The Lunar Mobility Vehicle (LMV)

by

LOCKHEED MARTIN
Defining a New Era of Space Mobility

Unlocking the Lunar Surface for Science & Industry
Space Heritage

Lockheed is responsible for engineering many of humanity’s boldest and most challenging space missions

- Experienced Team
- Established Facilities
- Flight-Proven Subsystems
The Next Generation Of Lunar Rover

- Commercial Lunar Mobility & Mission Support Services
- Long Range, High Data Rate, Multi-Mission Support
- Priced to Expand Access and Enable Impactful New Missions

Advance Space Science
Unlock the Lunar Economy
Alleviate Customer Infrastructure Needs
Explore New Possibilities
Unique Capability

- 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
- Launching to the Moon in 2027
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 km² of Mapping Per Lunar Day
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
Meaningful Data Collection & Transmission

- **Ka-Band HGA & S-Band LGA**
- **50 Mbps Downlink & 15 Mbps Uplink**
- **Ethernet and Local Wi-Fi Networking**
- **Significant Onboard Data Storage**

**Gimbal Motion**
- Low Gain S-Band
- Wi-Fi Networking
- High Gain Ka-Band

**Accounts for terrain slope changes**
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

500 mm
300 mm
300 mm
## 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
- 3rd 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: Lava Tube Explorer

- 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
Mission: Lunar South Pole

• Mission Duration:
  ➢ 180 Hours

• Objectives:
  ➢ Map Shackleton Crater Rim
  ➢ Deliver Three Comms Payloads
  ➢ Passive Magnetotelluric Sounding

• Distance Traveled:
  ➢ 500 km
Mission: Lander Staging & Inspection

• 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
Basic Services

**Landing**
Payload delivery direct to the lunar surface. First mission in 2027.

**Rideshare Payloads**
Payloads that collect data independent of the LMV’s primary tasked missions.

**Transportation & Active Payloads**
Payload missions that require specific tasking including asset delivery, surface interactions, robotic arm operations, or a specific location.

**Mapping & Imaging**
Mapping and imaging missions using native LMV sensors including cameras, LiDAR, radar, and neutron spectrometer.