

# Short Hopper – Lunar Shuttle Design Dossier

## 1. Mission Overview

The Short Hopper is a lunar shuttle designed for routine, short-range operations across the Moon's surface. Rather than deep space transit, it is purpose-built for lunar commuting between settlements, mining sites, and infrastructure hubs. It is fully reusable, ISRU-compatible, and built for high-frequency hops. Primary roles: - Crew and cargo transport across the Moon - Support for lunar infrastructure expansion - Emergency mobility and scientific payload delivery

## 2. Design Features

- Vertical takeoff and landing (VTOL) - Single-stage reusable design - ISRU-compatible (LOX/LH2 or LOX/methane) - Modular crew/cargo configurations - Interfaces with rovers and surface support units

## 3. Range and Performance

Optimized for land-to-land delta-v envelopes of 1.6–1.7 km/s. - 1,500 to 2,000 km range per tank - Staged hops enable global lunar reach - Round-trip: ~1,500 km with fuel margin - ISRU refueling enables full-surface mobility

## 4. Docking and Integration

- Rear airlock for docking with rovers/habitats - Autonomous precision landing - Designed to support future orbital platforms

## 5. Propulsion and Power

- Propellants: LOX/LH2 or LOX/methane - ISP: 370–450 seconds - Cryo insulation and boil-off management - Thrust vectoring for accurate VTOL

## 6. Payload and Cabin Options

- Crew capacity: 2–6 astronauts - Cargo: Up to 2 tank cartridges or trays - Modular cabins for: • Medical use • Sample return • Specialized missions

## 7. Operational Flexibility

- Commuter between remote sites - Sample return and emergency evac - High-frequency hops from polar depots - Rapid turnaround at refueling sites

## 8. Ground Support Compatibility

- Operates on bare regolith or pads - Integrates with Bob's Rover and R.O.N. - Supports ISRU fueling infrastructure

## 9. Strategic Role

The Hopper extends the reach and agility of any lunar system architecture. Whether or not an orbital platform exists yet, the Hopper supports: - Surface-to-surface logistics - Crew safety and access -

Decentralized development of lunar outposts

## **10. Availability**

This concept is part of the Aegis Station suite and is offered for: - Licensing or development partnerships - Feasibility study collaboration - Hardware adaptation into existing lunar mobility programs Contact: Aaron Smith, Principal Architect [aaroncsmith89@gmail.com](mailto:aaroncsmith89@gmail.com) [aegisstation.com](http://aegisstation.com)