



Engineering Analysis

At TriVector, we are known for our extensive engineering analyses *experience* and our superior results. We have successfully *performed* a wide range of complex engineering analyses for space, missile, aviation, and meteorology applications in support of our NASA, Army, Missile Defense Agency, NOAA, and commercial customers. From concept design to post production to mission execution, our engineering analyses results provide immense *value* to our customers.

- ▶ *Radar and Missile System Performance*
- ▶ *Concept Vehicle Performance*
- ▶ *Space Environments and Flight*
- ▶ *Unmanned Systems Analysis of Alternatives for Missions*
- ▶ *Software Design, Data Timing, and Airworthiness*
- ▶ *Thermal Space Environment*
- ▶ *Guidance, Navigation, and Control*
- ▶ *Quality and Reliability Analysis*
- ▶ *Production and Additive Manufacturing*

Our Customers

- ▶ *MDA: GMD (MOKV, RKV)*
- ▶ *NASA: MSFC (SLS)*
- ▶ *U.S. Army: CCDC AvMC*
- ▶ *PEO Missiles & Space*
- ▶ *Commercial Energy and Space Programs*

Our People

- ▶ *99% Employee Satisfaction*
- ▶ *95% Employee Retention*
- ▶ *51% Advanced Degrees*
- ▶ *32% Subject Matter Experts*

Delivering Engineering Excellence... Ensuring Technical Performance



Timing Analyses for NASA's Space Launch System (SLS) Avionics System Integration Lab (SIL)

The SLS requires tight time synchronization and data correlation among the dozens of avionics subsystems distributed throughout the 300-foot rocket. The Avionics SIL provides an extensive HWIL test environment for the avionics and software used to control the rocket throughout flight. TriVector led the complex analyses of time synchronization and data latencies from SIL testing. We established rigorous test criteria, procedures and analysis tools, and conducted early timing analyses. We identified problems early in the test cycle allowing for prompt resolution, educated stakeholders on time correlation impacts, and refined test solutions. TriVector continues to refine these test and analysis procedures to satisfy pending verification of critical timing requirements in preparation for flight certification.

Short and Intermediate Effectors for Layered Defense (SHIELD) and Tactical Aviation and Ground Munitions (TAGM)

Under SHIELD (formerly CMDS), TriVector provides Quality, Reliability, and Production support to the Stinger Based Systems. From restarting Stinger and Avenger production, to establishing new systems such as EMAM, TriVector supports the SHIELD PO by ensuring that high quality, reliable advanced capability products are developed and delivered to the warfighter for successful mission completion. For TAGM, TriVector provides production and sustainment support to the JAVELIN Block I Launcher and Missiles. We also provide Systems Engineering and Reliability support to the JAVELIN Light Weight Command Launch Unit development program. TriVector is an invaluable partner to both project offices through commitment to quality through expert analysis.



Engineering Services and Science Capability Augmentation (ESSCA) at NASA MSFC

For NASA's SLS, TriVector provided the design, analysis, and development of field programmable gate array (FPGA), and digital and analog electronics focused on power electronic systems. System design included schematics, build of materials and netlist using development tools (i.e., Mentor Graphics). TriVector's team performed testing of system designs that involved the development and execution of test procedures and included environmental testing. TriVector supported overall design of electronics hardware providing component level design assistance, enclosure design assistance, integration activities, Interface Control Document (ICD) development, and Hardware/Software (HW/SW) Interface documents.

Combat Capabilities Development Command (CCDC) Army Aviation and Missions Command (AvMC) Task Order

TriVector supports the Manufacturing Science and Technology (MST) division of AvMC's Systems Readiness Directorate (SRD) in the establishment, facilitation, and management of Integrated Product Teams (IPT) in various areas related to Advance Manufacturing. We serve as lead facilitator of the AvMC Composites Working Group (CWG) and support the AvMC Additive Manufacturing (AM) Facilities and Development IPT. TriVector's team is working to implement digital thread technologies and capabilities within the PIF while maintaining the engineering discipline to control the configuration baseline of computer-based models used to drive the manufacturing production. Our team illustrates the benefits and capabilities of the Digital Thread to better understand the technology gaps and challenges as we work towards a more integrated, model-based, enterprise.

