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1997, *Oceanography* 10(2):72–75, <http://dx.doi.org/10.5670/oceanog.1997.27>

Evolution of Bearing Determination in HF Current Mapping Radars

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First Paragraph

Nearly all target detection "radars" in existence operate at microwave frequencies because their wavelengths are small enough that compact antennas provide both good angular resolution and high sensitivity. By contrast, at high frequency (HF) very large antenna arrays are needed to achieve similar results using traditional signal processing techniques. (To form and scan a beam equal in width to that from a 2-m microwave dish demands an HF receive antenna that is 2-3 km in length.) Despite this physical drawback, only at HF is the first and second-order sea echo directly relatable to surface waves and winds and, through the Doppler relation, to surface currents (Crombie, 1955; Barrick, 1972). For example, at microwave frequencies Doppler shifts depend on many scattering properties of the surface in addition to the wave and current speeds.

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