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MCM sensor requirements: performance measures

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This paper presents a comparison of two measures of performance suitable to characterise operational performance of mine hunting sonars in various environmental conditions. The first measure is a direct adaptation of information theory and bounds the capability of a sonar to distinguish between objects, i.e. a classification capability. The bounds take into account the amount of distinguishable pixels between objects and the statistical information content of each pixel. Successfully applied in Radar, this approach has also demonstrated the performance of synthetic aperture sonar at NURC using a Rayleigh distribution for statistical pixel distribution. The measure is now being further developed to include high resolution distributions such as K-law which readily appear in high resolution images. The second measure, Johnson's criteria aims to provide guidance on resolution required for operator detection, classification and identification. This measure originally derived from experiments on night vision images is now being modified to simultaneously incorporate target highlight and shadow information in varying environmental conditions. Finally, the predictions of these measures will in the future be compared to each other and to current system performances.