Lunar Water Logistics

Shielding Humanity in Orbit

Mission-Critical Objective

Aegis Station cannot exist without water—not just for life support, but for shielding. Its entire structure depends on a 3-meter-thick layer of water embedded in the hull of each ring, serving as both a radiation barrier and a thermal buffer. This isn't optional—it's survival.

And that water will come from the Moon.

Shielding Requirements

To fully protect all three rings, a vast volume of water is required—equal in mass to the structure itself.

Confirmed Shielding Specs:

- **Ring centerline radius:** 150 meters
- **Tube radius (outer hull):** 50 meters
- **Water shield thickness:** 3 meters, from 47m to 50m
- **Total shielding volume:** ~1.65 million cubic meters
- **Mass of water:** ~1.65 million metric tons
- **Equivalent volume:** ~660 Olympic-sized swimming pools

This mass must be lifted into lunar orbit—efficiently, repeatedly, and reliably.

Source: Lunar Ice Only

❌ Earth-launched water: Prohibitively expensive (>$2,500/kg)
✅ **Lunar-sourced water**: Affordable, sustainable, infrastructure-building

Aegis Station will be the single largest customer for lunar ice in human history. This one project will justify the industrialization of the Moon.

Extraction and Processing

Lunar ice is primarily located in permanently shadowed craters near the south pole. Aegis's supply chain begins here.

ISRU Systems Will Include:

- Mobile excavators and heating augers
- Thermal separation and vapor transport
- Cold traps, filters, and UV sterilization
- Loading reservoirs for orbital tankers

Expected extraction rate: scalable to 300+ tons/day with modular redundancy.

Transport: The Tanker Fleet

Water will be transported from the lunar surface to Aegis Station using a dedicated fleet of autonomous tankers.

Fleet Configuration:

- **Number of tankers:** 20
- **Payload per trip:** 15 metric tons
- **Daily throughput:** 300 tons/day
- **Orbit insertion:** chemical or hybrid propulsion
- **Docking:** automated, with rotating delivery schedule

Each tanker will be capable of round-trip cycling between a lunar base and Aegis Station in orbit.

Timeline and Throughput

To deliver 1.65 million tons:

1,650,000 tons300 tons/day≈5,500 days≈15 years (single shift)300 tons/day1,650,000 tons ≈5,500 days≈15 years (single shift)

But with:

- **Round-the-clock operations**
- **Fleet redundancy**
- **Multi-node filling in parallel**

Realistic target fill time: ~3.7 years

Cost Estimate

Assumed delivery cost (Moon to orbit): ~$150/kg
Total shielding delivery cost:

1.65×109 kg×150 $/kg=$247.5B1.65×109 kg×150 $/kg=$247.5B

This cost covers:

- Extraction
- Transport
- Shielding reservoir integration
- Power and maintenance systems

⚠️ Note: This is still cheaper than launching the water from Earth—by a factor of 16× or more.

Multi-Use Infrastructure

The Aegis water supply chain creates enormous residual value:

- **Water for life support** and agriculture
- **Fuel production (LOX/LH2)** for tugs, shuttles, and haulers
- **Orbital refueling and resupply markets** for third-party missions
- **Storage depots** in lunar orbit and L1/L2

This isn't just a shielding operation—it's the beginning of a cislunar logistics ecosystem.

Strategic Rationale

Aegis Station:

- Is the **anchor customer** for lunar water
- **Accelerates lunar industrial development**
- **Reduces reliance on Earth for consumables**
- **Enables new markets** in Earth–Moon–Mars transport

This isn’t just logistics—it’s the architecture of independence.