

# The Lunar Mobility Vehicle (LMV)

by

**LOCKHEED MARTIN** 



Presented by: Ross Rickards  
Business Contact: Ben Pearson, [lunar.rover@lmco.com](mailto:lunar.rover@lmco.com)

# Cornerstone of the Lunar Economy: The Lunar Mobility Vehicle

**LOCKHEED MARTIN**



Far Side and Permanently  
Shadowed Operations

Over 1,000 km  
Range per Lunar Day

1,600 kg+ Surface  
Payload Capacity

Robotic Arm with 70 kg+  
Capacity and 2.5 m Reach

50 Mbps Data  
Downlink Rate to Earth

Robust Native Sensor  
Package

Operational Flexibility Beyond  
Artemis Landing Sites

Strong, Established  
Commercial Case

Advance  
Space  
Science

Unlock the  
Lunar  
Economy

Alleviate  
Infrastructure  
Needs

Explore  
New  
Possibilities





# Explore the Moon

Surface  
Mapping

Asset  
Imaging

Cinematic  
Filming

360° Illumination

Stills, Video, and Tessellated 3D Models

Robust, Multispectral Sensor Suite:

VIS/NIR  
HD & 4K  
Cameras

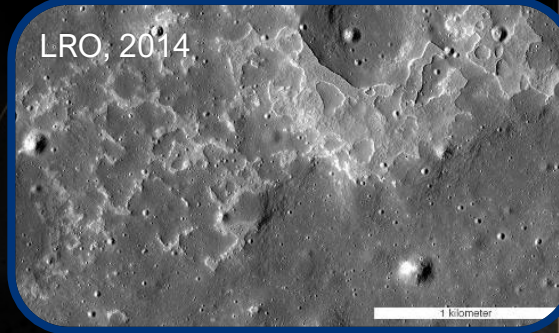
Radar &  
LiDAR

Neutron  
Spectrometer

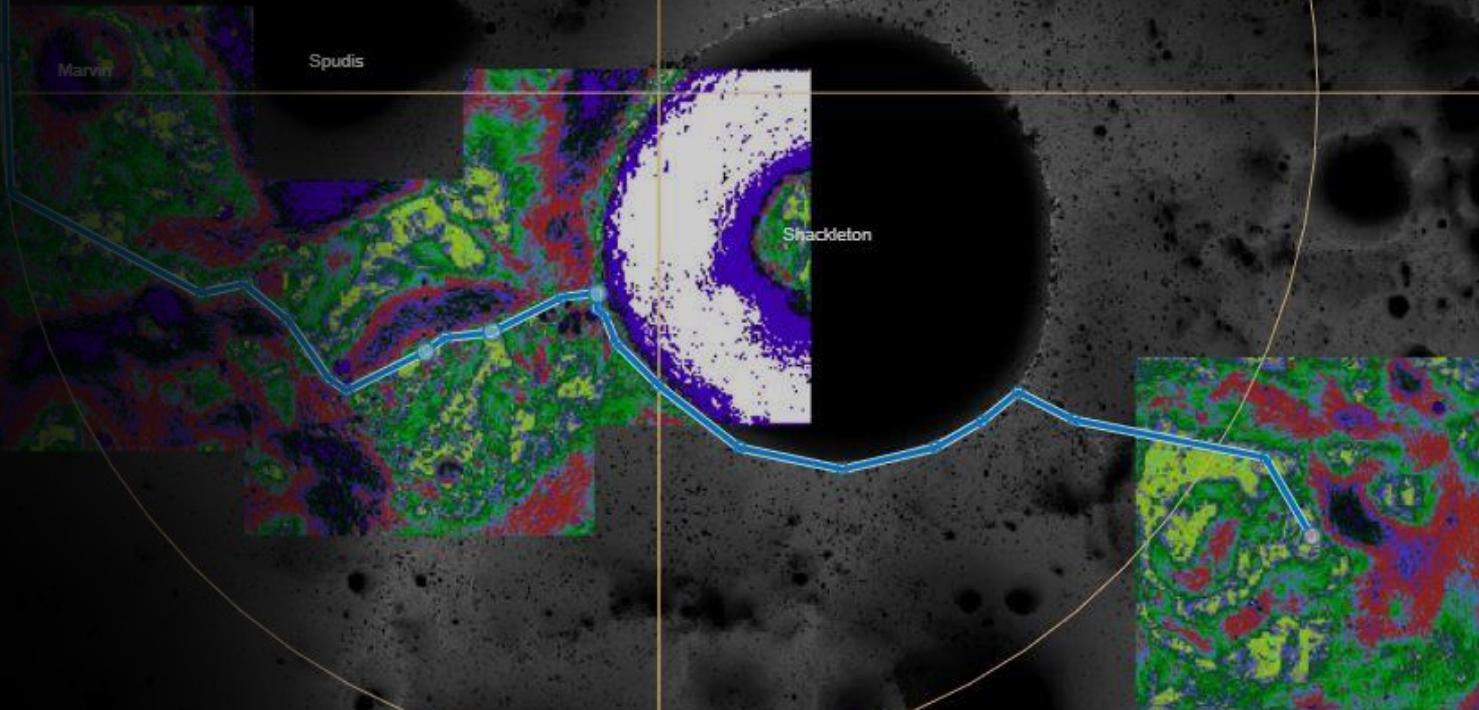
More than 10 km<sup>2</sup> of Mapping Per Lunar Day

**LOCKHEED MARTIN**

LRO, 2014



Apollo 15, 1971



Hanson

# Survive The Darkness



Vehicle Designed to Survive the Full Lunar Night and Support Payloads Throughout

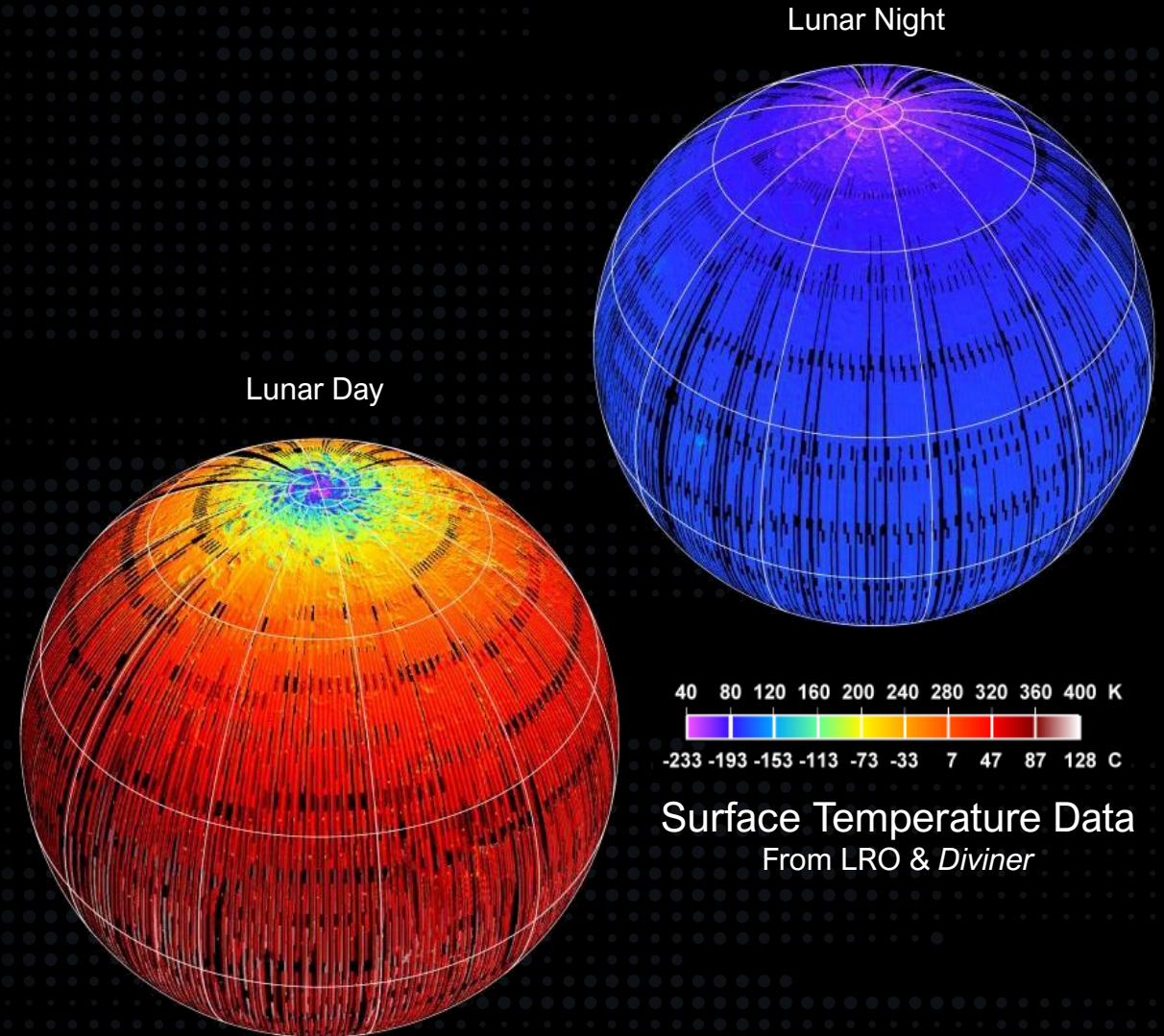
Continuous Lunar Night Payload Power Availability for Year-Long Mission Operations

Muti-Day Operational Capacity in Permanently Shadowed Regions

Prospecting,  
Sampling &  
Mining

Location  
Monitoring  
& Analysis

Nighttime  
Space  
Science





# Imagine New Possibilities



## Investigate, Explore and Experiment

- **Multispectral Surface Mapping**
- Sample Analysis
- Close-Proximity Asset Imaging
- Long-Term Lunar Biology
- **Deep Space Observation**
- Mobile Space Situational Awareness
- Low-Gravity Manufacturing
- Lunar Geology & Planetary Science
- **Survivability Testbed**
- Cinematic Event Capture
- Lunar Gravity & Magnetism
- Permanent Habitat Scouting & Staging

## Prospect, Mine, and Survey

- Mobile Power & Comms Network Services
- Surface Spectrometry
- **Core Sampling**
- Regolith Drilling
- Load Carrying
- **High Fidelity Resource Ground Truth**
- Resource Extraction & Processing
- Shadowed Region & Lava Tube Exploration
- Refueling Demonstrations
- **Volatiles & Rare Resource Sensing**

## Transport and Deliver

- **Asset Relocation**
- Sample Collection
- **Crew Transportation**
- 3<sup>rd</sup> Party Lander Unloading
- Cargo Hauling Heavy Mass Lunar Surface Landing
- Sample Flagging for Crew
- Microrover Positioning & Sustained Support
- **Critical Infrastructure Emplacement**
- Geophysical Instrumentation Delivery

## Construct, Service, and Assemble

- **Landing Pad Preparation**
- Asset Rescue & Maintenance
- Landing Zone Mapping
- Power, Transportation, PNT, and Comms Network Development
- Habitat Construction
- **Additive Manufacturing**
- Recycling & Asset Reconstitution

# Mission: Lunar South Pole

LOCKHEED MARTIN

- **Mission Duration:**
  - 180 Hours
- **Objectives:**
  - Map Shackleton Crater Rim
  - Deliver Three Comms Payloads
  - Passive Magnetotelluric Sounding
- **Distance Traveled:**
  - 500 km

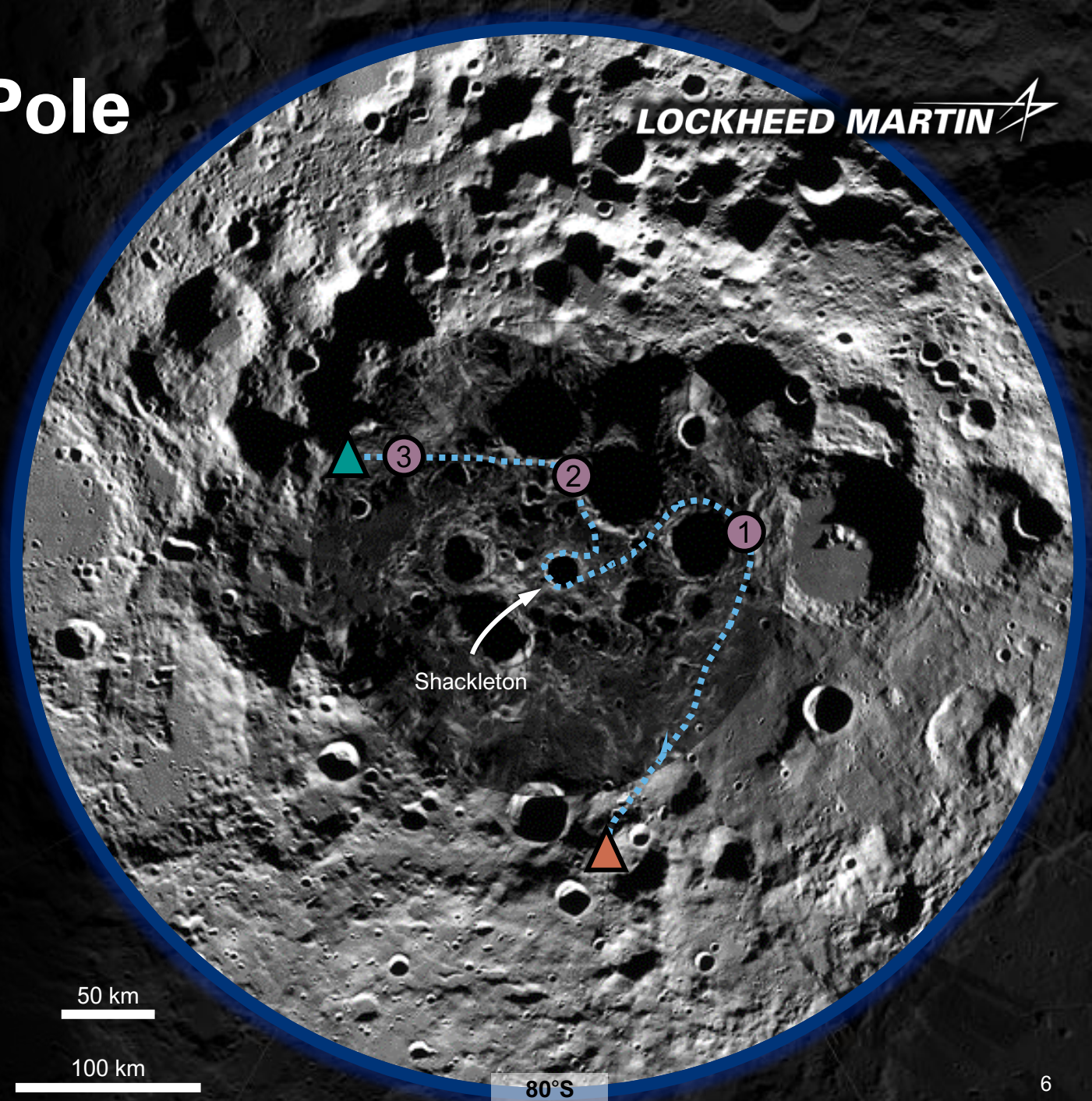
## Mission Key

..... Path of Travel

# Comms Payload

▲ Landing Zone / Start

▲ End Point

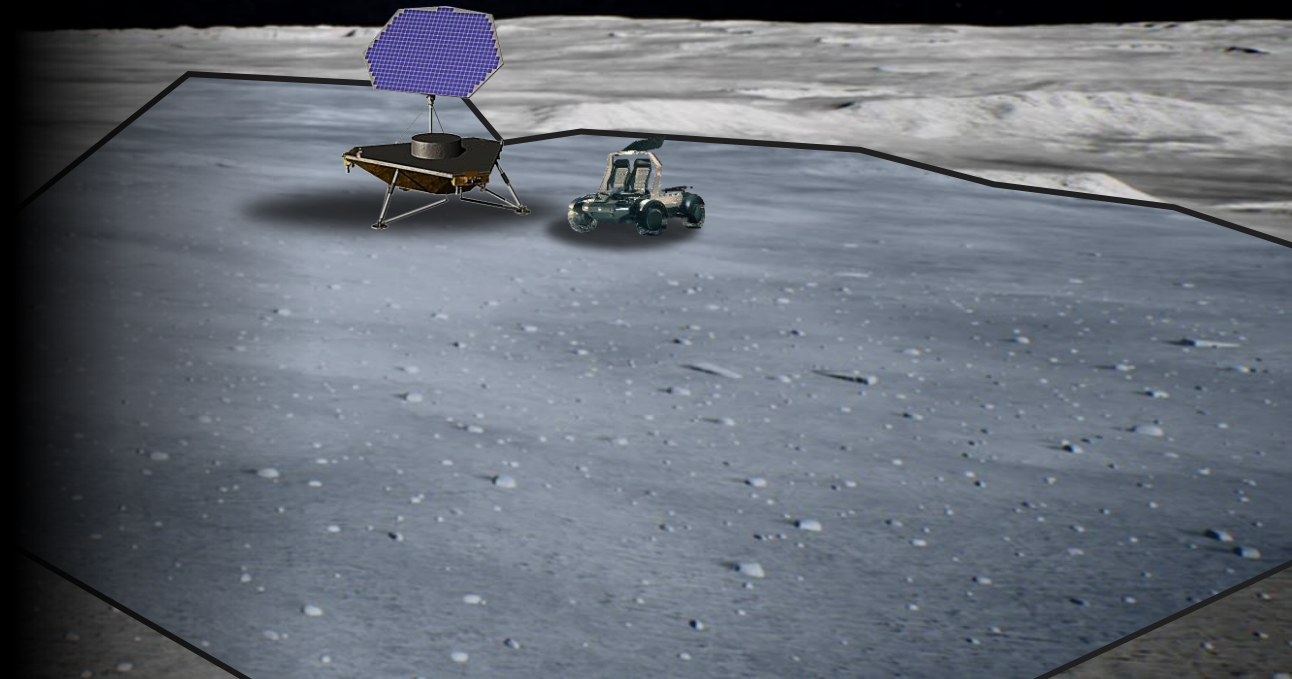




# Mission: Lander Staging & Inspection

LOCKHEED MARTIN 

- **Mission Duration:**
  - Two Lunar Days
- **Objectives:**
  - Scout Landing Zone for Hazards
  - Prepare Landing Zone Terrain
  - Provide Lander with PNT Beacon
  - Film Lander Descent with 4K Camera
  - Close-Proximity Post-Descent Lander Inspection
  - Offload Lander Payloads into LMV Payload Bed
  - Depart Landing Zone
- **Distance Traveled:**
  - 50 km



# Mission: Lava Tube Explorer

LOCKHEED MARTIN 

- **Mission Duration:**

- 300 Hours

- **Objectives:**

- Deliver Lava Tube Rover to an Opening in the southern Mare Australe
  - Provide Data & Power to Lava Tube Rover
  - Transmit 500 GB of Lava Tube Mapping & Geology Data

- **Distance Traveled:**

- 5 km

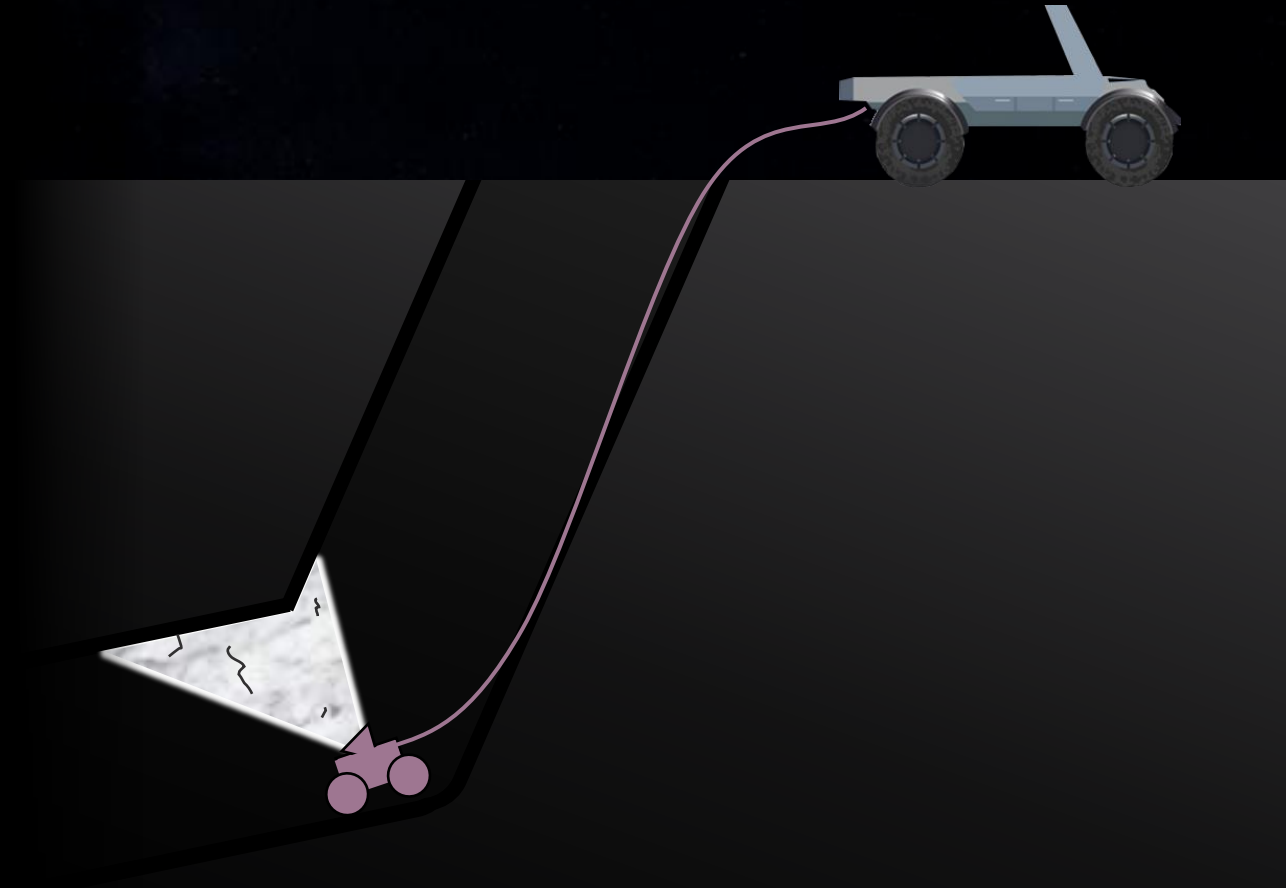
## Mission Key



Lava Tube Rover



Data, Power, and Winch





# First Movers

LOCKHEED MARTIN 







**LOCKHEED MARTIN**

**Defining a  
New Era of  
Space  
Mobility**



**Unlocking  
the Lunar  
Surface for  
Science &  
Industry**



# Simplify Development

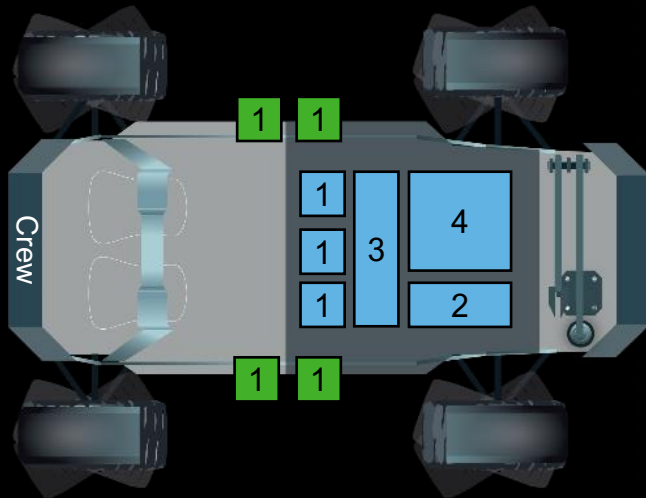
Standardized, Multipurpose Payload Support Configuration

Expandable Building-Block Model for Large Payloads

LM-Provided Interface Plates to Streamline Manufacturing

Payload Bed and Side-Slung Slots Available

Customizable for Specific Needs



## Single-Slot Universal Payload Adapter System (UPAS)

### Standard Specs:

- Land 35 kg Mass
- Support 70 kg+ Mass on Lunar Surface
- Wi-Fi & Ethernet
- Vehicle Data Access
- 28 & 120 VDC Power
- Survive the Night Support
- Robotic Arm Interface

