# Luna–Aegis Shuttle

Short-Range Orbital Shuttle for the Earth–Moon System

## Mission Role

The Luna–Aegis Shuttle is a reusable short-hop vehicle designed for efficient, high-frequency travel between Aegis Station in low lunar orbit and surface installations on the Moon. It is purpose-built for intra-lunar operations—not interplanetary flights—serving as the backbone of orbital–surface connectivity.

## Core Functions

- Crew and cargo transport between Aegis Station and lunar surface bases
- Personnel rotation and resupply missions
- Support for ISRU, rover, and surface construction efforts
- Emergency evacuation and contingency return

## Design Philosophy

- Optimized for low gravity and short distances
- No need for Earth reentry heat shielding
- Efficient propulsion and fast turnaround
- Modular, reusable, and designed for high uptime

## Configuration Overview

Max Crew: 6 (with cargo) or up to 20 (crew-only)

Cargo Payload: ~10–15 metric tons

Propulsion: Methalox (LOX + CH■), with hypergolic variant optional

Landing: Vertical, tail-first on retractable legs

Docking: Nose or rear (Aegis-standard compatible)

Flight Duration: 6–12 hours (one-way)

Life Support: 72–96 hours

## Operations Cycle

1. Launch from surface using vertical ascent from ISRU-equipped base
2. Transit to Aegis Station via low-delta-v arc (~1.8–2.4 km/s)
3. Dock at station, exchange crew/cargo, refuel if needed
4. Return to surface for next sortie

## Propellant Strategy

• Compatible with ISRU-derived LOX + CH■

• Refuelable on the Moon, at Aegis Station, or from mobile tankers

• Enables closed-loop, infrastructure-aligned operations

## Interior Configurations

• Crew Mode: Pressurized cabin with EVA access, forward cockpit

• Cargo Mode: Open bay with modular racks or pallets

• Hybrid Mode: Rear cargo + forward passenger seating (typical config)

## Mission Cadence

Standard Rotation: 6 crew, 5t cargo (weekly)

Cargo Express: 0–2 crew, 10t cargo (as needed)

Emergency Evac: Up to 20 passengers (contingency use)

## Fleet Composition

Initial: 3–5 shuttles in rotation

• One in orbit

• One on the Moon

• One in reserve/transit/maintenance

Scales with crew demand and surface activity

## Strategic Role

• Establishes routine cislunar transport

• Links lunar surface to orbital infrastructure

• Enables logistics, exploration, and commerce

• Forms a foundational layer of the Aegis ecosystem

## Closing Statement

The Luna–Aegis Shuttle is not speculative. It is the practical vehicle we need to sustain the first orbital world built for humans—not just to survive in space, but to live there.