Aegis Station Contingency Dossier

Asteroid-Based Assembly & Water Supply

If Not the Moon: Building Aegis Station in Deep Space

I. CONTINGENCY TRIGGER

This fallback plan is activated if:

- Lunar water deposits prove insufficient, inaccessible, or too costly
- Lunar ISRU fails to scale within required timelines
- Political, legal, or logistical blockages prevent lunar development

II. STRATEGIC SHIFT

Original Plan:

- Assemble Aegis Station in Lunar Orbit
- Use 45 lunar tankers to fill ~3.3 million tons of shielding water
- Rely on lunar rovers, hoppers, and ISRU plants for support

Contingency Plan:

- Assemble Aegis Station in orbit around a large C-type asteroid
- Extract water in situ, eliminating the need for tanker delivery
- Build without relying on lunar gravity, regolith, or crew infrastructure

III. TARGET CRITERIA FOR ASTEROID BASE

- Composition: C-type (carbonaceous), ideally >5% water-equivalent
- Size: >=500m diameter for shield-scale yield
- Orbit: Preferably near-Earth or accessible via solar-electric tugs

- Stability: Non-tumbling, low rotation
- Radiation: Outside major belts (no Jupiter moons)

Example Candidates:

- (24) Themis — Main belt, surface ice confirmed
- (101955) Bennu — Near-Earth, well-characterized
- (2008 EV5) — NEO, low delta-v access
- (65) Cybele — Transitional belt, outer region

IV. MISSION ARCHITECTURE COMPARISON

Lunar Plan vs. Asteroid Plan:

- Water Delivery: 45 tankers vs. In-situ mining
- Vehicle Needs: Rovers, hoppers vs. Hauler tugs, extractors
- Assembly Location: Lunar orbit vs. Asteroid orbit
- Crew Logistics: Regular shuttles vs. Robotic-first
- Gravity Wells: Significant escape delta-v vs. Negligible
- Radiation: Mild vs. Moderate (varies by target)

V. COST TRADE-OFFS

Category	Lunar Plan	Asteroid Plan	Delta
Water delivery system	\$12–15B	\$1–2B	Less
Surface ops (rovers etc.)	\$1–2B	N/A	Less
Tank production + ops	\$2B	N/A	Less
Crew shuttle support	\$2B	\$1–2B	Similar
Deep-space haulers	\$0.5B	\$2–4B	More
Schedule acceleration	4–5 years	6–8 years	Slower
Infrastructure complexity	Medium	High	More

Total Cost Estimate	~\$20–25B	~\$12–16B	**~40% less**

VI. TIMELINE COMPARISON

Phase	Lunar Plan	Asteroid Plan
Site prep / early access	<1 year	1–2 years
Water delivery window	3–5 years	Ongoing
Assembly duration	Parallel	Same
Crew arrival	3–4 years	5–6 years
Full station activation	~5 years	~6–8 years

VII. RISK TRADE-OFFS

Risk Area	Lunar Plan	Asteroid Plan
Launch failure	High (many launches)	Fewer launches
Water availability	Unproven at scale	Known water-rich targets
Surface hazards	Regolith, terrain, dust	None (free-space)
Crew safety	Closer to Earth	Remote, needs robust systems
Legal/political	Lunar treaties and constraints	Less regulation in deep space

VIII. CONCLUSION

Advantages of Asteroid-Based Deployment:

- Up to 40% lower overall cost
- Simplified logistics — no tankers, hoppers, or surface ops
- Access to nearly unlimited water
- Removes dependency on planetary surfaces
- Sets precedent for free-space infrastructure and deep-space permanence

Trade-offs:

- Longer lead time
- Requires asteroid mining and deep-space logistics development
- Remote crew access unless staged from deep-space hub

IX. RECOMMENDATION

Develop parallel early-phase scouting and engineering plans to:

- Identify optimal C-type asteroid targets
- Model long-haul propulsion requirements
- Prototype modular asteroid water extractors
- Maintain optional lunar ISRU path if breakthroughs occur

This contingency architecture may not just be a fallback — it may be the smarter path to **true space-based civilization**.

APPENDIX A: Solid Ice Asteroid Candidates (Bennu Excluded)

Criteria:

- Solid or near-surface ice
- Low or negligible gravity
- Accessible orbits (near-Earth or main belt)
- No hydrated clays requiring high-temperature processing

Top Candidates:

(24) Themis

- Confirmed surface ice, C-type, ~200 km diameter
- Gravity ~0.02g, stable, massive ice reserves
- Best large-scale ice-mining target

(65) Cybele

- Likely ice-bearing, ~273 km, low gravity

- Infrared shows ice frost and organics
- Well-suited for high-yield extraction

(90) Antiope (binary)

- Two ~86 km bodies, C-type, very low gravity
- Low density suggests interior ice
- Promising but needs verification

Honorable Mentions:

- 133P/Elst-Pizarro – comet-like activity, likely subsurface ice
- 238P/Read – active asteroid, ice-driven tail

Eliminated:

- **Bennu**, Ryugu: Hydrated minerals only (energy-intensive)
- **Ceres**: Too massive (0.28g), gravity well
- Jovian/Saturnian moons: Deep gravity wells + radiation

This narrowed list supports only those asteroids with solid, mineable ice accessible using present or near-future robotic extractors.