

Marshall Space Flight Center

Architecture Definition and Conceptual Design

The Advanced Concepts Office

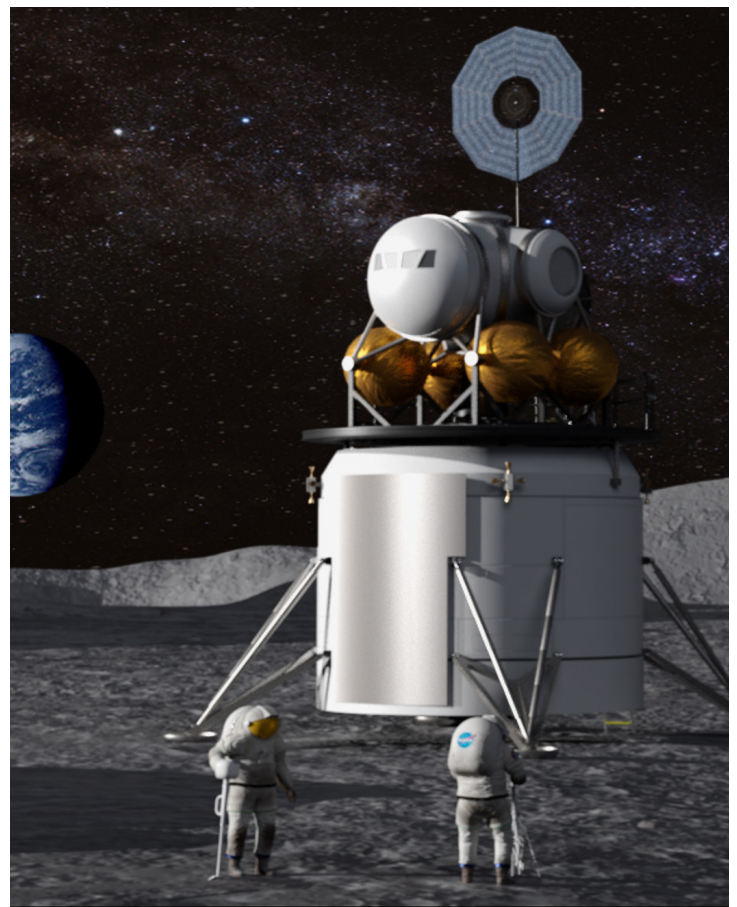
From early-stage innovations to human exploration architectures, the Advanced Concepts Office (ACO) provides multi-disciplinary engineering for pre-phase A architecture synthesis and concept design. Our office assists customers in all aspects of formulation by providing trade space exploration, decision analysis, requirements development, and identification of risks and opportunities for future projects.

ACO applies a digital engineering approach integrating multi-disciplinary engineering expertise in a collaborative environment to rapidly turn ideas into feasible and actionable concepts. The ACO team maintains expertise in spacecraft design, mission concepts of operations and trajectory optimization, system of systems architectures, and model-based systems engineering.

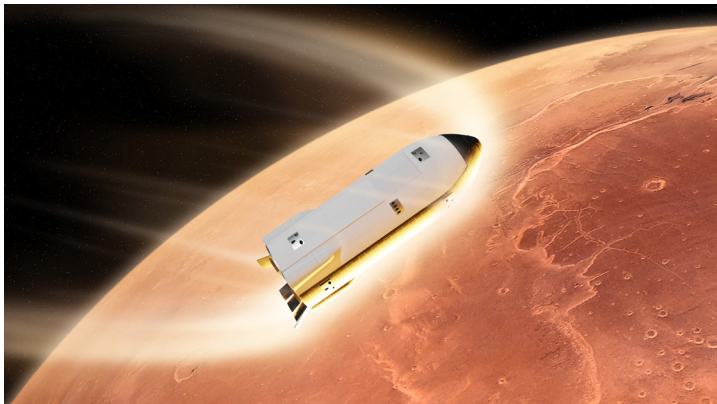
Our team is dedicated to working with each partner to define an approach with the flexibility and efficiency to best meet their needs. The team can provide ‘right-sized’ support to each project, whether it be a one-day study by a subject matter expert or a multi-month analysis with a full team of engineers.

ACO has extensive experience formulating new programs with multi-organizational teams, including U.S. Government agencies, industry partners, and academic institutions. Our office traces its roots back to the Apollo program and early studies for human exploration of the Moon and Mars.

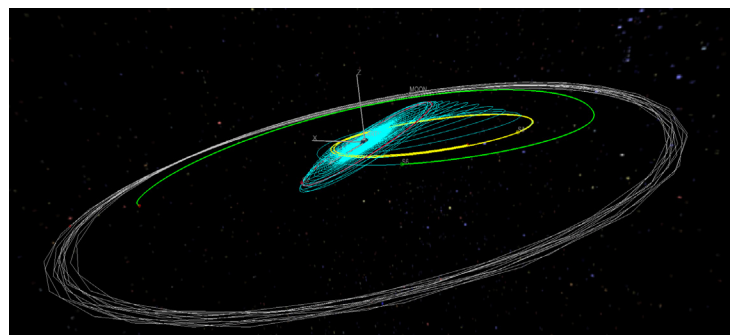
Past projects include conceptual developments for the International Space Station, Chandra X-ray Observatory, X-37, Space Launch System, Mars DRMs, SuperHERO high energy optics platform, and DRACO nuclear propulsion.



Living and Working in Space.



Traveling in Space.



Navigating in Space.

Capabilities

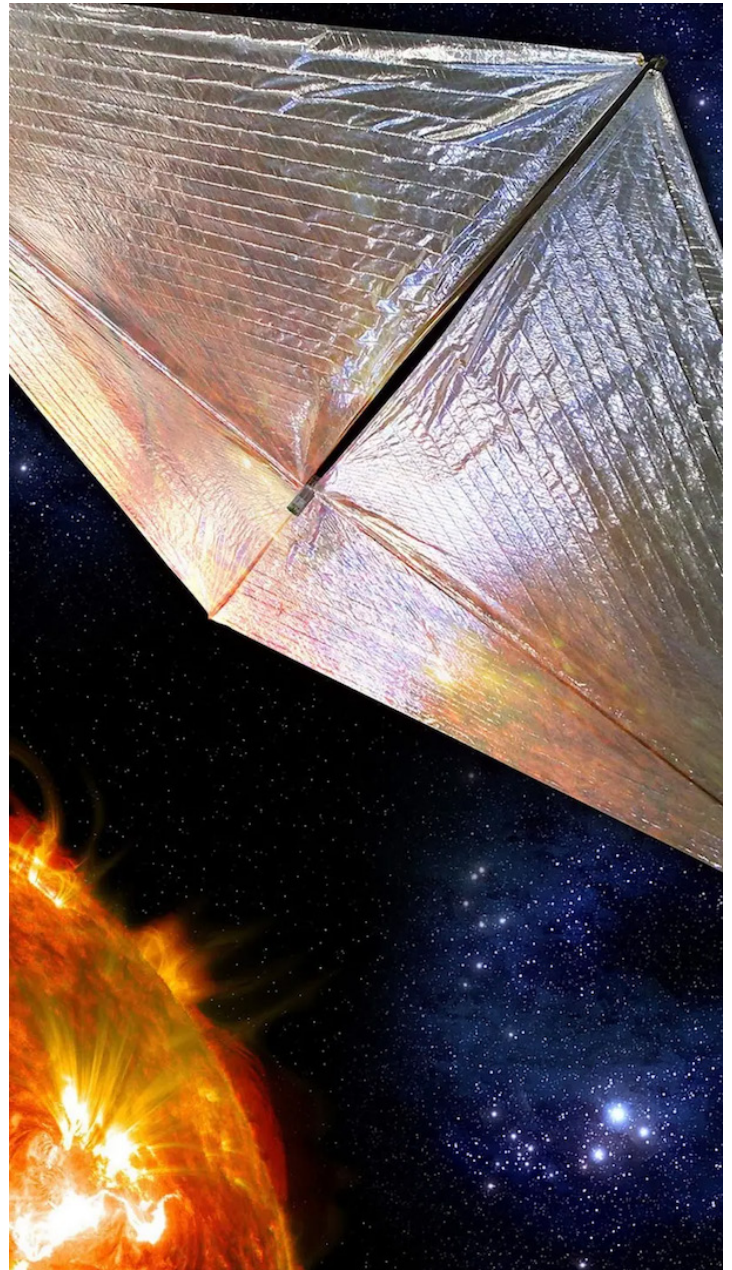
Our office maintains continually advancing capabilities in the areas of:

- Modeling and optimization techniques:
 - Multi-Disciplinary Analysis and Optimization
 - Mixed Integer Programming
 - Discrete Event Simulation
 - Functional Architecting and Logical Decomposition
 - Space Systems and Missions Ontologies
- Human Exploration Architecture Synthesis
- Launch Vehicle Fleet Campaign Analysis
- In-space Infrastructure & Operations Studies
- Early Concept Programmatic Assessments
- Baseline Mission & Concept Design Studies
- Trans-Atmospheric Trajectory Optimization
- In-space Trajectory Optimization
- Quantitative Technology Assessments and Prioritization
- Science Instrument Design Studies.

Benefits

The Advanced Concepts Office supports NASA's exploration, science, and space technology communities by providing:

- Multi-Element Space Architecture Definition and Synthesis
- Large Trade Space Definition, Decision Analysis, and Performance Analysis
- Mission Concept Formulation and Proposal Development
- Digital Engineering development for Systems Engineering & Integration
- Assessments of Technology Gaps, Minimum Viable Products, and Infusion Path.



Exploring the Universe.

National Aeronautics and Space Administration

Marshall Space Flight Center
Huntsville, AL 35812
www.nasa.gov/center/marshall

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Doing Business With MSFC

