Title: Simulation and Testing of the Range of Motion of a Six Degree of Freedom Docking System

Abstract: The soft capture system of the NASA Docking System (NDS) is a mechanism with six-degrees of freedom (6DOF). Although the nominal motion of the system is simple and largely in a single degree of freedom, complex movement is permissible within the requirements for docking. As such it is critical in the design, test, and verification of the docking system to fully understand the range of possible movement of the mechanism. This range of motion (ROM) must be large enough to accommodate all permitted docking sequences without internal collisions. This paper will discuss the methods used to perform these analysis for the NDS. Additionally, the testing sequences derived from this analysis will be presented, as illustrated in Figure 1. Finally, lessons learned from the analysis and test program will be discussed.

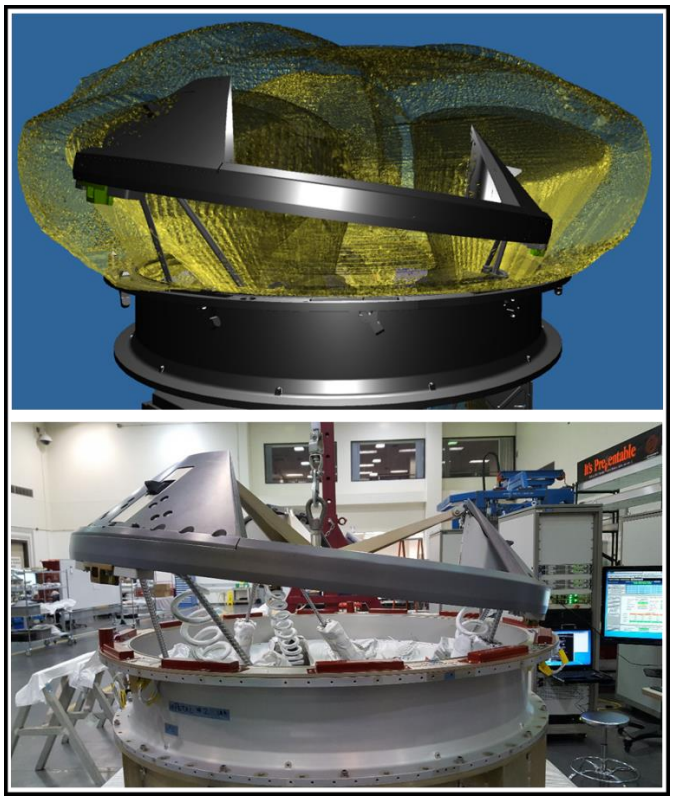

Figure 1. ROM Simulation and Test Comparison

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