

RISS Scene Generator

A high-fidelity, real-time infrared/electro-optical scene generator for reactive hardware-in-the-loop sensor testing

RISS: Real-time IR/EO Scene Simulator

RISS Scene Generator provides the spectral, spatial, and temporal fidelity necessary for hardware-in-the-loop testing of infrared sensor systems. The frame output of the scene generator is configurable to match the characteristics of the sensor system under test including: frame size, frame rate, spectral band, pixel resolution, and field of view. Image pixel radiance is calculated on a frame-by-frame basis. These calculations account for the relevant contributions from the sky, sun, targets, terrain, and atmosphere as functions of the position and orientation of the sensor and the other objects in the test scenario. The digital output can be formatted for direct injection into receiver/processor hardware or to drive an infrared projection system.

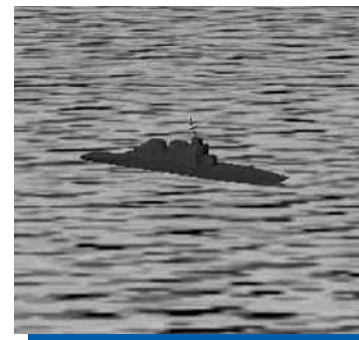
The high fidelity output and programmability of the **RISS Scene Generator** supports a wide range of test objectives for EOIR sensors including:

- Missile Approach Warning Systems
- Forward Looking Infrared (FLIR) Systems
- Imaging Infrared (I2R) Seekers
- Infrared Search and Track (IRST) Systems

RISS Scene Generator provides GUI-based control of all aspects of real-time simulation and hardware-in-the-loop testing. Graphical user interfaces are provided to control, configure, and visualize the real-time test environment.



Example of Multi-Node RISS Scene Generator Hardware



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Simulation Control

An operator control panel is provided to support the loading and execution of real-time test scenarios. It features interactive control of scenario execution, the simulation clock, and selection of the test scenario.

Situation Display

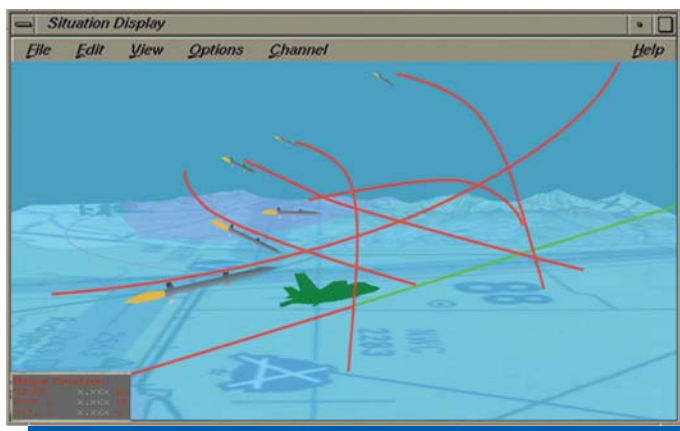
A 3-D situation display provides 3-D rendering of the terrain database, visualization of player and site symbology and trajectories, eye point selection, controls for scaling, zooming, and rotation, and visualization of the unit under test FOV

Simulation Set-up

A graphical user interface is provided for configuring all hardware-in-the-loop assets for real-time testing. The interface is designed to allow laboratory specific configurations of scene generation hardware, projection or direct injection devices, and external interfaces.

Real-time Data Collection

The data collection interface allows recording of simulation events, player motion, and external control data (i.e., kinematics), as well as single frame image capture.



For more information, please contact:

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RISS Scene Generator Design

RISS Scene Generator was designed specifically to address the requirements of EOIR scene generation. Real-time sensor stimulation requires a high level of fidelity (scene quality and radiometric content) and large frame sizes at high frames rates. Features of the **RISS Scene Generator** that meet these requirements include:

- Physics-based, radiometric processing with 32-bit floating-point precision
- Programmable frame rate and frame size synchronized to the unit under test
- High-speed digital output to drive optical projection and direct-injection systems
- Image output with 16-bit pixel radiance precision
- Consistent anti-aliasing processing for accurate pixel radiance values
- Deterministic high frame rate processing (200Hz)
- External control and kinematic interfaces for closed-loop reactive testing
- Synchronization interface for time and space coherent, multi-channel, multi-sensor stimulation
- Use of valid EOIR target, background, and atmospheric models

Graphics System Options

RISS Scene Generator is compatible with a wide variety of commercial graphics systems from many manufacturers. It can utilize hardware at any price point, from low cost desktop systems to advanced multi-node graphics clusters. The selection of a graphics system depends on the objectives of the test facility. Lower cost systems can be used for high fidelity non-real-time applications, or for lower fidelity man-in-the-loop applications. Multi-node systems are used when large frame sizes, high frame rates, and the highest fidelity are required. Since the fidelity and throughput limits are defined by hardware choices, a RISS system can be configured to meet the needs of any facility - from the smallest lab to the largest multi-spectral, multi-sensor Installed Systems Test Facility.

