Aegis-Class Rover Dossier – Engineering Edition
Subsystem Architecture for Pressurized Lunar Operations

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1. Technical Overview

The Aegis-Class Rover is a rugged, pressurized mobile platform engineered for surface autonomy, EVA operations, and long-duration field missions in the lunar polar regions. Its design emphasizes survivability, modularity, and compatibility with automated base support systems.

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2. Dimensional & Power Specs

Parameter	Value
Length	~6.5 meters
Width	~2.8 m (3.5 m with wheels)
Height	~2.7 meters
Mass (dry)	~4,000–5,500 kg
Pressurized Volume	~12–14 m²
Power System	Li-ion or solid-state packs (swappable) + RTG trickle backup
Life Support	48–72 hrs, fully self-contained

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3. Subsystem Architecture

Mobility & Chassis:

- 6 or 8 independently-driven wheels
- Rocker-bogie or adaptive suspension for slope and soft terrain
- Self-righting stabilizer system and all-wheel steering

Powertrain:

- High-capacity modular battery packs (72 kWh est.)
- Rear-swappable via robotic or manual service
- RTG unit (~200W) supports idle and emergency loads

Thermal Control:

- Insulated panels, interior heat loop, and thermal radiator coupling

Communications:

- Mesh node system (rover-to-rover)
- High-gain dish uplink (direct or via RON)

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4. Navigation & Autonomy Stack

- Inertial navigation system (INS) + visual odometry
- Terrain classification via stereo and mast sensors
- Ground-penetrating radar for subgrade hazards
- Dynamic replanning with AI pathfinding engine

Operator Modes:

- Manual piloting with joystick and voice UI
- Semi-autonomous assist
- Fully autonomous (pre-mapped or dynamic)

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5. EVA & Crew Systems

- Standing-room pressurized cabin with 2–3 seats
- Dual suitport system with external stowed suits
- Airlock cycle chamber with staging bay and glove wall
- Modular racks for tools, samples, suits, and emergency gear

Life Support:

- O2/N2 tanks, CO_2 scrubbers, condensate reclaim system
- Radiation-shielded sleep zones (near water tanks or stowage mass)

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6. Support Infrastructure: R.O.N. Node

- Kilopower reactor feeds charge bay (10–40 kW)
- Robotic gantry swaps battery packs in ~30 mins
- Thermal vault prevents cold-soak degradation
- Diagnostic and sensor cleaning arms

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7. Modularity & Maintainability

- Underfloor panels allow access to motor, battery, and control harnesses
- Tooling system supports swappable arms, drills, sample trays
- Software updates and diagnostics can be handled via RON uplink

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8. Visual Placeholders

- [Placeholder: Exterior Profile Illustration]
- [Placeholder: Interior Layout Cutaway]
- [Placeholder: R.O.N. Base Cutaway]
- [Placeholder: Navigation Interface Mockup]

End of Engineering Edition