

Call for Papers "Radar Clutter"

IET Radar, Sonar & Navigation Special Issue

As radars become more complex, with higher-resolution spatial and temporal processing, adaptive processing and agile antenna beams, it becomes necessary to model their interaction with the environment with ever greater fidelity. For this reason, the study of radar clutter continues as an essential aspect of the development of new radar systems.

Models of clutter are required for radar performance prediction, comparative performance assessment of competing radar designs, design of detection processing algorithms and, increasingly, measurement of performance for acceptance by a customer of a radar system into service.

Models are often derived empirically, from analysis of recorded radar clutter returns. Many good models are available for land, sea and precipitation clutter, but there still remain many areas where further research is required. For practical applications, radar designers must be able to relate environmental conditions, radar parameters and viewing geometry to specific clutter model parameters. For example, good models of low grazing angle bistatic clutter have yet to be developed for many environments. In the area of sea clutter, models of sea spikes, Doppler spectra and polarisation characteristics are all active areas of research. In the land environment, better models of non-homogeneous clutter are required for assessing STAP algorithms.

Direct modelling of electromagnetic scattering from representations of the physical reflecting surface is difficult, especially at low grazing angles. However, some progress is being made in this area. Successful electromagnetic modelling provides insight into scattering mechanisms and clutter behaviour, justification for the choice of empirical models, and the ability to model complex scenarios such as littoral environments.

The modelling of microwave propagation close to the earth's surface is also very important for operational radar systems and further work is needed to provide real-time high-spatial-resolution forecasts of conditions. Measurement of clutter returns may provide one means for estimating prevailing propagation conditions.

This Special Issue, to be published in *IET Radar, Sonar & Navigation*, will address recent progress in the analysis and modelling of radar clutter and the application of these models to understanding and improving the performance of radar systems for surveillance, targeting and remote sensing.

Examples of areas that may be covered are:

- The characterisation of radar clutter from measurements – amplitude statistics, reflectivity, Doppler spectrum, polarisation scattering matrix, spatial correlation.
- Modelling and exploiting the impact of propagation on clutter characteristics.
- EM scattering techniques for predicting clutter characteristics.
- Use of models for the design, specification and measurement of radar performance.
- Clutter from ground, sea, precipitation, birds or other sources.
- Modelling and exploitation of clutter in SAR imagery for remote sensing or target detection and the effects on automatic target recognition.
- The simulation of realistic clutter for scenario performance evaluation, synthetic environments and training aids.

This Special Issue is, we believe, timely and of great importance to radar designers, system planners and key stakeholders.

Proposed timeline:

Deadline for submission of papers: **31 March 2009**

Authors to have received a 1st decision by: **31 July 2009**

Final notification of acceptance: **31 December 2009**

Online and Print publication: **Early 2010**

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