



Test Engineering

TriVector's Test Engineering services cover the full spectrum of test activities from test program development to execution and analysis of results. Our experts have successfully performed test engineering services for Defense, NASA, NOAA, and commercial customers. At TriVector, we provide customers with critical Test Engineering *experience*, proven *performance*, and exceptional *value*.

Test Engineering Processes and Procedures

- ▶ Test Program Development & Planning
- ▶ Test Requirements Generation, Traceability, & Verification
- ▶ Test Procedure Definition, Development, & Execution
- ▶ Test Review Planning & Execution
- ▶ Test Facility Readiness
- ▶ Test Results Analysis & Reporting

Our Customers

- ▶ U.S. ARMY: AMRDEC (AED, S3I); PEO Aviation (UAS); PEO Missiles & Space (JAMS PO)
- ▶ MDA: Ground-Based Midcourse Defense (GMD)
- ▶ NASA: MSFC (SLS)

Our People

- ▶ 65% 25+ Years Experience
- ▶ 49% Engineers
- ▶ 42% Advanced Degrees
- ▶ 25% Subject Matter Experts

Test Experience

- ▶ Radar, Software, System Integration Testing
- ▶ Hardware-in-the-Loop & 10V Chamber Testing
- ▶ Ground and Flight Testing
- ▶ Environmental & Live Fire Testing
- ▶ Missile, Manned Space Flight Hardware, Space Payload, Unmanned Aerial Vehicles (UAVs)

Proving Performance Capability... Securing Mission Readiness



Ground-Based Midcourse Defense (GMD) Flight Test Expertise

TriVector supports the Ballistic Missile Defense System, GMD, in defining and executing the GMD flight test program. Our test engineers assist in defining target and developmental/operational flight test requirements to ensure assets are flown in a variety of flight test regimes against various targets to validate expected performance. We execute test planning and test analysis to ensure GMD and Safety flight test objectives are achieved. We perform pre-mission analysis and reporting to provide senior leaders the data required for decision making, risk management, and go/no-go decisions. Also, TriVector performs post mission analysis and reporting to assist in requirement verification and development of test evaluation reports for MDA and Congressional leaders.

Test Integration for Full Scale Space Flight Hardware Structural Qualification Testing:

The NASA Space Launch System (SLS) Core Stage (CS) requires full-scale qualification testing of the major structural components to support analysis, system verification and flight certification of the vehicle. TriVector's expertise has been instrumental in the development and execution of the qualification test requirements, Test Design Reviews, Test Readiness Reviews and configuration control of the NASA test facility. Given the program's complexity, TriVector was requested to coordinate and integrate activities involving multiple organizations within NASA's Engineering Directorate, Boeing's Test and Evaluation, and the Core Stage Project office. The first of four CS structural test articles has successfully completed testing; with the remaining to be completed by August 2019.



HELLFIRE Missile Test and Evaluation Leadership

As the airborne munition of choice for surface missiles, the HELLFIRE Missile system is constantly evolving to accommodate new targets beyond its original anti-armor mission. These modifications require significant testing to ensure the missile is safe and effective against the new threats. TriVector's test experts are leading critical HELLFIRE tests to include the Longbow L7A Limited Qualification Test required for Full Materiel Release. In this test, the Longbow version is shot from both an Apache and Gray Eagle Unmanned Aircraft System at Littoral and Unmanned Aircraft targets. Our experts also serve in key roles in the HELLFIRE Tango missile upgrade to include ensuring the missile's Electronic Safe Arm and Fire device is fully qualified for mission success.

Test Engineering and Integration (TE&I) Handbook for NASA Marshall Space Flight Center (MSFC)

In support of MSFC's Test Integration Branch, TriVector developed/baselined a TE&I Handbook providing test integrators with a single source for test-related definitions and references from Standards, Organizational and Marshall Work Instructions, and Marshall Procedural Requirements. Our Handbook assists test integrators in locating the reference material for planning, executing and controlling test programs, test activities, test facilities, and test documentation within the Stage Hardware Development and Flight Evaluation Branch. Using our Handbook, test integrators can easily find the proper references for hardware and test program classification, test analysis and documentation, test operations safety assessments, readiness reviews and inspections, test program configuration control, records and personnel training, and certifications.



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