Program Assists Satellite Designers

Originating Technology/NASA Contribution

Managed by Goddard Space Flight Center, the Rossi X-ray Timing Explorer (RXTE) was launched on December 30, 1995, from Kennedy Space Center, and to this day, it is still active. The satellite carries several instruments and is part of the Science Mission Directorate's study of deep space. The RXTE measures the timescale of flickering X-rays, called oscillations, revealing the underlying physics of the violent environment around objects such as neutron stars and black holes. The oscillations reveal the nature of the physical environment of the star system, so by studying these oscillations and tracking the same X-ray sources for years, RXTE scientists form a picture of the events that are taking place.

One of the enabling technologies created for the RXTE mission was the Advanced System for Integration and Spacecraft Test (ASIST) software, a real-time command and control system for spacecraft development, integration, and operations. It was designed to be fully functional across a broad spectrum of satellites and instrumentation, while also being user friendly.

Partnership

Annapolis, Maryland-based designAmerica Inc. (DAI), a small aerospace company specializing in the development and delivery of ground control systems for satellites and instrumentation, was one of the organizations that assisted Goddard in the development of the ASIST software.

Realizing that the technology had broader applications in the commercial sector, designAmerica sought assistance from the Innovative Partnerships Program at Goddard, which assisted the company in licensing the software for commercial applications. The company is now marketing ASIST as a commercial-off-the-shelf solution in an arena once restricted to costly, custom-developed, project-specific software.
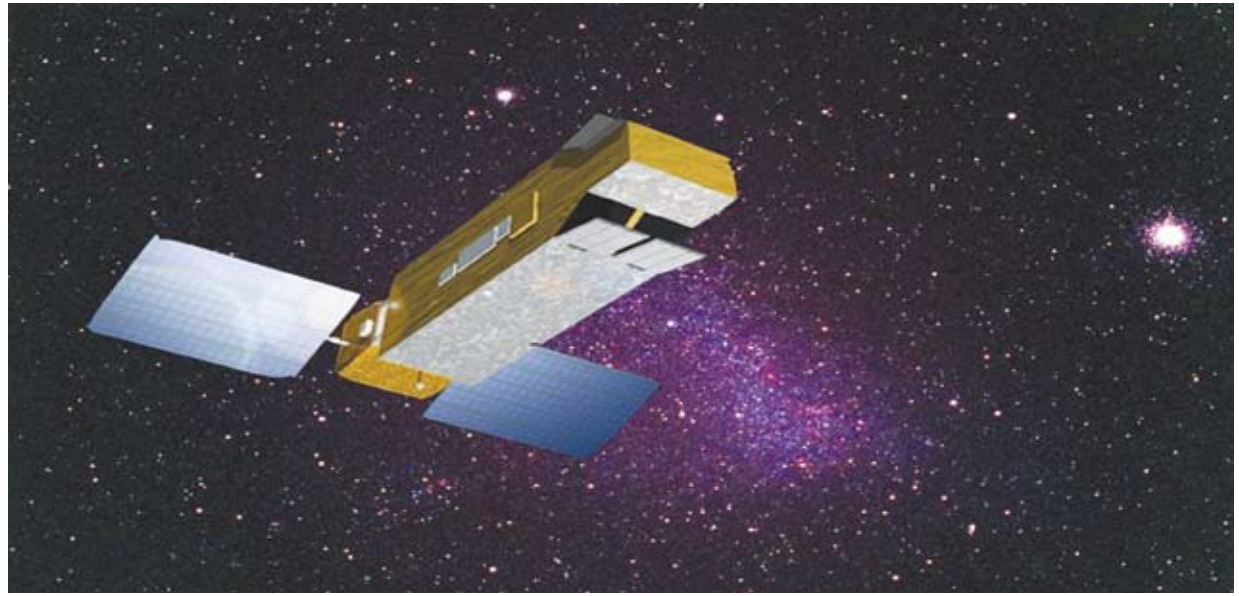
The Far Ultraviolet Spectroscopic Explorer (FUSE) is a NASA-supported astrophysics mission that was launched on June 24, 1999, to explore the universe using the technique of high-resolution spectroscopy in the far-ultraviolet spectral region. Maryland-based designAmerica Inc. provided software to aid this mission.

Product Outcome

ASIST is now a highly complex computer application designed to both meet the demanding technical requirements of modern satellites and their instrumentation and to serve as a tool for the engineers who construct and sustain the technology. The commercial version boasts the same level of functionality as the NASA-developed one, plus adds an approachable user interface, making it an effective and easy solution for customers to implement.

DAI's commercialized version of the ASIST technology is working its way back to the Space Program. The technology was selected by Lockheed Martin Corporation as the in-house integration and test and mission operations system at its satellite production facility in Denver for the Origins Spectral Interpretation, Resource Identification and Security (OSIRIS) mission, which is scheduled to launch in 2011 to survey an asteroid and provide the first return of asteroid surface material samples to Earth, and for the Mars Atmosphere and Volatile Evolution (MAVEN) mission. The demonstrated cost savings is well over $3 million for the ground system element.

Northrop Grumman Corporation is also using designAmerica's NASA-developed technology as its basic rapid-development component for in-house project flight software development and avionics integration and test labs. This work benefits a range of satellites that the company is developing in-house, including for NASA missions such as the Lunar Crater Observation and Sensing Satellite (LCROSS). With ASIST at the core of its development suite, Northrop Grumman has demonstrated impressive gains in automated development and testing and streamlined satellite development, saving substantial mission dollars. ❖