



# NASA's Moon to Mars Strategy

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Humans to Mars Summit

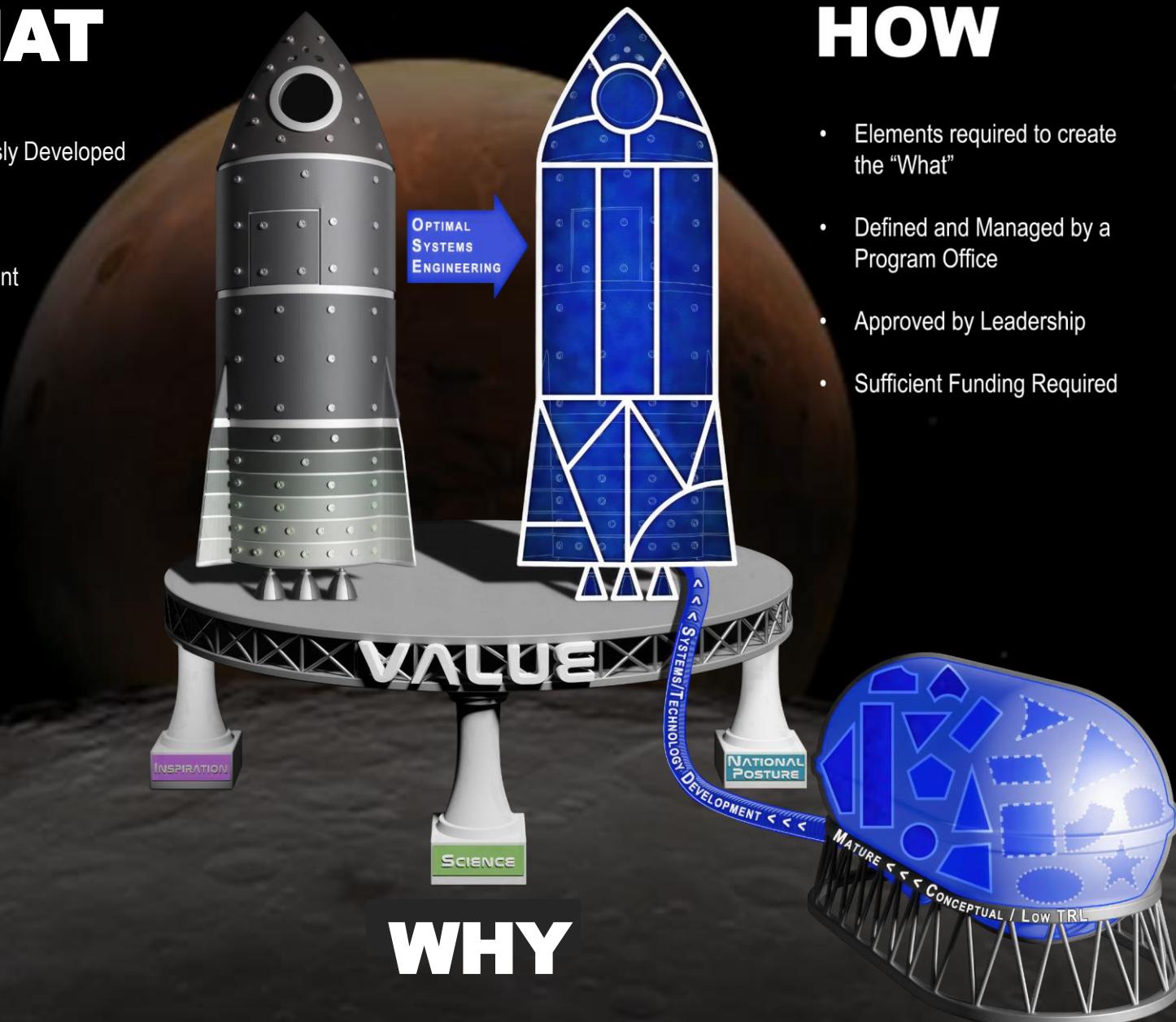
# WHAT

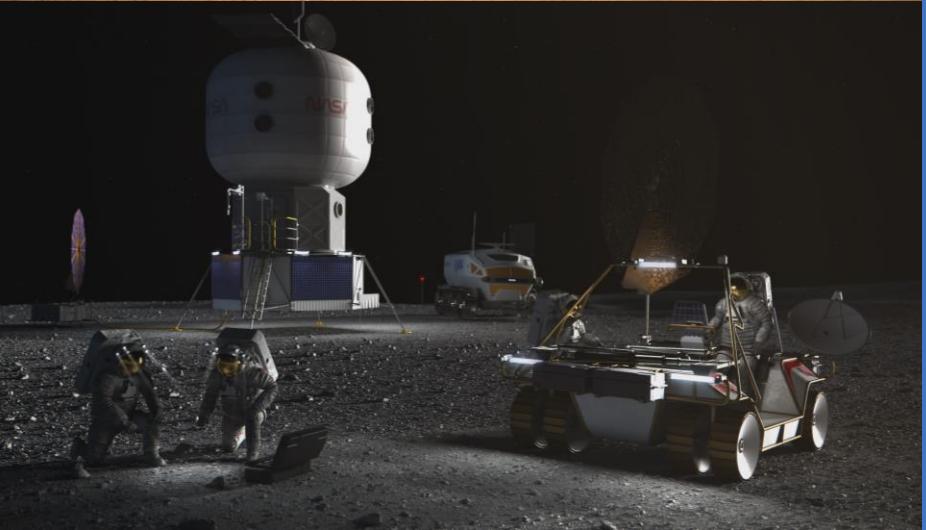
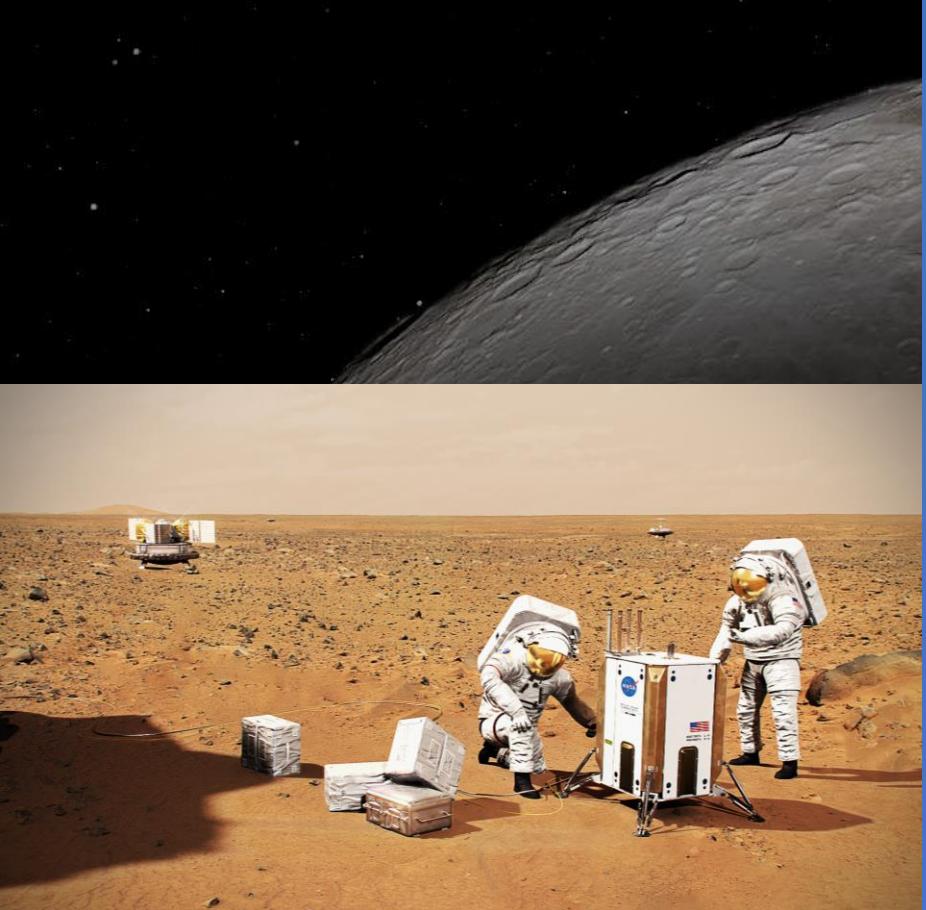
- Rigorously Developed
- Detailed
- Consistent



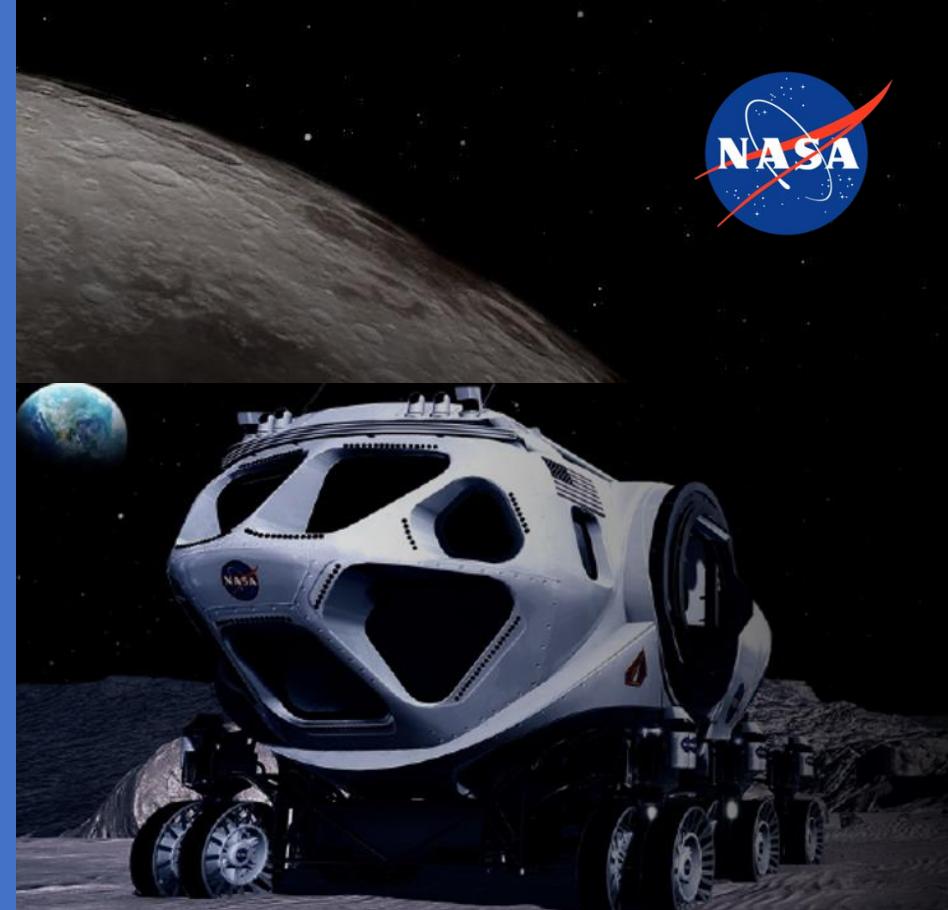
# HOW

- Elements required to create the "What"
- Defined and Managed by a Program Office
- Approved by Leadership
- Sufficient Funding Required





Create a blueprint  
for sustained  
human presence  
and exploration  
throughout the  
solar system



# Methodology Principles of the M2M Strategy



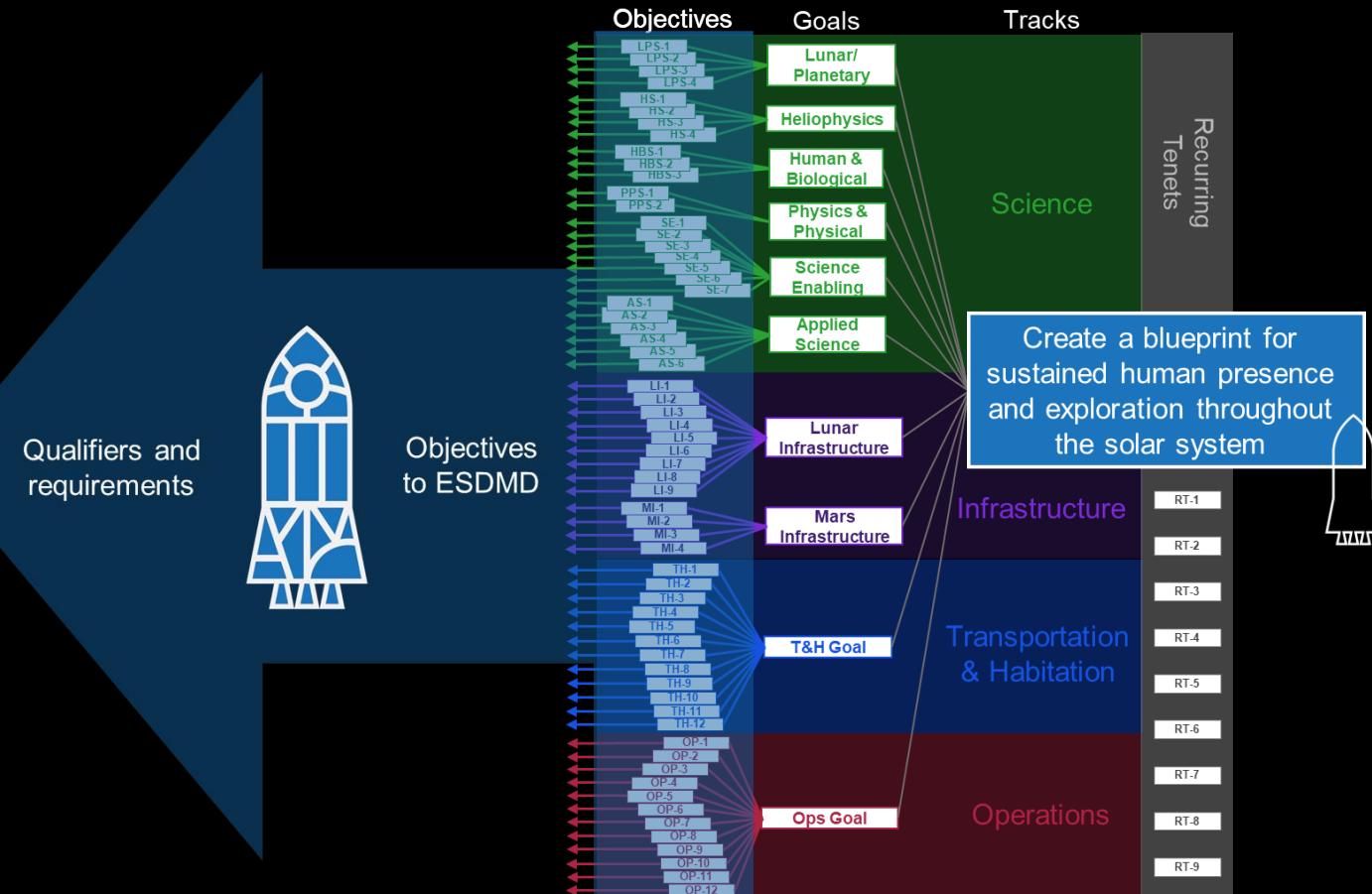
# Objective-Based Approach

## Architect from the Right

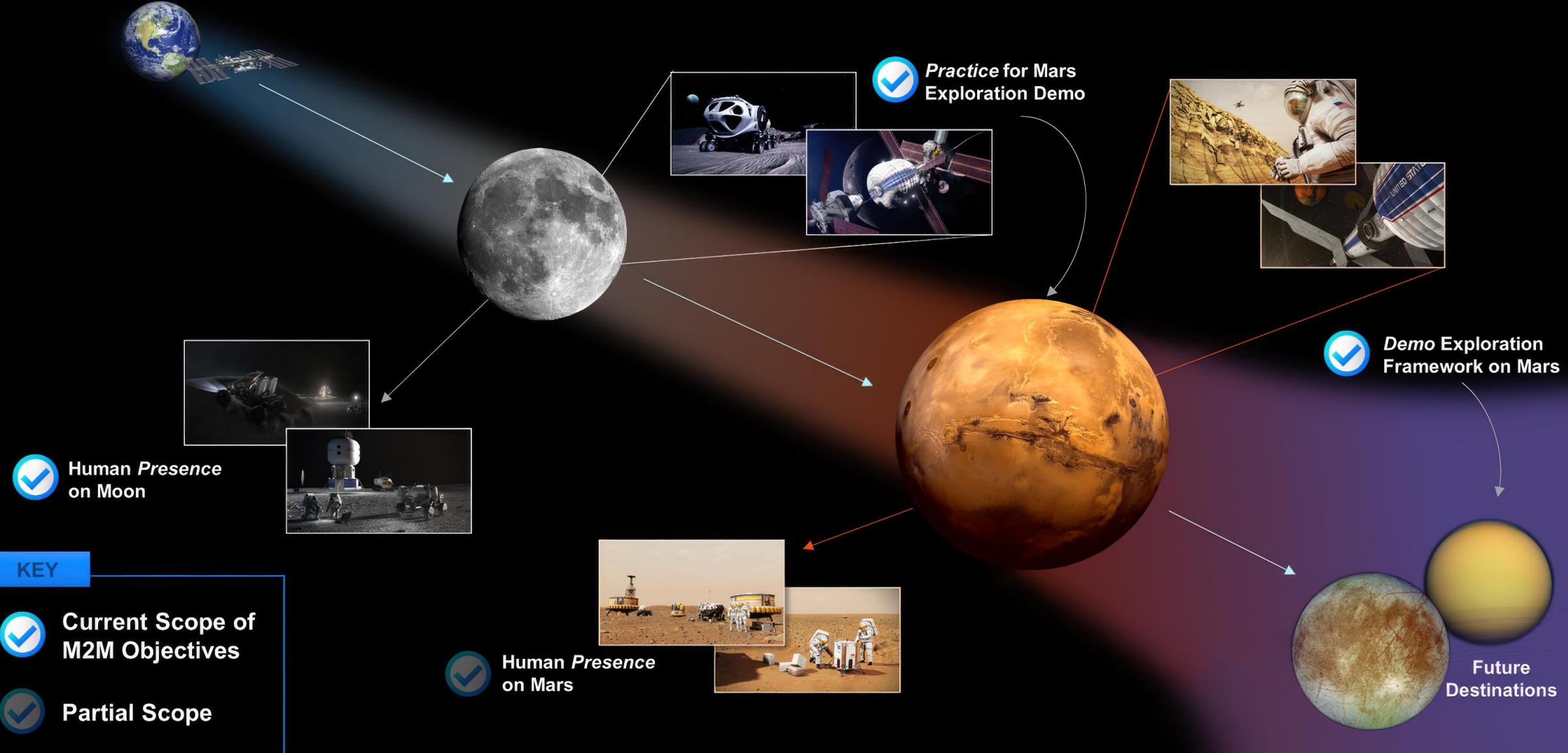
# Constancy of Purpose

# Unity of Purpose

# Enhanced Communication & Engagement



# Current Moon to Mars Scope





# Moon to Mars Top-Level Goals

SCIENCE

**Lunar/Planetary Science (LPS) Goal:** Address high priority planetary science questions that are best accomplished by on-site human explorers on and around the Moon and Mars, aided by surface and orbiting robotic systems.

**Heliophysics Science (HS) Goal:** Address high priority heliophysics science and space weather questions that are best accomplished using a combination of human explorers and robotic systems at the Moon, at Mars, and in deep space.

**Human and Biological Science (HBS) Goal:** Advance understanding of how biology responds to the environments of the Moon, Mars, and deep space to advance fundamental knowledge, support safe, productive human space missions and reduce risks for future exploration.

**Physics and Physical Science (PPS) Goal:** Address high priority physics and physical science questions that are best accomplished by using unique attributes of the lunar environment.

**Science-Enabling (SE) Goal:** Develop integrated human and robotic methods and advanced techniques that enable high-priority scientific questions to be addressed around and on the Moon and Mars.

**Applied Science (AS) Goal:** Conduct science on the Moon, in cislunar space, and around and on Mars using integrated human and robotic methods and advanced techniques, to inform design and development of exploration systems and enable safe operations.

**Lunar Infrastructure (LI) Goal:** Create an interoperable global lunar utilization infrastructure where U.S. industry and international partners can maintain continuous robotic and human presence on the lunar surface for a robust lunar economy without NASA as the sole user, while accomplishing science objectives and testing for Mars.

**Mars Infrastructure (MI) Goal:** Create essential infrastructure to support initial human Mars exploration campaign.

**Transportation and Habitation Goal:** Develop and demonstrate an integrated system of systems to conduct a campaign of human exploration missions to the Moon and Mars, while living and working on the lunar and Martian surface, with safe return to Earth.

**Operations Goal:** Conduct human missions on the surface and around the Moon followed by missions to Mars. Using a gradual build-up approach, these missions will demonstrate technologies and operations to live and work on a planetary surface other than Earth, with a safe return to Earth at the completion of the missions.

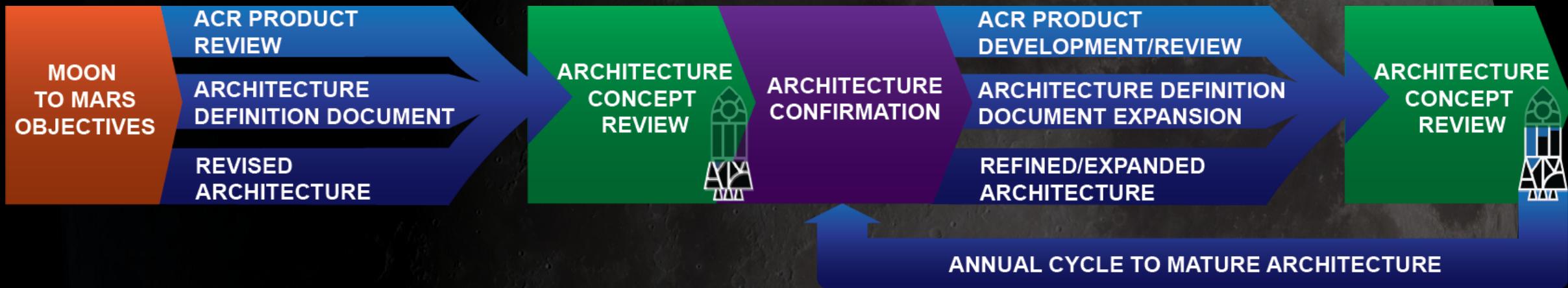
INFRA

T&H

OPS

# Evolutionary Architecture Process

*Formulating architecture and exploration strategy based on objectives*



## Architecture Concept Review Products



[www.nasa.gov/MoonToMarsArchitecture](http://www.nasa.gov/MoonToMarsArchitecture)



### Architecture Definition Document

Detailed documentation of a snapshot of NASA's human spaceflight architecture and exploration strategy



### Moon to Mars Architecture Summary

High-level overview of NASA's Moon to Mars architecture and exploration strategy



### White Papers

Six papers on architecture study details for frequently discussed topics

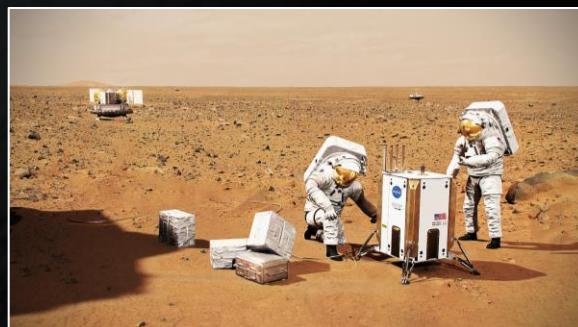
# Moon to Mars Architecture Segments

Human Lunar  
Return

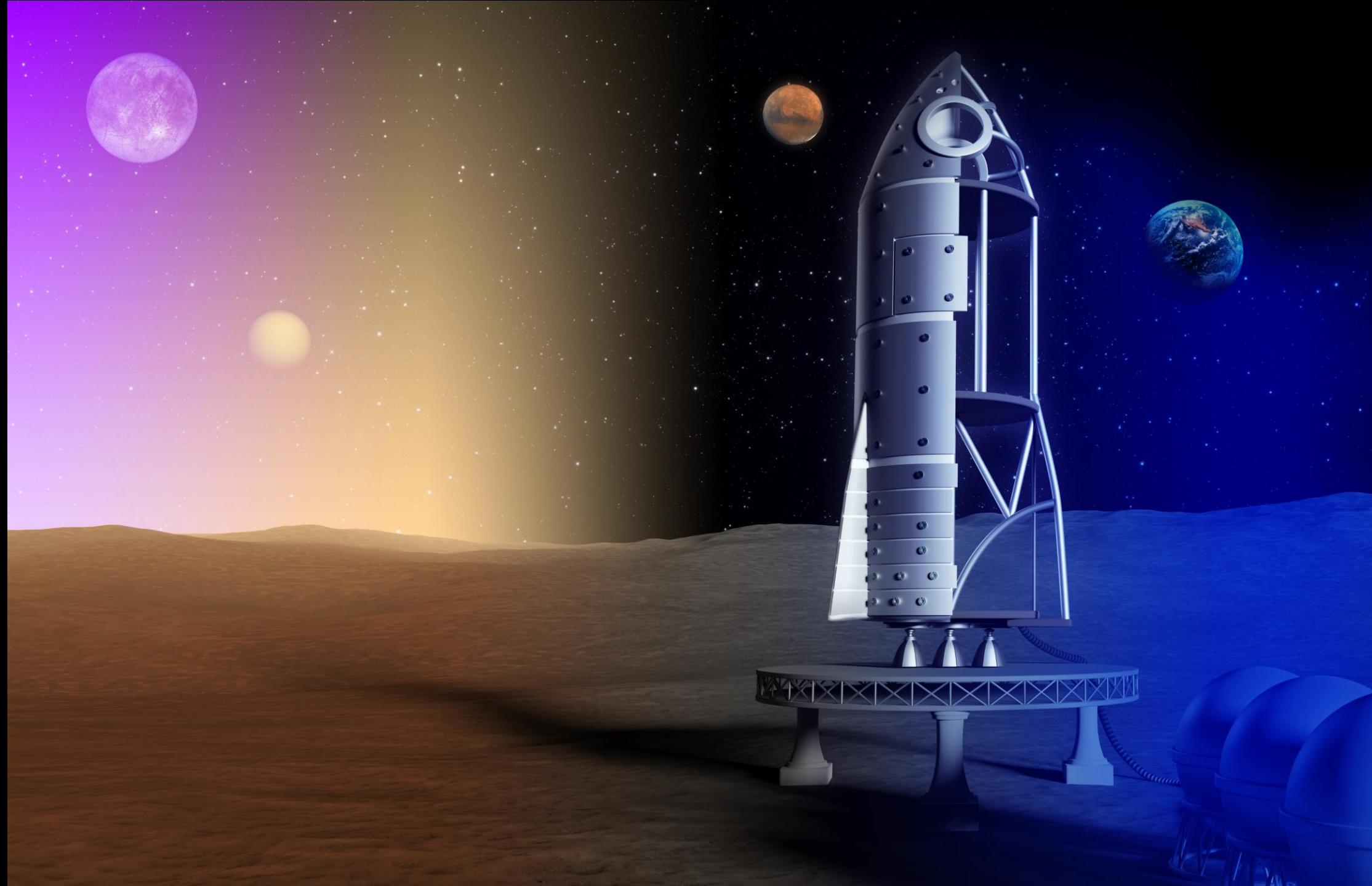


Foundational  
Exploration

Sustained  
Lunar  
Evolution



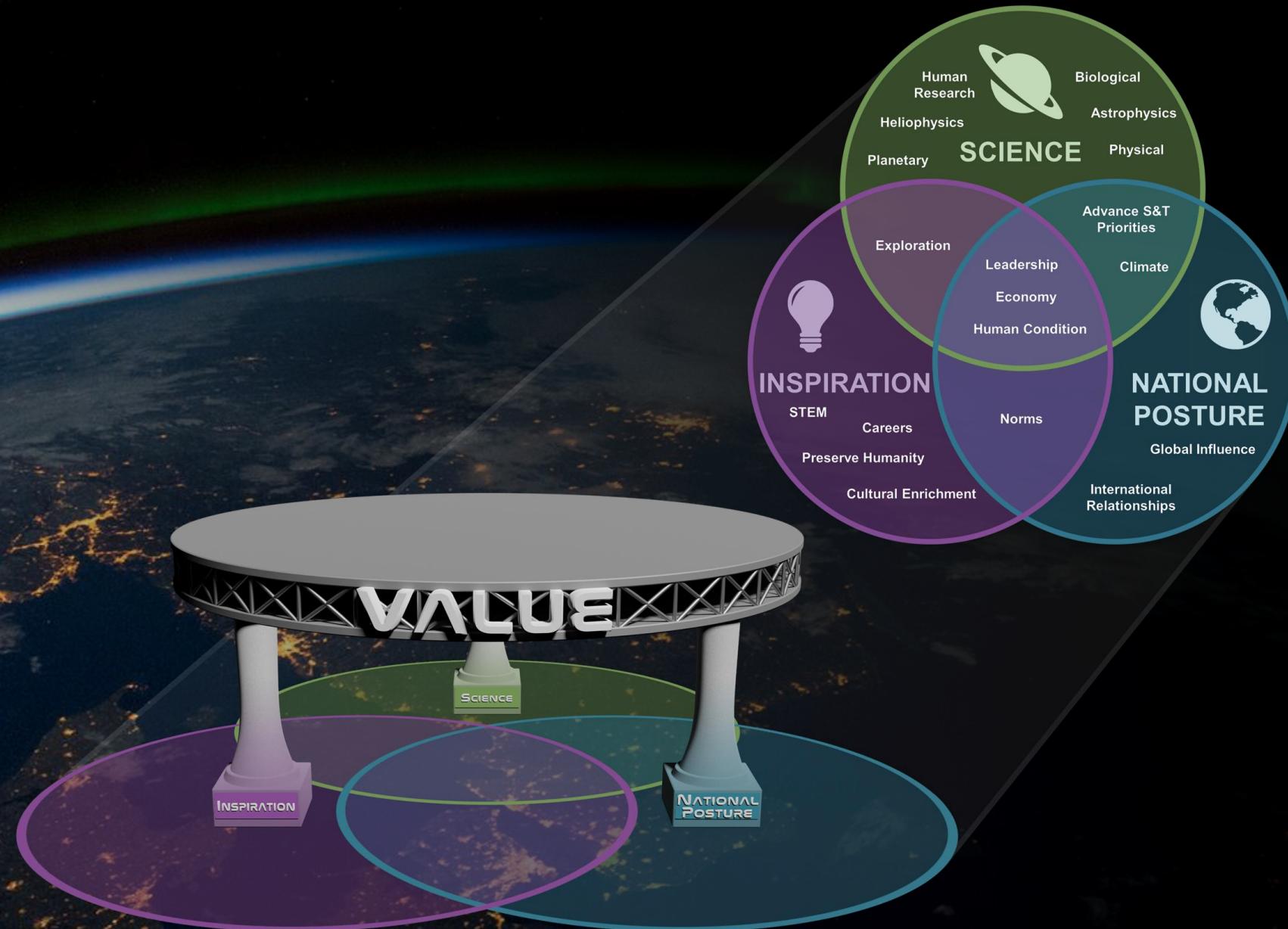
Humans To  
Mars



# Back-up

# Why Go?

*Benefit to Citizens*



# Architecture Processes

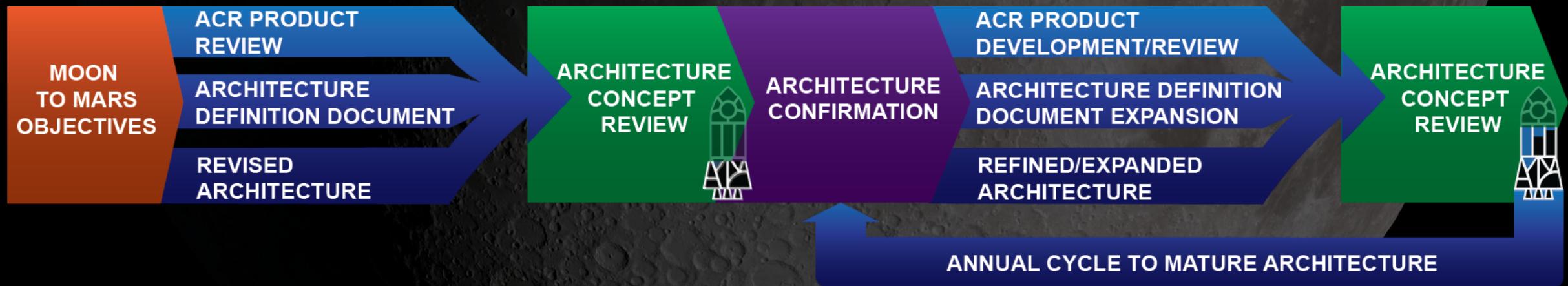
## Strategic Analysis Cycle



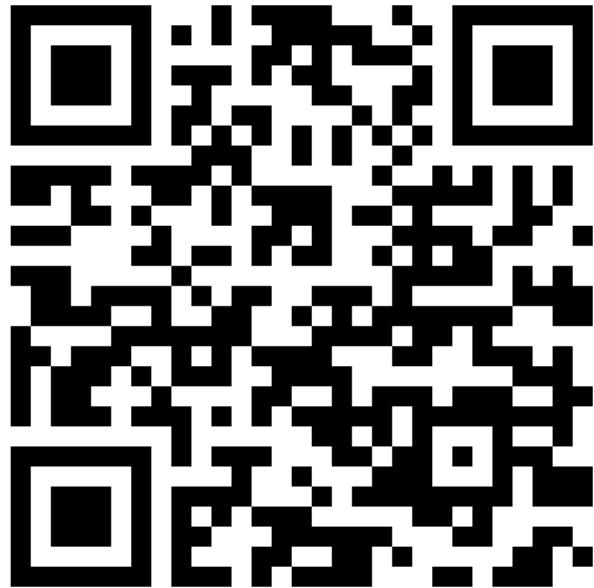
Moon-to-Mars Campaign  
Campaign and Architecture Development  
Element Formulation  
Modeling and Simulation  
Rapid Prototyping and Human in the Loop Testing

## Evolutionary Architecture Process

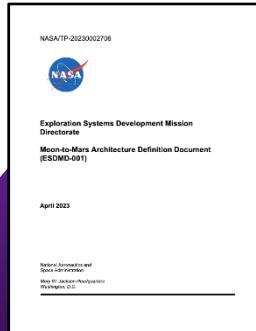
*Formulating architecture and exploration strategy based on objectives*



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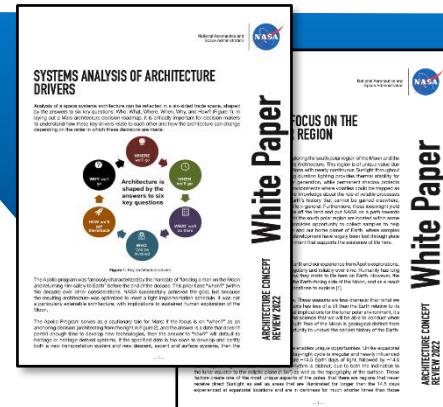


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