



The Use of HF Radar for Resource Assessment

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Commercial development of the generation of renewable energy in the marine environment will be predicated on the implementation of reliable methods for the assessment of the in situ energy resource. The most commonly utilized methods for assessments of the wave and current fields currently involves the deployment of in situ sensors. While the deployment of such instrumentation has a long pedigree and has led to numerous advancements in oceanography, there are significant shortcomings associated with the use of in situ instrumentation for resource characterization related to Marine Renewable Energy (MRE). In particular, such measurements are highly susceptible to environmentally related damage and even loss. Operationally, deployment and maintenance costs are high and reliability is low. Technically, the information is spatially constrained and, as relates to the horizontal plain, typically only provides point measurements.

HF (High Frequency) radar in a beam forming configuration provides a potential solution for resource assessment for both currents and waves which overcomes many of the above limitations. These sensors which operate using shore based antenna arrays provide a remote sensing alternative which delivers continuous measurements in real time. Using phased array technology, the HF radar system provides independent estimates of surface current and wave parameters over areas $O(100 \text{ km}^2)$.

In order to evaluate this application, a WERA HF radar system has been recently installed on the North Coast of Cornwall in the UK to provide measurements of surface currents as well as complete directional wave spectra in a high resolution (1 km spacing) grid around the Wave Hub site. In addition a collection of traditional sensors have been simultaneously deployed in order to provide independent measurements for validation. The presentation will discuss the expected characteristics of the proposed system, practical considerations for the utilization of such a system and an initial evaluation of the system performance during the first months of operation.