

Title: Performance Modeling for Local Position Reference Sensors Applied to Radarscan

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Abstract

When first presented with a measurement device of any sort, one very natural question to ask is “How accurate is it?” It’s often easy enough to give a simple, order of magnitude answer, but a fully specified, testable answer is necessarily more detailed.

In this paper we discuss the selection of performance metrics for a position reference sensor with a particular focus on the specification of accuracy. The use and benefits of a quantitative model of measurement errors is examined, in particular data fusion and measurement validation. This is in the context of the Kalman filter and alternative estimation techniques.

The experimental technique used to obtain a detailed error model is described and illustrated by results obtained from the RadaScan microwave position reference sensor. The most important environmental factors which affect the accuracy of RadaScan are described, particularly at the effect of sea reflection multi-path.

Data from both land and sea trials are presented along with recordings from routine operation at sea. These show how RadaScan performs across a range of representative operating circumstances.

Finally a summary performance model is specified which gives a usable guide to the accuracy the RadaScan can be relied upon to provide.

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