Stryker Family of Vehicles (FoV)

Executive Summary

- The Army conducted an FOT&E of the Stryker Double-V Hull (DVH) A1 Family of Vehicles (FoV) at the Yakima Training Center, Washington, in September 2018 and LFT&E from March 2016 to March 2017.
- DOT&E published its evaluation in an FOT&E report in May 2019.
  - The Stryker DVH A1 upgrades restore tactical mobility and improve the crew's situational awareness over that of the Stryker DVH.
  - The Stryker DVH A1 is operationally effective. The test unit accomplished its assigned task and purpose in 11 of 12 missions when equipped with the Stryker DVH A1. Eighty-four percent of unit soldiers and leaders surveyed indicated that the Stryker DVH A1 contributed in the accomplishment of their mission.
  - The Stryker DVH A1 is operationally suitable. The vehicle demonstrated a Mean Miles Between System Abort (MMBSA) exceeding the Army requirement by nearly a factor of two. The demonstrated reliability translates to a 93 percent probability of completing an Operational Mode Summary/Mission Profile (OMS/MP)-based mission consisting of 140 miles without a system abort.
  - The Stryker DVH A1 provides similar level of survivability and force protection as the baseline Stryker DVH vehicles in expected combat engagements.
  - Government testing revealed cybersecurity vulnerabilities.
- The FOT&E report supported the Army Program Executive Office decision to field a Stryker DVH A1-equipped Brigade Combat Team starting in June 2020.

Infantry Combat Vehicle-A1

System

- The Stryker DVH A1 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 Vehicle
  - Commander's Vehicle
  - Engineer Squad Vehicle
  - Fire Support Vehicle
  - Infantry Combat Vehicle-A1
  - Mortar Carrier Vehicle
  - Medical Evacuation Vehicle
- The Stryker DVH A1 configuration upgrades include:

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 and Power Distribution Panel 2 with the Enhanced Power Distribution Unit

Chassis Upgrade

- Increases chassis payload capacity from 55,000 to 63,000 pounds Gross Vehicle Weight Rating (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 FoV 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.

Major Contractors
- General Dynamics Land Systems – Sterling Heights, Michigan; Anniston, Alabama
- Caterpillar – Peoria, Illinois
- Marvin Land Systems – Inglewood, California

Activity
- All testing was conducted in accordance with a DOT&E-approved Test and Evaluation Master Plan and test plans.
- The Army conducted an FOT&E on the Stryker DVH A1 FoV at the Yakima Training Center in Washington in September 2018 and LFT&E from March 2016 to March 2017.
- DOT&E published its evaluation in an FOT&E report in May 2019.

Assessment
- The FOT&E report supported the Army Program Executive Office decision to field a Stryker DVH A1-equipped Brigade Combat Team starting in June 2020.
- The Stryker DVH A1 design restores mobility to the Stryker fleet and increases electrical and mechanical power generation. The Stryker DVH A1 adds an In-Vehicle Network, which facilitates the sharing of platform data among the Stryker common crew-stations and improves the crew's situational awareness over that of the Stryker DVH.
- The Stryker DVH A1 is operationally effective.
  - When equipped with the Stryker DVH A1, the test unit accomplished its assigned task and purpose in 11 of 12 missions in support of battalion operations.
  - Eighty-four percent of unit soldiers and leaders surveyed indicated that the Stryker DVH A1 contributed in the accomplishment of their mission.
- The Stryker DVH A1 is operationally suitable.
  - The vehicle demonstrated a MMBSA that exceeds the Army requirement by nearly a factor of two. The demonstrated reliability translates to a 93 percent probability of completing an OMS/MP-based mission consisting of 140 miles without a system abort.
  - Stryker DVH A1 electrical power generation was sufficient to operate all mission command systems with a growth margin for future network integration.
  - During Focus Groups, drivers stated that the Driver's Viewer Enhancer (DVE) field of view was degraded and lacked spatial reference when mounted onto the Driver's Ballistic Strike Shield. The altered field of view and degradation in spatial awareness creates a potential safety risk for the crew.
  - Software integration and screen durability failures involving the Commander's Situational Awareness Display (CSAD), the Driver's Situational Awareness Display (DSAD), and the Video Display Electronics Terminal (VDET) accounted for 39 percent Stryker DVH A1-related Essential Function Failures.
- The Stryker DVH A1 provides similar level of survivability and force protection as the baseline Stryker DVH vehicles. Stryker DVH A1 design modifications did not introduce any significant vulnerabilities to the Stryker crew or their ability to complete their mission given an operationally relevant engagement.
- Government testing revealed cybersecurity vulnerabilities.
- The driver's compartment in a Stryker DVH A1 provides limited protection beyond the seat belt during sudden stops or rollover situations. Aside from wearing the seat belt, there is no means of reducing the impact to the neck and head of the driver.

Recommendations

The Army should consider the following recommendations:
1. Correct DVE, CSAD, DSAD, and VDET deficiencies identified during testing.
2. Correct or mitigate cyber vulnerabilities identified during testing.
3. Examine the design of a restraint system to stabilize the head and neck of Stryker drivers in case of accident.