Lunar Water Logistics

Shielding Humanity in Orbit
Updated with Revised Fleet Configuration

Mission-Critical Objective

To make Aegis Station viable, we must move 1.65 million metric tons of water into lunar orbit. This water forms a 3-meter-thick shield around the outer hull of each of the station's three rings—protecting inhabitants from deep space radiation and stabilizing the thermal environment.

The only realistic source for this water is the Moon.

Shielding Requirements

Parameter	Value
Shield thickness per ring	3 meters
Total shielding volume	~1.65 million m³
Water mass required	~1.65 million metric tons
Equivalent in swimming pools	~660 Olympic-sized pools

Water is stored flush against the outer hull from radius 47m to 50m, embedding shielding directly into the station's structure.

Water Source: Moon Only

❌ Earth-launched water: Logistically possible, financially disastrous
✅ Lunar water: Technically feasible, cost-effective, infrastructure-building

All shielding water will be sourced and lifted from the lunar surface. Earth-sourced alternatives are excluded from Aegis planning.

ISRU and Extraction

Water ice is mined from permanently shadowed craters near the lunar south pole using autonomous industrial systems:

- Thermal augers and heating rigs
- Vapor collection and cold-trap separation
- UV and particulate filtration
- Cryogenic surface tanks for loading

These systems are modular and scalable for 24/7 operation under extreme thermal conditions.

Updated Transport Architecture

To meet shielding volume and schedule goals, a robust tanker fleet will ferry water from the Moon to lunar orbit.

Specification	Value
Number of tankers	**30 autonomous vehicles**
Payload per tanker	**30 metric tons**
Total throughput	**900 tons/day**
Projected fill time	**~5 years** (entire station)

Each tanker is equipped with:

- Pressurized or cryogenic tanks
- Hybrid chemical/electric propulsion
- Autonomous navigation and docking systems
- Redundant systems for reuse and in-flight recovery

Deliveries will be staggered and parallelized across rings.

Filling Strategy

Each ring (~552,000 tons of water) will begin shielding upon arrival in lunar orbit. Tankers will offload directly into the embedded shield reservoirs. The shielding operation runs continuously in parallel with station assembly and early ring operations.

Partial shielding of individual rings allows earlier crewed occupation.

Cost Estimate

Metric	Value
Delivery cost per kg	~$150/kg
Total water mass	1.65 billion kg
Total cost (water only)	**~$247.5 billion**

This includes surface operations, propellant, tanker maintenance, docking, and orbital integration.

Infrastructure Benefits Beyond Shielding

The water logistics system does far more than fill a tank:

- **Life support** (consumables, hygiene, agriculture)
- **Fuel production** (LOX/LH2 for tugs and shuttles)
- **Orbital resale** to depots, visiting craft, or Mars-bound missions
- **Pathfinding for lunar commerce** and mining operations

This infrastructure creates permanent off-Earth economic momentum.

Strategic Role of Aegis Station

- Acts as the **anchor customer** for lunar water
- Enables **first large-scale ISRU deployment**
- Spurs investment in **cislunar logistics**
- Makes **Earth-independent orbital life** achievable

This isn’t just about water. It’s about unlocking the next chapter in human expansion.