Executive Summary – Collaborative Research Grant Pitch

# Problem & Opportunity

Remote Western Australia hosts critical infrastructure and airspace vulnerable to illicit incursions. The Australian Federal Police (AFP) face challenges detecting 'black flights' – unregistered aircraft operating with transponders off. Defence also requires deployable, low-cost ISR systems for remote operations. Existing radar solutions are expensive, immobile, and dependent on overseas supply chains.  
  
Opportunity: A sovereign, WA-led solution using software-defined radios (SDR), machine learning (ML), and mesh networking to provide persistent situational awareness for both Defence and civil security.

# The Solution

We propose a deployable SDR‑ML Radar Node:  
• Integrates commercial off-the-shelf SDR hardware with phased-array antennas.  
• Uses ML at the edge to classify RF signals and detect UAVs, light aircraft, and illicit activity.  
• Employs GIS mapping for geolocation heat maps, already demonstrated in AFP support.  
• Ruggedised for WA conditions, verified by Lateral Sands with global design standards.  
• Deployable as a resilient mesh network providing real-time situational awareness.

# Team & Track Record

• Curtin University (Radio Astronomy Group): World-class phased array and signal processing expertise from SKA.  
• Lateral Sands Pty Ltd: Global design verification, ruggedisation, environmental testing.  
• Defence (13th Brigade, Army RICO): Operational validation, test ranges, deployment input.  
• AFP (advisory): Real-world operational use case for black flights.  
  
Proven history:  
• ERG/Transpage – First reprogrammable SDR for global paging, one product delivering multiple standards.  
• FramScan – Commercialised agricultural monitoring products.  
• AFP SDR GIS heat map support – Already delivering relevant tools today.

# 12-Month Plan

Months 1–3: SDR + phased-array integration, ML baseline, ruggedisation design.  
Months 4–6: Controlled demonstrations, mesh comms, GIS integration.  
Months 7–9: Remote WA field trials simulating black flights and UAV incursions.  
Months 10–12: Optimisation with trial data, final demonstrations to Defence & AFP, roadmap for scale-up.

# Impact & Benefits

Defence: Low-cost, sovereign ISR solution for remote regions.  
Civil Security: Supports AFP black flight detection and border security.  
WA: Builds sovereign supply chains, STEM workforce, industry capability.  
Coalition: Protocol-agnostic SDR foundation for interoperability and export potential.

# Budget Snapshot

Total Project: 420,000 AUD (12 months)  
Requested Grant: 250,000 AUD  
Partner Co-contributions: 170,000 AUD (in-kind and support)  
  
Eligible use: prototyping, field trials, ML development, ruggedisation, personnel support.

# Closing Pitch

This project leverages WA’s unique academic, industry, and Defence ecosystem to deliver a rapid, dual-use demonstrator of deployable SDR‑ML radar nodes. With proven experience in SDR innovation and commercialisation, and active engagement with AFP and Defence, the team is uniquely placed to de-risk this sovereign capability.