



CUSTOMER:  
**Orbital Sciences Corporation**

INDUSTRY:  
**Aerospace**

PROJECT NAME:  
**Concept Evaluation and Refinement Support**

CUSTOMER LOCATION:  
**Reston, Virginia**

## OVERVIEW

Orbital Sciences Corporation (OSC) was awarded a series of contracts by NASA to define an architecture to support NASA's Space Exploration Vision. ATA Engineering (ATA) worked closely with the Concept Evaluation and Refinement (CE&R) design team to help develop conceptual designs for lunar exploration infrastructure.

ATA's efforts involved developing conceptual designs, performing trade studies, and carrying out structural analyses—static, dynamic, structural optimization, and thermal—to define initial sizing and generate mass estimates for a variety of different elements.

## ATA SUPPORT INCLUDED:

- ▷ Heavy Lift Launch Vehicle
  - Internal loads evaluation and tank structural sizing.
- ▷ Human Transport Systems
  - Human Lunar Lander: High-level layout and packaging of tanks, subsystems, and structural elements. Structural analyses and material and design trade studies to define initial sizing for primary structure of lander base, crew cabin, and airlock.
  - Crew Exploration Vehicle: Structural analysis of launch abort system and optimization of crew module.
  - Space Exploration Module: Internal loads analysis, tank structural sizing, and design and sizing of tank supports and thrust structure.
- ▷ Cargo Transport Systems
  - Cargo Lunar Lander: High-level layout and packaging of tanks, subsystems, and structural elements, and structural analyses to define initial sizing for primary structure of lander base.
- ▷ Exploration Surface Infrastructure Systems
  - Airlock: Conceptual design development, and structural analysis to determine initial sizing and mass.
  - Habitat: Trade studies of various habitat shapes to determine optimal design for given mass, volume and size constraints, structural optimization to determine initial sizing.
  - Crawler crane: Initial sizing of primary crane structure that would be used to move habitat and other large payloads from the lunar lander.



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