Presentation to Moon to Mars Commission

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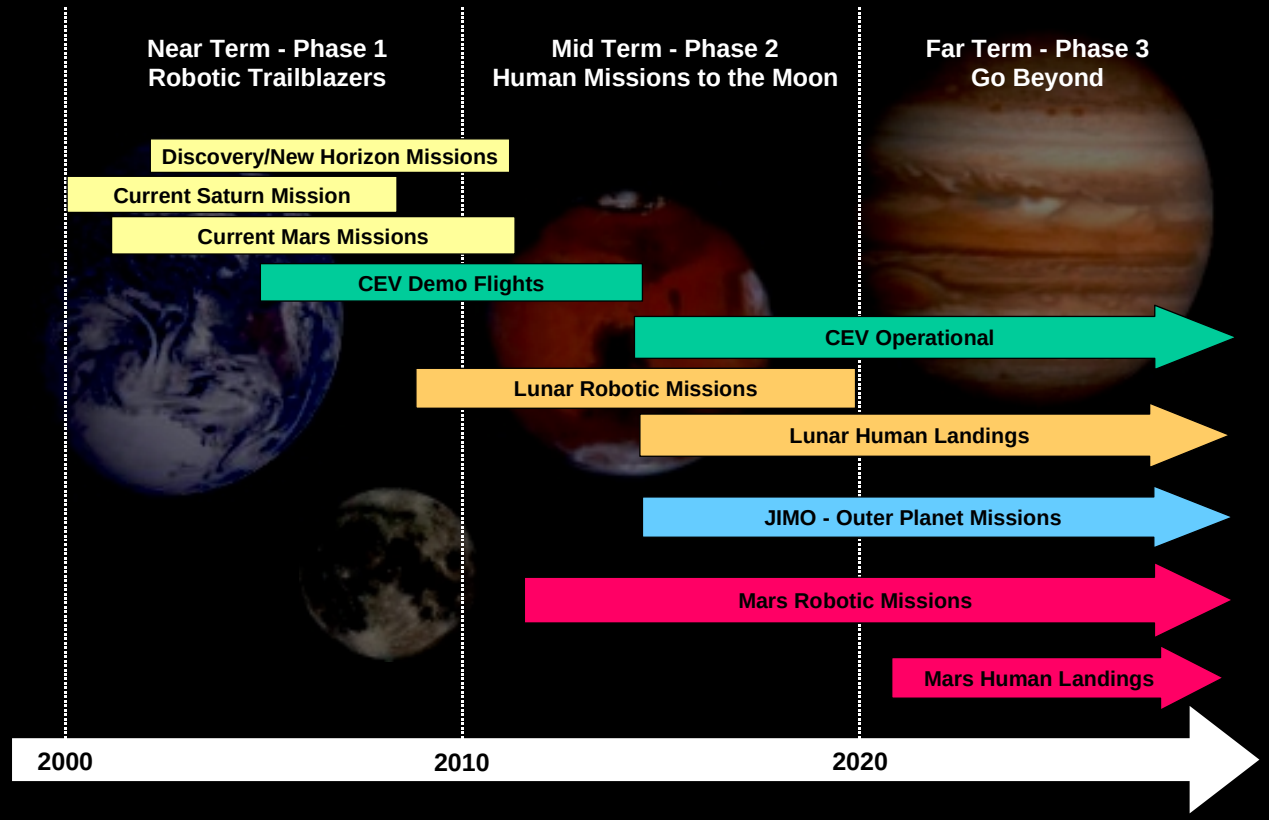
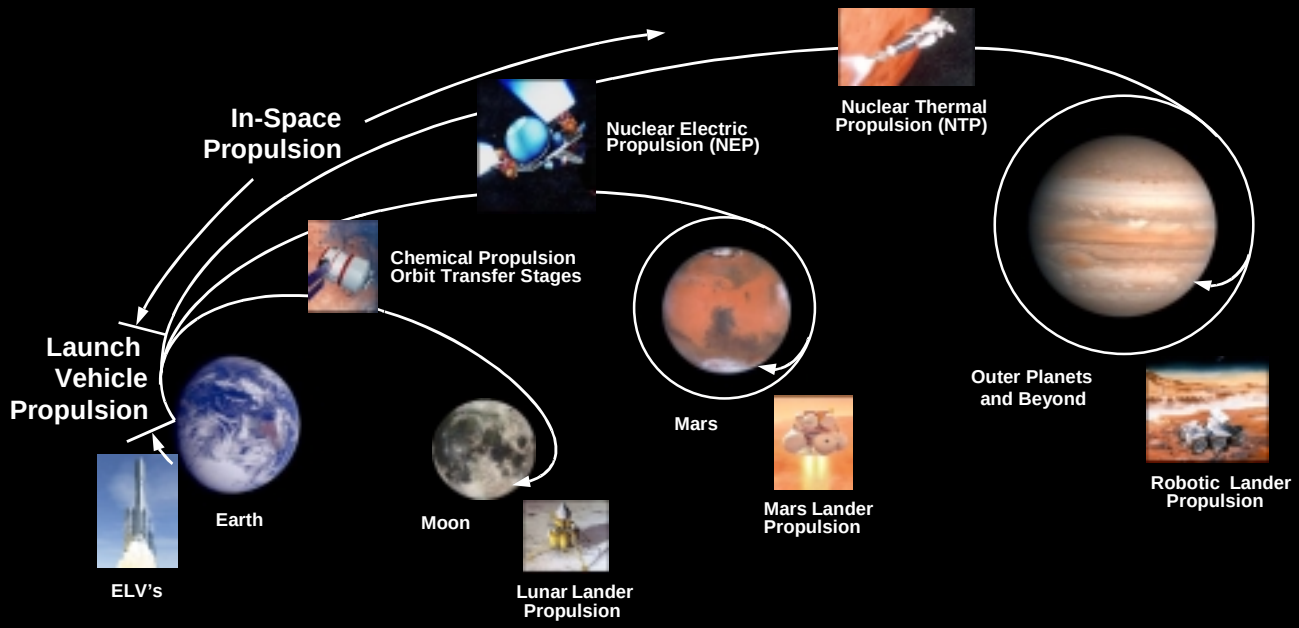
The Three Phases of NASA's Exploration Road Map



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



Aerojet's View:
Launch Vehicle Propulsion for Space Exploration

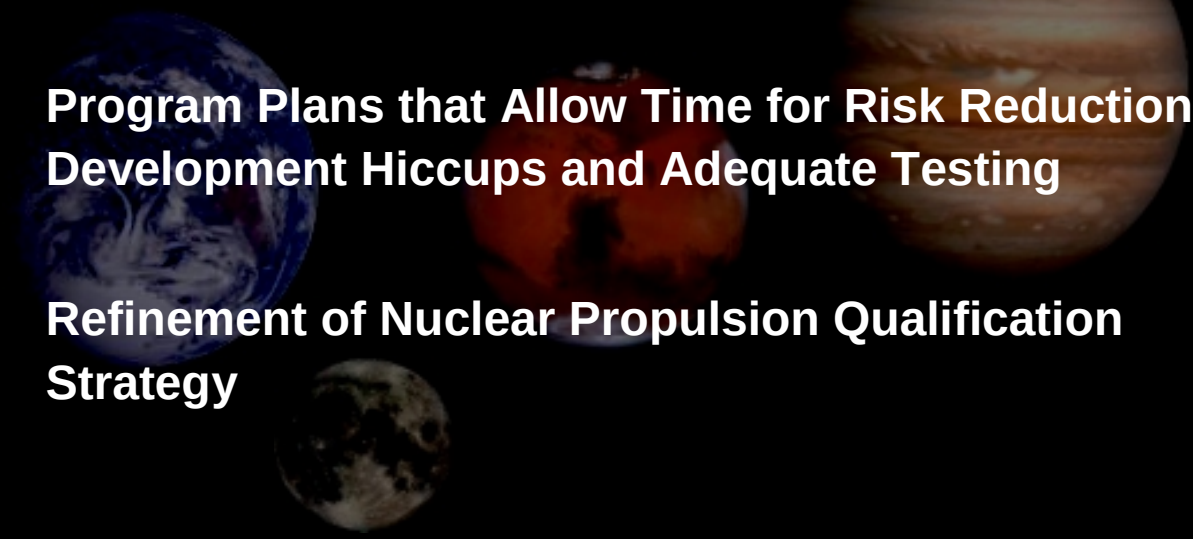
Phase 1 Near Term	Phase 2 Mid Term	Phase 3 Far Term
• Existing ELV's Meet Needed Payload Lift	• ELV's will Require Human Rating • Possible Heavy lift Launch Vehicle Depending on System Architecture and Trades	• Possible Nuclear Thermal Launch Vehicle Propulsion Systems

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

Phase 1 Near Term	Phase 2 Mid Term	Phase 3 Far Term
• Existing Technology and Hardware Products Adequate	• 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	• 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



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