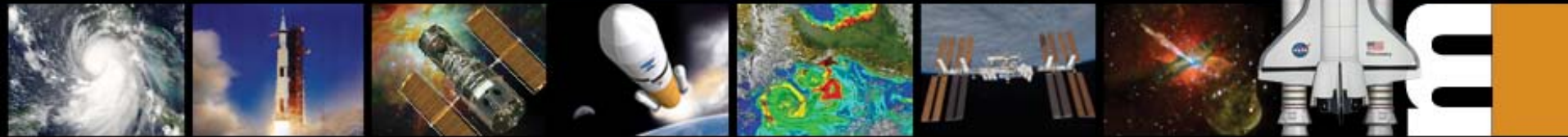




Engineering Innovations for Exploration Challenges

Marshall

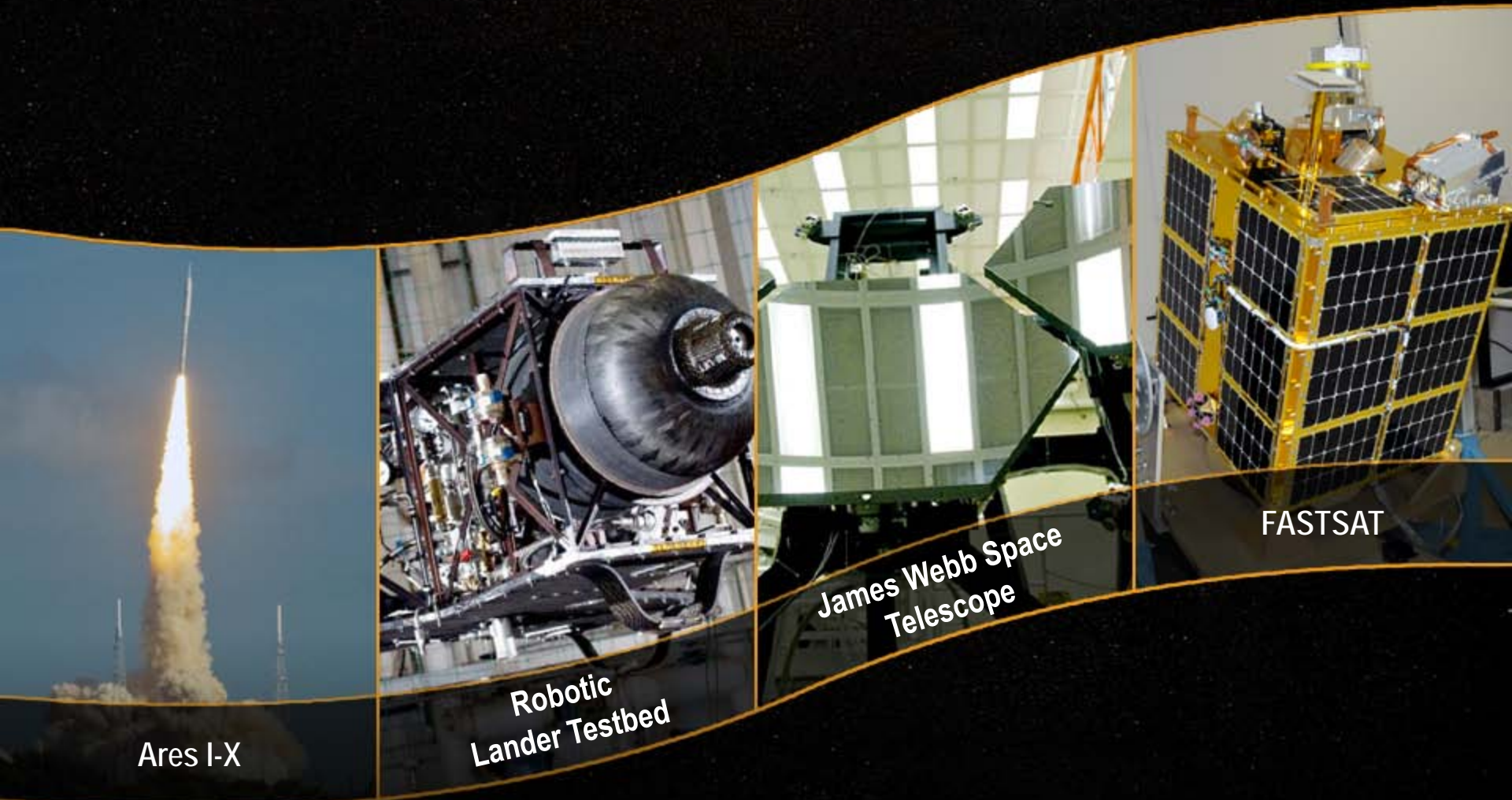


**Daniel L. Dumbacher, Engineering Director
NASA Marshall Space Flight Center
May 11, 2010**

Agenda

- 2009 Highlights
- Many Places to Explore
- Space Exploration Enterprise
- Marshall's Missions
- Project Lifecycle Management Model
- Sustainable Long-term Program
- Building Block Approach
- Defining the Path Forward
- Mars In Sight

2009 Highlights



Ares I-X

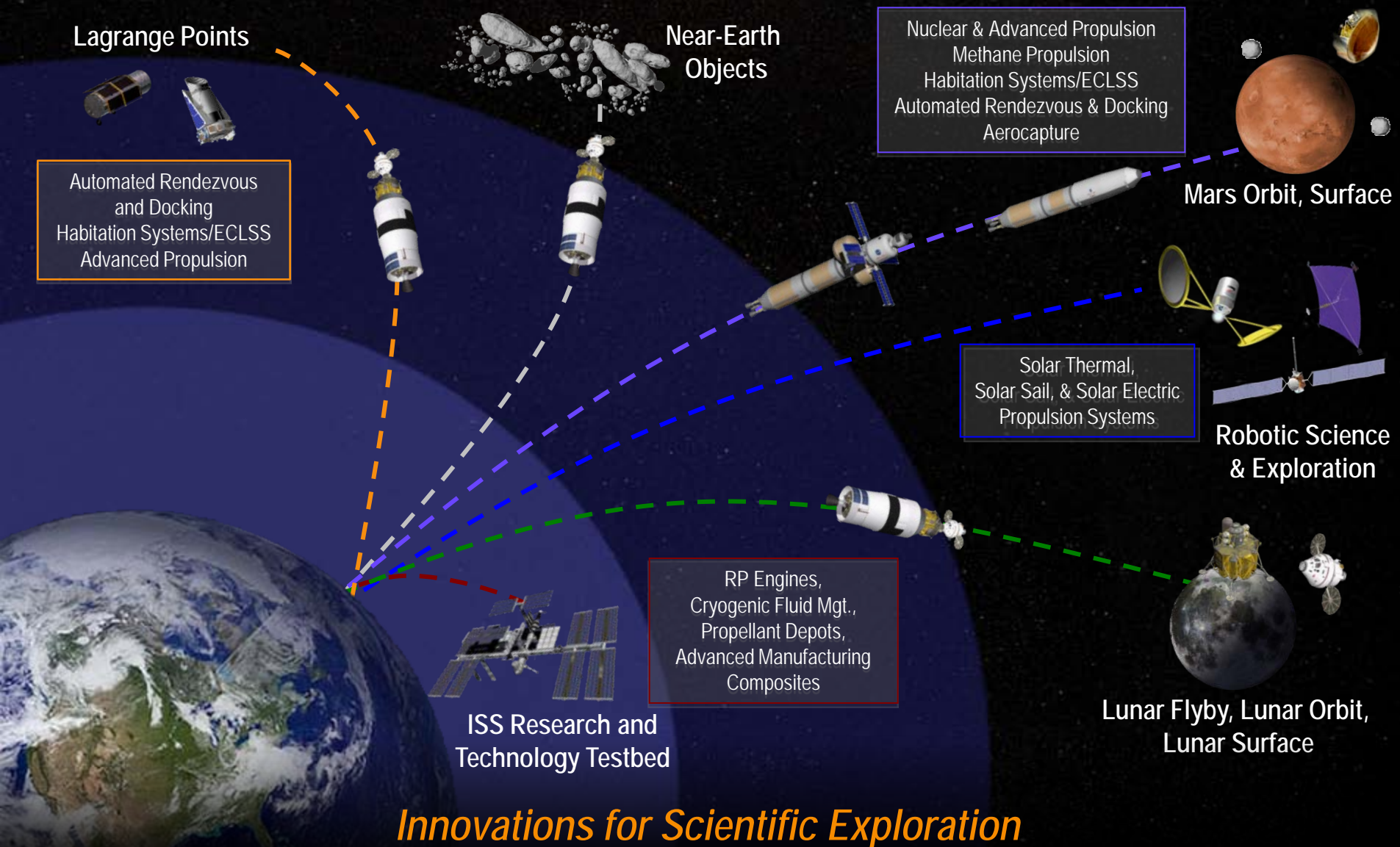
Robotic
Lander Testbed

James Webb Space
Telescope

FASTSAT

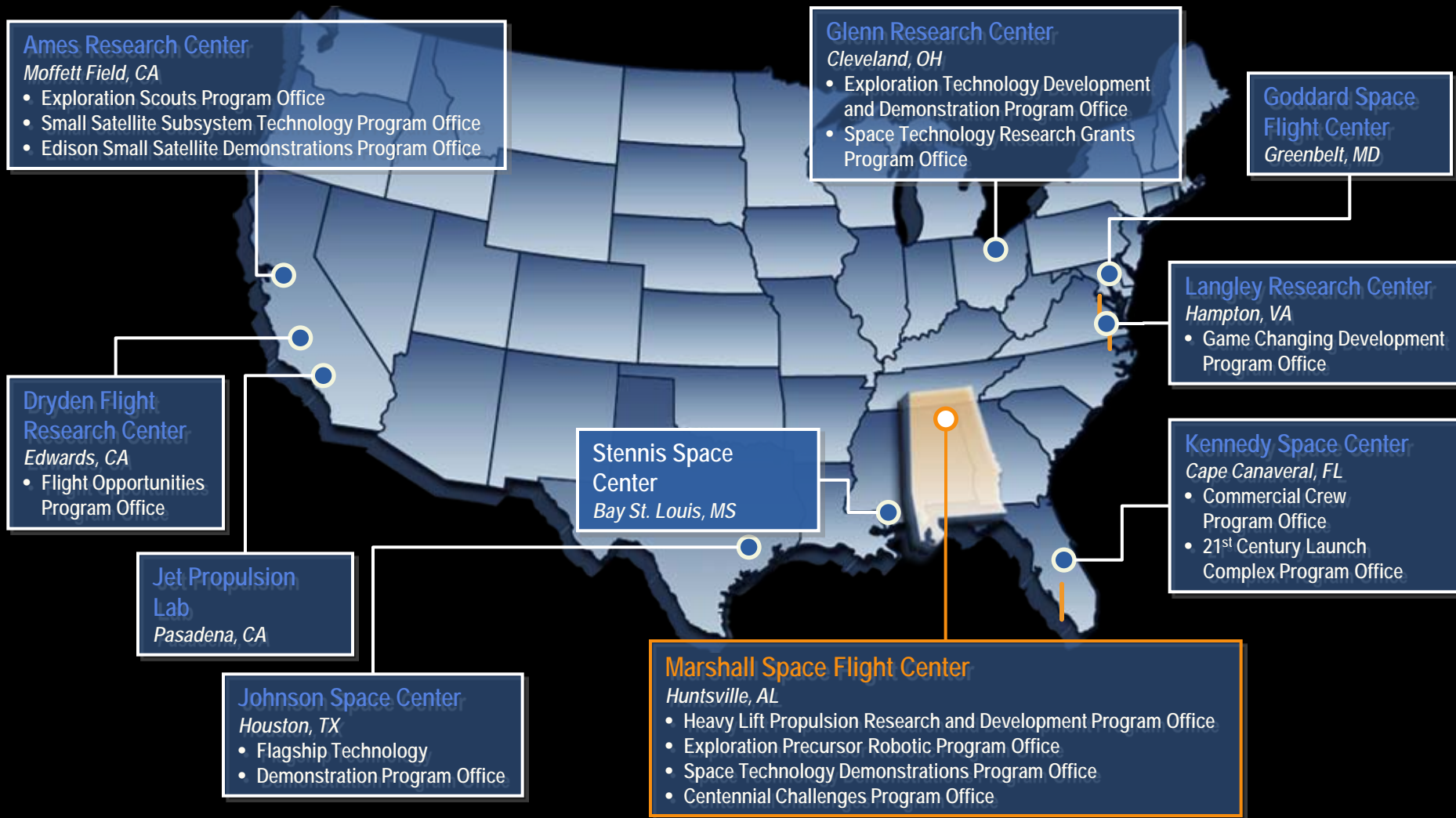
Significant Successes in Space Transportation, Exploration, and Science

Many Places to Explore



Innovations for Scientific Exploration

Space Exploration Enterprise



Government, Industry, and Academia Working Together

Marshall's Missions

A space shuttle is shown in the process of launching, with a large plume of white smoke and fire trailing behind it. The shuttle is oriented vertically, and its external tank and boosters are clearly visible.

Propulsion and
Transportation
Systems

A large, complex space station is depicted in orbit. It features a central module with several long, rectangular solar panel arrays extending outwards. The station is set against a dark background of space with stars.

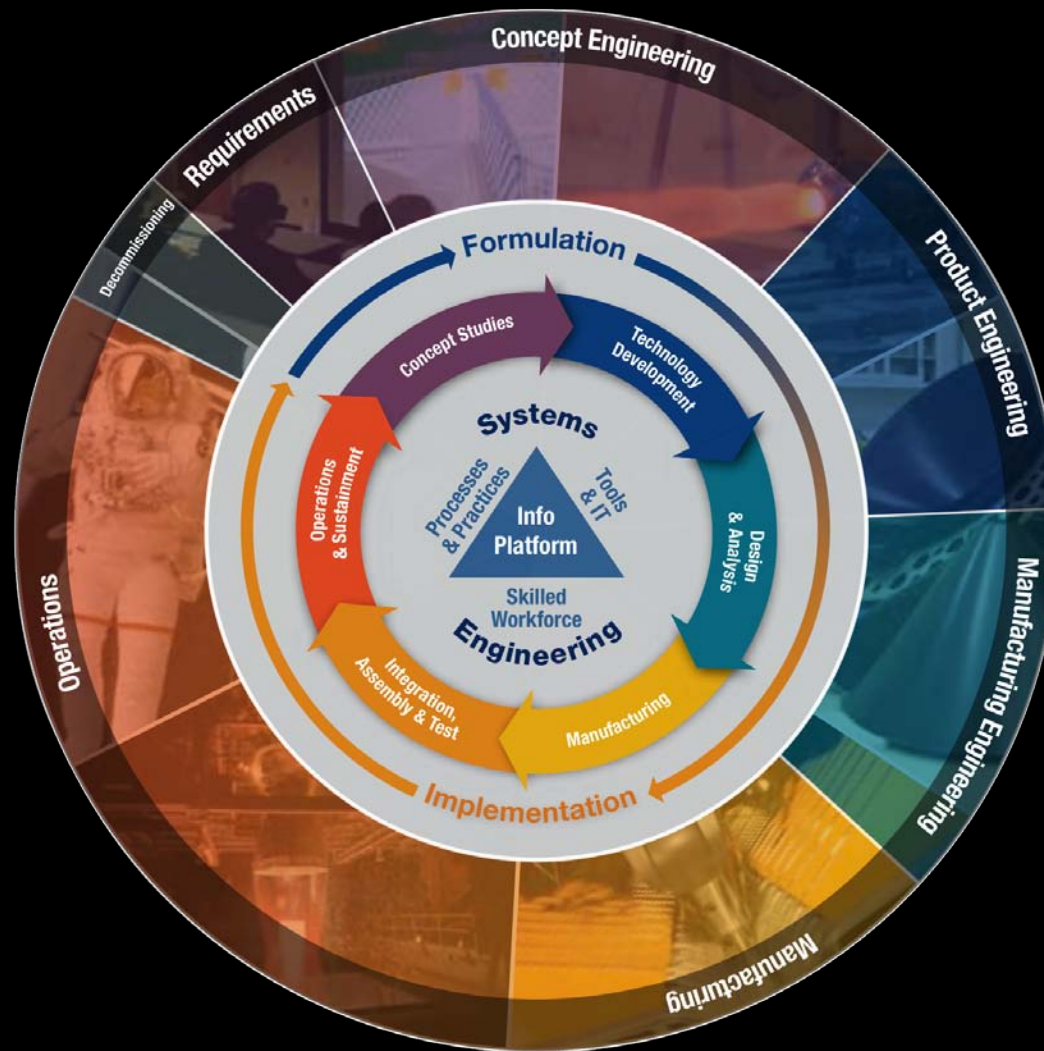
Life Support Systems

A satellite is shown in orbit, with its solar panels deployed. The satellite has a central body and two long, thin solar panel arms. The Earth's horizon is visible in the background.

Earth and Space Science
Spacecraft, Systems, and
Operations

Making Possible Human and Scientific Space Exploration

Project Lifecycle Management Model



Reducing Undefined, but Known, Risks

Sustainable Long-term Program



B-52Bs, 1957



NB-52A, 1959



B-52H Stratofortress,
The longest-serving bomber in U.S. military history

Block upgrades contributed to long-term program success

Building Block Approach



Building success through incremental testing and development

Defining the Path Forward



Expanding Knowledge through Exploration

Mars In Sight



*...I believe we can send humans to orbit Mars
and return them safely to Earth.*

—President Obama
Kennedy Space Center, April 15, 2010



*For more information:
www.nasa.gov*