

## a 'Digital Twin' for Use in System Design and Support

Hardware and electronic systems makers submit their products to testing before they are put into service. Where safety and operational criticality is vital then that testing is very rigorous. Once in service, keeping complex equipment operating requires a support program which can itself be complex and often costs more over time than the original hardware acquisition. Why is it that support systems are seldom subjected to testing before they are brought into operation? This paper examines the use of a Digital Twin - a mathematical model - of a support system whose purpose is to test the support plan's efficacy and to determine its periodic cost. Case studies will be used to illustrate the various ways that a complex equipment support system can be represented in model form and the benefits they provide to operators. The paper will address an obstacle to modelling that is common in peoples' minds, which is the availability and quality of data. The paper will demonstrate how the integration of automatically captured data from environmental and positional sensors can significantly add to the fidelity of a Twin of a support system and enhance its ability to predict increased risk of system operational unavailability.

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