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AXIENT: A PREMIER SOLUTIONS AND SERVICES COMPANY



Get to Know Us

Axient advances defense and civil missions from aerospace to cyberspace with multi-domain test and analysis, mission engineering and operations, and advanced technologies. We partner with our customers to identify and analyze their most important challenges and design solutions that turn challenges into breakthroughs to accelerate assured performance. With extensive domain expertise in defense and aerospace, we rapidly develop mission-enabling technologies that allow customers to move at mission speed. With an unwavering commitment to mission success, we make customers more capable, decisions more informed, systems more efficient, and outcomes more certain.

About Axient

Axient is an aerospace and defense company headquartered in Huntsville, Alabama and has provided premier services and solutions to the Federal Government for more than three decades. Customers choose Axient because they know they can trust our people and count on our performance. With over 2200 employees and locations in Alabama, Tennessee, Florida, California, New Mexico, Colorado, and the National Capital Region, we provide local expertise and program management to our customers which means faster response times and an easier partner to reach. Axient is certified in the following: ISO 9001:2015, AS9100 Rev D, CMMI-DEV Maturity Level 3, and has a DCMA Purchasing System, DCMA Property System, and DCAA Accounting System. Our history of success is attributable to our core philosophy of putting mission and customers first, empowering our employees, and ensuring success for our customers by providing value-added, mission-oriented solutions. New challenges demand new thinking. New threats require new ideas. At Axient, we're driven to new solutions for what comes after next - whether new approaches, new insights or new technology to advance mission forward. We provide expertise and technical insights that enable customer missions to rise to every challenge.

What We Do

CAPABILITIES

Axient delivers superior, custom-tailored engineering & technical services through end-to-end capabilities providing innovative, mission-oriented expertise to Defense and Civilian customers. We provide our customers depth & scale in the following core capability areas:

- Systems Engineering and Integration (SE&I)
- Safety & Mission Assurance
- Product Engineering
- Infrastructure Development and Mission Operations
- Multi-Domain Test and Analysis
- Logistics Engineering and Supply Chain Analytics
- Cyber Systems Development

TECHNOLOGY FOCUS AREAS & EXPERTISE

Our experts specialize in the following technologies for our customers:

Hypersonics • Directed Energy • Sensors (Radar, Optics, Acoustics, etc.) • C5ISR • Computer Generated Imagery • Cyber • Advanced M&S • Autonomous Machines • Missile & Aviation System Unique Technologies • Data Visualization/Knowledge Management • Geospatial Systems/Technologies • Position, Navigation, & Timing Systems • Artificial Intelligence/Machine Learning • Augmented Reality

At Axient, our employees are experts across a wide variety of disciplines:

SE&I • Digital Engineering • M&S • Software Engineering & Development • Rapid Prototyping • Technology Development • SWIL/HWIL • Data Science • Cybersecurity • Human Space Flight • Intel Analysis • Test & Evaluation • Logistics Analysis • Facilities / Environmental Engineering • Business Intelligence Safety, Reliability & Quality Assurance Risk Management



Customers

U.S. Army • U.S. Air Force • U.S. Space Force •
U.S. Navy • National Aeronautics & Space
Administration (NASA) • Missile Defense Agency (MDA)

Markets & Missions We Serve

Axient offers expertise across Defense and Civil markets in the following areas:

- Long Range Precision Fires
- Hypersonics
- Strategic Intelligence
- Global Strike
- Improved Readiness and Lethality
- Counter UAS
- Missile Defense
- Counter Long Range Precision Fires
- Air Defense (Integrated Fires)
- Space Asset Protection
- Next Generation Jamming and Countermeasures
- Cyber-Secure/Cyber-Resilient Systems
- Integrated Intelligence, Surveillance and Reconnaissance
- Air Superiority
- Advance Data Analytics
- Autonomous Operations
- AI and Machine Learning
- Robotics
- Space Exploration
- Moon-to-Mars
- Civil & Commercial Space
- Science Spacecraft
- Remote Sensing, PNT
- MILSATCOM
- Classified Warfighter Support

Who We Are

BREAKTHROUGH SOLUTIONS FOR MISSION SUCCESS

New challenges demand new thinking. The changing landscape and our nation's critical missions demand adaptive, innovative, and accelerated solutions and new ideas. At Axient, we're driven to new solutions for what comes next, whether new approaches, new insights or new technology to advance mission forward. From mission to operations and sustainment to cyber threats, we provide expertise and technical insight that enables customer missions to rise to every challenge.

DELIVERING AT MISSION SPEED

Innovation without responsiveness only solves yesterday's problems. At Axient, we leverage our engineering, customer expertise and proven development process to drive solutions at the speed of mission, to ensure our customers are always ahead of the threat and clear of the challenge.

CONTRACT VEHICLES

- GSA Multiple Award Schedule (MAS)
- GSA OASIS Pools 1, 3 and 4 (JV access to SB Pools 4, 5, and 6)
- US Navy SeaPort Next Generation (NxG)
- US Army AMCOM EXPRESS: Programmatic and Business & Analytical Domain (Strategic Partnership Access to Technical and Logistics Domains)
- Responsive Strategic Sourcing for Services (RS3)
- GSA ASTRO: Research, Space, Development/Systems Integration, and Support Pools
- Access to several Consortium/OTAs

Locations

Huntsville, AL (HQ) • Arlington, VA • Wallops Island, VA • Dahlgren, VA • Washington DC • Greenbelt, MD • Columbia, MD • Pax River, MD • Aberdeen Proving Grounds, MD • Tullahoma, TN • Warner Robins AFB, GA • Eglin AFB, FL • Melbourne, FL • Cape Canaveral, FL • Johnson Space Center, TX • Corpus Christi, TX • Albuquerque, NM • Cannon AFB, NM • Holloman AFB, NM • Yuma Proving Grounds, AZ • Colorado Springs, CO • Hill AFB, UT • Moffett Field, CA • Vandenburg AFB, CA • Armstrong Flight Research, CA • Los Angeles, CA • Pasadena, CA • Glendale, CA • Michoud Assembly Facility, LA • Fairmont, WV

Axient Program Highlight: Hypersonics



Executive Summary

The Arnold Engineering Development Complex (AEDC) operates and conducts developmental testing and evaluation on almost 70 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, arc heaters, and ballistic ranges. Axient provides contract services to fully support aerospace research, development, test and evaluation activities at the AFTC. Work is primarily performed at Arnold AFB, TN, as well as other AF installations and original equipment manufacturer facilities.

Axient has:

- Executed >\$50M in Hypersonic test portfolios across DoD since 2016
- Facilitated and provided test and evaluation (T&E) expertise in test and analysis efforts in Hypersonic testing across AFTC, Commercial Facilities, etc.

Hypersonic Combined Test Force (CTF)

Axient supports the AEDC Hypersonic CTF in its role as the Executing Test Organization (ETO) for all USAF hypersonic programs. Its role is expanding to include testing for MDA, DARPA, etc. ETO roles include program management and technical support and interface, schedule, and coordination of hypersonic requirements, analyses, etc. across the enterprise. Axient supports the Test Resource Management Center (TRMC) in program integration tasks and helps facilitate US hypersonic infrastructure gaps.

CUSTOMER

Air Force Test Center (AFTC)
Arnold Engineering Development Complex (AEDC)

AXIENT'S HYPERSONIC SUPPORT

ARCs/Space & Missile CTF

- Material testing, facility planning, test technique design

Hypersonic Signatures

- Address signature concerns for hypersonic vehicles

Technology Branch

- Hypersonic Test Techniques development (nozzle, inlet, and aftbody integration)

Modeling & Simulation (M&S) Computational Fluid Dynamics (CFD)/ Technology Branch

- Analysis behind current test techniques, predict/understand performance

Wind Tunnels/Flight CTF

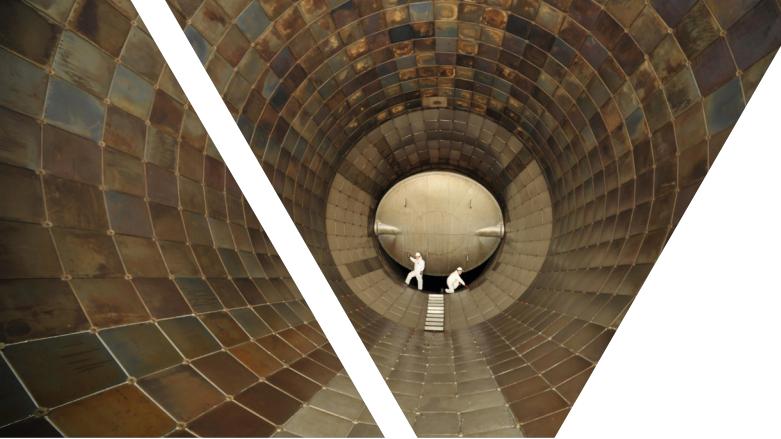
- Aerodynamic, control, heat transfer

Aerodynamic and Propulsion Test Unit (APTU)/Hypersonic Systems Test Branch (TSTH)

- Airbreathing engines, SCRAMJet, inlet, fuel

Test Techniques/G-Range

- Freeflight subscale testing of RV's and scramjets



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Axient Test Engineering & Analyses

- Provide expert Test Engineering and Analysis to ETO and Arnold AFB Participating Test Organizations (PTO) or test Facilities
- Interface planning, Instrumentation requirements, etc. between the OEM and the Participating Test Organization (PTO)
- Analysis Expertise includes:
 - Aerodynamic Analyses
 - Aerothermal
 - Aeropropulsion
 - Stage/Store Separation
 - Weather Erosion
 - Lethality
 - Sensor/Seeker
 - Aero-Optics
 - Vehicle signatures
 - Computational Fluid Dynamics

Axient Hypersonic Test Facility Requirements & Design

Develop design requirements for future test facility (J5) (combustion, heating, cooling, high pressure air, flow nozzle CFD; ARCs material test facility).

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Axient Program Highlight: Unparalleled Launch and Safety Mission Assurance Support to USSF Accelerating Possible.

Launch Mission Assurance Expertise

Axient delivers Launch Mission Assurance to the USSF/SSC National Security Space Launches. Axient has delivered Systems Engineering & Integration expertise for 100+ launches and the certification of 4 Launch systems. We have been a trusted advisor for 10+ years to the USSF customer and the Range of the Future initiative. Our team provides unique expertise through:

- Mission assurance support to Atlas, Delta, Falcon, Vulcan, OmegA, and New Glenn family of launch systems
- Launch vehicle systems engineering
- Launch system risk analysis and joint handling plans
- Analysis, audit, and certification of the design and processes of New Entrant Launch Service Providers (Vulcan, Falcon 9/Heavy, OmegA, and New Glenn)
- Launch range architecture and infrastructure assessment, including modernization & efficiency improvements
- Launch site operations and day-of-launch support
- Mission integration and planning
- Flight critical item analysis, and assessment
- On-site support and insight at launch service provider development, manufacturing, and launch sites
- In depth auditing of manufacturing, quality, logistics, and qualification testing

System Safety Expertise

Axient also delivers system safety throughout every Corp at SMC and across every launch and space system (GP Systems (Ground, User, and Space), SBIRS, DMSP, AEHF, WSF-M, NG OPIR, and FORGE) in operation or development. Specific areas include:

- System Safety Acquisition Expertise
- Systems Safety Anomaly, Hazard Reporting, and Safety Lessons Learned and Sharing
- Systems Safety Policy and Documentation
- System Safety Management Planning
- System Safety Launch and Range Activities
- System Safety Training and Documentation Analysis and Update

CUSTOMER

United States Space Force (USSF), Space Systems Command (SSC)

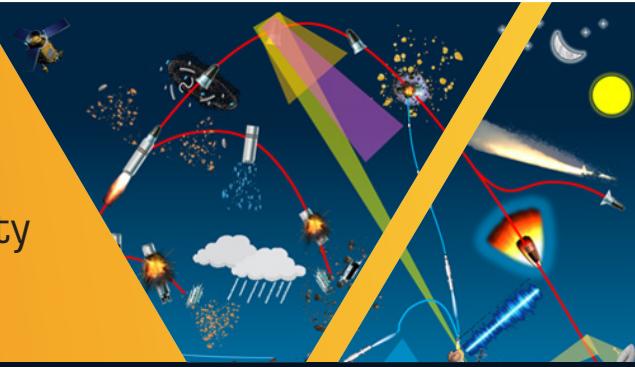
AXIENT LAUNCH AND SAFETY MISSION ASSURANCE CAPABILITIES

- Launch Vehicle Technology – Avionics, Propulsion, Structures
- Program Management
- Mission Integration
- Mission Assurance
- Systems Engineering and Integration
- Requirements Analysis, Decomposition, Verification and Tracking
- Launch Vehicle Qualification and Acceptance Testing
- Launch Site Operations
- Launch Range Environmental Systems
- Risk Management
- System, Space, and Range Safety
- Systems and Cyber Security
- Manufacturing and Quality Engineering
- Logistics Engineering
- Mission Assurance, System Safety, and Certification Training
- Configuration and Data Management

ABOUT AXIENT

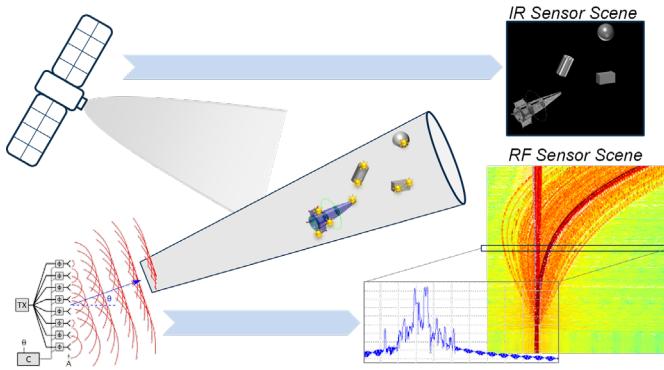
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Axient Capability Highlight: Integrated Sensor-Scene Modeling & Simulation: Physics-Based Unlimited-Scalability Simulation Environment (PULSE)



PULSE Motivation

Single Source of Truth Data: PULSE supports activities across the system engineering “V” by providing a common source of truth data representing the entire fully integrated threat scene. This shared technical framework ensures consistent representation from requirements to design, through HWIL testing, operational testing, and warfighter training and mission planning.



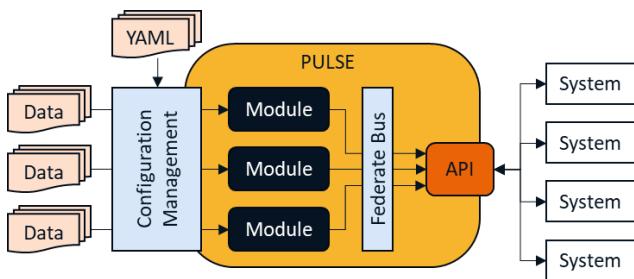
Software Integration Simplification: The IAMD scene is described by a wide range of models that must be integrated into many weapon/missile system simulations which is costly and error prone.

Data Configuration Management: TBs of data comprising hundreds of thousands of files. Decades of data products with dozens of file naming conventions and formats

PULSE Architecture

PULSE employs a federated architecture which offers “best of both worlds” features:

- Integrated threat scene modeling
- Standard interface
- Ease of integration of new capability
- Ability to breakout/deliver individual or subsets of modules as standalone simulations

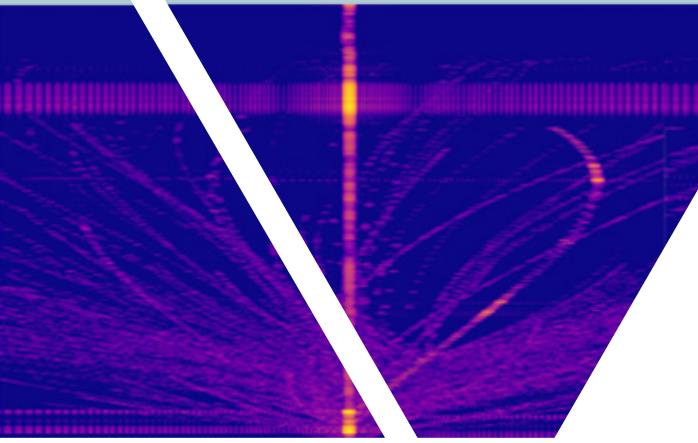


What is PULSE

PULSE is an integrated sensor-scene generation simulation framework providing frame registered sensor truth data for complex scenes. It includes modules that simulate debris, corporate clutter, and other phenomena for a wide variety of integrated air and missile defense applications and hosts a user-defined vehicle model library. Currently hosted vehicle models include the MDA common threat library, Navy Intelligence ATEP models and MSIC OMEGA models. PULSE supports individual RF scatterer, per object RCS, and convolved RF scene output as well as IR signatures and scenes comprising point-sources and resolved images. PULSE provides a framework for SME analysis of threat systems and weapon system performance impacts in an adaptable M&S framework with a federated architecture to allow for fast integration of a wide range of tools for various applications.

PULSE Legacy

PULSE is the culmination of Axient's threat scene over 25 years of threat engineering experience serving the Navy and Missile Defense Warfighter and Intelligence Community by providing high-fidelity, physics-based threat engineering models representing the integrated air and missile defense threat scene. Axient provides advanced engineering solutions in the form of intelligence analysis, threat system engineering and physics modeling, expert systems of systems engineering, sensor prototypes, software, algorithms & models, missile M&S from component to All-Up Round (AUR), US and foreign system experience, and highly specialized scene generation and M&S products for R&D labs, DoD, industry and warfighters. All of these models and simulations are available through PULSE.



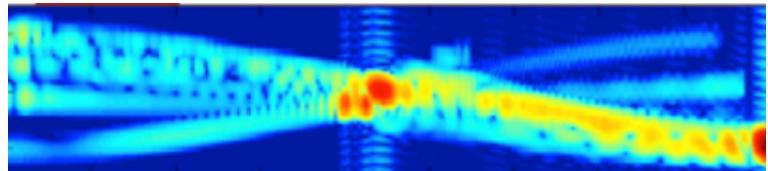
What is in PULSE?

Physics Modules Currently in Software Federation:

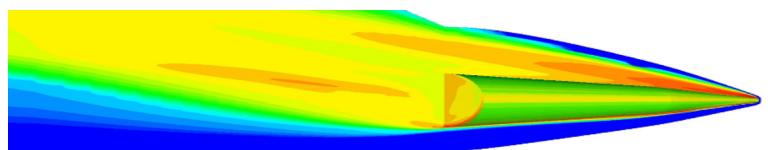
- Principal Object Trajectory: High-fidelity physics-based modeling of principal object kinematics including propulsion, 6DOF Aerodynamics, CAD-based mass properties, and GNC. Supports pre-generated data read from files, trajectory optimization, and fully integrated on-the-fly modeling.



- RF Scatterer/Signature: Modeling of Radar returns of objects in the scene based on a variety of selectable fidelity tools and techniques including method of moments based on detailed CAD models, physical optics approximations, and mathematical models



- IR Signatures: Modeling of IR emissions of objects in the scene as either point-sources or fully resolved images
- Hypersonic Atmospheric Waking: High-fidelity physics-based modeling of RF properties of endo-atmospheric wake characteristics of a hypersonic vehicle. Includes RF signature of the wake itself as well as attenuation of the PO's hard-body signature



- Debris and Clutter Phenomenology: Physics-based modeling of various debris phenomena represented in threat scenes including post-intercept debris, solid fuel, separation hardware, break-up debris, and other sources. Debris is initialized either statistically or using higher fidelity methods and is propagated using selectable fidelity propagators (3DOF, 3+3DOF, 6DOF) and can be down-sampled to improve performance. RF and IR Signatures are calculated using selectable fidelity representations including up-sampling, shadowing, and multi-bounce where appropriate.
- Scene Construction: the RF and IR signatures of objects in the scene can be convolved and returned to sensor simulations through the API.

Where is PULSE?

PULSE and Component Sponsors:

- | | |
|-------------------|-------------------------------|
| • MDA/AB | • DoN M&S |
| • NSMWDC | • IWS 1 (CSTB) |
| • NSWC DD | • MDA/DE |
| • NSWC CDR | • MDA/AB |
| • MIT/LL | • IWS10 (ETB) |
| • JHU/APL | • Kratos |
| • Raytheon M&D | Technologies |
| • Lockheed Martin | • Mitsubishi Heavy Industries |
| • IWS 1 (CSTB) | |

Other Axient-SEG GFI Threat Data Users:

- | | |
|--------------|----------------|
| • MDA/AB | • OASIS/ACSSIS |
| • MDA/DE | • RTSS |
| • LM ATL RSG | • OSF |
| • NGS | • ONI |

About Axient

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Axient Program Highlight: Reliable Expandable Satellite Testbed (REST)

Purpose

REST is a HWIL testbed framework used to support the design, development, and testing of satellite avionics and flight software.

- Configurable: Integrate models of the satellite components to be used in testing of hardware and software elements.
- Expandable: Evolves as your satellite system matures, enabling rapid assessment of future design enhancements and additional missions.
- Adaptable: Maximize investments in one satellite system to provide appreciable cost reductions in building additional satellites.

History

REST was developed by Dynamic Concepts, LLC (DCI), an Axient subsidiary, for a US ARMY Space and Missile Defense Command (SMDC) customer with NASA Marshall Space Flight Center (MSFC) as a supporting partner. NASA provided the ARTEMIS framework software, the first satellite test article, and the associated lab floorspace. The two organizations' main goal was to ensure the Army's and NASA's investments in satellites would be fully integrated and tested prior to deployment in order to ensure mission success. REST leverages the Avionics HWIL testbed framework used to support the SLS Avionics testing. This framework has been and continues to be instrumental in testing the avionics through a number of critical nominal and off-nominal scenarios where many issues were identified and corrected that would have compromised the mission. In addition, the SLS program realized significant cost savings by using the same simulation software running within the framework to satisfy many different integration and test needs across multiple avionics and software test labs. REST is intended to be a low cost instantiation of that concept for satellites.

OVERVIEW

REST is a combination of the ARTEMIS (Advanced Real Time Environment for Modeling, Integration, and Simulation) simulation framework and a suite of generic satellite system models used to integrate a few satellite components and sensors using real interfaces. This reflects the concept of providing a real-time distributed simulation with actual flight software and avionics. REST is designed to be configured to use full suite of models using real system interfaces to assess the Satellite interfaces, and functionality. As real hardware is available, REST can be configured to replace models with the hardware (prototype EDU or production FEU). However, there is important value in using models of hardware because the models provide the ability for assessing off nominal system behavior. This integrated system representation of the satellite enables the assessment of monitoring and control software in a controlled environment.

When performing these tests, REST is designed to record simulation and avionics data and hardware signals for detailed posttest analysis. There is also a suite of tools available for the analysis of the recorded data. The goal is to use this capability throughout the satellite program lifecycle, requirements, design, development and qualification testing, continually evaluating the system and its ability to complete its mission. SMDC and NASA recognize the importance of catching defects early in the program reduces cost and schedule impact and increases mission success.



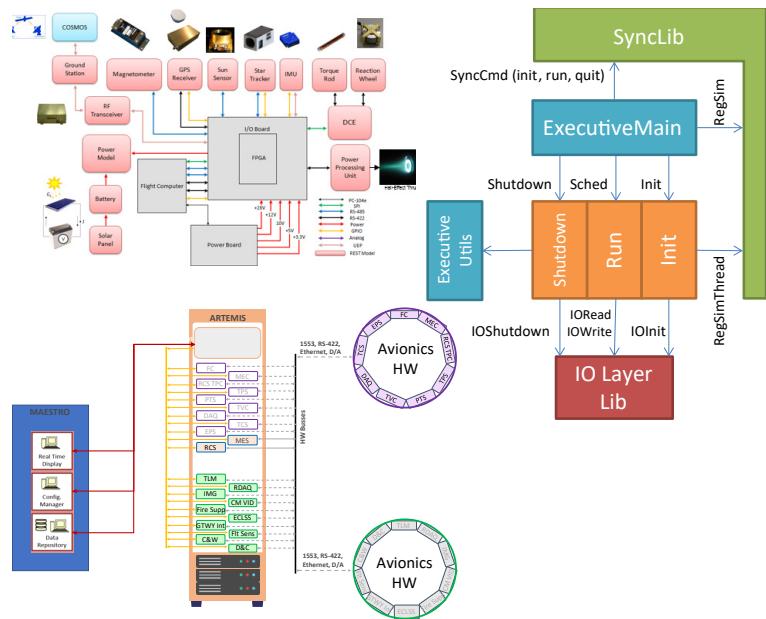
Core Capabilities

Simulation Framework features:

- Simulation Executive that provides a common framework for models to execute and interact.
- Real-time Synchronization & Timing services to control timing, execution, and shared data for distributed executable. In addition it provides the architecture to perform fault insertion.
- Input/Output modules that provide the interfaces to actual and simulated bus hardware (e.g. 1553, RS422, Gigabit Ethernet, Discrete I/O, Analog Sensors)
- Real-time Satellite Simulation models accelerate adaptation for similar application for similar applications Real-time Satellite Simulation models accelerate adaptation for similar application for similar applications
- Real-time data recording of simulation, buses, and HW data.

Simulation Test Operator Interface features:

- Simulation test setup, execution, monitoring, and termination.
- Real-time plots and tabular data of simulation parameters.
- Visualization displays.



Summary

Experience gained across many programs' development cycles has shown that the key to successful development is to integrate early, and integrate often. The REST Simulation Framework and Test Operator Interface provide a foundation for any HW/SW program to enable that to occur. It provides a proven foundation that enables systems integration early in the program using models with real interfaces to feed early system design cycle decisions. As prototype or candidate HW become available, the system enables it to be integrated and assessed as the system transitions from development to testing. This testing can be performed for nominal and off-nominal conditions across the entire mission timeline. The main goal is catch defects early in the lifecycle to avoid the exponential cost and schedule impacts of defects later in the program.

Benefits:

- Proven real-time simulation framework & test operator interface.
- Designed to facilitate reconfiguring the system to swap a model out for a prototype of FEU hardware.
- Provides key insight to the integrated system as the process through development to delivery.
- Reduces program cost & schedule risk by identifying and fixing defects early in the life cycle.

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Axient Program Highlight: Air Force Research Lab (AFRL) R&D Integrated Space Experiments (RISE) Accelerating Possible.

Executive Summary

Our R&D Integrated Space Experiments (RISE) contract with Air Force Research Laboratory Space Vehicles Directorate (AFRL/RV) provides concept design, development, integration, test, launch integration, and operations and evaluation of new space technologies and engineering prototypes. We support a broad range of mission areas including Intelligence Surveillance and Reconnaissance, Position Navigation and Timing, Space Situational Awareness, Space Control, and Weather across all classes (Class 1 "Rapid Sats" to Class 3 "Flagships").

In support of the RISE contract, Axient provides:

- **Program Management**
- **Mission Design:** Analytic modelling of enterprise objective and translation to individual mission formulation; systems engineering translating requirements into initial designs
- **Implementation:** Engineering, including systems, software, and test engineering; systems engineering support; flight hardware design, fabrication and assembly
- **Assembly, Integration, and Test:** laboratory research engineering, design, scheduling test preparation, software and operation; flight payload and experiment integration and test
- **Experimental Demonstrations:** spacecraft launch integration, commissioning and on orbit experimentation; integrated ground experiments, design fabrication and assembly; ground system development, integration, test and deployment; mission planning and operations
- **Technology Transfer** of lessons learned and technology capability to enterprise partners

Current Missions Supported

- Small Satellite Portfolio (SSP): Very Low Frequency Propagation Mapper (VPM), ASCENT, Recurve
- Space Solar Power Incremental Demonstration & Research (SSPIDR)
- Navigation Technology Satellite-3 (NTS-3)
- ESPA Augmented Geostationary Laboratory Experiment (EAGLE)
- Demonstration and Science Experiments (DSX)



COOPERATIVE SMALL AEROSPACE TESTING

Through a Cooperative Research and Development Agreement (CRADA), Axient provides other government agencies and commercial industry access to the AFRL's premier test assets (thermo vacuum chambers, vibration tables, and clean rooms, to name a few) at very affordable costs.

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Axient Program Highlight: NASA's Space Launch System (SLS) Program



Axient's Work on the SLS Program

Axient is the SLS **primary structural loads contractor** providing the following:

- Integrated vehicle and element level loads analysis
- Structure fracture and fatigue analysis support
- Shock and acoustic propagation support
- Vibro-acoustic component loads and spectra development
- Debris impact analysis

Axient is the SLS **primary developer** of the SLS Avionics System Integration Lab (SIL) and the Avionics Real-Time Environment for Modeling, Integration and Simulation (ARTEMIS) tools for NASA's Marshall Space Flight Center. Models and tools include:

- Real-time M&S used for SLS hardware-in-the-loop (HWIL)
- Closed loop physics-based M&S running across multiple computer nodes (multi-CPU) running at 400hz.
- Developed to easily switch models for real HW to support off-nominal
- SLS vehicle emulator deliveries to external organizations used for their development and testing (Launch Control and Crew Vehicle)

ACCELERATING POSSIBLE.

CUSTOMER **NASA**

NASA'S SLS PROGRAM

NASA's Space Launch System, or SLS, is a super-heavy-lift launch vehicle that provides the foundation for human exploration beyond Earth's orbit. With its unprecedented power and capabilities, SLS is the only rocket that can send Orion, astronauts, and cargo to the Moon on a single mission. (NASA Fact Sheet)

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Axient provides **primary guidance**, navigation and control (GN&C) design, modeling, simulation, and analysis, and verification and validation (V&V) for SLS. This work includes:

- Mission design, trajectory design, navigation design & analysis, flight control design & analysis, plant & environmental modeling, liftoff & separation analyses, and Monte Carlo technique
- Model Based Design (MBD) delivery of executable GN&C for SLS FSW

Axient was also the **SLS Ground Systems systems engineering and integration (SE&I) contractor**, providing the following:

- SE&I of the exploration ground system for the SLS vehicle processing
- Verification and validation
- Logistics planning for vehicle processing

DOMAIN EXPERTISE FOR DECISIVE OUTCOMES

CERTAINTY IN PARTNERSHIPS

Locations

Huntsville, AL (HQ) • Arlington, VA • Wallops Island, VA •
Dahlgren, VA • Washington DC • Greenbelt, MD • Columbia,
MD • Pax River, MD • Aberdeen Proving Ground, MD •
Tullahoma, TN • Warner Robins AFB, GA • Eglin AFB, FL •
Melbourne, FL • Cape Canaveral, FL • Johnson Space Center,
TX • Corpus Christi, TX • Albuquerque, NM • Cannon AFB,
NM • Holloman AFB, NM • Yuma Proving Ground, AZ •
Colorado Springs, CO • Hill AFB, UT • Moffett Field, CA •
Vandenburg AFB, CA • Armstrong Flight Research, CA • Los
Angeles, CA • Pasadena, CA • Glendale, CA • Michoud
Assembly Facility, LA •

Axient Program Highlight: Delivering Expertise to the Space Sensing Mission

Development Corps Expertise

Axient delivers expertise to the USSF/SSC Space Sensing mission, critical to our nation's warfighting capability. Our Space Sensing Engineering Expertise includes:

- Development of the enterprise Overhead Persistent Infrared (OPIR) mission threads
- Requirements development and analysis
- Interface management, configuration management, and overall technical baseline management
- Acquisition lifecycle support for sensor subsystems
- Production engineering and quality assurance for Space Based Infrared System (SBIRS) GEO-5 & 6 final testing and launch
- Mission engineering to Environmental Monitoring & Tactical Surveillance missions
- Future OPIR program ground systems development, including data format refinement, concept of operations, ground data management technology adaptation, storage/archive methodology, host-ground operation center integration, and command & data handling telemetry customization

Sustainment Expertise

Axient also delivers expertise to the SSC's PEO for Space Sensing. Our SBIRS Core Sustainment and Logistics Expertise includes:

- Integration support
- Integrated facility baseline management
- SBIRS communication infrastructure engineering support
- Technical management planning
- Systems modification expertise
- Sustainment analysis/studies (supply chain)
- Maintenance data collection/analysis
- Emergency urgent depot level maintenance; includes short-notice deployment to mobile locations

About Axient

With over 2,200 employees, Axient is headquartered in Huntsville, Alabama and has provided premier services and solutions to the Federal Government for more than three decades. Axient's customers include the U.S. Space Force, U.S. Air Force, U.S. Army, U.S. Navy, Missile Defense Agency, and NASA. Axient is certified in the following: ISO 9001:2015, AS9100 Rev D, CMMI-DEV Maturity Level 3, and has a DCMA Purchasing System, DCMA Property System, and DCAA Accounting System.

CUSTOMER

United States Space Force (USSF),
Space Systems Command (SSC)

AXIENT CAPABILITIES

Sustainment Engineering

- Reliability, Maintainability, Availability Analyses (RMAA)
- 24/7/365 Emergency Depot Level Support
- Obsolescence Supply Chain Management

Information Assurance and Cyber

- System Security and Information Assurance
- Tracking Cyber Threats/Capabilities related to Sustainment Enterprise
- Facilities Support - Mods, Database, Upgrades

Space Sensing

- System Integration
- System Design
- Integrated Logistics Support
- Joint Reliability and Maintainability Team
- Engineering Support
- Modeling and Simulation
- Acquisition Planning
- SBIRS and SFP Training System Test and Evaluation

Software Facilities O&M

- Architecture Support, Master Software Library, SW Maintenance System, CM and DM
- Security

Axient Program Highlight: Accelerating Possible for Space Systems Command

Space Sensing

Axient is the prime contractor delivering systems engineering and technical acquisition expertise to the USSF/SSC's PEO for Space Sensing; this includes delivering expertise to major defense programs such as Space Based Infrared System (SBIRS), Overhead Persistent Infrared (OPIR) Next Gen, Evolved Strategic SATCOM (ESS), Weather Systems Follow-on Microwave (WSF-M), and others.

- Acquisition Planning & Development / Cybersecurity
- Systems Engineering / Test & Evaluation
- Concept & Technology Development
- Payload, Spacecraft, & Launch Vehicle Integration
- Ground System Development & Satellite Operations
- Configuration, Interface and Data Management

Assured Access to Space

Axient is the prime Systems Engineering & Integration contractor responsible for New Entrant Certification of the ULA Vulcan and Blue Origin New Glenn launch vehicles.

- Systems / Project / Quality & Manufacturing Engineering
- Risk & Process Management / Validation and Verification
- Launch Site Operations
- System, Range, and Orbital Safety

Military Communication, Position Navigation, & Timing (PNT)

Axient also delivers expertise to the SSC's PEO for Comm & PNT providing systems engineering & cybersecurity services

- Acquisition Systems Program Security
- Architecture, Requirements Management, & Verification Planning
- OPSEC, INFOSEC, COMSEC, PERSEC, and Industrial Security
- Hazard Analysis, Reliability & Maintainability Engineering
- Program Protection Planning & Risk Management Framework
- Failure Modes & Effects Analysis (FMEA)
- Mission Systems Assessment and Authorization (A&A)

Space Systems Integration Office

Axient is the prime contractor delivering systems engineering and technical acquisition assistance to enable SSC to integrate system of system integration across the field command.

CUSTOMER

United States Space Force (USSF),
Space Systems Command (SSC)

ENTERPRISE CAPABILITIES

- Digital Engineering
- DOORS Administration
- Requirements Baseline Management
- Tools and Interface Support
- Data Management
- Integrated Logistics Support

Concept Development & Testing

- Operations Concept (OPSCON) Development
- Modeling and Simulation Performance Analysis
- Campaign-level Modeling
- Software Testing
- Lead Development Test Organization (LDTO) Support

Mission Assurance

- Multi-discipline Specialty Engineering
- System Safety
- Data Management
- Environmental
- System Security & Information Assurance
- Risk Management

About Axient

With over 2,200 employees, Axient is headquartered in Huntsville, Alabama and has provided premier services and solutions to the Federal Government for more than three decades. Axient's customers include the U.S. Space Force, U.S. Air Force, U.S. Army, U.S. Navy, Missile Defense Agency, and NASA. Axient is certified in the following: ISO 9001:2015, AS9100 Rev D, CMMIDEV Maturity Level 3, and has a DCMA Purchasing System, DCMA Property System, and DCAA Accounting System.

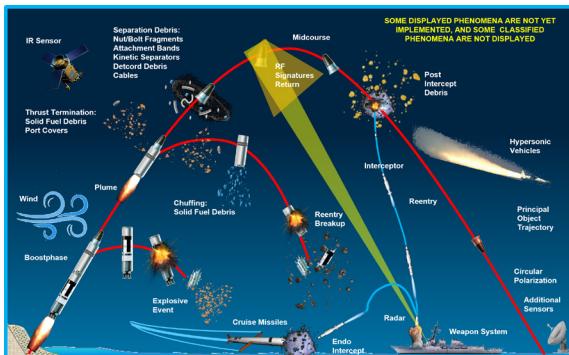
Axient Capability Highlight: Threat Engineering

Developing a characterization of the adversary threat, with fidelity, to drive weapon system design to meet operational needs.

Why Threat Engineering?

Threat data and models are needed for design and test of defensive weapon systems.

- DoD is working to counter all threats through the acquisition of defensive weapon systems (software and hardware).
- Design of defensive weapon systems to counter threats requires threat information at all phases of development:
- Conceptual phase – general threat metrics are needed.
- Requirements development – requires detailed threat information and low/medium fidelity data and tools.
- Detailed design – requires high-fidelity threat data and simulations.
- Requirements verification – verified using high-fidelity threat data and simulations.
- Test and evaluation – high-fidelity threat data, simulations, and test targets.

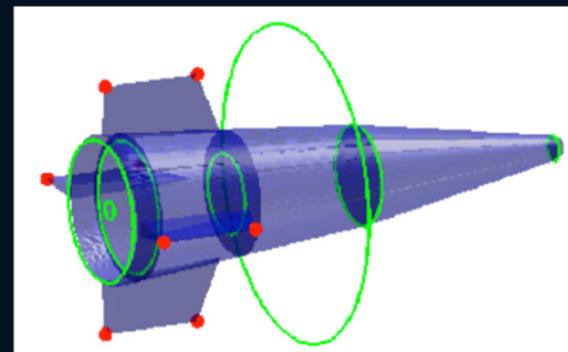


Threat engineering is an essential part of the development of a weapon system and provides the data and models necessary to support each phase of development.

- Fidelity must match the analysis tools used by the designer and must capture all phenomena that can be observed by the weapon system.
- Threat engineering requires capability in many different disciplines to successfully represent all aspects of the threat and environment.
- This requires knowledge of all information available, including understanding unknowns and uncertainties, to be successful.
- Axient's focus has been primarily on missile related threat systems.

Axient threat models are developed under the cognizance of the Intel community and government customer. They are reviewed and approved by both parties before acceptance. Once accepted by the government, the data may be released to weapon system designers to support the development lifecycle of the weapon system and continue to verify performance capability against emerging threats.

Axient data and models are unique because they provide the highest level of fidelity available when necessary. Tools and processes have been developed by Axient that allow for development of composite-fidelity models. The composite models allow for an excellent compromise of high fidelity while meeting cost and schedule.



About Axient

With over 2,200 employees, Axient is the result of the merger of four leaders in the defense and civil markets: QuantiTech LLC, Millennium Engineering and Integration LLC, Systems Engineering Group, and Dynamic Concepts LLC. Axient is headquartered in Huntsville, Alabama and has provided premier services and solutions to the Federal Government for more than three decades. Axient is certified in the following: ISO 9001:2015, AS9100 Rev D, CMMIDEV Maturity Level 3, and has a DCMA Purchasing System, DCMA Property System, and DCAA Accounting System.



SEG's Threat Engineering Characterizations Include:

Design

- Through coordination with intel agencies such as NASIC, Axient's design team gathers all available intelligence information on a given threat.
- Intel gaps are filled through engineering judgment, analysis, and research.
- Final threat design is provided to other engineering disciplines to develop threat models and data.
- Products include: intelligence compendiums to document all related intel on the threat system that was used to produce the threat models.

CAD

- Key Tools: Solid works, Creo, and NX for solid modeling. FEMAP, ModelMan, CrossCheck, and Pointwise for meshing, edge, and ILDC file creation.
- CAD models feed development of other engineering characterizations such RF signatures, CFD, infrared (IR), and mass properties for flight models.
- Products include: solid models, line drawings, meshed models, and documentation.

RF Signatures

- Key Tools: Xpatch, SENTRI, CICERO, Scattering Center Extraction (SCEX).
- Development of 4Pi Steradian RF signature field data through the use of Xpatch, SENTRI or CICERO electromagnetic software for each configuration of a threat system.
- Generation of field data through measurements in anechoic radar chambers.
- Direct use or comparison of flight test data collects and chamber measurements to enhance RF signature models and perform V&V of those models.
- RF signature model variations (size, material type and thickness, etc.) to account for Intel uncertainty.
- Development of 3-D scattering center models to compress field file data by 100 fold for use in simulations and hardware in the loop applications.
- Products include: field file data, 3-D scattering center models, and documentation.



Trajectory

- Key Tools: GENESIS and SEG6DOF kinematic flight simulations; DATCOM, CART-3D, and Kestrel for aero-predication; Various Monte Carlo tool suites to provide variation to individual trajectories to account for Intel uncertainty.
- Characterization of missile concepts-of-operation (CONOPs) through boost phase, mid-course, and terminal flight. Captures kinematic capability of missile system.
- Generation of kinematic data for all missile configurations (e.g., boost phase, spent boosters, reentry vehicles, etc.).
- Flight test reconstruction analysis to benchmark and validate flight models.
- Products include: kinematic data files for all configurations of the threat system and executable flight models that are able to produce trajectory data given user inputs.

Phenomenology

- Key Tools: DebrisSim for debris modeling. TMCAT for clutter modeling. WakeSim and PHANTASM for RF wake modeling.
- Debris can contribute significantly to the overall scene of a threat missile system. DebrisSim is able to characterize thrust termination debris, chuff, separation debris, post-intercept debris and reentry break-up debris.
- TMCAT can provide a high fidelity representation of the radar scene for Aegis BMD with fully correlated trajectory and RF signature returns.
- A hypersonic vehicle moving though the atmosphere will ionize the atmosphere and stream ablation products from the vehicle's exterior. This may cause a significant perturbation to the hardbody RF signature returns and must be characterized to supplement the hardbody-alone response.
- Products include: input files to run the DebrisSim, TMCAT, and WakeSim tools in addition to documentation.