The DSTO Ionospheric Sounder Replacement for JORN

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The Jindalee Over-the-horizon Radar Network (JORN) is an integral part of Australia's national defence capability. In order for JORN to perform its duties a real-time model of the ionosphere is generated. The primary source of data for this model is a set of 13 vertical-incidence sounders (VIS) scattered around the Australian coast and inland locations. These sounders are a mix of Lowell DPS-4 and VIS-1. Both of these sounders, the VIS-1 in particular, are near the end of their maintainable life. As part of the ongoing sustainment program for JORN the VIS network is being upgraded and a VIS replacement was sought. Over the last few years the High-Frequency Radar Branch (HFRB) of DSTO has been developing its own sounders based on its successful radar hardware technology. The DSTO Ionospheric Sounder Equipment (DISE) will be described in this paper, with focus given to the VIS configuration known as PRIME (Portable Remote Ionospheric Monitoring Equipment) and the Digital Oblique Receiver System known as DORS.

Of considerable importance to a successful VIS is the auto-scaling software, which takes the ionogram images and produces a single-valued function-of-frequency trace, and from that produces a set of ionospheric parameters that represent the overhead ionosphere. HFRB has developed its own auto-scaling software which has been tested under a large variety of ionospheric conditions. Recently, PRIME has been run at a JORN VIS site collocated with the existing Lowell VIS-1. This side-by-side testing was to ascertain the fit-for-purpose level of the PRIME.

The performance of DSTO's PRIME under a multitude of challenging ionospheric conditions and the results of the side-by-side comparison will be presented.