

Resilient Monitoring in Extreme Conditions: Sustaining the Warramunga Seismic Array in Tennant Creek, Australia

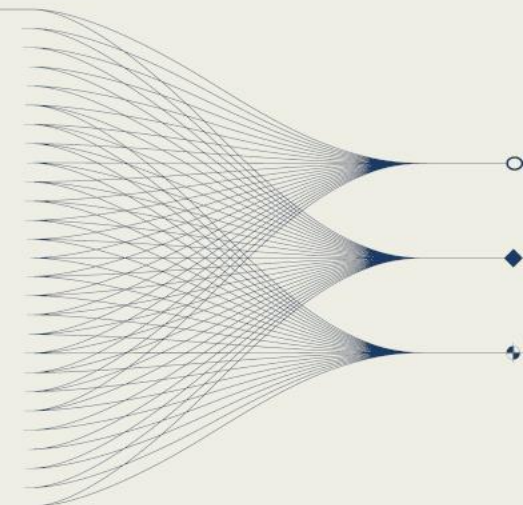
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INTRODUCTION AND MAIN RESULTS

PS02/WRA, the Warramunga Seismic Array in Australia, operates in a harsh environment and has been vital to the IMS since 2000. Recent upgrades focus on resilience to flooding, bushfires, lightning, and heat. Enhancements include grounding, communications, and power. Planned work includes posthole upgrades and modernizing sensors and digitizers at all 24 elements.





Intra-site Radio Communications Upgrade

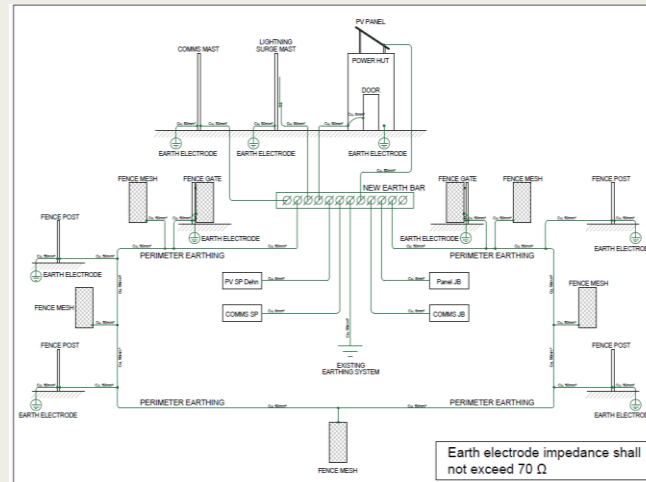
Prior to Upgrade	After 2024 Upgrade
Obsolete EION VIP 110-24 Radios – Over 13 years old	Installed AFAR AR-24027E 2.4 Ghz Radios
Frequent Radio Failures	Redundancy at CRF and Remote Elements
Packet Drops up to 40%	Active Radio Roaming Capability
No Redundancy / Single Points of Failure	Ethernet and RF SPDs NEMA Enclosures
Inadequate Surge Protection	



Earthing & Lightning Protection

Challenges	Solutions
High Lightning Density	Equipotential Bonding
Aging Earthing System	Install Main Bonding Bar
Low Ground Moisture	CADWeld > Bolted Joints
Low Soil Conductivity	$R_{\text{earth}} < 10 \text{ Ohms}$

Upgraded Earthing Plan



Flooding Postholes

Current Problems	Planned Actions for 2026
13/24 postholes flooded – due to Atmospheric Pumping	Standardize posthole design across array
Non-Uniform Posthole emplacement and casing diameter	Minimize casing volume
18 Postholes installed over 50 years ago	Use non-corrosive material
Steel degradation, poor coupling to bedrock	Fire-resistant
	Conduit Entry via Cable Box
	Specialized Posthole drilling method – Focus on Longevity
	Sensor/Digitizer Recapitalization

