

An Analysis of the Radar Image from Ocean Scattering near KaoHsiung Harbor Using UTD Model

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Abstract

When a radar is set up along the coast near KaoHsiung harbor, the radar image shows a peak periodically even without an obvious target on sight. From previous studies, it was found that the effect is from the ocean itself, more specifically, from the scattering of the oceanic wave.

The sea spike scattering can be relatively large. In many instances, it might be higher than the scattering from a small RCS target on the sea. This might significantly limit the detection capability of the coast radar system. A close observation has shown that in order to reduce the problem and increase the sensitivity of the detection capability, the sea scattering effect must be somehow eliminated or reduced.

To understand the problem, series measurements of the sea scattering at different time of the day, day of the month, month of the year, with different wind direction and conditions are recorded. An X-band pulsed radar with PRF approximately 2000 PPS, and transmitted peak-power around 150 KW is used to obtain the data. The radar system is set up near the coast, with antenna direction fixed at preset directions and distances. A statistical analysis of the model is done to find out the sensitivity to different parameters.

An UTD analysis of the scattering from the concave/convex periodic surface is modeled. The effect of the ocean scattering is modeled using UTD analysis. A post processing of the measured radar image by removing the UTD scattering effect is presented.