

A CASE STUDY: PLANNING AIRBORNE NETWORKING TEST EVENTS

WYLE REDUCES TEST CYCLE WITH STK

Solution | UAV and Aircraft Missions

Challenge:

Wyle performs test and evaluation of new airborne networks and ground systems for USAF ESC/XR and the DoD.

Solution:

STK is used during the planning phase of nearly every test event to predict link margin and antennae gain, optimize performance and enhance technical decision-making.

Results:

STK's modeling and simulation helped reduce the test cycle, saving Wyle and its customers' time, money and effort.



The Electronic Systems Center (ESC) is the main acquisition arm of the United States Air Force. ESC's Airborne Networking Division is developing numerous programs of record designed to bring emerging capabilities and services—aerial retrans, Voice over IP, Full Motion Video, Mesh Networks and mobile-ad hoc networks—to disadvantaged users on the ground. ESC uses RIAC, a DoD Information Analysis Center, to vet test studies and analysis of newer COTS-based technologies that can meet this critical warfighter need.

Wyle, the prime contractor for RIAC, is using AGI's commercial off-the-shelf (COTS) STK software as a conceptual planning tool for ESC and DoD test events and analysis. Zack Shaw, Wyle systems engineer and program manager, says "The hope is that some of the best COTS technology will find its way into a program of record to benefit disadvantaged users today." By testing performance early, Shaw says, Wyle's customers are assured that the system is "not going to cause interruption of service when it's fielded and the turnaround time for advancing the technology is a lot shorter than a normal acquisition would be."

Specifically, STK is being used to evaluate:

- Route planning for air and ground assets
- Impact of terrain
- Optimal antenna configuration
- GPS availability
- Comparison of predicted vs. actual values

While Wyle found it was easy to input Digital Terrain Elevation Data into STK through the Image Converter Tool and to determine when the optimal number of GPS satellites would be present for a live flight, Shaw says "one of the cooler functionalities that STK

offers is route planning for any particular asset." During tests, Wyle used STK to:

- Choose the best UAV route to either optimize performance or simulate real world scenarios.
- View the impact of terrain on ground mobile users.
- Repeat the same route during live test and validate the model for accuracy.

Shaw says, "If our objective function is range and throughput, STK is a powerful tool in order to define what those variables are and what the constraints are in order to come up with the best possible outcome."

Analyzing optimal antenna configuration to ensure solid air-to-ground communications was a vital piece of Wyle's job. STK enabled the team to recommend the best antenna for the system with confidence. "It's not just a great planning tool. It's a good evaluation tool when it comes to systems."

Wyle continues to utilize STK for test event analysis for ESC and other DoD customers. Future work includes validating more models, which would result in high government efficiencies relative to cost, schedule and system performance. Concludes Shaw, "There is so much you can do just in modeling and simulation to cut down on the test cycle. It saves you time. It saves you money. It saves you effort."

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