DEFENCE INNOVATION NETWORK

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Defence Innovation Network Grant Scheme: Pilot Project

SENSORS FOR JORN

PROBLEM

The Jindalee Operational Radar Network (JORN) is an"over the horizon radar" systems employed to monitor Australia's Northern sea and airspace over a 37,000 km square area
JORN comprises 3 radar stations stations in Queensland, WA and Alice Springs and a network of 12 ionosonde stations for monitoring the ionosphere
The JORN over the horizon radar relies on reflections from the ionosphere, which can behave erratically, making radar results unreliable.

NEED AND RELEVANCE TO DEFENCE

- Defence are tasked with providing security to Australia
- Border surveillance is an important part of providing this service

But

- Radar performance is highly dependent on knowledge of the ionosphere – better ionosphere knowledge could improve performance
- Radar may not always be operational – e.g. Such as when MH370 disappeared
- Radar has more difficulty with large surface vessels than fast moving airborne vehicles

So

- JORN is not able to provide 100% temporal & spatial coverage resulting in surveillance gaps

RESEARCH QUESTION

- Can bistatic GNSS-Reflectometry be used for characterizing the ionosphere?
- Can large slow ocean vessels be detected from space using GNSS-R signals from systems such as GPS, Galileo, Beidou, QZSS, GLONASS, SBAS, …
- Can the processing of these signals be performed 'on-board' with within a minimal power budget?

EXPECTED OUTCOME

Our approach would be to use specialised passive, bistatic radar in L-band.