

LUVMI

A Mobile Platform for Lunar Exploration & Experiments



Overview

The Lunar Volatiles Mobile Instrumentation (LUVMI) rover family provides a smart, low mass, innovative, modular and extendable platform designed to accommodate payloads and provide payload mobility on the moon. It is tele-operated with optional autonomous modes to allow for faster traverses and for safety when entering Permanently Shadowed Regions.

LUVMI

The LUVMI rover is a four-wheel drive, **holonomic** platform thanks to independent wheel steering. It features an **active chassis system** able to adjust the ride height from zero (ground contact) to 30cm. It is capable of climbing up to **30 degree slopes** and clearing up to **30cm obstacles**.

The active suspension allows fitting the LUVMI rover in a compact volume when stowed, making it compatible with a wide range of lunar landers.

In its reference configuration, LUVMI features the following science instruments - including:

- A mass spectrometer
- A sub surface sampling device
- Two 3D light field cameras

LUVMI-X

LUVMI-X is an evolution of LUVMI that provides more payload accommodation and deployment capabilities, including deployment of small payloads, all within a lower mass and volume.

In its reference configuration, LUVMI-X features a full set of volatiles science instruments – as well as cube payloads, including:

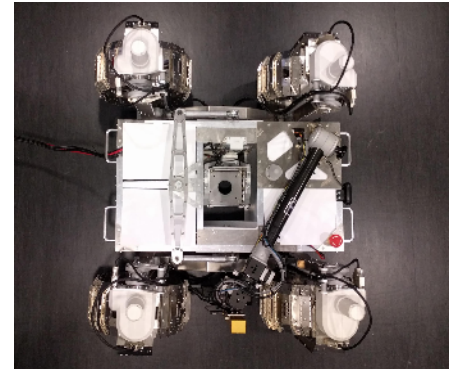
- A mass spectrometer
- A laser induced breakdown spectroscopy system (LIBS)
- A radiation detector

Payloads

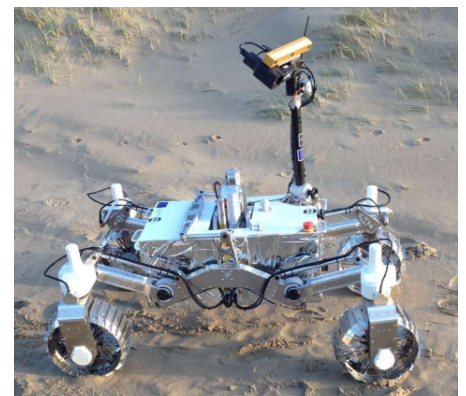
LUVMI-X provides a high ratio of rover to payload mass (targeting 1 to 1). Payloads connect to the rover via a standardized interface for power and data transfer. Payloads are accommodated from 1U upwards in multiples of 10cm:

- Mounted payloads, fixed to the rover platform.
- Droppable payloads, softly deposited on the soil allowing for data collection away from rover related disturbances (vibratory, magnetic ...).
- Propellable payloads will be projected up to 50m from the rover reaching otherwise inaccessible areas.

CONFIGURATIONS



Stowed configuration



Traverse configuration



Surface proximity configuration

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LUVMI Specifications

The rover is designed for operation in polar regions of the moon. Platform mass is 40kg and may accommodate **30-40kg of payload mass**.

Power

Onboard solar panels generate up to **180W** of which more than 50% are available for payloads. Power cells may store up to **1750Wh** of power. 28V nominal, 12V and 5V available upon request.

Envelope (LxWxH)

Stowed	850 x 920 x 450mm
Deployed	1400 x 920 x 800mm

Communications (LUVMI+LUVMI-X)

Near Side: Direct To Earth, high speed link (1-2 Mbps)
Far Side: Dependent on Relay Satellite

Local communications to lander and/or deployed payloads over UHF band.

LUVMI & LUVMI-X Add-ons

A 5 DoF robotic manipulator with approx. 1.2m reach and 8.85kg mass.

LUVMI-X Specifications

Enhancement of the LUVMI rover with optimized footprint but similar navigation capabilities and features. Target dry mass of 25kg, and **25kg of payload**.

Power

Onboard solar panels generate up to **140W** of which more than 50% are available for payloads. Power cells may store up to **1400Wh**. 28V nominal, 12V and 5V available upon request.

Envelope (LxWxH) without P/L

Stowed	850 x 770 x 350mm
Deployed	1140 x 770 x 800mm

Payload Data Interface

Low rate data (< 1Mbps)	CAN
High rate (10 – 200Mbps)	SpW
Other	TBD

Power & Data (per P/L cube unit)

Power	3-6W/kg (avg), 10-50 (pk)
Data	50–100 kbps (avg), 1-2Mbps (pk)

Two way RF communications with deployed payloads.

APPLICATIONS

- Lunar exploration (polar or equatorial)
- Payload cubes deployment and recover
- Prospecting of volatiles and other resources as precursor of ISRU
- As a scout or secondary platform supporting operations of a larger rover (or lunar EVA activities)

SERVICES

Purchase accommodation of your payload on LUVMI and receive lunar surface delivery and on surface mobility. Command and monitor your payload from your own facilities.

Purchase a rover and allow us to adapt and configure it for your specific needs.

For more information please contact us:
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OTHER SERVICES

Mobility / Rover Operations
Traverse planning & Execution
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Robotics operations
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ABOUT SPACE APPLICATIONS SERVICES

Space Applications Services NV/SA is an independent Belgian company founded in 1987, with a subsidiary in Houston, USA. Our aim is to research and develop innovative systems, solutions and products and provide services to the aerospace and security markets and related industries. Our activities cover manned and unmanned spacecraft, launch/re-entry vehicles, control centres, robotics and a wide range of information systems.

