Infrastructure Specification: Regional Superstation (RSS)

Role: Regional Cortex & Master Librarian | **Tier:** Layer 3 (Territory Master)

1. Site Requirements & Operational Logic

- **Footprint:** A 30' x 30' secure, high-fenced perimeter.
  - **The Compound:** A streamlined staging ground. Features a 20' x 24' main insulated structure with a gravel-packed apron for the UTV and trailer.
  - **Security:** 8ft chain-link with 45-degree barbed outriggers. Essential for protecting the 1.2kW solar array and high-value fleet assets.
- **Facility Architecture: The Compact Command Center**
  - **The "Service" Bay (Garage/Active Maintenance):** A 20' x 14' insulated area.
    - **Vehicle Storage:** Houses the 4WD Heavy-Duty UTV and the 1" Hydraulic Auger Trailer.
    - **Active Staging:** Storage for 2–3 days of installation inventory (approx. 30–40 "Pivot Kits"). This keeps the workflow fluid without requiring a massive permanent warehouse.
    - **Seasonal Expansion:** During the 90-day "Blitz" period, the site includes a **Rented 20' High-Cube Container** placed in the compound to hold the bulk "Molecular Inventory" (15,000+ sensors).
  - **The "Clean" Core (Cortex & Lab):** A 10' x 10' hermetically sealed, HVAC-stabilized environment.
    - **Server Vault:** Houses the Zo Kriging Cluster and the Oracle Vault (50TB+ NVMe) with specialized dust filtration.
    - **Refurbishment Lab:** Precision workbench for "Sled" diagnostics, Viton O-ring replacement, and battery testing. This is the year-round "Hospital" for maintaining the district's sensors.
- **Location:** Centrally located in the subdistrict (e.g., Monte Vista). Must have a South-facing aspect for solar harvesting and a fiber-optic "Hand-off" point.

2. Capital Expenditure (CapEx) Breakdown

Category	Item Description	Estimated Cost

Structure	**The Compact Hub:** 20' x 24' Insulated Steel Building/Converted Container. Includes R-14 Foam and Grade 1 Security.	$14,000
Cortex Compute	**The Brain:** 64-Core Zo Cluster + Oracle Vault (50TB NVMe). Includes redundant cooling and 10kVA UPS.	$35,000
Networking	**The Spine:** Starlink Business + Fiber ONT + 100ft regional distribution tower.	$6,500
Power Plant	**The Pulse:** 1.2kW Ground Array + 800Ah 48V Heated LiFePO4 + 5kW Auto-start Backup Generator.	$22,000
"Blitz" Fleet	**The Muscle:** 4WD Heavy-Duty UTV + Custom 12' Auger Trailer w/ RTK-GPS integration.	$28,500
Refurb & Tools	**The Hospital:** Automated JIGs, 5psi Pressure Chamber, and Precision Soldering kit.	$7,000
Total	**Compact Regional Startup Cost**	**~$113,000**

3. Operational Scaling: The JIT (Just-In-Time) Model

- **Seasonal Flexibility:** By utilizing a rented container during the 90-day install peak, the permanent RSS remains lean and easier to secure/heat during the winter dormancy.
- **The Refurb Cycle:** Post-install, the "Service Bay" transitions entirely to maintenance. Crews bring in failed "Sleds" for battery swaps and seal testing, keeping the 1,280 pivots at 99.9% uptime.
- **O&M (Annual):** $14,500/year. Includes structure climate control, fleet fuel, consumables, and the **seasonal 3-month container rental**.

Funding Note: Shifting to a compact RSS model reduces permanent structure costs by ~$4k, which is reallocated into higher-quality security and the "Blitz" rental budget. This ensures we aren't paying to heat or maintain empty warehouse space for 9 months of the year.