



Images courtesy of Ball Aerospace and NASA

CUSTOMER:
Ball Aerospace & Technologies Corporation

INDUSTRY:
Aerospace

PROJECT NAME:
Analysis and Test Support for Deep Impact Spacecraft

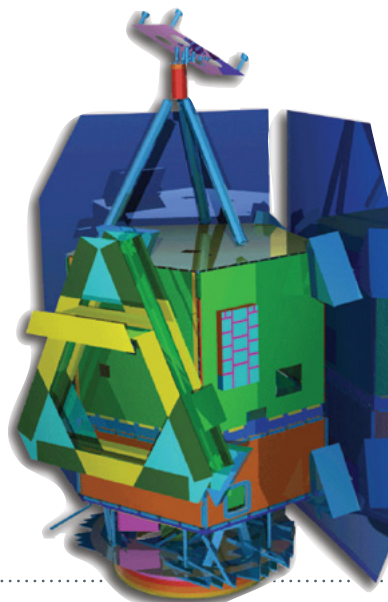
CUSTOMER LOCATION:
Boulder, Colorado

OVERVIEW

Ball Aerospace & Technologies Corp. (BATC) provides advanced imaging, communications, and information solutions to government and commercial aerospace markets. The spacecraft they developed for NASA's Deep Impact program actually consisted of two spacecraft that will fly into deep space to gather more information about the Tempel 1 comet. One of the spacecraft was designed to impact the comet while the other flyby spacecraft observes and records the impact, the ejected material blasted from the crater, and the structure and composition of the crater's interior. On July 4, 2005, the Deep Impact Spacecraft successfully completed its mission. ATA Engineering, Inc., (ATA) provided specialized test and analysis support over a period of 12 months to BATC at the component, subsystem, and system levels.

ATA SUPPORT INCLUDED:

- ▷ Developed detailed finite element models (FEMs) of a variety of components and subsystems.
- ▷ Verified designs through detailed stress analysis under specified static, thermal, and dynamic loads.
- ▷ Worked with designers to implement necessary component and system modifications required to achieve positive margins for all design loads.
- ▷ Developed forcing functions and performed transient analyses on subsystems subjected to impact loading.
- ▷ Developed correlated, simplified subsystem FEMs for inclusion in the system dynamic analysis FEM.
- ▷ Designed and validated innovative shock attenuation flexures for a variety of components by applying shock data from test to detailed analytical models.
- ▷ Performed a modal test of the entire spacecraft at BATC's facility in only three days.
- ▷ Updated system level dynamic model to closely correlate with modal test data for fourteen target modes.



▲ Comet Tempel 1 image taken by high-resolution camera on the flyby spacecraft 67 seconds after it collided with Deep Impact .

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