ATEC used soldier surveys and vehicle instrumentation to compare automotive performance and collect Human Systems Integration feedback on the differences between the ICVV and ICVV-A1.
- The Program Executive Office used data from the side-by-side developmental test to authorize the conversion of up to 253 DVH variants to DVH ECP A1 variants. The Army plans to use soldier feedback and instrumented data from the operational test scheduled for 4QFY18 to inform its decision to authorize the conversion of three additional brigades from DVH variants to DVH A1 ECP variants.
- The Army has not announced which Stryker Brigade Combat Team will be the first to field the Stryker DVH ECP A1 variants.
- ATC completed FUSL live fire testing for the Stryker ICVV-A1 in 1QFY17 in accordance with DOT&E-approved test plans. FUSL testing consisted of 14 events encompassing a spectrum of operationally realistic threats to include underbody and underwheel mines, ground-emplaced IEDs, airburst artillery, rocket-propelled grenades, and explosively formed penetrators. ATC also completed AFES and controlled damage testing for the Stryker DVH A1 ECP in 1QFY17.
- The Army is writing a Test and Evaluation Master Plan (TEMP) to test all Stryker DVH A1 ECP variants in an operationally realistic environment against an opposing force. The Army intends for the TEMP to include Cooperative Vulnerability and Penetration Assessment and Adversarial Assessment cybersecurity testing.

### Assessment

- Soldier feedback and instrumentation identified:
  - ICVV-A1 automotive performance and engine power is superior to that of the ICVV. Soldiers noted the ICVV-A1 improved drivetrain easily negotiated steep grades with decreased engine load, which should result in greater tactical mobility in combat.
  - The ICVV-A1 was initially slower than the ICVV when starting from a stationary position but the ICVV-A1 has greater acceleration beyond 50 meters once the turbocharger is engaged.
- The soldiers noted:
  - The Driver's Situational Awareness Display and Commander's Situational Awareness Display in the ICVV-A1 enhanced shared understanding among crew members regarding automotive data and performance.
  - The ride quality of the ICVV-A1 is superior to the DVH when traveling off-road or traversing rough terrain.
  - The external noise level of the ICVV-A1 is higher than the ICVV. There is no change to the interior noise level.
- Side-by-side developmental soft soil mobility testing was not conclusive. Follow-on analysis using the NATO Reference Mobility Model and comparative testing during a controlled damage experiment show the ICVV-A1 has greater soft soil mobility than the ICVV.
- FUSL live fire testing and AFES testing demonstrated that ECP modifications did not result in any new, critical vulnerabilities for the Stryker DVH A1 ECP.

### Recommendations

- Status of Previous Recommendations. This is the first annual report for this program.
- FY17 Recommendations. None.