On Schedule

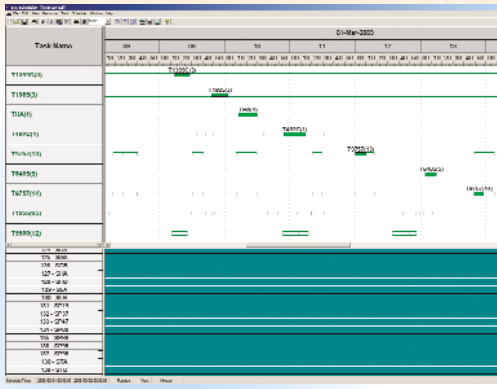
The Air Force Keeps Its Satellite Network Fine Tuned With Support From STK

If the Air Force Satellite Control Network (AFSCN) were a telephone company, its lines would be ringing off the hook. It is the largest ground station network the U.S. Air Force uses to control satellites, and the AFSCN's eight ground stations around the globe talk to more than 100 communication, navigation, missile warning, and meteorological satellites each day. Every 24 hours, network personnel perform more than 500 scheduled events—from satellite communications to tests and program maintenance. So, in this world, a finely tuned network is a must.

To optimize the AFSCN's current and future coverage and capacity, Scitor Corporation works under contract with the 50th Space Wing Studies and Analysis Branch at Schriever Air Force Base, CO, to develop utilization forecasts. These near-term and long-term network forecasts ensure that the ground system meets the needs of satellite users today and in the future. Scitor also runs studies to answer "what-if" questions for exercises and battlespace simulations.

Last year, when branch personnel were searching for software to supplement their legacy tools, they chose STK/Scheduler, which quickly became important to simulating a "day in the life" of the network. "Our legacy software remains an essential part of our tool kit," says Byron Hays, lead for the branch's model and simulation team that includes Andrew Carlile and Tom DeLaCruz. "However, STK/Scheduler is the most promising tool we have used in a while," he says.

Although 50th Space Wing personnel and contractors have forecasted for the past 12 years with proven government legacy software that is fast and accurate, they wanted more. "We were looking to automate the 10-year forecasting process; to become more sophisticated in detailing how the antennas on the specific sites were utilized; and to support requirements tied to orbit events, time, locations, and other variables," says Hays. They also wanted to automatically generate orbit and scheduling graphs.



STK/Scheduler automates the complicated task of 10-year utilization forecasting for the AFSCN.

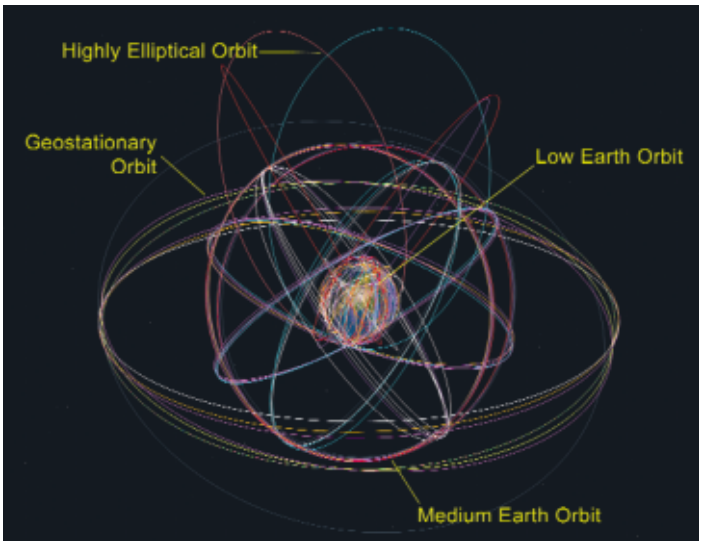
What's more, national space policy had begun directing integration with other networks such as NASA, NOAA, and the Navy, and the branch needed a tool to help them determine how to do that most effectively.

STK/Scheduler, combined with STK software products they already owned—STK/PRO, STK/Comm, STK/Coverage, STK/Connect, and STK/Chains—gives the branch a robust scheduling and satellite operations analysis suite.

STK/Advanced Visualization Option (STK/Advanced VO), which can output STK data in three-dimensional, animated displays, is the next module the branch would like to add to its suite. "The 3-D graphics better communicate load stresses to the system than line graphs," says Hays. "You can show on a graph that the system is 88% utilized, but it's hard to understand what that means." With 3-D dynamic depictions, Hays can show ground stations with satellites flying overhead and denote those that can and cannot be communicated with. While 88% utilization may look good on a graph, "When you see the number of satellites the antennas can't contact, you easily grasp missed opportunities," Hays says.

As a result, STK/Scheduler has quickly become a cornerstone of the branch's analysis tools. "Almost everything we use with STK is essential to our analysis," says Hays. STK Standard, AGI's free core product, has proven invaluable, alone. When the IMT 2000 (the next generation of commercial cell networks) studies were being conducted, there was concern that cell users would take some of the bandwidth the AFSCN uses to talk to satellites. "With STK, we generated a simple graph that showed we wouldn't be able to contact some of the GEO satellites, and that took the discussion off the table," says Hays.

So, with a little help from STK, the AFSCN keeps communication lines open—to the satellites, the network, its operators, and users.



STK models the 100-plus LEO, MEO, HEO, and GEO satellites in the complex AFSCN communication network.