



Images courtesy of NASA JPL

CUSTOMER:

**NASA Jet Propulsion
Laboratory (JPL)**

INDUSTRY:

Aerospace

PROJECT NAME:

**Design of Mars Science
Laboratory Test Chassis**

CUSTOMER LOCATION:

Pasadena, California

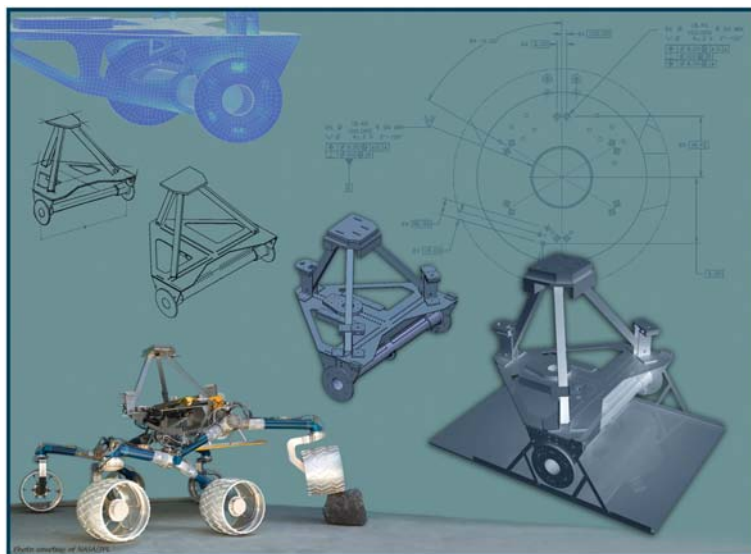
OVERVIEW

As part of NASA's unmanned planetary exploration program, the Jet Propulsion Laboratory (JPL) is building and sending a next-generation rover, called the Mars Science Laboratory (MSL), to the surface of Mars. This is the largest rover yet to be sent to Mars, and will fulfill the unique directive of searching for evidence of microbial life, past or present.

The landing system for this mission is the first of its kind; the rover will be lowered from a slowly descending rocket-controlled stage via tethers, and will touch down using the same mobility system that it will use to traverse the planet. Advanced testing methodologies were called for to understand this sequence. ATA Engineering, Inc (ATA) supported this work in a number of areas, one of which being the design and manufacture of a representative rover chassis for full-scale touchdown testing.

ATA SUPPORT INCLUDED:

- ▷ Creation of a conceptual design that fulfilled requirements such as mobility system interface locations, total mass, center of mass location/adjustability, bridle keep-out zones, and hard-stop locations.
- ▷ Use of an analysis-driven design approach to develop a conceptual system representation that met all performance criteria.
- ▷ Development of a detailed design of the chassis.
- ▷ Performance of detailed analysis of the system to ensure it met performance requirements; analyses included stress analysis, structural dynamics, and determination of mass properties given the materials and system architecture.
- ▷ Finalization of structural details and fastener selection including addressing issues related to manufacturability and tolerancing.
- ▷ Generation of engineering/manufacturing drawings of all parts.



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