

A space-themed background image showing the Earth's horizon on the left, the Moon in the center, and Mars on the right. A bright sun is visible in the upper left, creating a lens flare effect. The text 'NASA TECHNOLOGIES' is written vertically in a stylized, white, outlined font on the left side.

**NASA TECHNOLOGIES**

# **Review of NASA's Technology Roadmaps**

Walt Faulconer

November 16, 2011

# NRC Technology Roadmap Review

The background of the slide is a composite image of space. At the top, a bright sun or star is partially obscured by the dark, cratered surface of the Moon. Below the Moon, the curved horizon of Earth is visible, showing a thin blue atmosphere. In the lower right, the reddish, cratered surface of Mars is shown, also with a thin atmosphere. The overall scene is set against the deep black of space.

## Propulsion & Power

TA01 Launch Propulsion Systems

TA02 In-Space Propulsion Technologies

TA03 Space Power & Energy Storage Systems

TA13 Ground & Launch Systems Processing

## Robotics, Communications and Navigation

TA04 Robotics, TeleRobotics & Autonomous Systems

TA05 Communication & Navigation Systems

## Instruments & Computing Panel

TA08 Science Instruments, Observatories, and Sensor Systems

TA011 Modeling, Simulation, Information Technology, and Data Processing  
Human Health & Surface Exploration

TA06 Human Health, Life Support & Habitation Systems

TA07 Human Exploration Destination Systems

## Materials

TA10 Nanotechnology

TA12 Materials, Structures, Mechanical Systems & Manufacturing

TA14 Thermal Management Systems

## Entry, Descent & Landing

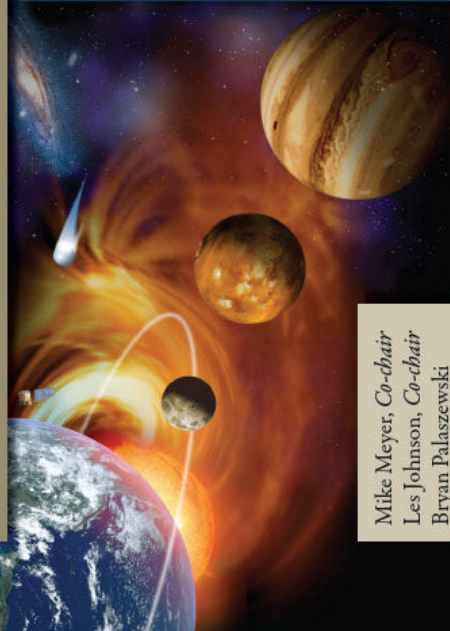
TA09 Entry, Descent & Landing Systems

# NASA Technology Roadmaps

National Aeronautics and Space Administration

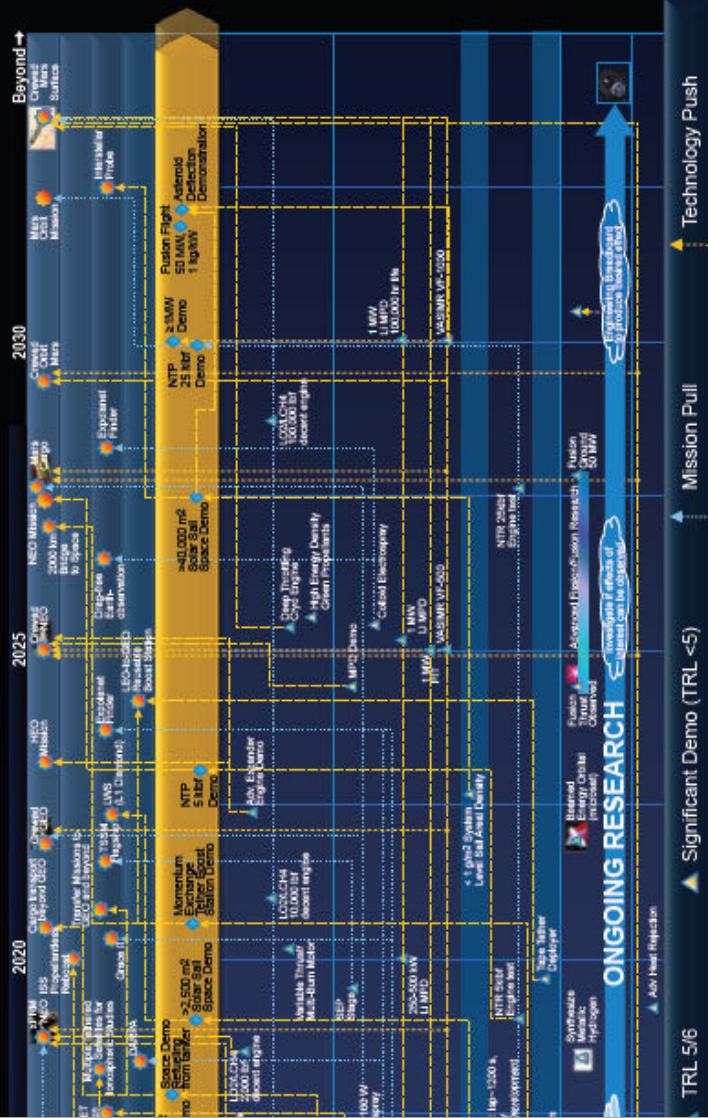


## DRAFT IN-SPACE PROPULSION SYSTEMS ROADMAP TECHNOLOGY AREA 02



Mike Meyer, *Co-chair*  
Les Johnson, *Co-chair*  
Bryan Palaszewski  
Dan Goebel  
Harold White  
David Coote

November • 2010



# Technology Priority Evaluation

The background of the slide is a space-themed image. It shows the curved horizon of Earth in the foreground, with the Moon in the middle ground. A bright star or sun is visible in the upper left, creating a lens flare effect. The sky is dark blue and black with some nebulae.

- Followed a QFD systematic process
- Considerations:
  - Sequencing of technologies
  - Technology Pull vs Push
  - System capability versus subsystem needs
  - What is needed within the next 5 years
  - Technology investment funding
  - Destinations/Missions
  - Identify Technologies at the “Tipping Point”

# Need an Integrated Approach

A space-themed background featuring the Earth's horizon on the left, the Moon in the center, and the Sun as a bright blue-white star in the upper left corner. The scene is set against a dark, starry space background.

- **Example: Radiation**
- **TA02 and TA03: coordination with radiation protection measures for nuclear propulsion and power systems**
- **TA03: survivability of solar power cells and other power system components in extreme radiation environments**
- **TA06: astronaut health**
- **TA08: instrumentation for particles, fields, and waves**
- **TA10: use of boron nitride nanotubes for protection against radiation**
- **TA12: materials and structures for radiation shielding**

# Final Evaluations

The background of the slide is a composite image of space. In the upper left, a bright sun or star is partially obscured by the dark, cratered surface of the Moon. Below the Moon, the curved horizon of Earth is visible, showing a thin blue atmosphere. In the lower right, the reddish, textured surface of Mars is visible, also showing a thin atmosphere. The overall scene is set against the deep black of space with some distant stars.

- How does each technology support NASA in achieving its Strategic Goals?
  - Extend and sustain human activities throughout the solar system
  - Explore the origins of life on Earth and the potential for life elsewhere
  - Expand our understanding of the Earth and the universe in which we live
- Crosscutting Technologies
- Critical Enabling Technology

NASA Technology Roadmaps

THANK YOU



By:  
Walt Faulconer

[www.StrategicSpaceSolutions.com](http://www.StrategicSpaceSolutions.com)