

Ground Based Strategic Deterrent (GBSD)

Executive Summary

- The Ground Based Strategic Deterrent (GBSD) program entered the Engineering and Manufacturing Development (EMD) phase after the Milestone Decision Authority signed the Milestone B (MS B) Acquisition Decision Memorandum on September 4, 2020.
- The DOT&E-approved GBSD Test and Evaluation Master Plan (TEMP) describes an adequate and integrated T&E strategy that relies heavily on the use of modeling and simulation.
- The GBSD Program Manager, with guidance and support from DOT&E, completed the first phase of a cybersecurity risk assessment of the Digital Engineering System (DES), which is a cloud-based development and testing environment.



System

- GBSD is a recapitalization for the Minuteman III Intercontinental Ballistic Missile (ICBM) weapon system.
- The GBSD program comprises two major segments: the Aerospace Vehicle Equipment (AVE) segment and the Command and Launch (C&L) segment. Both segments include all associated trainers, test support equipment, transport equipment, maintenance support equipment, and depot support equipment used to operate and maintain GBSD.
- The AVE segment is an integrated missile stack, which includes the following major sub-components: Booster stages and interstages, Post-boost Vehicle, Missile Guidance Set, Reentry System, and Reentry Vehicle.
- The C&L segment encompasses all launch command and control equipment including the Secondary Launch Platform, Launch Center equipment, Launch Facility equipment, and Integrated Command Center equipment. The C&L segment includes all communications and facility infrastructure.

Mission

- The U.S. Strategic Command will use the GBSD to execute operational plans as directed by the President of the United States.
- GBSD is an ICBM nuclear warhead delivery system that provides safe, secure, responsive, global capability both to deter potential adversaries and to assure allies, and if necessary, decisively defeat adversary targets and retaliatory capabilities.

Major Contractors

- Northrop Grumman – Roy, Utah
- Northrop Grumman Space Systems – Chandler, Arizona
- Bechtel – Reston, Virginia
- Textron – Wilmington, Massachusetts

Activity

- The Milestone Decision Authority signed the MS B Acquisition Decision Memorandum on September 4, 2020, and the Air Force awarded the EMD contract on September 8, 2020.
- The Program Office built the DES, which is both a development environment and a T&E venue built on a cloud-based infrastructure provided by the DOD Chief Information Officer for Special Access Programs (DOD SAP CIO). The Program Office intends to use the DES as a data repository as well as the means to facilitate data sharing among the geographically separated government and contractor teams.
- The GBSD Program Office coordinated with DOT&E and DOD SAP CIO to conduct a cybersecurity risk assessment

of the GBSD DES. The DES cybersecurity testing is a three-phased test and part of the planned continuous cybersecurity testing of both the development environment and the weapon system. The cybersecurity risk assessment will help the program manager decide when the DES can safely store and distribute sensitive data.

- DOT&E approved the GBSD MS B TEMP to include the LFT&E Strategy in August 2020. The GBSD TEMP describes an integrated T&E strategy. The flight test design carefully integrates developmental and operational testing goals; hence, each flight test should provide useful data for evaluation. The LFT&E Strategy describes the evaluation framework needed to assess the survivability of AVE and C&L segments

with all appropriate support equipment, and the lethality of the weapon system.

- The integrated test strategy relies heavily on the DES and the modeling and simulation tools. The work on verification, validation, and accreditation of those tools began during the Technical Maturity and Risk Reduction phase, prior to MS B.
- The Program Office will coordinate an update to the TEMP based on the additional program and technical information from the EMD Baseline Review with the prime contractor.
- The Program Office and the Air Force Test and Evaluation Center (AFOTEC) created a Combined Test Force (CTF) to design and execute integrated testing. The CTF integrates developmental and operational testing but preserves AFOTEC's independence.

Assessment

- The first phase of the DES cybersecurity risk assessment found no significant vulnerabilities.
- The GBSD Program Office's implemented innovative approaches should help reduce cybersecurity and schedule risks. These approaches include:

- Building a cybersecurity defense team as a part of the GBSD Mission Defense Team as a part of an exemplary strategy to defend the system from cybersecurity adversaries.
- System Theoretic Process Analysis for Security, which links vulnerabilities to operational impact. This process is integral to the GBSD cybersecurity plans, and provides a rigorous analytical basis for test design and analysis.
- Implementing Model Based System Engineering, and creating a lab environment that integrates the requirement management system, architectural products, and component designs. The integrated system-engineering environment will be a valuable testing asset once AFOTEC accredits it for operational test data collection.
- DOT&E, USD(R&E), and the GBSD Program Office are developing test methodology for nuclear hardening and survivability test tools and methods. The updated TEMP will include this approach.

Recommendations

None.