



CUSTOMER:

Sierra Nevada Corporation

INDUSTRY:

Aerospace

PROJECT NAME:

Structural and Thermal
Analysis Support for Sierra
Nevada Corporation's Dream
Chaser Spacecraft

CUSTOMER LOCATION:

Louisville, Colorado

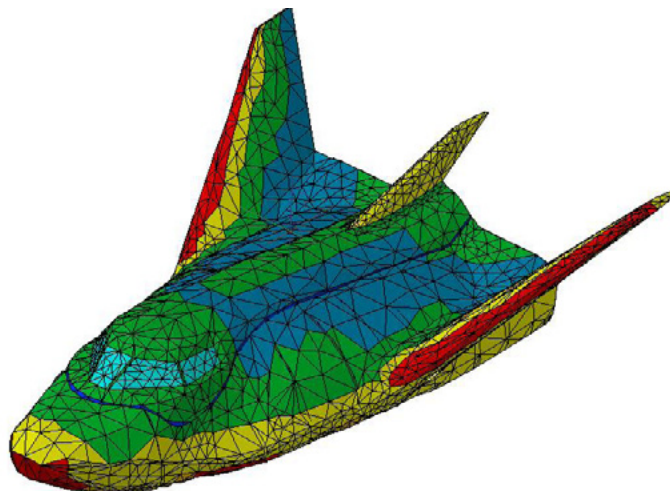
OVERVIEW

Sierra Nevada Corporation (SNC) is a world-class prime systems integrator and electronic systems provider of agile and innovative solutions. For over 50 years, SNC has developed and provided high-technology electronics, avionics, and communications systems. In 2012, SNC was selected as one of three companies to participate in NASA's Commercial Crew Integrated Capability (CCiCap) initiative, following its Commercial Crew Development Round 2 (CCDev2) Space Act Agreement with the agency. During CCDev2, SNC furthered the development of its reusable composite *Dream Chaser*[®] spacecraft.

ATA supported SNC as a team member on the Dream Chaser program for nearly two years on the CCDev2 and CCiCap initiatives, in the areas of thermal analysis and the measurement of rocket motor noise and vibration. Software packages used include Thermal Desktop, Nastran, Matlab, and Perl.

ATA SUPPORT INCLUDED:

- ▷ Thermal models were developed and the structure was evaluated for various thermal operating conditions including free flight, reentry, and potential docking scenarios with the International Space Station (ISS).
- ▷ A new method was developed that correctly included orthotropic properties upon importing Nastran models into Thermal Desktop.
- ▷ Several parameter studies and cases were run where ATA developed extensive scripts to read the results and quickly postprocess them in batch form.
- ▷ A 1-D fluid network and CFD model were created to represent the airflow throughout the pressure vessel and predict temperature on computers and avionic components.
- ▷ Components of the Active Thermal Control System (ATCS) and the Environmental Control and Life Support System (ECLSS) were modeled and adjusted as necessary.



▲ Dream Chaser model

Credit: Sierra Nevada Corporation

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