

A CASE STUDY: HARRIS CORPORATION ENHANCES COMMUNICATION SYSTEM ANALYSIS WITH STK

Solution | Electronic Systems

Challenge:

Demonstrate Harris Corporation's advanced proprietary communications algorithms, technology innovation and expertise in the areas of communication system design and signal processing.

Solution:

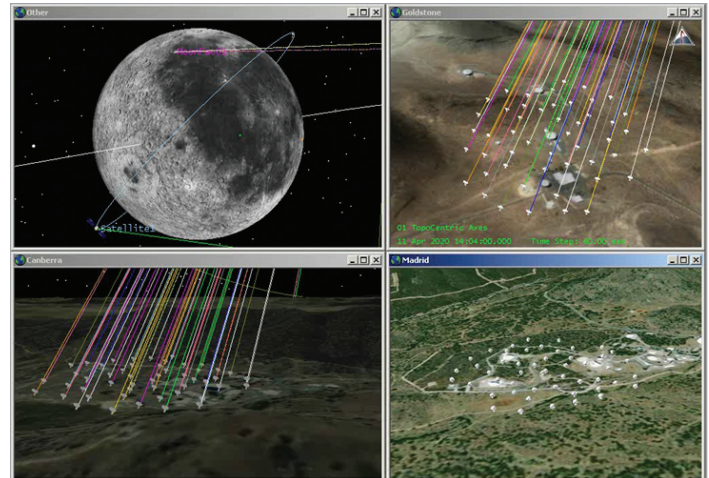
Harris ArrayLab directly connected to STK via the STK Integration module.

Results:

Using AGI technology enabled Harris Corporation to develop dynamic simulations of proposed communication systems and capture business including a prototype uplink arraying study.

Harris Corporation's Transmit Array Combining Experiment is a multi-million dollar effort to array widely separated 12m reflector antennas. The effort utilizes ArrayLab, an internally developed package that analyzes adaptive phased-array communications system performance within custom mission scenarios. By integrating STK with ArrayLab, Harris saved time adopting AGI's existing capabilities while adding new functionality to its "simulation to prototype" package. ArrayLab with STK has been used for internal R&D, proposals, program-deliverable analysis tools, and, hardware prototype demonstrations including conformal communication systems such as on a spacecraft body and widely spaced elements such as the large antennas used on this experiment. Initially, Harris debated developing its own STK-like orbit propagator to model planetary and platform motion; range and range rate between targets; line-of-sight angles between targets; and target availability with respect to obscuration.

Harris also needed 3D visualization to manipulate the communications platform for analysis and troubleshooting of array designs. By incorporating STK into ArrayLab via the STK Integration module, Harris was able to focus on its own areas of expertise: advanced adaptive array designs, innovative signal processing techniques including blind signal sorting, and instant return, and unique array self-calibration methods.



Using AGI's proven technology enabled Harris Corporation to develop dynamic simulations of proposed communication systems and capture new business.

With the aid of STK software, ArrayLab provides realistic array performance analysis of complex communication systems and simplifies design trades. Currently, ArrayLab is being used on the Large Reflector Uplink Arraying program to demonstrate model-based transmit uplink arraying with three 12m widely spaced antennas. Harris proprietary algorithms that are being demonstrated include: model-based adaptive arraying on Tx, blind signal sorting adaptive aperture combining on Rx, continuous self-calibration of all RF equipment and fiber optic lines and the Instant Return algorithm which uses the receive signal and blind signal sorting to calculate beam steer weight for transmit array.

Using STK with Harris' ArrayLab has enabled Harris Corporation to demonstrate its advanced proprietary communication algorithms in the context of specific mission scenarios; promoting the company's communication systems expertise and leadership to end customers to capture new business.

"The credibility that STK gives to our ArrayLab simulations is only surpassed by the live demonstration using STK in real-time mode with ArrayLab controlling the actual prototype system."

— Kathy Minear, senior mathematician
HARRIS CORPORATION



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