

HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Advanced Systems, Technologies, and Innovations for Human Spaceflight (7)

Author: Mr. Helder Dittmer
QinetiQ Space nv, Belgium, sabine.vanbeek@QinetiQ.be

Mr. Oscar Gracia
European Space Agency (ESA), The Netherlands, oscar.gracia@esa.int
Mr. Marco Caporicci
European Space Agency (ESA), The Netherlands, marco.caporicci@esa.int
Mr. Bart Paijmans
QinetiQ Space nv, Belgium, bart.paijmans@qinetiq.be
Mr. David Meuws
QinetiQ Space nv, Belgium, david.meuws@QinetiQ.be

THE INTERNATIONAL BERTHING DOCKING MECHANISM (IBDM): DEMONSTRATING FULL
COMPLIANCE TO THE INTERNATIONAL DOCKING SYSTEM STANDARD (IDSS)

Abstract

The International Docking System Standard (IDSS) is the result of a collaboration by the International Space Station (ISS) membership to establish a recommended standard docking interface to enable joint collaborative endeavors utilizing different spacecraft and on-orbit crew rescue operations. The purpose of the IDSS is to provide basic common design parameters to allow developers to independently design compatible docking systems. The IDSS defines the meshing geometry, the contact and in-orbit loads and the range of masses and Initial Contact Conditions of the mating spacecraft that a docking system, implementing the standard, shall comply to.

QinetiQ Space, under ESA contract, is currently building the International Berthing Docking Mechanism (IBDM), an androgynous low impact docking mechanism which features an actively controlled soft-capture system that is capable of docking and berthing large and small spacecraft, and is compatible with the IDSS definition. At the same time, NASA is also conducting the design and manufacturing of their NDS (NASA Docking System) compatible with the IDSS definition. NASA is also outfitting the ISS with 2 International Docking Adapters (IDAs) to provide IDSS compatible docking ports for future commercial crew and other visiting spacecraft.

The paper describes the demonstration through simulation and testing of the compatibility of the IBDM with the meshing geometry, the structural contact loads and the broad range of masses and ICCs of the mating spacecraft defined by the IDSS. The presented testing is an important step in the preparation for operational use of the IBDM on one of the new generation vehicles servicing the ISS.