



A New OTHR Modelling Concept: Target Visibility

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No one surveillance system can provide all of the information necessary to develop and maintain an understanding of a particular geographical region. For long range wide area surveillance Over the Horizon Radars (OTHRs) are good candidates but the final selection can only be made after detailed performance assessment. This is typically achieved through the exhaustive modelling of the minimum detectable radar cross section (MDRCS), for a candidate configuration as a function of operating frequency, solar activity, time of year, time of day etc.

The MDRCS provides a convenient method for assessing radar performance against an arbitrary target and these can be related to RCS calculations of the targets. However, the illuminating angles at the target, scattered angles and signal polarisations, as well as frequency all change the RCS. Further, these parameters can frequently change during observation, not only due to target manoeuvring but also due to ionospheric fluctuations. To overcome this problem, we have assessed all combinations of these parameters to determine the percentage of possible combinations for which the target RCS is above a specified threshold. We call this probability the *visibility*.

This paper will introduce the concept of visibility and provide visibility coverage maps for a number of targets.

The visibility provides a compact performance assessment metric technique for both the system designer and the system user.