

A CASE STUDY: STAR ONE & NOAA SATS SHARE LONGITUDE BRASILSAT B1 AND GOES 12 SATELLITE SAFETY ASSURED VIA STK ANALYSIS

Challenge:

Star One wanted to ensure its Brasilsat B1 satellite could share 75 W longitude with NOAA's GOES 12 satellite without radio frequency interference or spacecraft collision.

Solution:

Star One and NOAA engineers employed AGI software to standardize orbit data and gravity models.

Results:

AGI products provided appropriate translations between the organizations' orbital software and 3-D visualizations for easy explanation to management.



The National Oceanic and Atmospheric Administration (NOAA) has been broadcasting meteorological data from 75 W longitude since 1975 thanks to its GOES (Geostationary Operational Environmental Satellite) program. For the past five years, GOES 12 has been transmitting imagery from this location 22,300 miles above the Earth. So when Star One, a subsidiary of EMBRATEL that operates the major satellite system in South America, approached NOAA about sharing its location, analysis to assure satellite safety was critical. NOAA and Star One engineers employed STK to standardize orbit data and gravity models between the organizations.

"Geostationary satellites are all at about the same spot," says Eric Madsen, senior international relations specialist at NOAA. "The real estate isn't regulated, but the radio frequencies are. They really have to be controlled to eliminate interference." The satellites could certainly do serious damage to each other if they accidentally collided, but in reality they are several miles apart. The major concern for both parties was minimizing interference to ensure data continuity. "We have an unbroken flow of data at this longitude dating back to 1960 when NASA's TERRA satellites were there, and we have plans into the next generation of GOES through 2030," Madsen says.

The "gentlemen's agreement" between Star One and NOAA was formed more than a year ago in March 2007, with engineers at both companies using STK to assure efficiency. "Our orbital operations need to speak the same 'language' in terms of gravity models, coordinate systems, references, and orbital elements," says Evandro Paiva de Andrade, orbit operations team leader, engineering division, Star

One. "STK sets up a common basis for the agreements. Star One and NOAA use orbital software from our respective satellite manufacturers, but STK enables appropriate translations between them."

Star One leverages STK/Professional Edition, STK/Integration, STK/Astrogator, STK/Conjunction Analysis Tools, STK/Analyzer, and the Optimizer Extension for its analysis. The company also found the software's 3-D capabilities especially helpful for easily demonstrating the technical aspects of the shared orbit slot with managers. "One of the outstanding aspects of STK is its contribution to the Star One decision-making process," Paiva de Andrade says. "The graphical capabilities bring a better comprehension of flight dynamics issues to Star One managers."

The organizations agree that being able to work together without third parties as a result of common software has increased confidence in their decision, and eliminated the energy and resources that would have been invested to develop a solution themselves. "Using STK reduces coordination needs to a minimum, and allows us to focus our development efforts on the applications of our interest," Paiva de Andrade concludes.

For more on Star One, visit www.starone.com.br. Details on the GOES program can be found at www.goes.noaa.gov.

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