

Coherent Ku-Band Radar for Monitoring Ocean Waves

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Abstract : Although X-band radar is commonly used to measure the properties of ocean waves, the use of a higher frequency has several advantages, such as increased backscatter coefficient, better Doppler sensitivity, lower power, and a smaller package. A low-power Ku-band radar system was developed to demonstrate these advantages. It is fully coherent, and it interleaves short and long pulses to achieve a transmit duty ratio of 25%, which makes the best use of solid-state amplifiers. The range scales are 2 km, 4 km, and 8 km. The minimum range is 100 m, 200 m, and 400 m for the three range scales, and the range resolution is 4 m, 8 m, and 16 m for the three range scales. Measurements of the significant wave height, wavelength, wave period, and wave direction have been made using traditional 3D-FFT methods. Radar and ultrasonic sensor results collected over an extended period of time at a coastal site in South Korea are presented.

Keywords : measurement of ocean wave parameters, Ku-band radar, coherent radar, compact radar

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