

Title: **Dynamic Positioning System (DPS) Risk Analysis Using Probabilistic Risk Assessment (PRA)**

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Abstract

The National Aeronautics and Space Administration (NASA) Safety & Mission Assurance (S&MA) directorate at the Johnson Space Center (JSC) has applied its knowledge and experience with Probabilistic Risk Assessment (PRA) to projects in industries ranging from spacecraft to nuclear power plants. PRA is a comprehensive and structured process for analyzing risk in complex engineered systems and/or processes. The PRA process enables the user to identify potential risk contributors such as, hardware and software failure, human error, and external events. Recent developments in the oil and gas industry have presented opportunities for NASA to lend their PRA expertise to both ongoing and developmental projects within the industry. This paper provides an overview of the PRA process and demonstrates how this process was applied in estimating the probability that a Mobile Offshore Drilling Unit (MODU) operating in the Gulf of Mexico and equipped with a generically configured Dynamic Positioning System (DPS) loses location and needs to initiate an emergency disconnect. The PRA described in this paper is intended to be generic such that the vessel meets the general requirements of an International Maritime Organization (IMO) Maritime Safety Committee (MSC)/Circ. 645 Class 3 dynamically positioned vessel. The results of this analysis are not intended to be applied to any specific drilling vessel, although provisions were made to allow the analysis to be configured to a specific vessel if required.