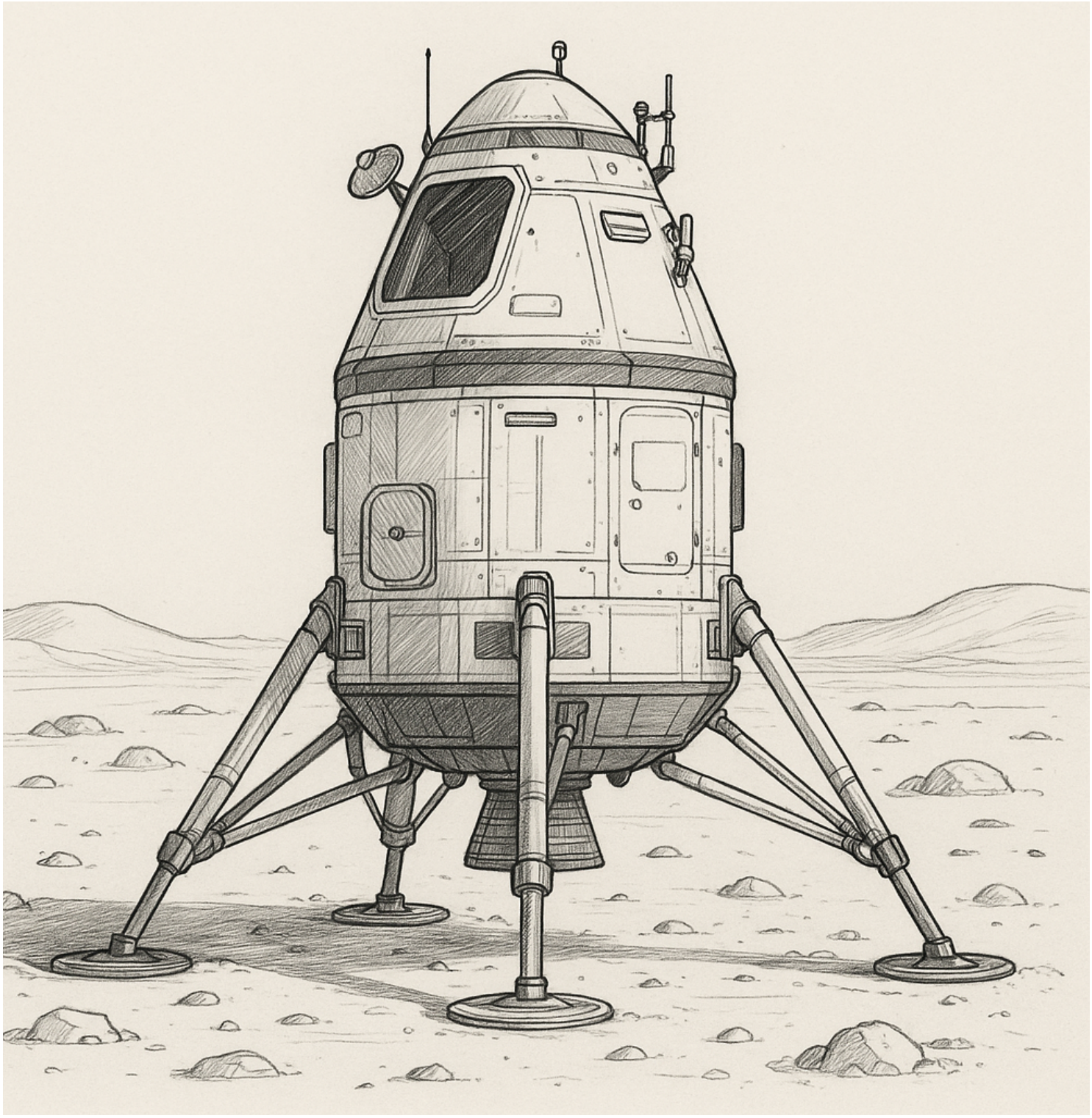
LUNA–AEGIS SHUTTLE (SHORT HOPPER) – DESIGN DOSSIER



Luna-Aegis Shuttle concept

Explainer Sheet

Title: Luna–Aegis Shuttle ("Short Hopper")
Type: Reusable Lunar Shuttle for Surface-to-Orbit and Land-to-Land Transport
Design Status: Concept Design – Feasibility Ready
Licensing: Available for study, adaptation, or development partnership

Overview:

The Short Hopper is a vertical takeoff and landing shuttle designed to ferry crew and cargo between the lunar surface and orbital platforms like Aegis Station — as well as between distant surface sites. With ISRU-compatible propulsion, modular cabin options, and full reusability, it supports high-frequency, infrastructure-oriented lunar mobility.

Key Features:

- VTOL landings on unprepared lunar terrain
- ISRU-compatible propellants (LOX/LH_2)
- Modular crew/cargo cabin configurations
- Range of 1,500–2,000 km per hop
- Interfaces with Aegis Station and rovers

Primary Roles:

- Surface-to-orbit crew and cargo transport
- Intra-lunar mobility between outposts, mines, and settlements
- Support for ISRU operations, medical evacuation, and sample return

Why It Matters:

- Enhances mobility between lunar assets
- Reduces surface isolation and mission downtime

Status: Feasibility-ready. Dossier and specifications available.

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Mission Overview

The Luna–Aegis Shuttle, or "Short Hopper," is a short-range orbital shuttle designed to transport crew and cargo between lunar surface sites and orbiting platforms such as Aegis Station. With support for vertical takeoff and landing, ISRU-compatible propellants, and modular crew/cargo configurations, it is optimized for routine and reliable cislunar operations.

Primary Roles Include:

- Transporting crew and cargo between Aegis Station and the lunar surface
- Supporting lunar infrastructure development with high-frequency hops
- Enabling intra-lunar commuting between settlements, mining sites, and research outposts

2. Design Features

- Vertical takeoff and landing (VTOL) on unprepared lunar terrain
- Fully reusable single-stage platform
- ISRU-compatible propulsion system (LOX/LH_2)
- Aegis-compatible docking interface for pressurized crew transfer
- Modular cabin options:
    - Crew-only
    - Cargo-only
    - Hybrid configuration

3. Range and Performance

The Short Hopper is optimized for one-way or round-trip land-to-land missions across the Moon. Performance is sized for delta-v envelopes of 1.6 to 1.7 km/s per hop.

- **Max Surface-to-Surface Range:**
    - 1,500 to 2,000 km one-way
    - ~1,500 km round-trip with reserves
- **With ISRU Refueling:**

    - Full lunar surface access in staged hops
    - Enables global logistics and emergency return capability

4. Docking and Integration

- Compatible with Aegis Station docking ports
- Pressurized airlock docking with rovers and surface habitats
- Autonomous precision landing guidance for targeted touchdown

5. Propulsion and Power

- **Propellant:** LOX/LH_2
- **ISP:** ~370–450 s depending on configuration
- Thrust vectoring for VTOL
- Integrated cryo tank insulation and boil-off management

6. Payload and Cabin Options

- **Crew Capacity:** 2–6 astronauts (with suits + airlock)
- Swappable cabins for:
    - Medical evacuation
    - Scientific payloads
    - Mining sample return

7. Operational Flexibility

- Aerial bridge between Aegis Station and lunar surface
- Routine hops between distant lunar sites
- Enables crew rotation, emergency evacuation, and sample delivery
- Rapid turnaround at refueling and reloading depots

8. Ground Support Compatibility

- Lands on bare regolith, landing pads, or docking platforms
- Interfaces with R.O.N. units and Aegis-Class Rover
- Compatible with ISRU fuel plants for local propellant production

9. Strategic Role in Aegis Architecture

The Short Hopper is mission-critical to Aegis Station's ecosystem. It:

- Reduces Earth launch cadence
- Enhances emergency and logistics responsiveness
- Enables expansion beyond polar regions

10. Licensing and Feasibility

The Short Hopper is part of the Aegis Station conceptual hardware suite. Available for:

- Feasibility study collaboration
- Licensing and adaptation into lunar mobility initiatives
- Partnerships with ISRU and infrastructure developers

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Design subject to revision as part of ongoing development of the Aegis Station system.