

A CASE STUDY: WALLOPS RESEARCH RANGE STK IN LAUNCH RANGE SUPPORT ANALYSIS

Challenge:

NASA's Wallops Research Range performs traditional launches and serves as a test bed where scientists try out new flight vehicles, ground support systems, and scientific instruments. To win business, the range needed a tool that assessed the variables of each launch so that Wallops personnel could advise customers and assure range safety.

Solution:

A mission planning lab built on AGI's commercial off-the-shelf software simulates each mission and assesses feasibility and costs quickly and accurately.

Results:

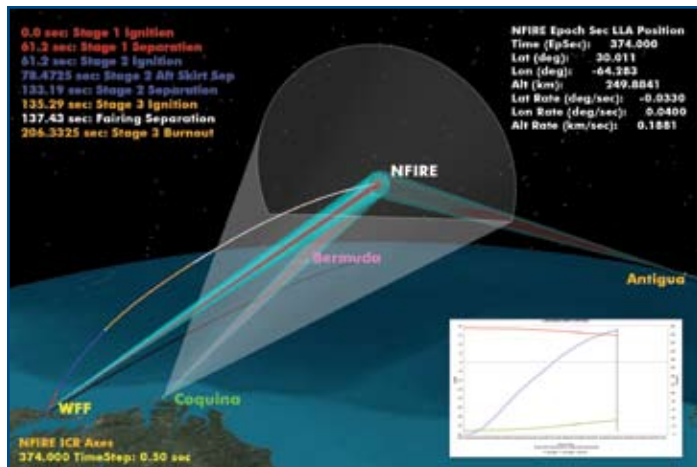
Customers can make fast decisions that allow the range to capture business quickly. At least one multimillion-dollar contract was awarded on the spot.



Jay Pittman, chief of the Range and Mission Management Office at NASA's Wallops Research Range, captures business using a mission planning lab that is based on STK software.

The Wallops Research Range, owned by NASA and situated on Virginia's Eastern Shore, serves as the agency's principal facility for sub-orbital and small-orbital research programs. An operational range and a test bed, Wallops launches proven systems for some of its government and commercial customers, while enabling the exploration of new vehicles, flight components, ground support systems, and instrument functionality for others. The facility launches sub-orbital and small-orbital vehicles of every type, including aircraft, unmanned aerial vehicles, rockets, balloons, and small expendable launch vehicles. Its customers include the major NASA directorates as well as the Department of Defense, Department of Homeland Security, the National Oceanic and Atmospheric Administration, Defense Advanced Research Projects Agency, and commercial companies.

Fast and flexible, Wallops routinely configures its fixed and mobile radar; telemetry; command and control; communications; and data



In April 2007, the Near Field Infrared Experiment (NFIRE) satellite will launch from Wallops Research Range.

retrieval systems in unique ways to meet specific requirements of its customers. According to Jay Pittman, chief of the Range and Mission Management Office, providing nimble range support in traditional and experimental situations presents two key challenges: 1) understanding how the overall range will perform during flight operations, and 2) educating customers about the range as well as the flight implications of the choices they make about test articles or operations.

"There are hundreds of decisions involved in payload, vehicle, ground system, and operational concepts where a tiny change makes a huge impact on cost or technical feasibility," says Pittman. When new customers don't understand the range itself or how the vehicles and assets on it perform, they can easily compound the risks involved in making even small decisions.

To help its customers quickly assess technical feasibility, safety, and cost drivers, the Research Range established its Mission Planning Lab (MPL). Based on AGI's core analysis software STK, the MPL integrates and analyzes detailed information regarding vehicle characteristics, range setup, flight profiles, and mission-specific objectives. The software then provides mathematically correct, dynamic 3-D simulations that assist Wallops analysts and their customers in evaluating choices about platform selection, flight profiles, and range-asset placement.

"Our goal for every mission is 'safe success,'" says Pittman. "AGI's software tools and our additions to them in the Mission Planning Lab let us see 'safe success' on screen long before it happens in flight."

Being able to evaluate the essential requirements for a mission in advance has directly led to the range capturing business in many instances, says Pittman. In one situation, a DoD customer presented the range with a scenario involving very high altitude sounding rockets, multiple supporting aircraft, specific command links, and several geographically dispersed participating instruments.

"They were prepared, during a morning meeting, to fund a study on the feasibility of launching the mission from Wallops, but we told them

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we could have the answer before their departure that afternoon. Using the Mission Planning Lab, we showed them what their operational scenario would look like, the data links, the participating assets, and the key cost drivers for our range support. They were astonished and funded the multi-million dollar project on the spot.”

While STK helps to provide safe flexibility for Wallops customers, its extensibility also allows the range to spread out its capital investment over time as the Mission Planning Lab grows. The software is easily extended and tailored to analysts’ workflows with the STK/Integration module, allowing individuals to continue their highly specialized

routines. Also, because STK comes as independently validated and verified modules, Wallops is able to build a comprehensive planning lab piece-by-piece using incremental budget allocations.

“In fact, customers actually funded extensions to our Mission Planning Lab after they saw our first cut at mission feasibility and realized the costs that had just been saved,” says Pittman.

So, as Wallops Flight Facility’s Research Range continues its job of providing reliable launch range services, the range’s Mission Planning Lab will be there to meet critical needs for its customers.

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