

A CASE STUDY: RT LOGIC HARDWARE-IN-THE-LOOP GENERATION OF PRECISION RF/IF SIGNALS

Challenge:

- High-fidelity test and evaluation of communications systems can be dangerous, expensive or require assets not yet deployed.
- Analysis of worst case scenarios that contain hypothetical conditions not easily replicated.
- Users may not possess the scientific knowledge or algorithms to model and simulate high-fidelity tests.

Solution:

AGI's STK Engine software, used in complement to RT Logic's product:

- Reduces development time, cost and risk.
- Leverages a high-fidelity geometry engine for modeling platforms.
- Incorporates accurate 3D visualization within a customizable GUI.
- Maintains the flexibility required to address future enhancement.
- Provides full flight testing without leaving the ground.

Results:

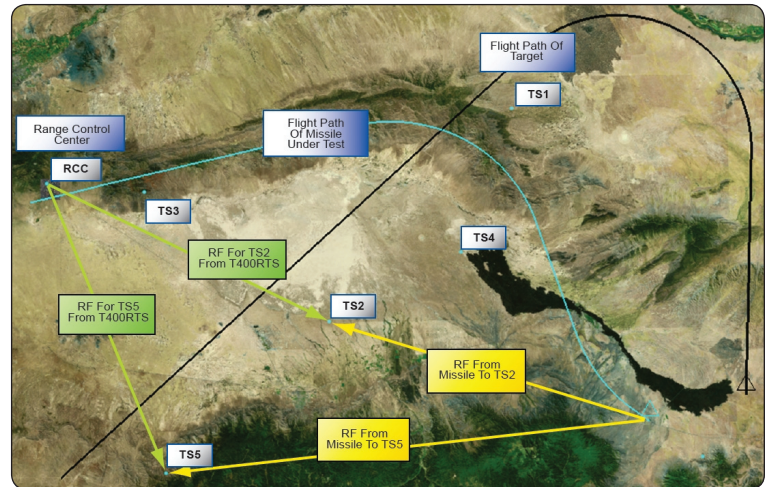
- Reduced time-to-market with Telemetrix® product line.
- Eliminated the requirement for user expertise in channel models, propagation effects or astrodynamics.
- Successfully deployed a complete communications system verification product that generates RF/IF signals indistinguishable from an actual mission.

INDUSTRY CHALLENGE

Flight system and ground system testing for UAV, missile and target applications can be both dangerous and expensive. If the tracking system experiences a telemetry loss, the mission may fail due to indecipherable data. Or worse, the platform may need to be prematurely destroyed to ensure range safety.

Additionally, there is the challenge associated with testing space-based communication systems or assets that are not yet deployed. Testing a system in these environments requires an in-depth understanding of the scientific algorithms associated with modeling trajectories, propagation effects and astrodynamics. The test can be further complicated by the need to validate a communication system with a mix of operational equipment and simulated equipment.

RT Logic, a wholly owned subsidiary of Integral Systems, Inc., is a leading provider of ground system components and test instruments with an emphasis on satellite and range opera-



tions. Through their experience with RF/IF test and measurement, RT Logic identified a need to conduct low-cost, stationary evaluations.

SOFTWARE SOLUTION AND RESULTS

RT Logic selected AGI'S STK Engine to complement their Telemetrix® product line. The seamless integration of AGI software allowed RT Logic to significantly reduce its time to market with a precision channel simulator that generates RF/IF signals indistinguishable from an actual mission. Not only did AGI's development tool kit reduce development time, cost and risk, the software provided RT Logic with the flexibility they required to address future enhancements to their product line.

By controlling the Telemetrix channel simulator through AGI's time-dynamic geometry engine, RT Logic eliminated the need for users to possess expertise in channel models, propagation effects or astrodynamics. Both simple and complex test scenarios are designed to produce high-fidelity, hardware-in-the-loop simulation. The resulting tests incorporate Doppler shift, range attenuation, interference, obscura, range delay, etc.

The combination of RT Logic's true channel simulator with AGI software has resulted in a product that creates a true-to-life test environment. Operating these products in tandem allows users to conduct significantly more extensive tests and experience dramatic decreases in both test and total system design costs.



GENERAL INFO & SALES

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Analytical Graphics, Inc. (AGI) develops physics-based software that computes and depicts the relationships among moving objects over time. Space, defense and intelligence community professionals use it to model, simulate and operate Earth- and space-based systems. The software can be purchased as ready-to-use applications or development tools with flexible pricing and licensing options.