

LSPT

Lunar Surface Propellant Tanker

Land-to-land cryogenic fuel delivery for lunar refueling nodes

1. Mission Role

The LSPT enables the **routine delivery of LOX/LH₂ propellant** from ISRU production sites to distant LUNET service nodes across the lunar surface. It is a **fully autonomous, uncrewed vehicle** designed for **suborbital hops**, bridging distances too far for surface rovers like the Mammoth Car.

Its mission is to **land full**, unload, and optionally return empty, supporting a modular, cartridge-based logistics model.

2. Key Capabilities

Capability	Description
Payload	~6,000–8,000 kg of LOX/LH ₂
Range	Up to 1,800 km (ballistic arc)
Landing	Fully loaded, soft vertical touchdown
Propulsion	LOX/LH ₂ pressure-fed, same cluster as Short Hopper
Autonomy	Autonomous launch, navigation, and landing
Delivery Options	Pump transfer or cartridge drop-off

3. Architecture & Configuration

- **Structure:**
 - Cylindrical frame with shock-absorbing landing gear
 - Reinforced to withstand touchdown with full tank mass
- **Cryo Storage:**
 - Dual-tank system (LOX and LH₂) with MLI and boil-off control

- Optional active cooling for long-duration idle time
- **Interfaces:**
 - **LUNIFUEL™ coupler** (standard cryo fuel port)
 - Docking ring or skids for node alignment
 - Umbilical port for telemetry/data sync
- **Redundancy:**
 - Twin avionics packages
 - Abort-ready flight profile
 - Optional emergency beacon + passive reflector for search/recovery

4. Dimensions (Nominal)

Parameter	Value
Height	~10–12 meters
Diameter	~3.5–4 meters
Dry Mass	~5,000 kg
Fully Loaded Mass	~13,000–14,000 kg

5. Reusability & Turnaround

- Designed for **10+ cycles** before overhaul
- Requires minimal ground servicing
- Can return empty or stay on-site as temporary storage unit
- Supports swap-in **refill cartridges** compatible with LUNET nodes

6. Deployment Strategy

Phase	Use Case
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Phase 1	Shackleton → Mid-latitude Node
Phase 2	Multi-node circuit hopping
Phase 3	Multi-vehicle LSPT fleet (round-robin ops)
Phase 4	Emergency resupply to stranded vehicles

7. Interoperability

- Compatible with all **LUNET nodes**
- Uses the **same fueling interfaces** as the Short Hopper
- Shares avionics architecture with Hopper (simplified controls)
- Can refuel from ISRU base, orbital depot, or other nodes

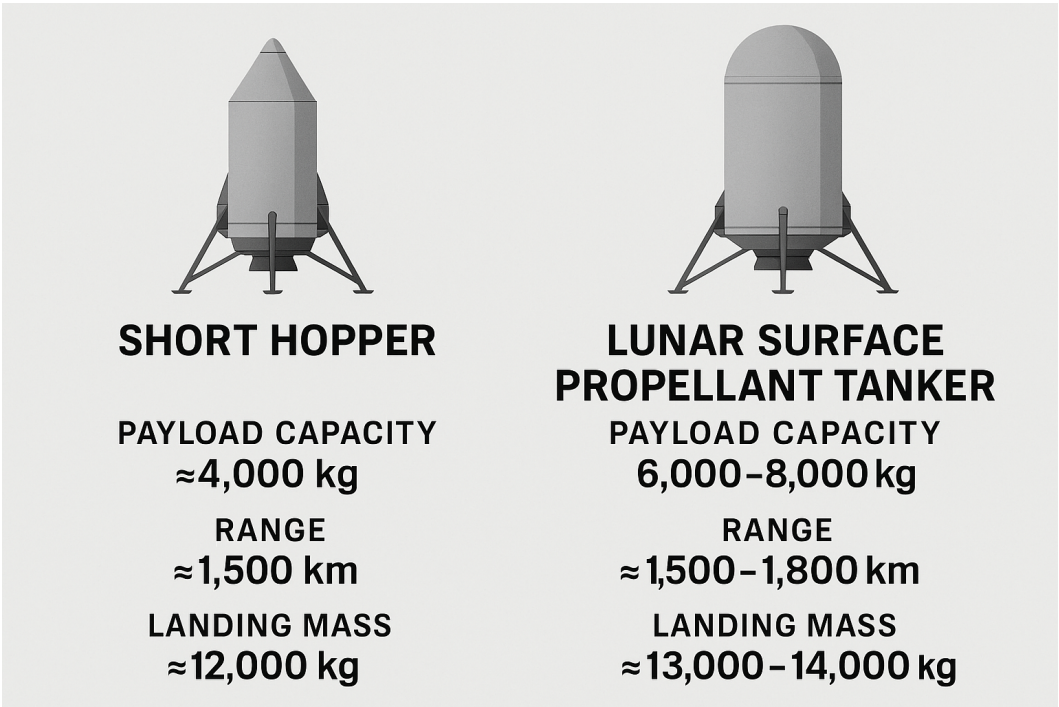
8. Strategic Value

- Expands fuel delivery **beyond rover range**
- Enables **distributed operations** for Short Hoppers and other LOX/LH₂ vehicles
- Reduces dependency on massive descent vehicles for resupply
- Can evolve into part of a **planetary surface logistics backbone**

Short Hopper Vs LSPT Comparison

Parameter	Short Hopper	LSPT Tanker
Mission Role	Crew/cargo transport (surface-orbit or surface-surface)	Uncrewed land-to-land fuel delivery
Payload Capacity	~2,000 kg (crew + cargo)	~6,000–8,000 kg (LOX/LH ₂)
Range (Land-to-Land)	~1,750 km	~1,800 km
Fuel Type	LOX/LH ₂	LOX/LH ₂
Crewed	Yes (2–6 crew)	No
Landing Mass (Fully Loaded)	≈14,000 kg	≈13,000–14,000 kg

Refueling Method	Receives fuel from node	Delivers fuel to node
Reusability	10–20 cycles before overhaul	10+ cycles before overhaul
Primary Use Case	Station access, personnel mobility	Node resupply, logistics support



Caption