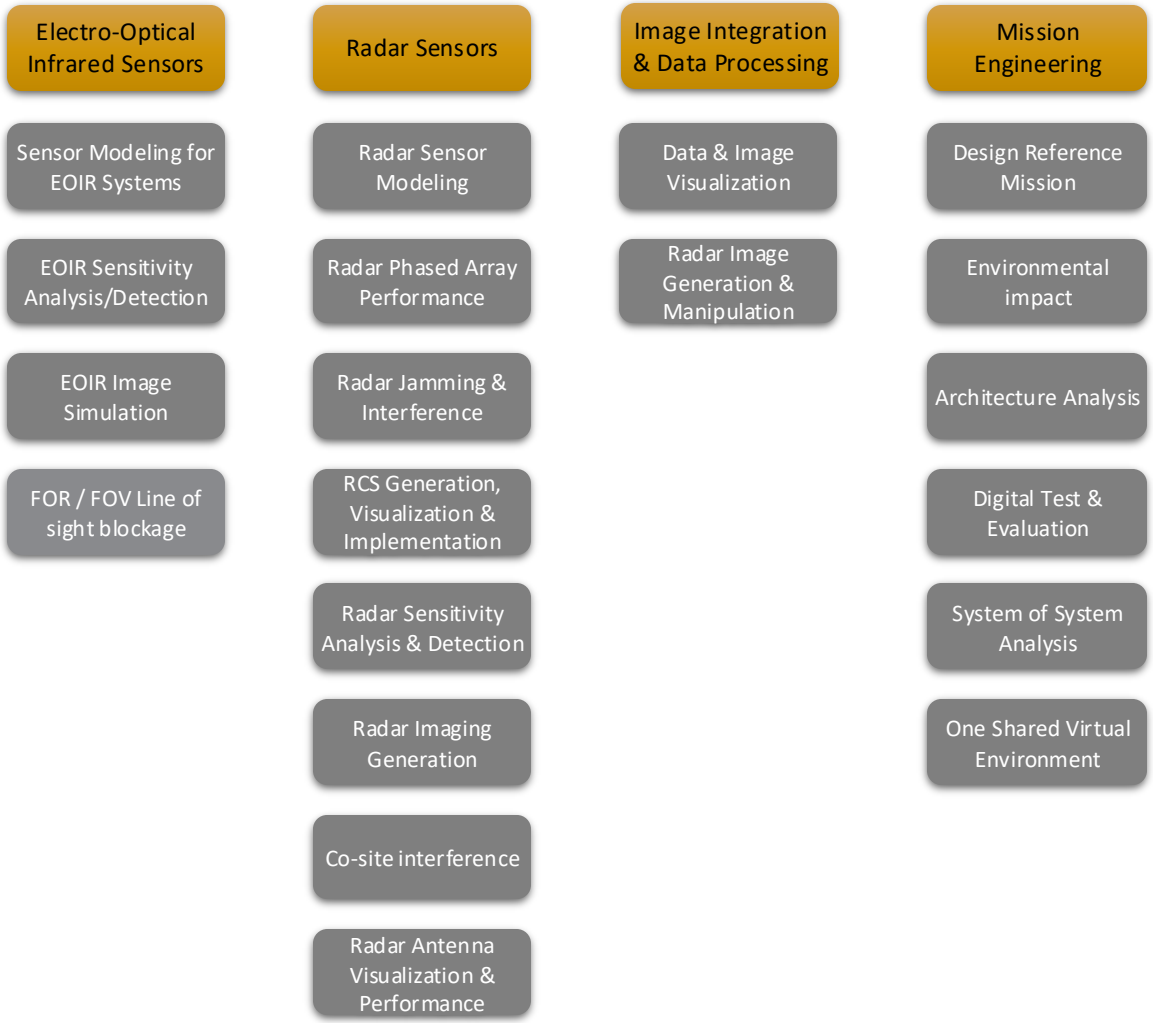
Powering Innovation That Drives Human Advancement

Remote Sensing and Imaging – Ansys Solution Overview

Remote Sensing & Imaging Solutions



Remote Sensing & Imaging – Solution-Product Matrix

Learn more about Ansys products at: https://www.ansys.com/products

Solution Areas	Ansys Systems Tool Kit® (STK®)	Ansys RF Channel Modeler™	Ansys Discovery™	Ansys Mechanical™	Ansys HFSS™	Ansys Perceive EM™	Ansys ModelCenter®	Ansys Thermal Desktop™	Ansys Zemax OpticStudio®	Ansys Speos®	High Performance Computing
Electro-Optical Infrared Sensors	●			●				●	●	●	
Radar Sensors	●	●	●		●	●					●
Image Integration and Data Processing	●	●			●	●					
Mission Engineering	●	●			●		●				

/ Increased Collaboration; Faster Innovation; Customized Workflows; Optimization; Cloud & HPC

Electro Optical/Infrared (EOIR)

Sensor Modeling for Electro-Optical Infrared Systems in Space

Challenge

EOIR sensors are typically the primary payload and mission of many space-based and space monitoring systems. As such, modeling these sensor systems helps engineers:

- Balance essential mission performance characteristics with highly constrained system limitations of power, budget, space, and mass.
- Carefully generate requirement specifications for custom made components that will need to integrate with the overall system to meet mission satisfaction criteria.

Solution

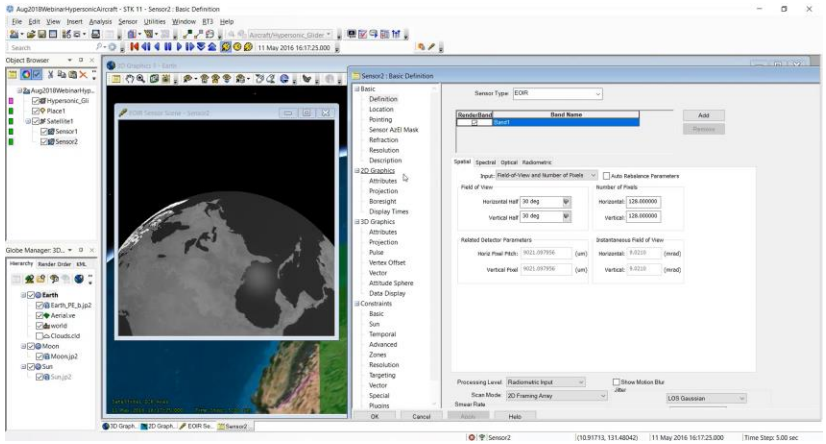
Utilize STK with EOIR to model EOIR sensor systems to:

- Estimate or demonstrate, with a complete digital framework, the effectivity of the overall system performance.
- Rapidly evaluate or generate complete proposal system designs with an objective non-proprietary physics engine.
- Design, optimize, or adapt a sensor system from scratch or with updated factory information to have the most relevant and current system performance characteristics.

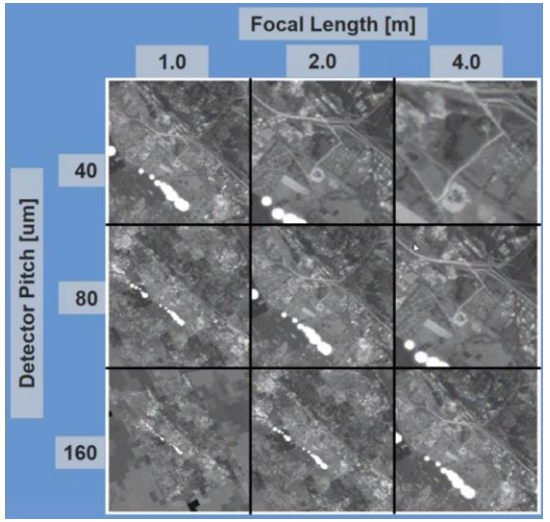
Benefits

Legacy sensor modeling has traditionally been proprietary, limiting the ability and flexibility to update designs and overall system performance characteristics. With STK and EOIR engineers have:

- Regularly up-to-date COTS software.
- Simple and flexible interface for both interactive users through a GUI and for automation via a complete API.



A complete system to rapidly prototype sensor modeling in real-time with both simulated imagery and performance metrics.



Support EOIR sensor trade studies and requirement development and verification.

Applicable Products: Ansys Systems Tool Kit® (STK®)

Electro-Optical Infrared Sensitivity Analysis & Detection in Space

Challenge

One of the greatest difficulties in designing or operating an EOIR system is determining the limits of performance. Challenges include:

- Determine performance for nominal operations.
- Determine and compare the capabilities of various EOIR systems for tasking high priority collections.
- Determine the tasking parameters of a specific EOIR system for a special collection.
- Convert performance parameters to physical parameters for easier system capability characterization and tasking.

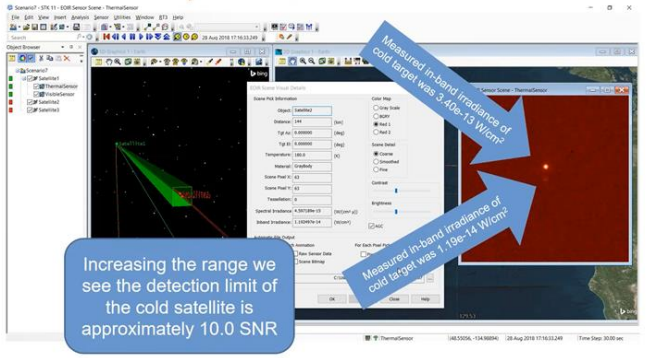
Solution

Utilize STK with EOIR to:

- Simulate operational conditionals and collect on targets of interest utilizing prebuilt or custom models and materials.
- Adjust sensor and environmental collection settings to determine performance characteristics and sensitivity limits.
- Generate test data with parametric target, collection condition, or sensor settings to feed to analytic engines, analysts, operational exploitation algorithms, or to train new algorithms.

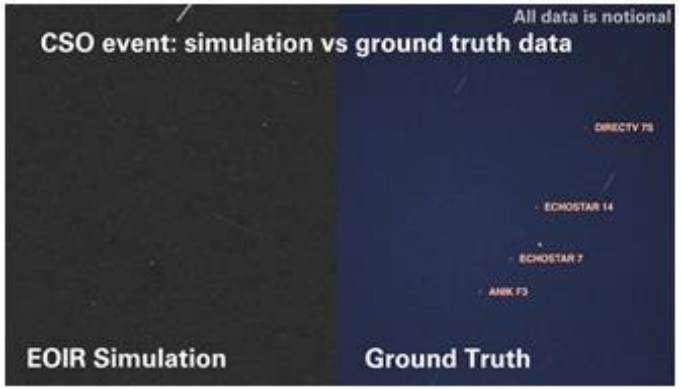
Benefits

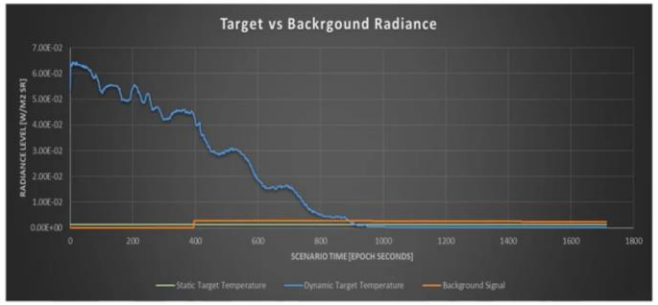
- A complete software framework with example analysis for customers to immediately utilize for sensitivity analysis, performance characterization, and exploitation analysis. Saves time, reduces risk, and integrates disparate inputs into a single analytical capability.



Radiometric verification for sensor performance and target detection.

Ground truth verification for target detection and sensitivity analysis.





Radiometric metrics for target detection with dynamic background and collection condition sensitivity analysis.

Applicable Products: Ansys Systems Tool Kit® (STK®)

Electro-Optical Infrared Image Simulation for Space Applications

Challenge

Simulating imagery for a variety of platforms and payloads is an essential task for designing, building, and operating imaging systems:

- Understand the qualitative and quantitative requirements for early system design
- Perform trade studies for critical system components, parameters, and tasking/collection methodologies.
- Support system initialization and calibration as well as performance prediction and forensic analysis.
- Design and optimize processing and exploitation algorithms.

Solution

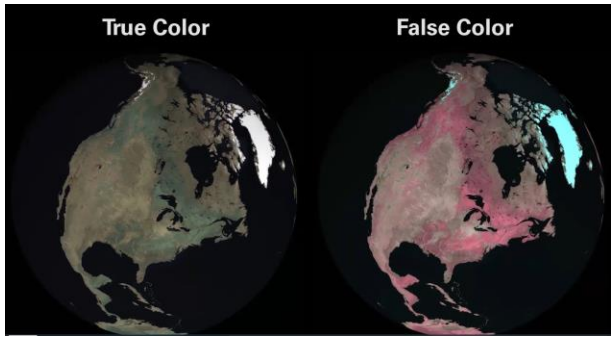
Utilize STK with EOIR to simulate imagery in order to:

- Quickly model systems with simple to sophisticated parameters and generate representative simulated imagery.
- Show expected system performance with operational targets of interest and imaging conditions such as atmosphere, clouds, and backgrounds.
- Train operators, analysts, and algorithms with imagery before the system is constructed and operating or before critical missions or special collections.

Benefits

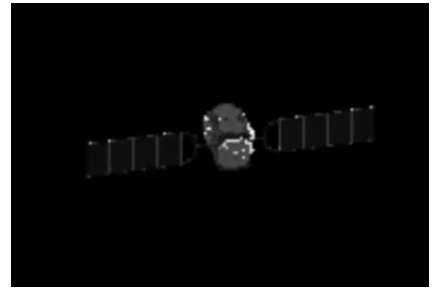
Integrated solution to simulate imagery taken from land, sea, air, or space looking in any direction under any circumstances to allow users to see what a low cost to billion-dollar system would generate:

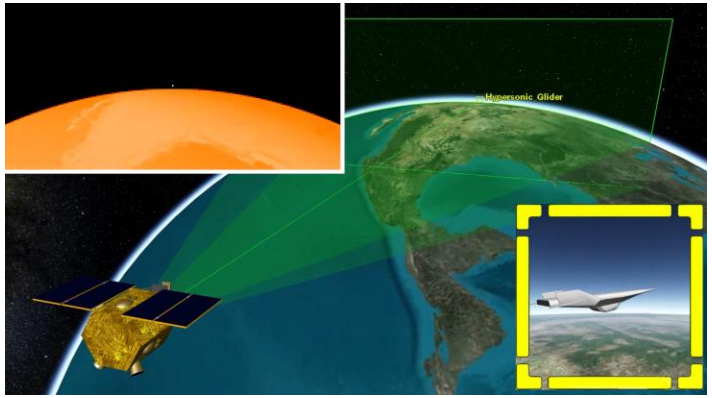
- Optimize early designs to maximize performance and minimize risk.
- Allow users to support the entire life-cycle with digital mission modeling from a single tool capable with limitless integration flexibility.



Simulate accurate high fidelity spectral image products.

Simulating imagery of custom target geometric, material, and thermal characteristics.





Generate radiometrically accurate simulated imagery combining external radiometric, thermodynamic, and signature models with STK EOIR's target, atmospheric, celestial, and terrestrial models.

Applicable Products: Ansys Systems Tool Kit® (STK®)

Line of Sight Blocking & Obstructions

Challenge

When designing aerospace platforms many components can potentially interfere with each other, from physical obstruction to electromagnetic interference, impacting the system performance capabilities, such as:

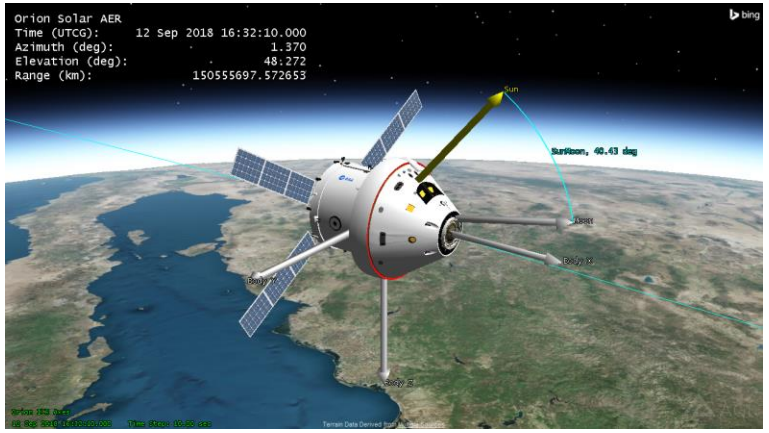
- Physical pointing and articulation restrictions.
- Thermal nearfield interference.
- Stray light interference.
- Optical distortions.
- Exclusion and keep-out angles.

Solution

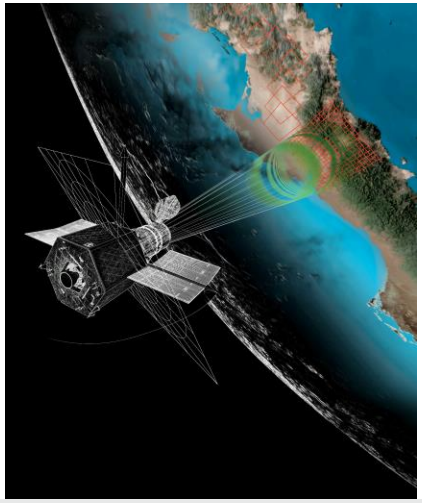
- Simulate a complete space system with astrodynamics, environmental interactions, and time-dynamic system-to-system and coordinate subsystem interactions (STK):
  - Assess the interactions with the sensor systems for potential Field-of-Regard (FOR) or Field-of-View (FOV) direct physical restrictions.
  - Generate complex thermodynamic nearfield environment for infrared sensors.
  - Characterize stray light impact on payloads from structures and time-dynamic and attitude dependent illumination conditions.
  - Generate complex pupil functions to calculate the diffraction pattern of the optomechanical design.
  - Model and track exclusion angles either for geographic/political restrictions or safety/radiation concerns.

Benefits

- System designers and operators can model the additional interactions that cause FOR/FOV issues as they are discovered in design or operations, depending on the phase of the lifecycle, allowing higher-fidelity performance prediction than less rigorous models.



Simulating astrodynamics and attitude control while considering environmental time dynamic conditions.



Combining satellite configuration and thermodynamics modeling with accurate tasking and targeting parameters when imaging allows accurate stray light and nearfield thermal interference estimates.

Applicable Products: Ansys Zemax OpticStudio®, Ansys Mechanical™, Ansys Systems Tool Kit® (STK®), Ansys Thermal Desktop™ , Ansys Speos®

Electro-Optical Infrared Sensors – Solution-Product Matrix

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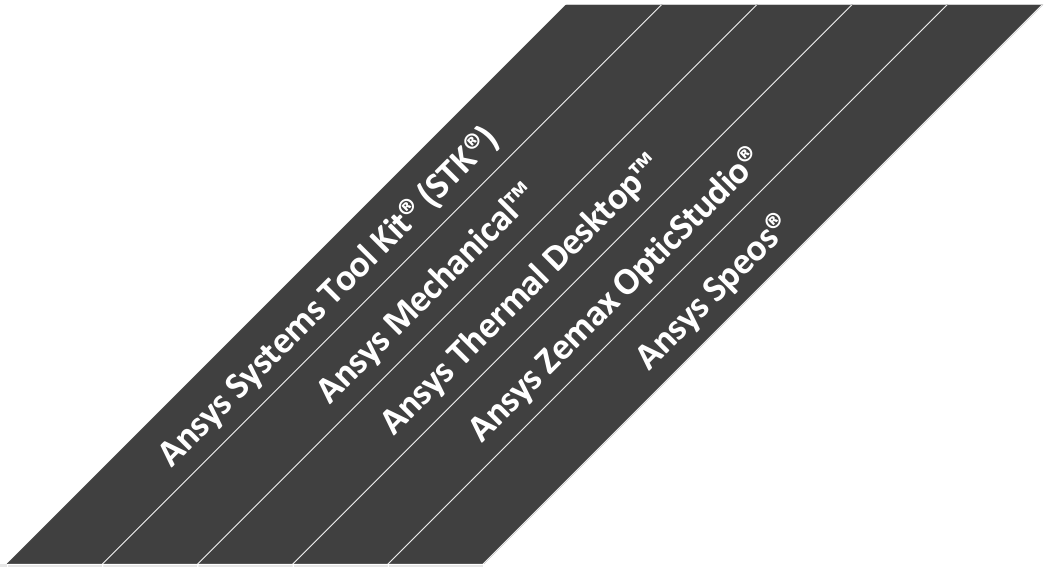


Applications					
Sensor Modeling for Electro-Optical Infrared Systems in Space	●				
Electro-Optical Infrared Sensitivity Analysis & Detection in Space	●				
Electro-Optical Infrared Image Simulation for Space Applications	●				
Line of Sight Blocking & Obstructions	●	●	●	●	●

/ Increased Collaboration; Faster Innovation; Customized Workflows; Optimization; Cloud & HPC

Radar Sensors

Radar Sensor Modeling

Challenge

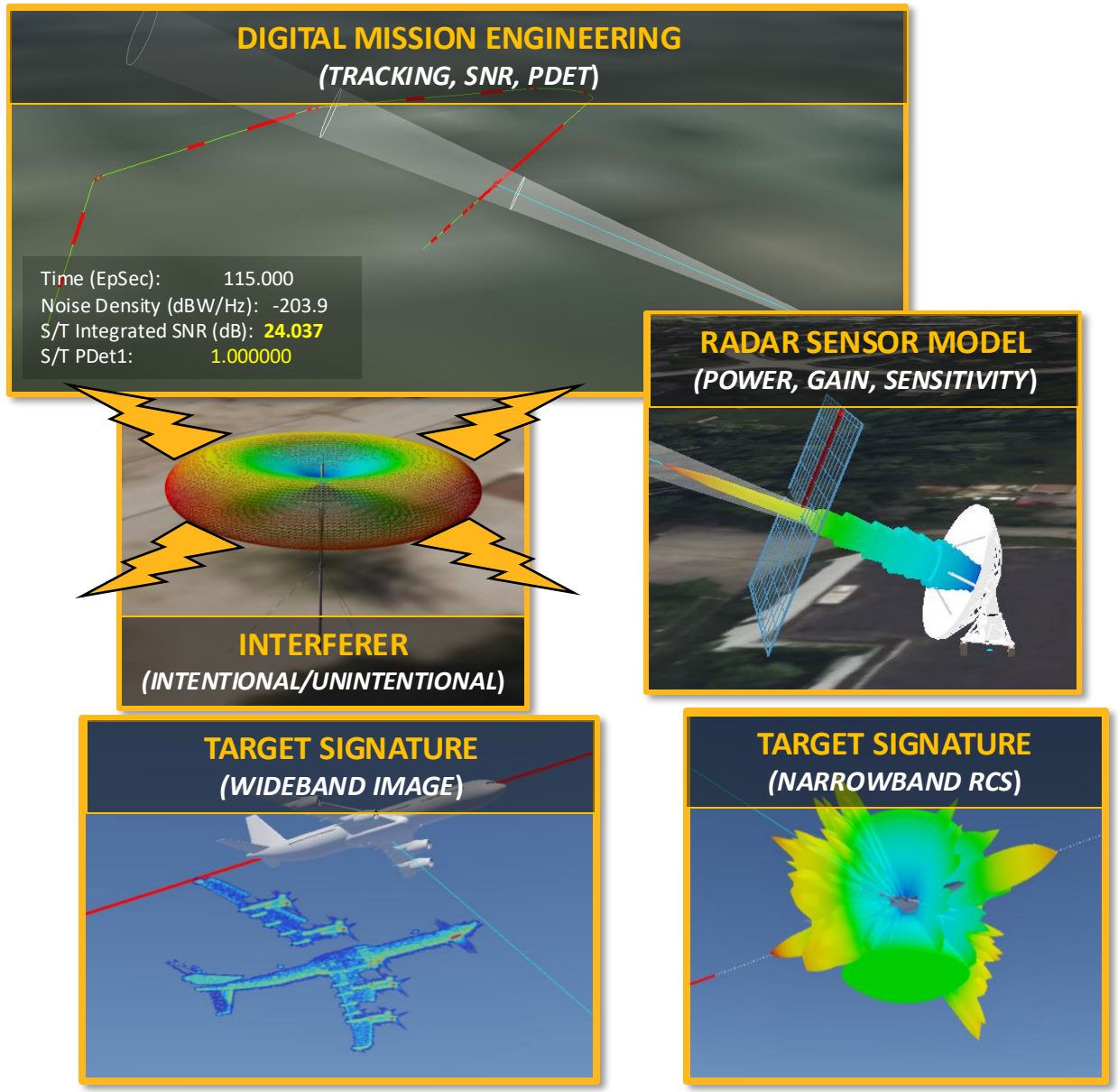
- **NEED** to fully model radar system integration, platform geometry, antenna behavior, target positioning, and environmental influences.
- **NEED** to evaluate operational employment of candidate radar systems against realistic targets.

Solution

- **MODEL** all primary capabilities of radar systems, antennas, propagation factors, target RCS, and receiver performance.
- **VISUALIZE** radar employment and operations against realistic targets for performance confirmation and customer advocacy.
- **CONDUCT** radar system Analysis of Alternatives vs. approved threat scenarios to assess Measurements of Effectiveness.

Benefits

- **DESIGN** REFERENCE MODEL (DRMs) support radar system design, development, employment, sustainment, and modernization.
- **DIGITAL representative models** and virtual scenarios confirm design options and requirement satisfaction.
- **DIGITAL ENGINEERING** helps discover product weakness through virtual testing and streamline mitigation options.



Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys HFSS™, Ansys RF Channel Modeler™, Ansys Perceive EM™

Radar Phased Array Modeling

Challenge

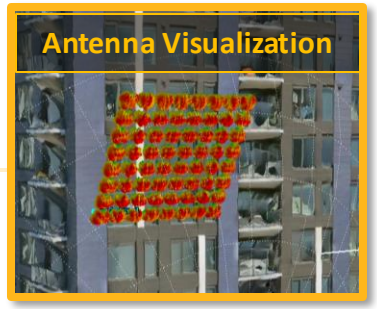
- **MODEL** Phased array hardware (frequency, spacing, pattern).
- **DEMONSTRATE** how antenna gain pattern changes as phased-array steers off the mechanical bore site.
- **DEMONSTRATE** phased array **operations** in realistic scenario.
- **DEMONSTRATE counter-jamming** capability.

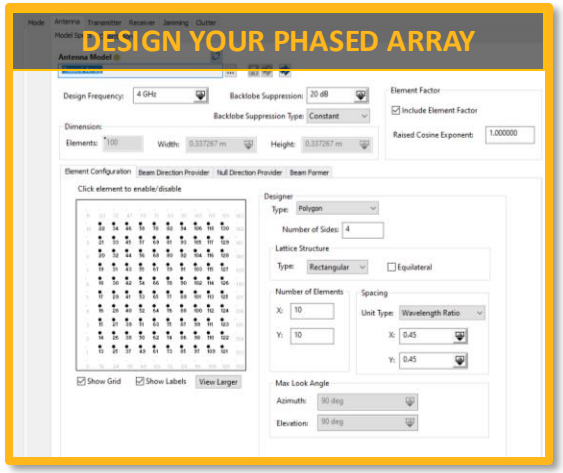
Solution

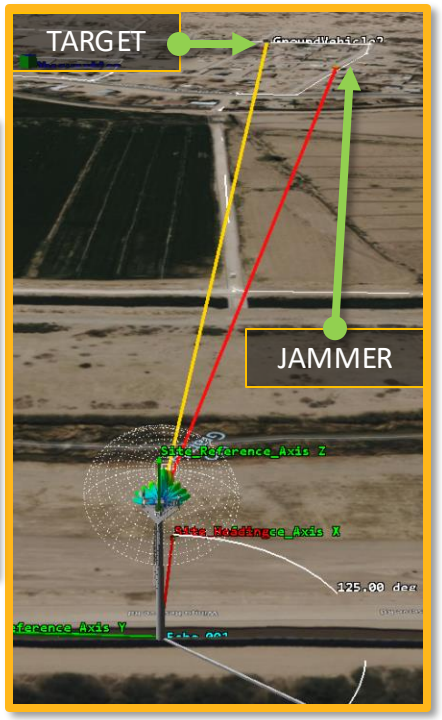
- **EXPLORE** representative models of Phased Array concepts.
- **EXPLORE** pointing impact on Antenna Gain pattern.
- **EXPLORE** Interferer Antenna Nulling impact on mission.
- **VISUALIZE** sidelobe pattern and grading lobes.
- **ASSESS** mission effectiveness.

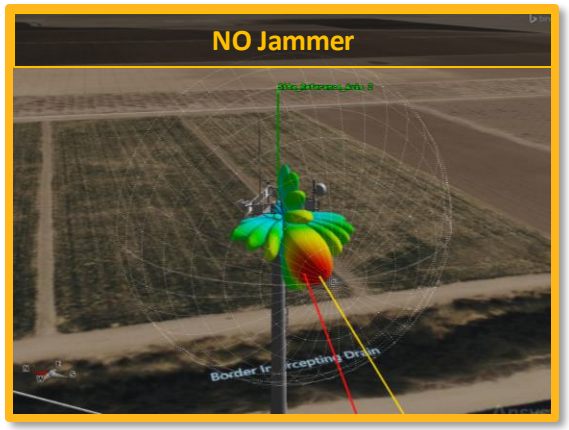
Benefits

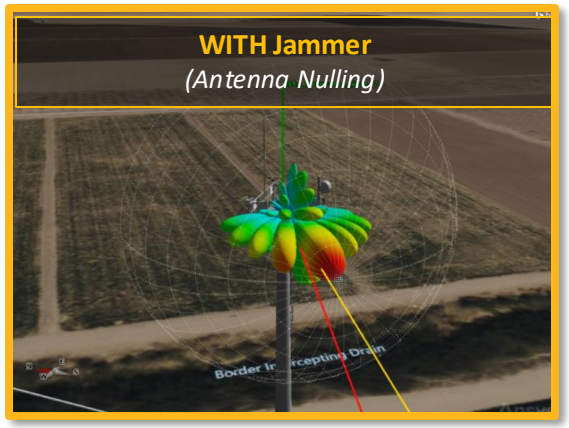
- **INCREASE confidence** in candidate phased array operational designs.
- **FASTER time-to-market** and **reduced cost** due to less reliance on physical prototypes.
- **INCREASE customer confidence** through virtual operational demonstration (DRM support).











Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys HFSS™

Radar Jamming and Interference

Challenge

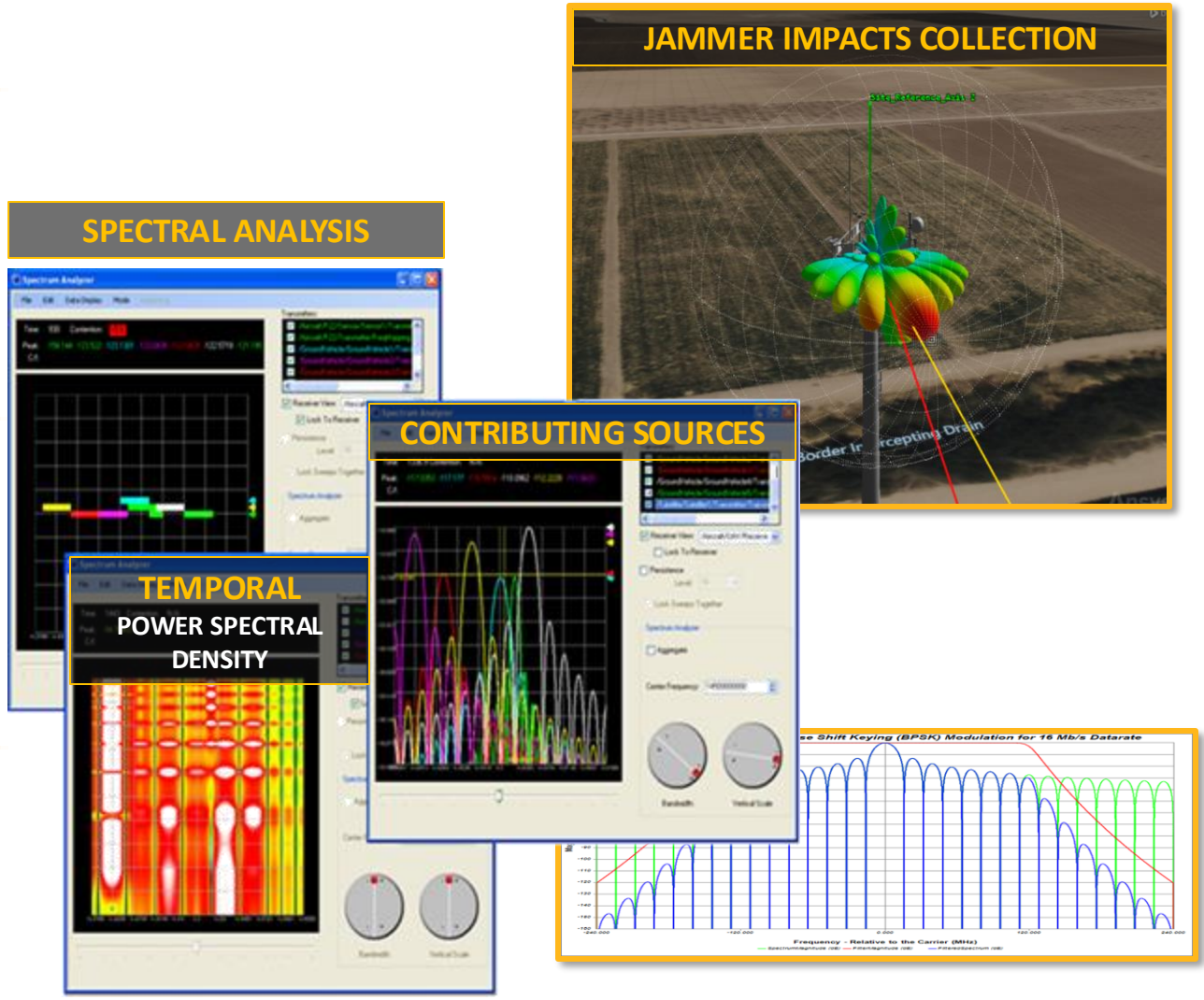
- **DEMONSTRATE** impact of adding interference source to a collection scenario.
- **QUANTIFY impact** to receiver sensitivity due to RF interference source.
- **ILLUSTRATE** Power Spectral Density at Receiver given intended and unintentional RF sources (TX vs Interferers).

Solution

- **DEMONSTRATE** how interferer sources will directly impact receiver detection performance of the intended transmitting signals for RF scenarios (Spectral and Temporal).
- **MEASURE and display** RF performance **degradation** due to active jammer nulling.
- **EXPLORE** engagement **options** to **mitigate** impact of active jamming attempts.

Benefits

- **INCREASE confidence** in measuring and displaying jamming sources for evaluation purposes.
- **FASTER time-to-market** and **reduced cost** due to less reliance on physical prototype testing.
- **INCREASE customer confidence** through virtual operational demonstration (DRM support) of candidate solutions.



Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys RF Channel Modeler™

Radar Cross Section (RCS) Generation, Visualization and Implementation

Challenge

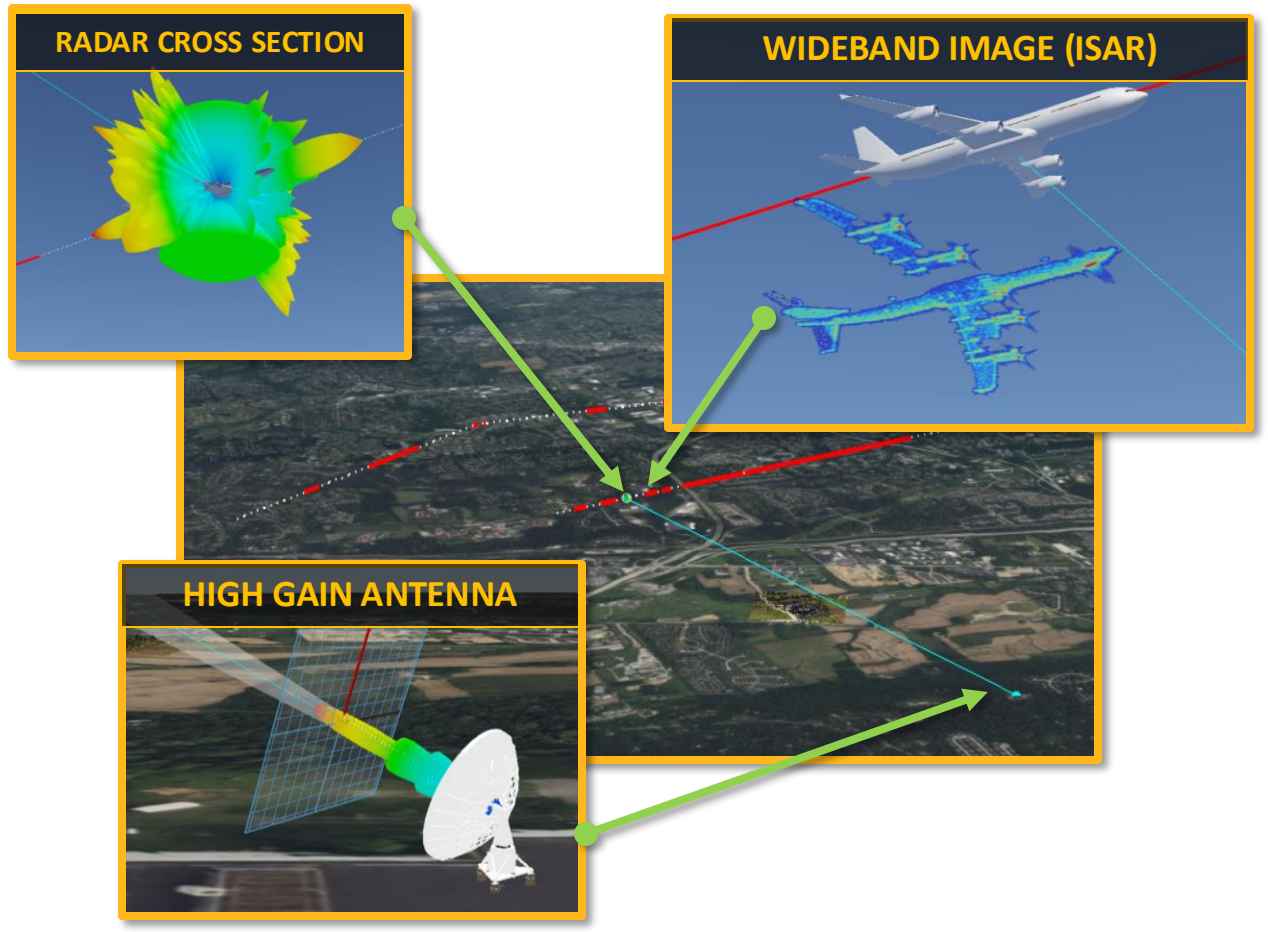
- **Need** to generate RCS measurements to explore vehicle and equipment design concepts.
- **Need** to visualize RCS data in 3D environment to understand vehicle signature behavior in operational scenario.
- **Need** to assess target vehicle operational performance against opposing radar system various collection modes.

Solution

- **Generate** 4 Pi Steradian RCS data on 3D models over a large range of frequencies, polarizations, bandwidths, and collection geometries.
- **Visualize** RCS around vehicle to understand vehicle signature vulnerabilities.
- **Create** ISAR Images to understand vehicle surface scattering characteristics.

Benefits

- **Increased** confidence in vehicle performance vs. opposing radar systems in a realistic operational scenarios.
- **Mitigate** risk of creating a poor vehicle design that increases probability of detection and survivability.
- **Speed** the development process through implementation of a virtual testing in an operationally relevant scenario.



Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys RF Channel Modeler™, Ansys Perceive EM™, Ansys HFSS™

Radar Sensitivity Analysis and Detection

Challenge

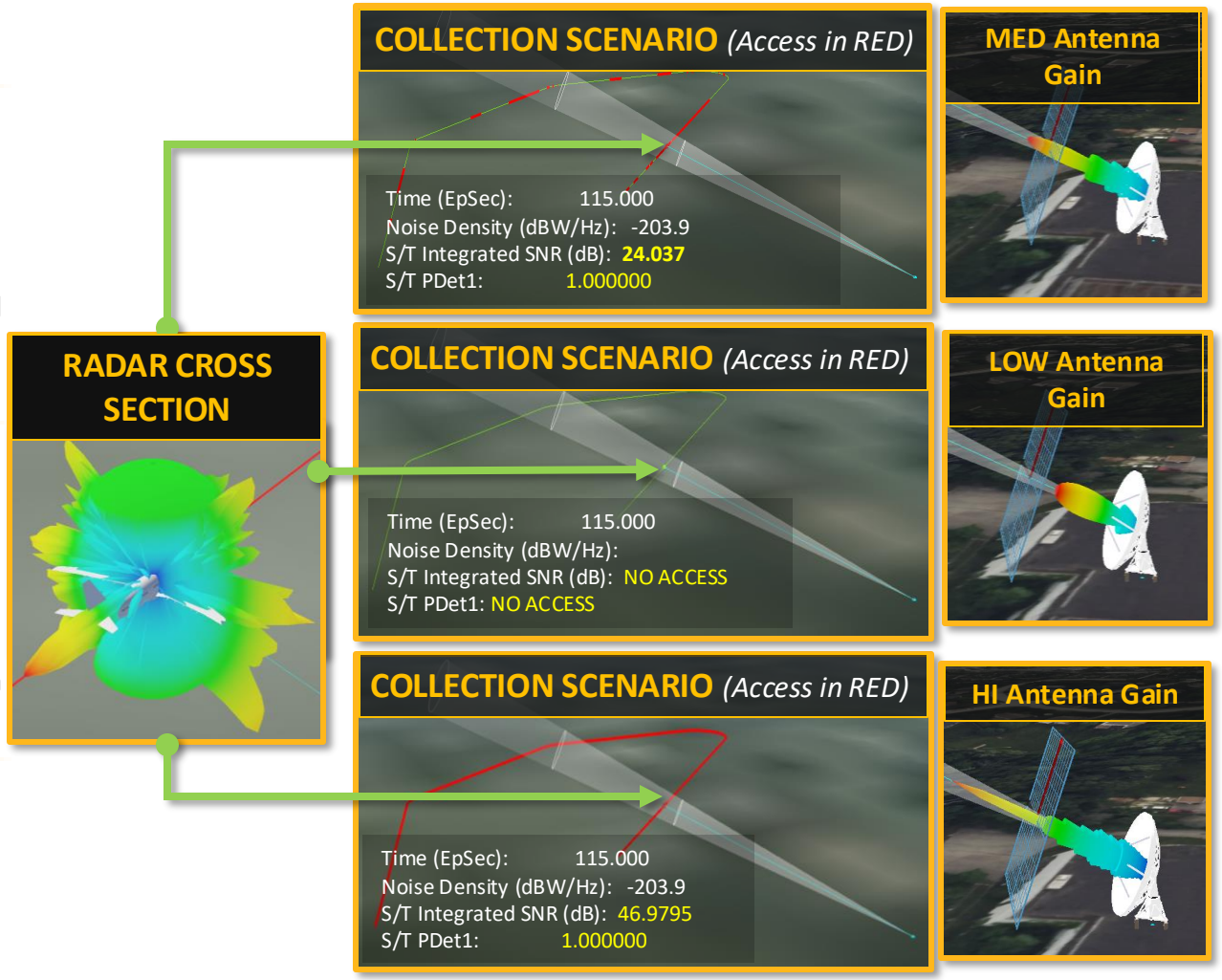
- **NEED** to assess Radar performance vs various candidate threat signature levels.
- **NEED** to understand and demonstrate radar design factors that impact sensitivity analysis.
- **NEED** to demonstrate radar performance in real-world collection scenarios vs defined targets.

Solution

- **CREATE** operationally relevant scenarios to test radar performance while iterating radar receiver parameters.
- **CONDUCT** coverage analysis for candidate radar systems to assess detection range vs standard target systems.
- **PERFORM** parametric analysis to assess optimal radar configuration based on mission scenarios.

Benefits

- **INCREASE confidence** in candidate radar parametric settings for relevant operational scenarios.
- **FASTER time-to-market** and **reduced cost** due to virtual testing during development cycle reducing the number of real-world operational tests.
- **INCREASE customer confidence** through virtual operational demonstration (DRM support).



Applicable Products: Ansys Systems Tool Kit® (STK®)

Radar Imaging Generation (ISAR and SAR)

ISAR - Inverse Synthetic-Aperture Radar
SAR - Synthetic-Aperture Radar

Challenge

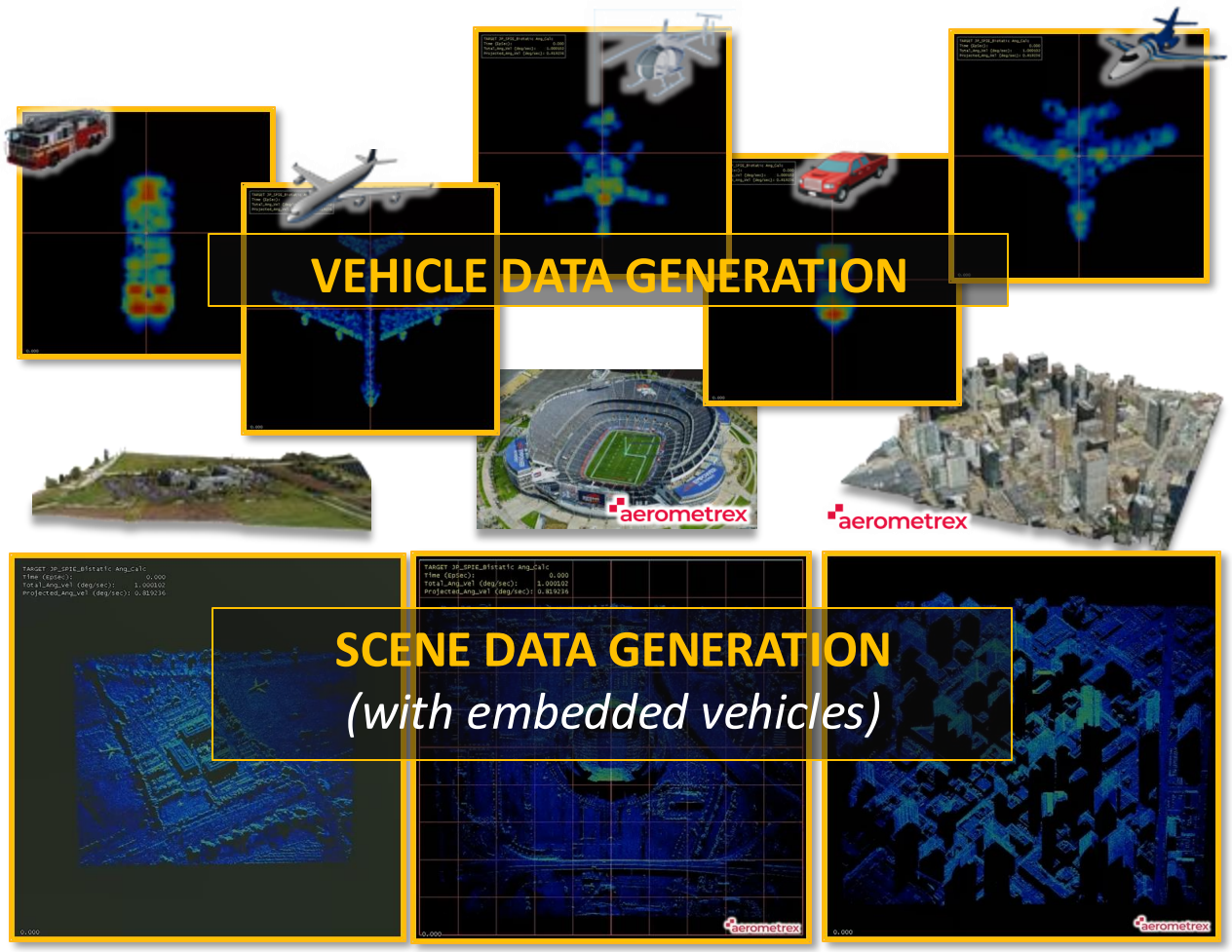
- **NEED** to generate ISAR images of vehicles in complex operational scenarios.
- **NEED** to generate (SAR) of large scenes from realistic collection scenarios.
- **NEED** to create bistatic radar signatures.

Solution

- **GENERATE** wideband SAR images of large-scale complex scenes for personnel training and machine learning.
- **GENERATE** vehicle ISAR images that accounts for collection complex system and vehicle motion/attitude .
- **GENERATE** images monostatic and bistatic radar collection scenarios, to include ISAR and SAR images.

Benefits

- **TRAIN** new radar image analysts on complex collection scenarios for SAR and ISAR Image analysis.
- **INCREASE** Test Range measurement **success** by ensuring proper radar positioning and vehicle flight path design.
- **CREATE** signature dataset (a Data-Lake) of vehicles in ANY geometry in addition to the integration of those vehicles in large scenes to support AI Algorithm development.



Applicable Products: Ansys RF Channel Modeler™, Ansys Perceive EM™, Ansys HFSS™, Ansys Systems Tool Kit® (STK®)

RF Sensor Satellite Integration and Cosite Interference Mitigation

Challenge

- **Characterize and quantify** effects of installed antenna/array.
- Determine proper placement and orientation.
- **Mitigate** cosite interference.

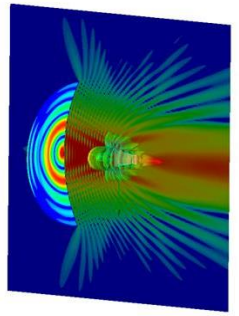
Solution

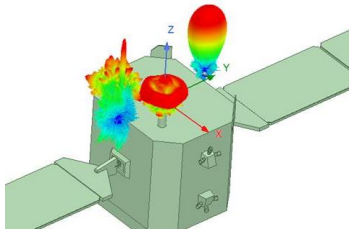
- **Hybrid** electromagnetic solver choices.
  - Finite element, Integral Equation.
  - Shooting and Bouncing Rays (SBR+), Physical Optics.
- **CAD-neutral** geometry import and cleanup.
- Computational **scalability** across all solution stages.
- Interference mitigation across platform life cycle.

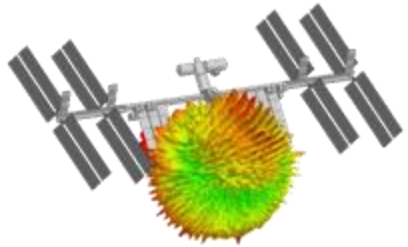
Benefits

- Ensures proper antenna installation and **reduces risk of degraded antenna** gain performance and mission intent.
- Full system signal characterization will ensure **operational integrity** of each radio mission and **minimize cosite interference**.
- Save **cost** and development **schedule** by exposing **potential interference** issues early in the design stage avoiding costly re-test, re-work, and possible production delays.

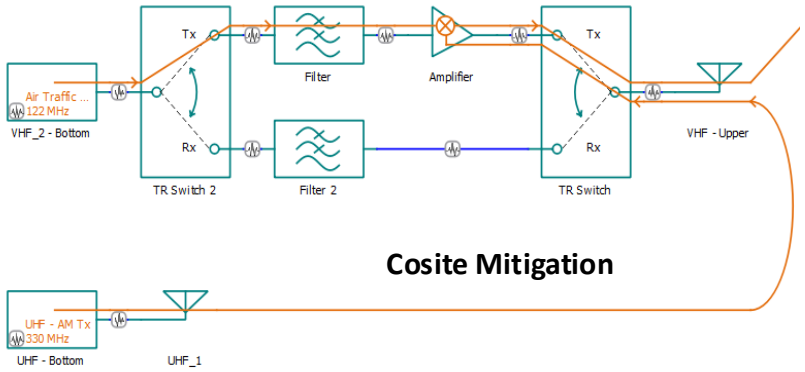
Installed Performance → **Placement Optimization** → **Comm Link Assessment**



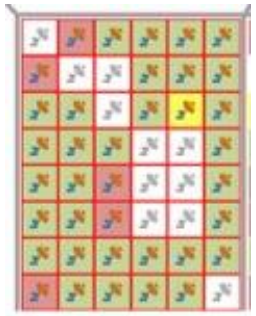




Radome

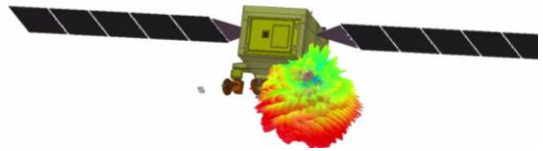


Cosite Mitigation

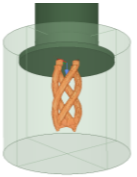


Applicable Products: High Performance Computing (HPC), Ansys HFSS™, Ansys Discovery™

Radar Antenna Modeling & Visualization



INSTALLED ANTENNA PATTERN



Challenge

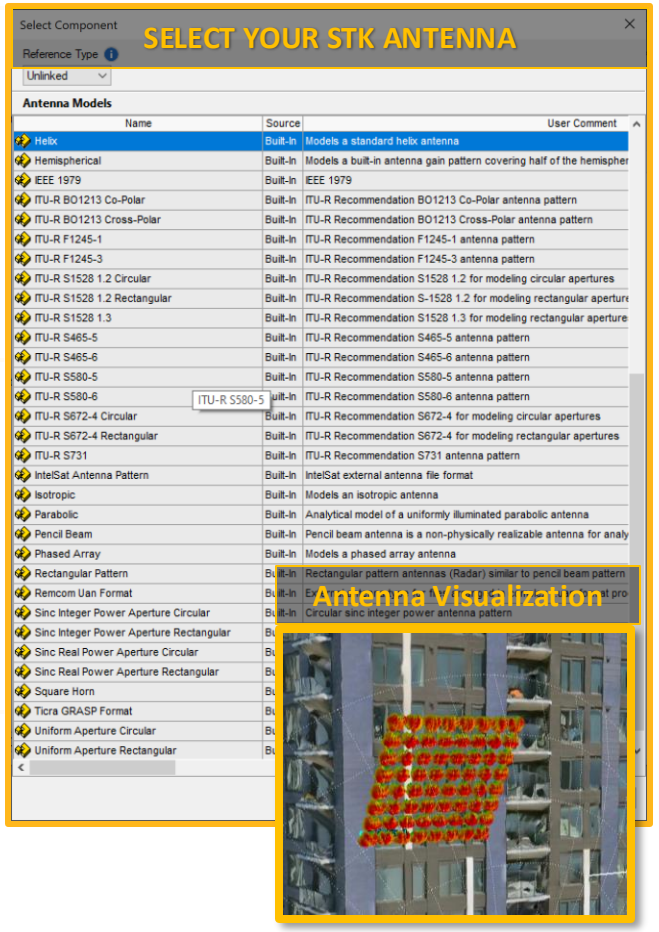
- **NEED** to understand antenna pattern based on the planned operational employment.
- **NEED** to understand how antenna will be impacted after platform integration.
- **NEED** to easily change antenna parameters and quickly visualize the antenna gain pattern.

Solution

- **OFFER** a comprehensive set of notional and adjustable antennas to support design exploration.
- **CALCULATE** integrated antenna pattern based on installation location and influence from surrounding antennas.
- **ASSESS performance** in a virtual “real-world” scenarios against notional targets and jammers.

Benefits

- **INCREASE confidence** in candidate antenna options and performance.
- **FASTER time-to-market** and **reduced cost** due to less reliance on physical prototypes.
- **IMPROVE data exchange** between design tools and virtual test and performance assessment environments.



Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys HFSS™

Radar Sensors – Solution-Product Matrix

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Applications	Ansys Systems Tool Kit® (STK®)	Ansys RF Channel Modeler™	Ansys Discovery™	Ansys HFSS™	Ansys Perceive EM™
Radar Sensor Modeling	●	●		●	●
Radar Phased Array Modeling	●			●	
Radar Jamming & Interference	●				
Radar Cross Section Generation, Visualization and Implementation	●			●	●
Radar Sensitivity Analysis & Detection	●				
Radar Imaging Generation (ISAR and SAR)	●	●		●	●
RF Sensor Satellite Integration and Cosite Interference Mitigation			●	●	
Radar Antenna Modeling & Visualization	●			●	

/ Increased Collaboration; Faster Innovation; Customized Workflows; Optimization; Cloud & HPC

Image Integration & Data Processing

Data and Image Visualization

Challenge

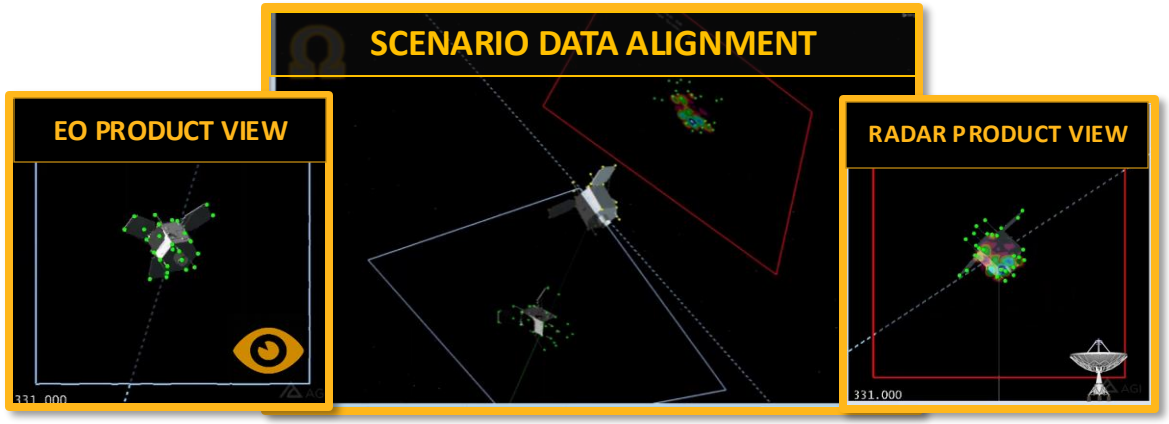
- **Need** to integrate radar and electro-optical images back into proper collection geometry orientation.
- **Need** to synchronize all sensor data with the collection scenario.
- **Need** model alignment with collected data.

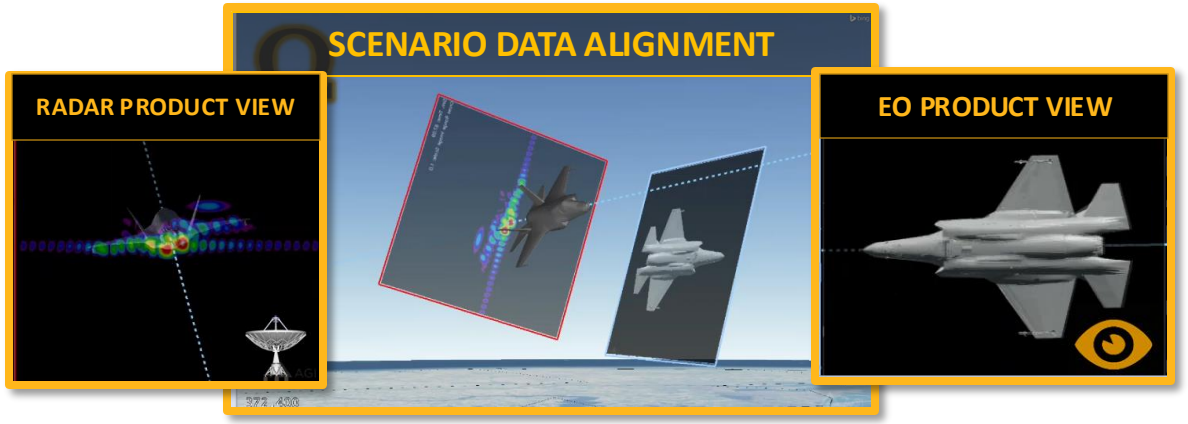
Solution

- **Illustrate** how a multi sensor scenario can be jointly integrated into a single target collection scenario.
- **Time synchronize** the physical collection scenario with the EO/IR/Radar images in the correct reference plane for cross discipline simultaneous analysis.
- **Align** 3d model with sensor image plane to support sensor data analysis and model alignment.

Benefits

- **Build** confidence in analysis exploitation and assessments through model alignment.
- **Accelerate** training for new image analysts through synchronized model and cross discipline data alignment.





Applicable Products: Ansys Systems Tool Kit® (STK®)

Radar Image Generation & Manipulation

PRF = Pulse-Repetition Frequency

Challenge

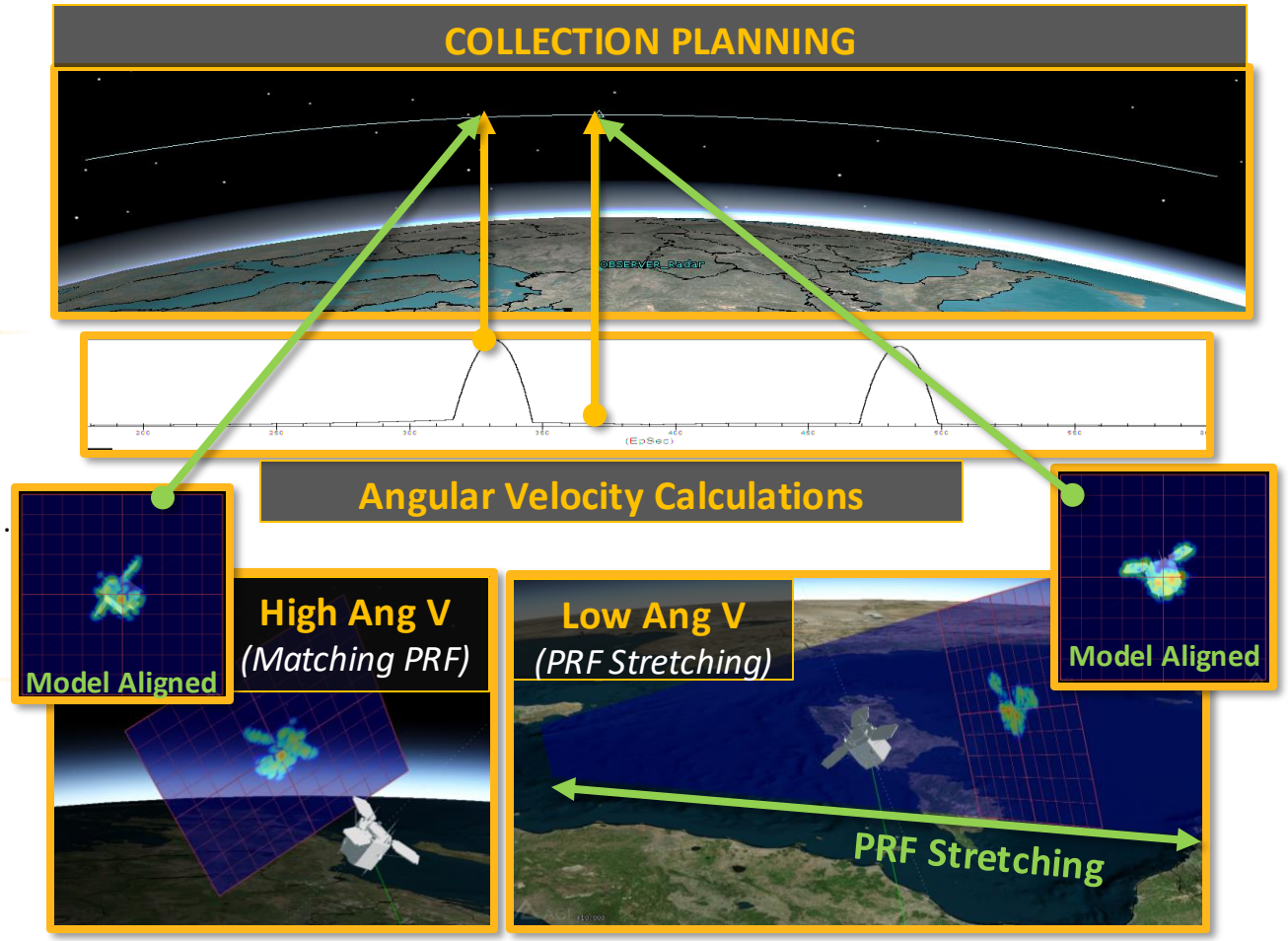
- **NEED** to create realistic data in an operational scenario.
- **NEED** to manipulate image generation parameters to produce relevant product outputs.
- **NEED** to illustrate impact of real-world collection artifacts due to collection settings.

Solution

- **CREATE** operationally realistic collection scenarios with a moving target.
- **OPTIMIZE** image generation through PRF matching with measured angular velocity.
- **AUTOMATES** image Stretching to compensate PRF due to angular velocity mismatch.

Benefits

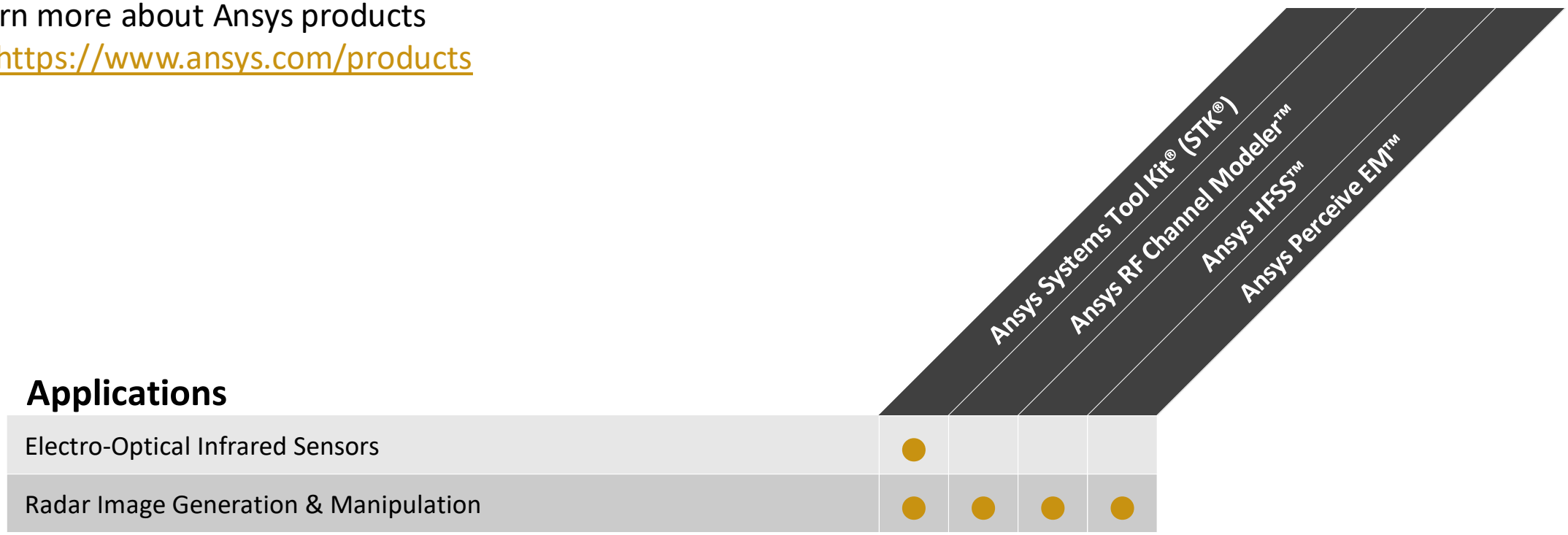
- **SIMPLIFIES** the very complex process of image generation.
- **BUILDS** confidence in collection planning.
- **SUPPORTS** advanced training in collection planning and image generation.



Applicable Products: Ansys RF Channel Modeler™, Ansys Perceive EM™, Ansys HFSS™, Ansys Systems Tool Kit® (STK®)

Image Integration & Data Processing – Solution-Product Matrix

Learn more about Ansys products
at: https://www.ansys.com/products



/ Increased Collaboration; Faster Innovation; Customized Workflows; Optimization; Cloud & HPC

Mission Engineering

Design Reference Mission (DRM) with Physics-Based Environment

Challenge

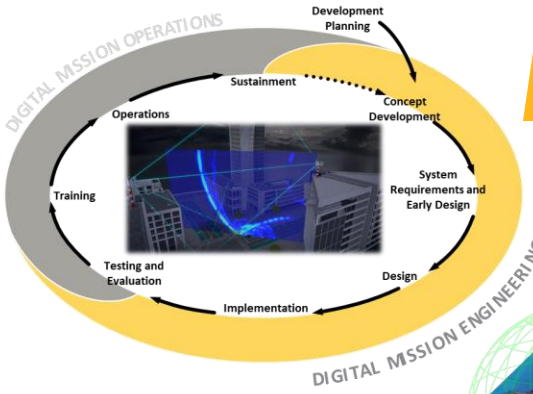
- **Design** representative mission profiles that sufficiently describe the intended system use across its nominal and most stressful operating conditions.
- **Visualize** active systems in a dynamic and realistic three-dimensional environment.
- **Evaluate** system performance and guide development efforts.

Solution

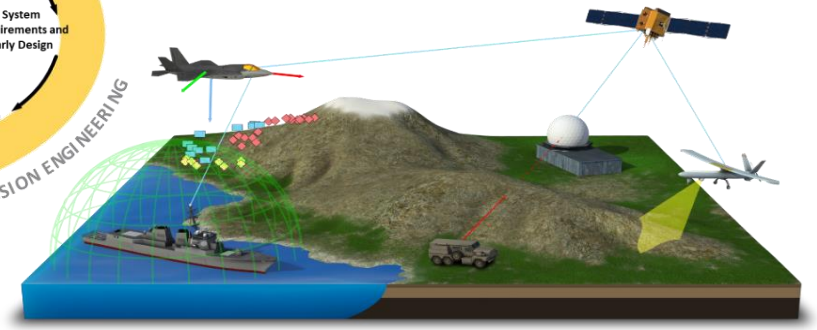
- **Accurate** built-in models for dynamic sensitivity measures, modeled and analyzed in one integrated setup.
- **Analysis** of systems in the full mission context, from characteristics of individual object to the relative geometry and physics-based interactions.
- **Visualize** resulting analysis and troubleshoot outcomes to meet project requirements and convey the desired effect.

Benefits

- **Predict** overall sensor performance and specific link parameters within a realistic physics-based environment simulation.
- **Enable** automation and fact-based decision-making across the lifecycle, accelerating organization transformation.
- **Reduce** build-up time with example mission profiles and walk-through tutorials.

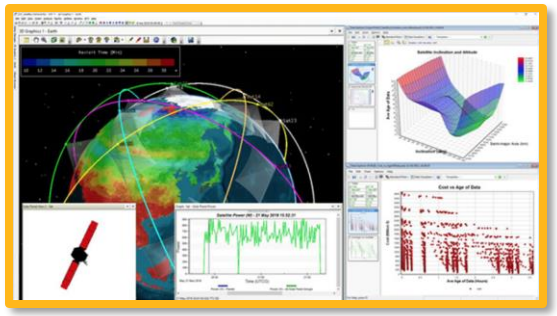


"STK provided superior qualitative and quantitative results as compared to our customer's and competitor's results."
— Chris Champagne, NGC



Design Reference Mission (DRM) modeled in tools such as STK

SATELLITE PERFROMANCE CHARACTERISTICS



Reduced development time by 75%, operational ECP creation by 48%, and contributed to capturing $700M+ contract award.
— Eastern Range Coverage Planning Tool, Computer Sciences Raytheon

Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys HFSS™

Risk to Communications Reliability due to Environment Impact

Challenge

Vulnerabilities and risks to communications reliability are driven by environmental factors including atmosphere, terrain, obstructions, or celestial objects.

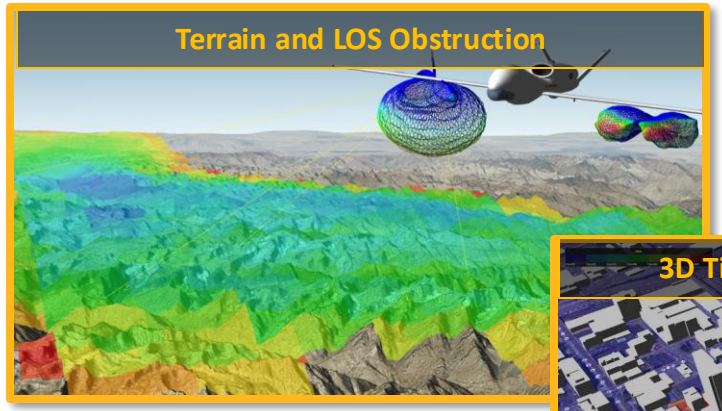
- **Identify** real-world constraints and conditions that affect and RF/EO attenuate, impacting performance.
- **Implement** pre-existing RF/EO environments or plugins to model realistic under-test environment.
- **Demonstrate** complexity of sensor performance under dynamic environmental.

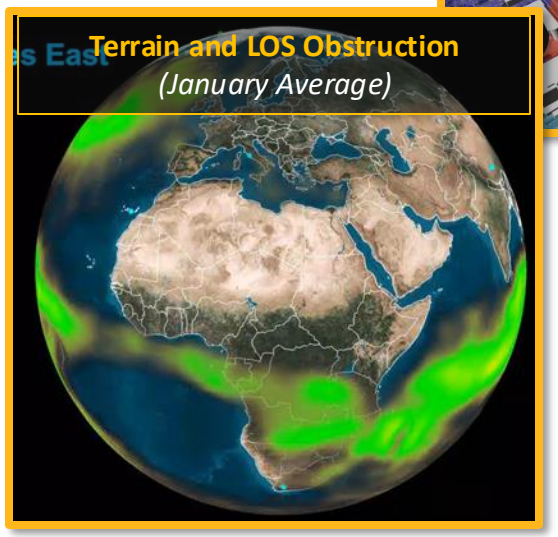
Solution

- **Built-in ITU** and external environmental for rain, cloud, atmosphere, troposphere, ionosphere, and celestial object impact to calculate performance impacts.
- **Utilizes** Terrain and Urban Models (3D Tiles) to assess line-of-sight and refracted sensor performance.
- **Assess** performance as collection system and targets move through domain, displaying dynamic impact on sensor data (smearing, obstruction, sun-keep-out, etc.).

Benefits

- **Reduce** design time as propagation models are directly built-in and preconfigured.
- **Implement** custom propagation models, urban scenes.
- **Meet** industry standards for propagation models that can be set for use with sensor analysis.





Rainfall Over One Year

Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys RF Channel Modeler™

Design with Executable Architectures

Challenge

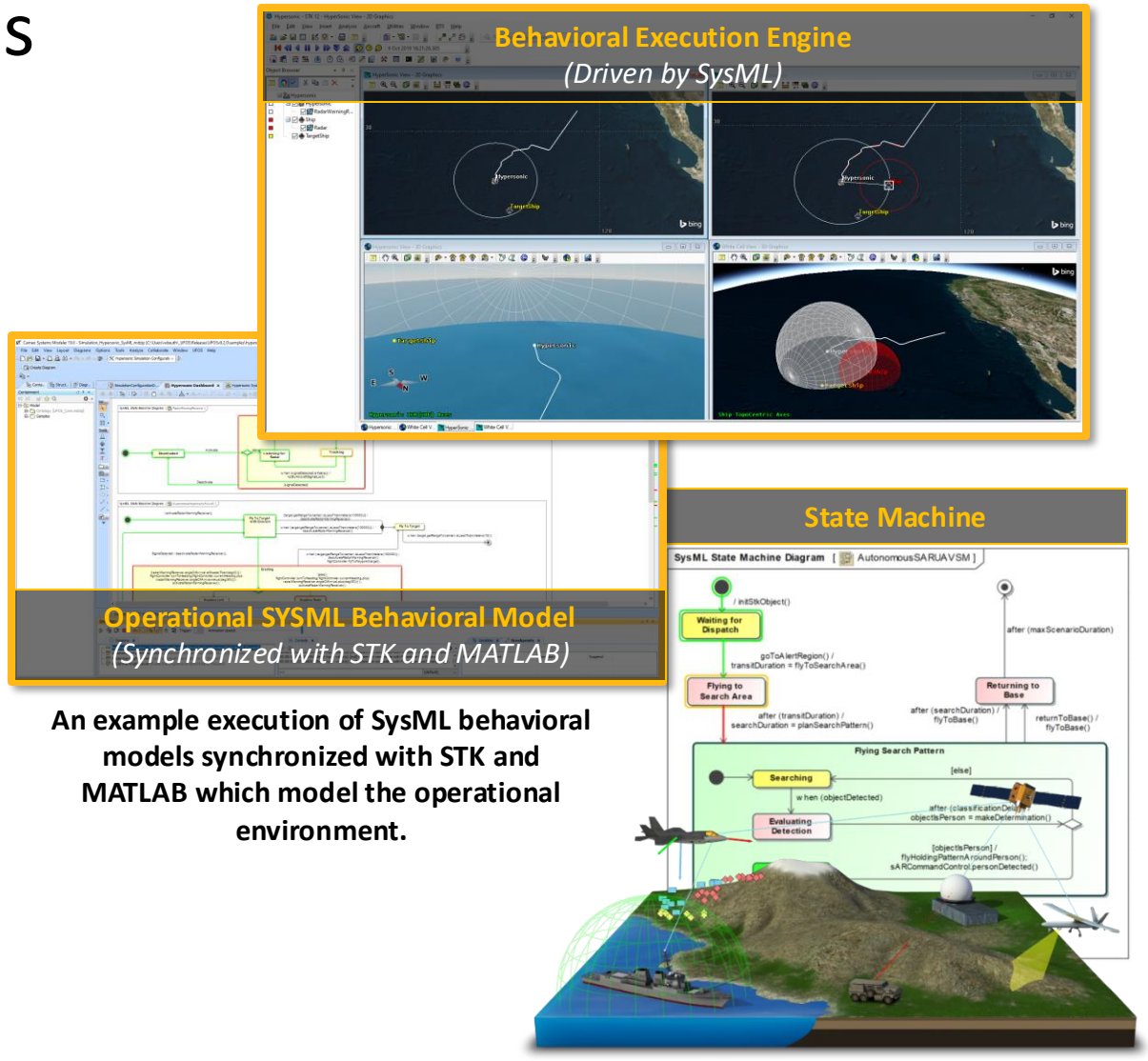
- **Need** to create and evaluate interactions between behavioral models and the simulated operating environment to predict mission outcomes and assess capability performance.
- **Need** to Automate analysis and generate repeatable end-to-end results of a modeled sensor system.

Solution

- **Explicit**, thread-safe, time orchestration across the digital operating environment, eliminating cross-system simulation anomalies and ensuring accurate analysis.
- **Customizable**: Delegate architecture provides fully customizable one-to-one relationships between state machine transitions and operational environment events.
- **Execute** custom analysis tool code with modeled time events, change events, call events, signal events, and effects.

Benefits

- **Enhance** the accuracy of digital prototypes by analyzing and refining behavioral models relative to their performance in a system's operational environment.
- **Include** customizable fidelity levels to support initial concept studies through detailed analysis and complex calculations from analysis tools in the flow of executable architectures.
- **Validate** automated decision-making processes by subsystems for desired outcomes across a variety of mission scenarios.



An example execution of SysML behavioral models synchronized with STK and MATLAB which model the operational environment.

Applicable Products: Ansys Systems Tool Kit® (STK®)

Digital Test & Evaluation (DTE) at Every Life Cycle Phase

Challenge

- **Improve** efficiency and effectiveness of test and evaluation activities across the digital engineering product life cycle.
- **Build** and validate detailed test plans, monitor test execution, and rapidly analyze post-test results to mitigate costs and reduce retest rates.

Solution

- **Accurate modeling** of collection systems and test vehicle, terrestrial and environmental modeling, and test workflows across test event planning, execution, and post-test analysis.
- **Flexible** tools to facilitate import of unique system data in a common digital/virtual test environment for post analysis and event recreation.
- **Monitor** test execution in near real-time to ensure test goals are met and support "live" flight test adjustments as necessary to ensure test success.

Benefits

- **Maximizes** test point density and reduces retest rates by analyzing timing and spatial relationships in test plans.
- **Minimizes Processes** data quickly to enable immediate mission insights.
- **Increases** test success rate.
- **Accelerates** test performance assessments through comprehensive quick-look playbacks.

Test range set of airspaces and additional GIS information

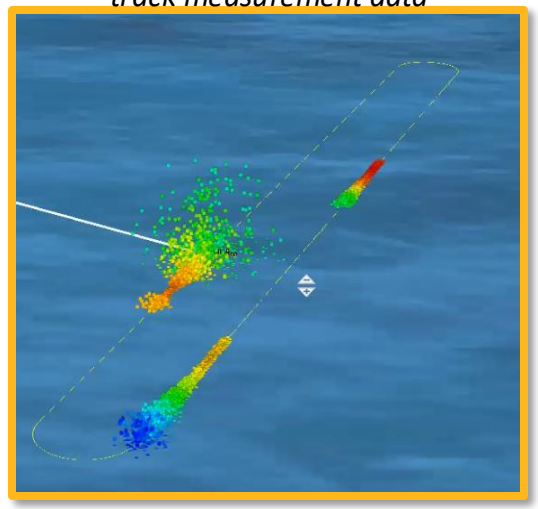
"Valid flight testing at your desk."

– Bruce MacDougall, NGC

Accelerated & optimized test planning, increased flexibility in test event execution, and faster post-test analysis.

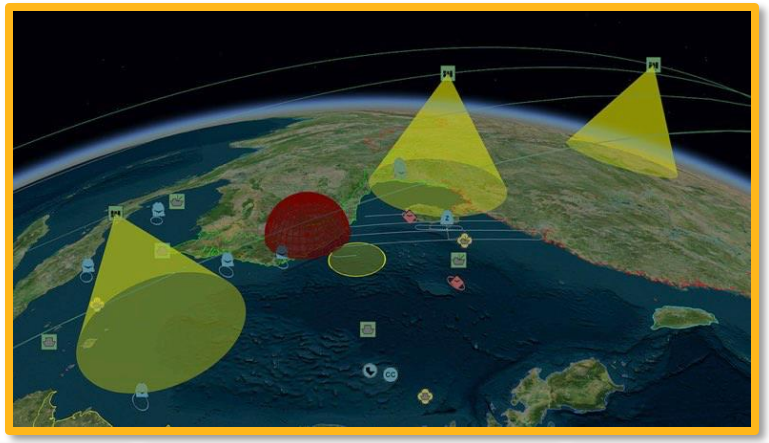
— F-35 Integrated Test Force, Lockheed Martin

Colorized visualization of track measurement data



Applicable Products: Ansys Systems Tool Kit® (STK®)

System of System Analysis: via Individual System Performance

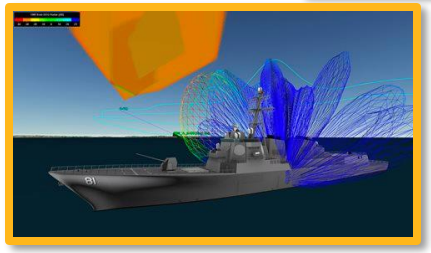


Challenge

- **Design** individual systems at varying levels of fidelity and complexity in the context of the entire mission profile.
- **Evaluate** connectivity for models of engineered systems and simulations of missions. This supports system operators and intelligence analysts performing forensics on the root cause of why outcomes resulted the way they did.

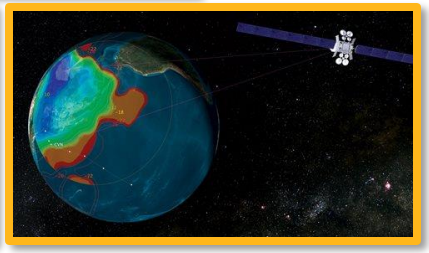
Solution

- **Combine** disparate elements into one integrated system, rooted in a multi-domain physics-based geometry engine, and analyze the measures of mission effectiveness.
- **Connect** components and systems into mission-level simulations for greater understanding of decisive impacts from the concept development stage through training and operations.



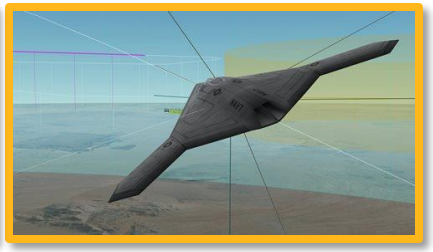
Radar Systems

Space Systems

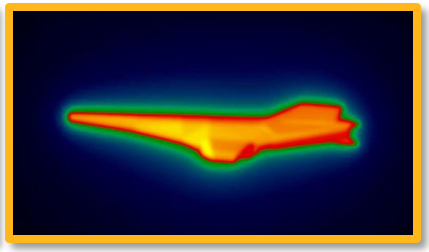


Communications Systems

Missile Systems and Hypersonics



Air Systems



Electro-Optical and Infrared Sensors

Benefits

- **Construct** custom, reusable workflows to reduce design time and implementation effort and minimize risk.
- **Understand** the influence of changes in individual systems within the mission context for better, faster, and more efficient decision-making.

Applicable Products: Ansys Systems Tool Kit® (STK®), Ansys ModelCenter®, Ansys HFSS™

One Shared Virtual Environment: Connect All Physical Assets in One Space

Challenge

- **Design** end-to-end, repeatable, high-fidelity, and automated analysis and data collection that incorporates all assets into the full operational context.
- **Analyze** relationships of platforms between each other as well as the surrounding environment over time.

Solution

- **Provide** common spatial and temporal coordinate system for modeling complex missions, systems of systems, and corresponding assets.
- **Enable flexible and customizable** software applicable programming interfaces (APIs) to ingest custom algorithms that support hardware, software, or human-in-the-loop.
- **Offer data-driven** software for users to set asset parameters and track changes while maintaining connectivity to the full representative picture.

Benefits

- **Common** framework to support orchestration and simulation of multi-physics tools.
- **Persistent** digital thread throughout the entire engineering life cycle supports adaptation of propagated changes to individual assets.

"STK drastically shortened the development time and allowed us to focus on the network side and implementing our custom algorithms."

— Experimental Networking Technologies Platform (ENTroPy), Johns Hopkins University APL

Applicable Products: Ansys Systems Tool Kit® (STK®)

Mission Engineering – Solution-Product Matrix

Learn more about Ansys products
at: https://www.ansys.com/products

Applications	Ansys Systems Tool Kit® (STK®)	Ansys RF Channel Modeler™	Ansys HFSS™	Ansys ModelCenter®
Design Reference Mission (DRM) with Physics-Based Environment	●		●	
Risk to Communications Reliability due to Environment Impact	●	●		
Design with Executable Architectures	●			
Digital Test & Evaluation (DTE) at Every Life Cycle Phase	●			
System of System Analysis via Individual System Performance	●		●	●
One Shared Virtual Environment - Connect All Physical Assets in One Space	●			

/ Increased Collaboration; Faster Innovation; Customized Workflows; Optimization; Cloud & HPC


Ansys