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Case Study

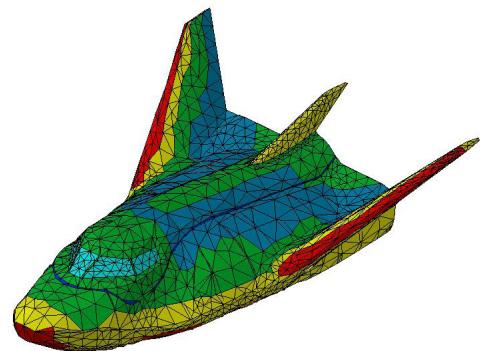
Dream Chaser Analysis Support

OVERVIEW

For over 50 years, Sierra Space (formerly Sierra Nevada Corporation [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 Sierra Space 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.

TASKS PERFORMED & KEY OUTCOMES

- Thermal models were developed to evaluate structure for thermal operating conditions including free flight, reentry, and docking with the International Space Station.
- A new method was developed that correctly translated orthotropic properties from Nastran models to Thermal Desktop.
- Several parameter studies and cases were run where ATA developed extensive scripts to quickly read and postprocess results in batch form.
- A 1D 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.



System-level model. Image courtesy Sierra Space.