



IBDM Hard Capture System



SENER AEROSPACE & DEFENSE / SPACE / INTERNATIONAL

*IBDM HARD CAPTURE
SYSTEM*

Cliente: QinetiQ / ESA

País: International

The International Berthing and Docking Mechanism (IBDM) is the European androgynous low impact docking system that is capable of docking and berthing large and small spacecraft.

Sener, as part of a European consortium, has developed the Hard Capture System of the IBDM. The function of the HCS is to create a rigid structural connection to allow for a pressurized passageway between the two spacecraft. It also includes connections for the transfer of electrical power, data and fluids such as fuel.

The IBDM has been designed to be compatible with the International Docking System Standard (IDSS) and hence compatible with the ISS International Docking Adapters (IDA) on the US side of the International Space Station (ISS). The possibility of modifying the system to accommodate new docking standards has been taken into account during the project phase, so it has the required flexibility to allow the integration of the IBDM into different vehicles.

This extremely precise and complex system may become a standard for manned space missions in the future.

The main components of the HCS are:

- HCS Tunnel Assembly, which provides the structural integrity and accommodates seals, alignment pins and sensors.
- HCS Hooks, with 12 independently driven hook units to achieve the structural mating, seal compressions and interface preload. It also accommodates the Contingency Release Devices, based on pyrobolts.
- Separation System (three separators), which generates the required axial thrust to push off the hoisting vehicle from the ISS once the hooks are opened.



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- Two Resource Transfer Umbilical, with connectors to transfer power and data.
- MMOD Cover, a Micro Meteorite and Orbital Debris Cover.
- Thermal Control, active and passive (Multi-layer Insulation over the MMOD)

Sener is responsible for design, implementation, integration and testing of Separators, Resource Transfer Umbilical, MMOD cover, and two types of sensors: Ready To Hook Sensor (RTH) and Undocking Complete Sensor (UCS).

One of its potential applications is in the successor of the International Space Station, the Gateway station, whose construction, with SENER Aeroespacial participation with five different contracts, is planned for 2025. Ultimately, Gateway will be embedded in space around the Moon and will serve as a strategic point for distant space expeditions, such as a manned flight to Mars. Part of it will be the I-HAB, a habitat for astronauts arriving from Earth, developed by ESA member companies. I-HAB is expected to be equipped with the HCS system developed by Sener.
