



Exceptional
service
in the
national
interest

We perform R&D to advance flexible, extensible, and robust large-scale software applications for remote sensing system-level simulation as well as real-time remote sensing ground station data processing that transform data to knowledge enabling our customers to take action with confidence.

1

Contact:

Aaron Niese
505.844.8365
adniese@sandia.gov



Remote Sensing System-Level Simulation Capability

This capability includes the exploration, architecting, design, development, and verification/validation (V&V) plus uncertainty quantification (UQ) of both static and dynamic stochastic models integrated into simulation frameworks with the corresponding analysis tools and visualizations that can be applied to a variety of missions. This capability extends across the spectrum of real-time lower fidelity solutions suitable for system-level trade study and performance assessments to higher fidelity solutions suitable for system-level analysis, simulation-based test injection, and formal V&V.

Capabilities:

Modeling of:

- Nuclear weapon source signals
- Signal propagation through atmosphere
- Orbital mechanics of multiple satellite constellations
- Sensors and on-board processing
- Communications and downlinks
- Flexible and customizable sensors definable using Lua

Simulation engines:

- High-fidelity to lower-fidelity real-time
- Monte Carlo based with UQ
- Optimal spatial sampling
- Parametric study design to analysis

Data visualizations and charting:

- 2D and 3D with statistics
- Global heat maps with statistics

Analysis:

- Global, regional, and point performance
- Instantaneous or time averaged perf.

Real-Time Remote Sensing Ground Station Data Processing Capability

This capability includes the exploration, architecting, design, development, and testing of software covering the areas of collection, processing/exploitation, and dissemination optimized for high assurance operational environments. Collection includes sensor telemetry data acquisition, extraction, and processing. Processing/exploitation includes mission algorithm development for event identification, correlation, classification, and confirmation as well as system state of health monitoring and analysis. Dissemination includes application process orchestration and system control, data persistence, user interface and experience, visualization and message management.

Software Engineering Capabilities:

- Agile scrum-based processes
- Mission algorithm development
- Core infrastructure development
- User interface design to realization
- Test-Driven Development (TDD)
- Software architecture & design

Technology Capabilities:

- C++ application software
- Java user interface software
- Java Native Interface (JNI) C++ binding
- Python analysis tools & scripts
- Portable XML data bindings
- Advanced Message Queuing Protocol (AMQP)
- Object-Oriented database storage