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Advanced operational capabilities through implementation of a fully digital SuperDARN radar

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Development work conducted in the Department of Electronic Engineering, La Trobe University, coupled with recent developments in Field Programmable Gate Array (FPGA) and Analogue to Digital Converter (ADC) technologies have made the production of a cost effective “fully digital” SuperDARN radar a realistic possibility. While a cost effective “fully digital” radar system can be produced to replicate the operation and performance of the current analogue radars, a key feature will be its reconfigurable architecture. A flexible hardware platform will greatly enhance the overall scientific value of the instrument. While normal SuperDARN operations can be maintained, it will also be possible to readily adapt the radar hardware configuration, tailoring it to suit any particular mission. Our vision is an instrument that can grow and evolve along with the ideas of the community who use it. For example, in the future researchers may be able to change the radar hardware, analogous to the way the operating software is changed today. In this presentation we will discuss some future operational possibilities for a “fully digital” SuperDARN radar system, along with possible scientific benefits. However, the main aim of the presentation is to seed discussion in the wider SuperDARN community, to generate ideas and scientific rationale for the future evolution of the radars. We need feedback from the potential users to best develop a radar system for the future.