

**SBIR Topic Number:**  
AF06-272

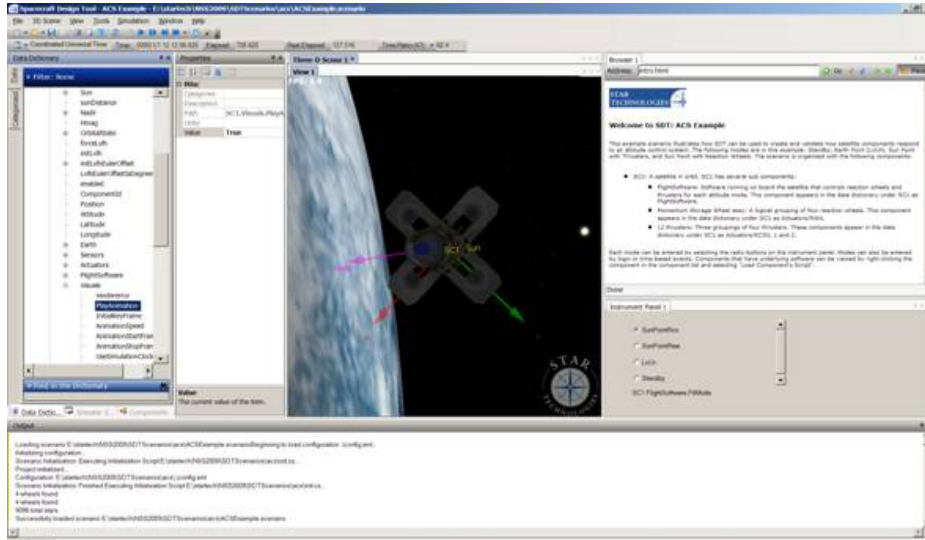
**SBIR Title:**  
Satellite Design  
Automation for  
Responsive Space

**Contract Number:**  
FA9453-07-C-0051

**SBIR Company Name:**  
Star Technologies  
Corporation,  
Great Falls, VA

**Technical Project Office:**  
AFRL Space Vehicles  
Directorate, Kirtland AFB,  
NM

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.



Use of the Spacecraft Design Tool (SDT) for Attitude Control Design

## Mission Design and Analysis Tool

- The Air Force needs innovative technology to support the Plug-N-Play (PnP) Satellite and Operationally Responsive Space (ORS) programs
- Star Technologies developed the Mission Design and Analysis Tool (MDAAT), which is a collection of software and utilities designed for automation to foster quick development of PnP Satellite hardware and software such as attitude control system design, hardware placement and orientation, and ground systems
- MDAAT makes a new “concept to launch” paradigm possible, as it allows for the automation of different analyses required for quick satellite creation and launch
- As MDAAT matures, it has the capability to reduce the time to design, build, and test a satellite, while providing overall mission performance measures

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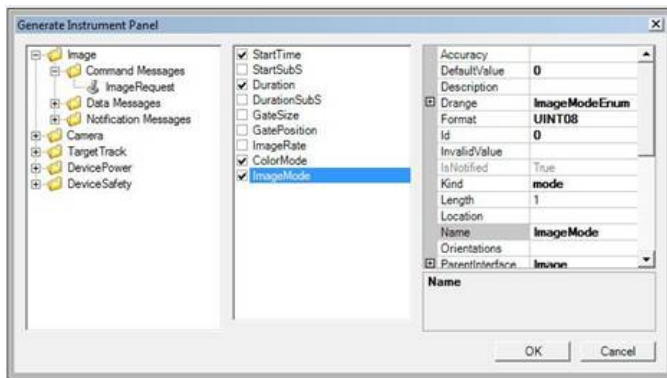
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## Air Force Requirement

The Air Force needs innovative technology to support the Plug-N-Play (PnP) Satellite and Operationally Responsive Space (ORS) programs. The PnP Satellite Program is developing the technology necessary to rapidly prototype and assemble complex Tactical Satellites. Part of the PnP Satellite Program (PnP Sat) requires software automation called the Pushbutton Tool Flow (PTF). The PTF allows a user to move through a sequence of Design Tools to configure a satellite based on mission requirements.

## SBIR Technology

In this SBIR project, Star Technologies developed the Mission Design and Analysis Tool (MDAAT). An initial version of the MDAAT involves developing a core "Design Tool Set" in support of the Pushbutton Tool Flow.



Automatic generation of an Instrument Panel for use in Ground Systems

MDAAT is a collection of software and utilities designed for automation to foster quick development of PnP Sat hardware and software such as attitude control system design, hardware placement and orientation, and ground systems. MDAAT is centered on Star Technologies' Spacecraft Design Tool (SDT) – a spacecraft simulation software product already in use at the Air Force Research Laboratory (AFRL).

## Potential Air Force Application

Transitioning manual analysis to analysis with automated software is necessary for the new "concept to launch" paradigm required by ORS goals. MDAAT is the concept that makes this new paradigm possible, as it allows for the automation of different analyses required for quick satellite creation and launch. As tactical mission requirements and

performance criteria are satisfied, MDAAT can generate an assembly plan and a high fidelity satellite simulation for final test and evaluation.

As MDAAT matures, it has the capability to reduce the time to design, build, and test a satellite while providing overall mission performance measures. MDAAT can also support resolution of satellite anomalies that occur during a mission and provide the ability to query Satellite Data Model (SDM) based components and send and receive messages in real time within the SDT.

## Company Impact

Working with AFRL allows Star Technologies to further develop the technologies necessary to realize rapid satellite creation concepts. Star will use MDAAT as the basis for additional software tools based on AFRL and ORS requirements.

Star Technologies Corporation was incorporated in the Commonwealth of Virginia in 1990 by Robert R. Strunce, Jr., and is located in Great Falls, Virginia. Star provides commercial off-the-shelf (COTS) software products and engineering services to the aerospace industry.



# SBIR/STTR

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