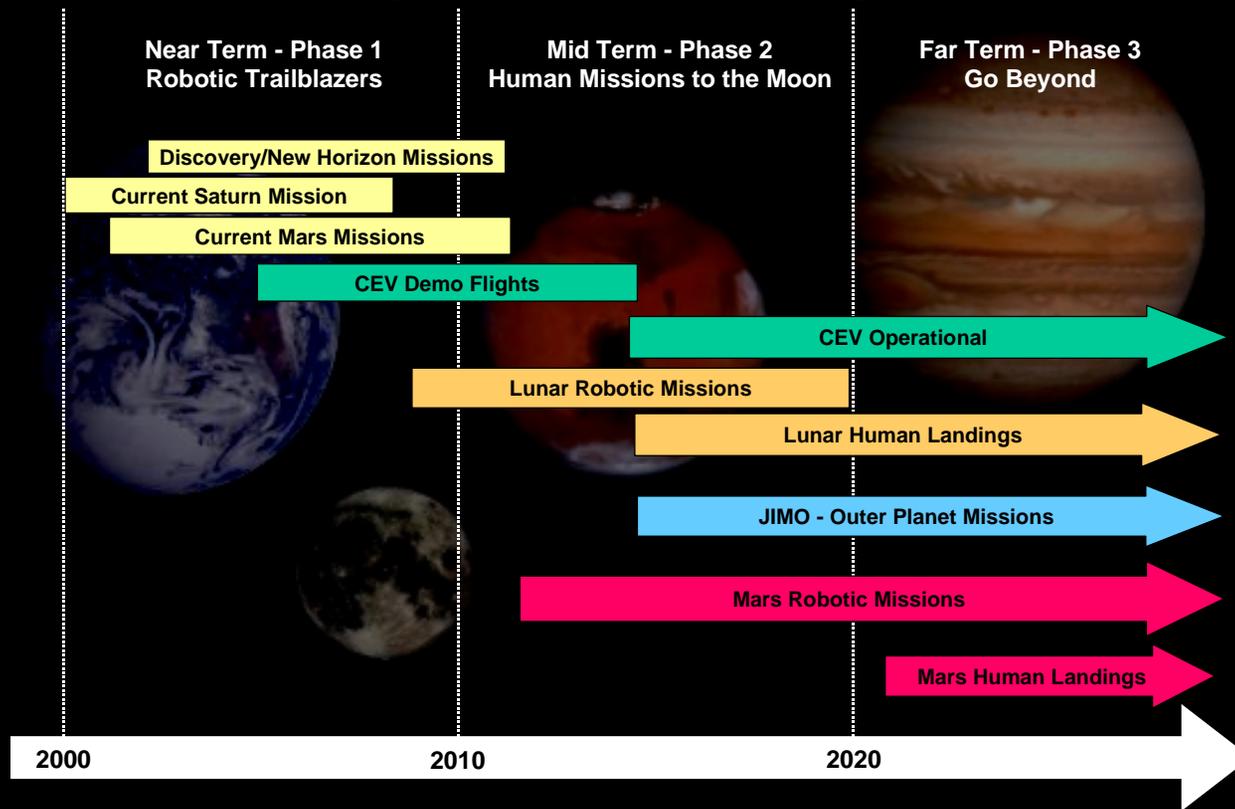


The Aerojet logo, featuring a stylized red and white 'A' with a red arrow pointing right, is positioned over the word 'AEROJET' in a bold, white, italicized sans-serif font. The background is a black field with faint, semi-transparent images of celestial bodies: Earth (blue and white), Mars (reddish-orange), Jupiter (brown and white bands), and the Moon (grey and white).

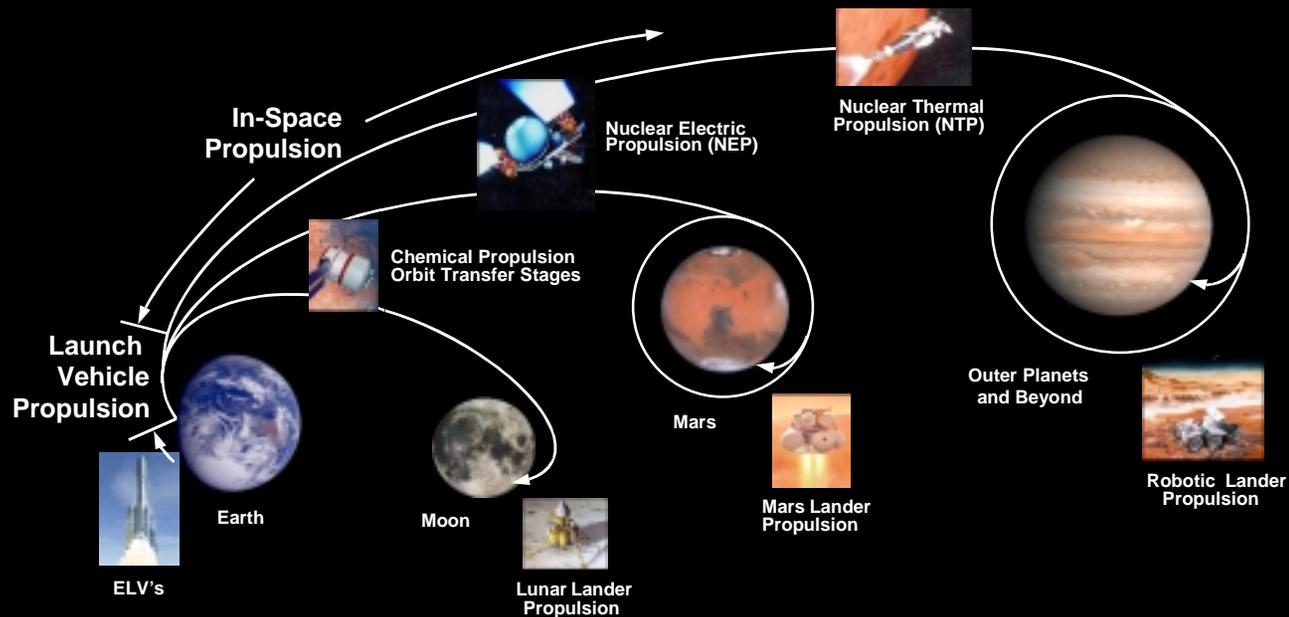
AEROJET

Presentation to Moon to Mars Commission
Michael F. Martin, President, Aerojet
April 16, 2004

The Three Phases of NASA's Exploration Road Map



The New Space Exploration Initiative Requires Launch Vehicle and In-Space Propulsion



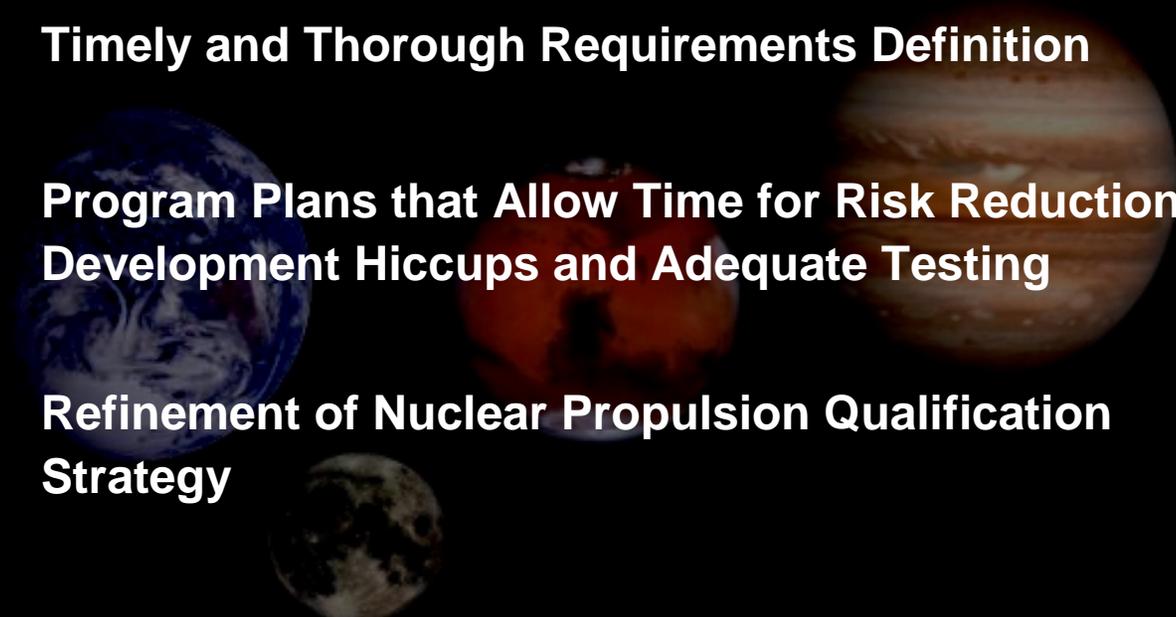
Aerojet's View: Launch Vehicle Propulsion for Space Exploration

Phase 1 Near Term	Phase 2 Mid Term	Phase 3 Far Term
<ul style="list-style-type: none">• <u>Existing</u> ELV's Meet Needed Payload Lift	<ul style="list-style-type: none">• ELV's will Require Human Rating• Possible Heavy lift Launch Vehicle Depending on System Architecture and Trades	<ul style="list-style-type: none">• Possible Nuclear Thermal Launch Vehicle Propulsion Systems

Aerojet's View: In-Space Propulsion for Space Exploration

Phase 1 Near Term	Phase 2 Mid Term	Phase 3 Far Term
<ul style="list-style-type: none">• <u>Existing</u> Technology and Hardware Products Adequate	<ul style="list-style-type: none">• Human Rate CEV Propulsion Systems Developed During Phase 1• Propulsion Systems that take Advantage of in-Situ Propellant Production• High Power Nuclear Electric Propulsion for Outer Planet Exploration	<ul style="list-style-type: none">• Nuclear Thermal Orbit Transfer Propulsion Systems

Common Propulsion System Challenges

- **Timely and Thorough Requirements Definition**
 - **Program Plans that Allow Time for Risk Reduction, Development Hiccups and Adequate Testing**
 - **Refinement of Nuclear Propulsion Qualification Strategy**
- 
- The background of the slide features a dark space scene with several celestial bodies. On the left is a blue and white Earth. In the center is a reddish-orange planet, likely Mars. On the right is a large, banded gas giant, Jupiter. Below the Earth is a smaller, cratered moon.

Conclusions and Recommendations

- **The Vision is Achievable - Propulsion Challenges Understood**
- **Requirement Definition and Adequate Development Time are Critical**
- **Vision Implementation will have a Substantial and Positive Impact**

