



EURODOCK

A Universal Docking Downloading Recharging System for AUVs

**E.C. MAST PROGRAMME
PJ NR. MAS3-CT97-0084**



Scope of the *EURODOCK*

To allow AUV repeat missions with a single Launch & Recovery Operation by:

- ♦ **Downloading data**
- ♦ **Recharging batteries**

without retrieval to the surface.



Basic Design Premise

To be compatible with:

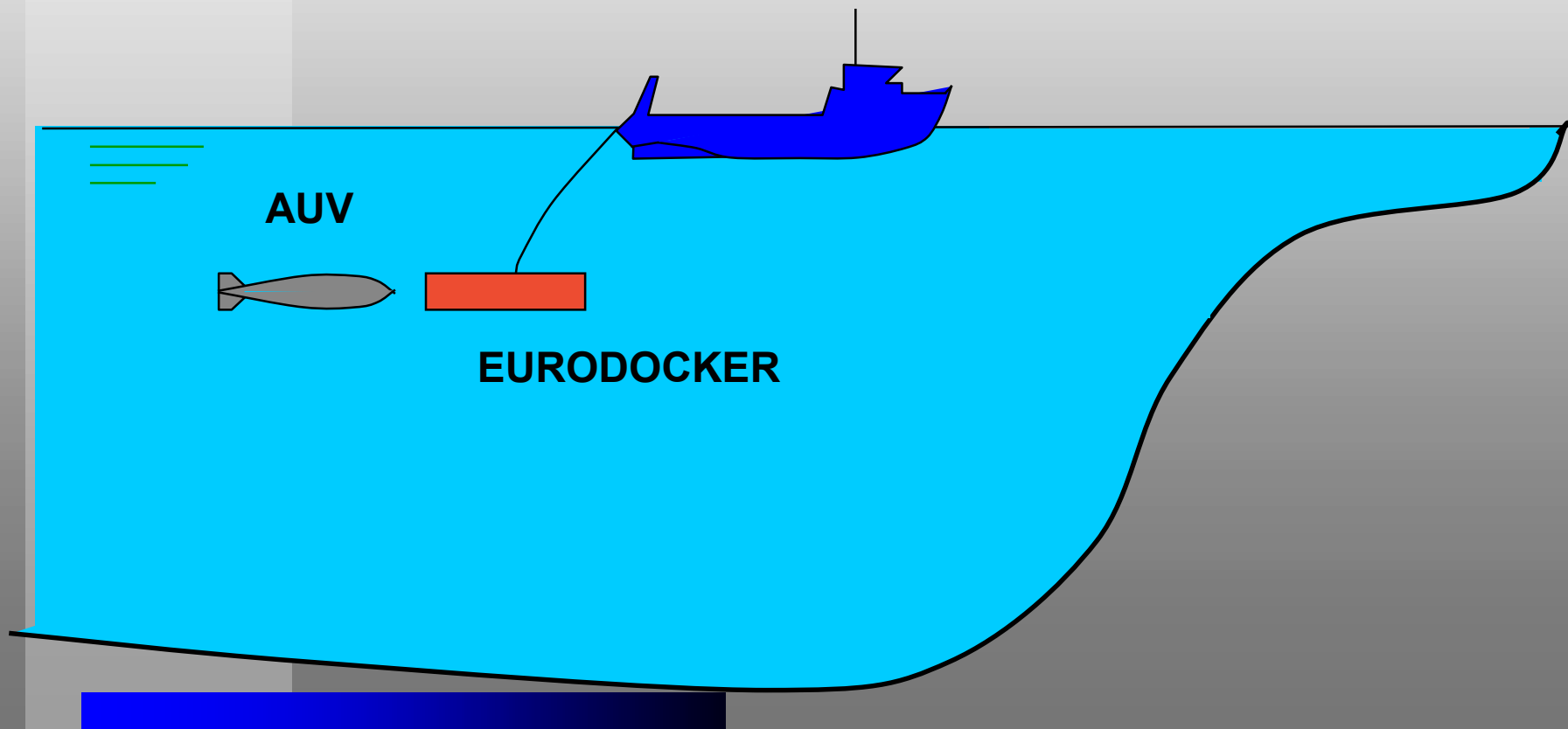
- Different current AUV's**
- Different Operative Scenarios**
- Future AUV innovations**

To permit:

- Ease of construction**
- Cost saving during manufacture**
- Ease of operation, particularly for L&R**
- Operative reliability**

Operational scenarios

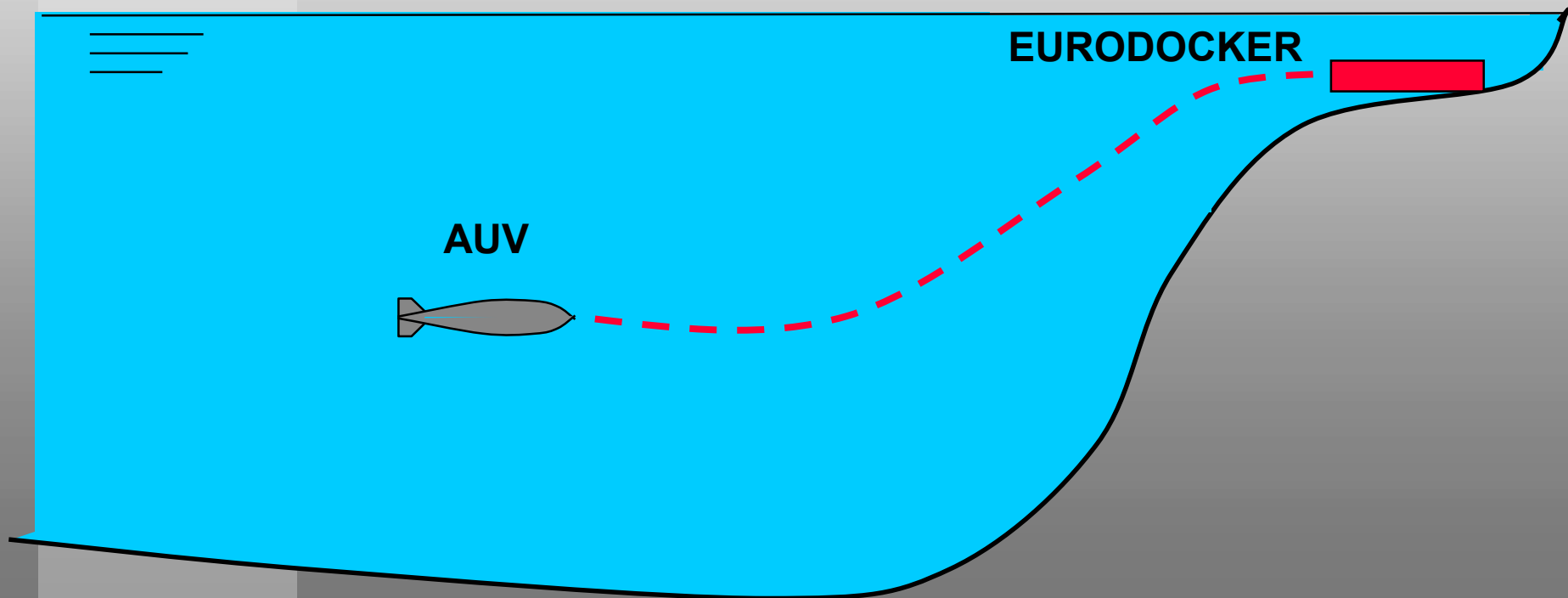
OS 1 - Ship support in any water depth – typ. docking depth 50 m





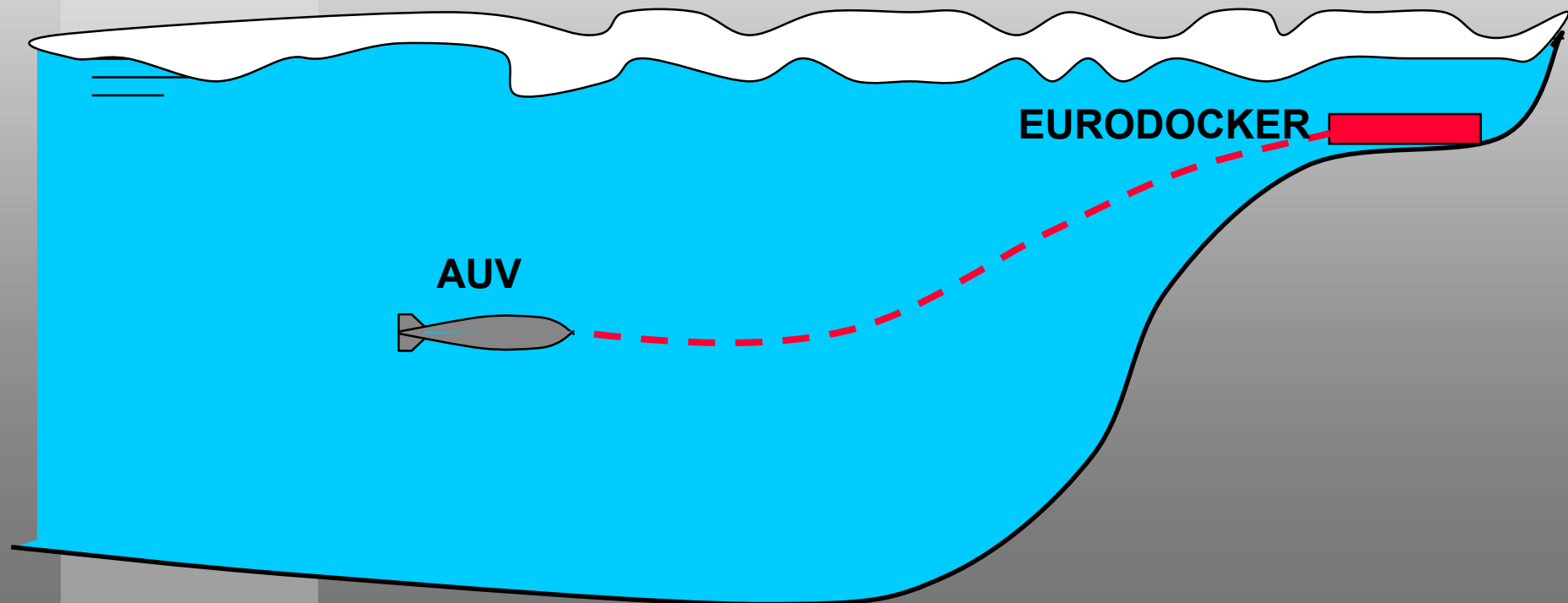
Operational scenarios

OS 2 - Missions from Continental Shelf waters



Operational scenarios

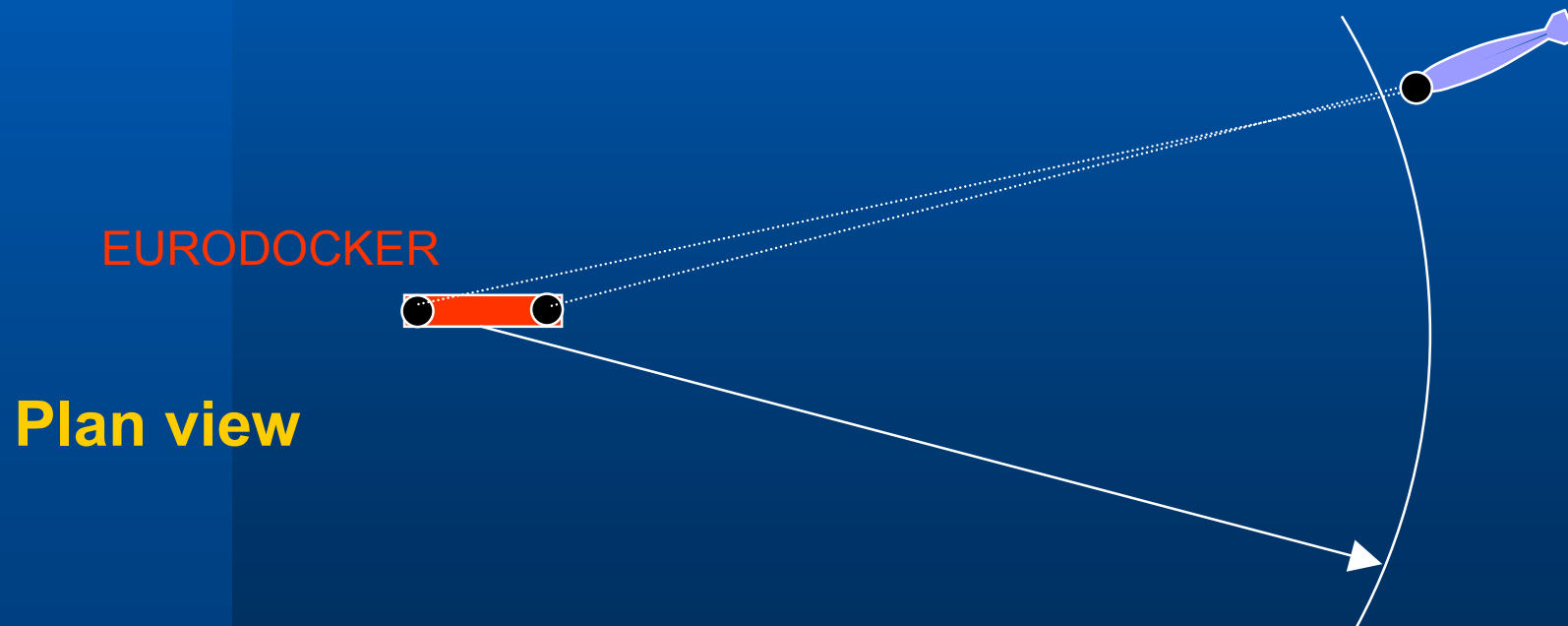
OS 3 - Ice infested waters (Antarctic, Arctic) – typ. at less than 100 m depth





Homing

- AUV enters re-entry circle and rises/dives to ED depth





Homing Procedure

- AUV goes downstream of ED
- enters re-entry circle (typ. 50 m)
- is tracked by a **USBL** reference & alignment system
- approaches at minimum speed
- contacts the Eurodocker

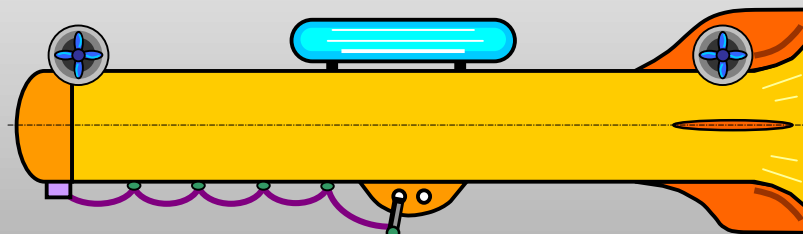


Mating - challenges

- Residual vessel motions
- AUV's with no hovering capability
- Position inaccuracy of $\pm 30\text{-}40$ cm
- Re-entry speed up to 1.2 m/s



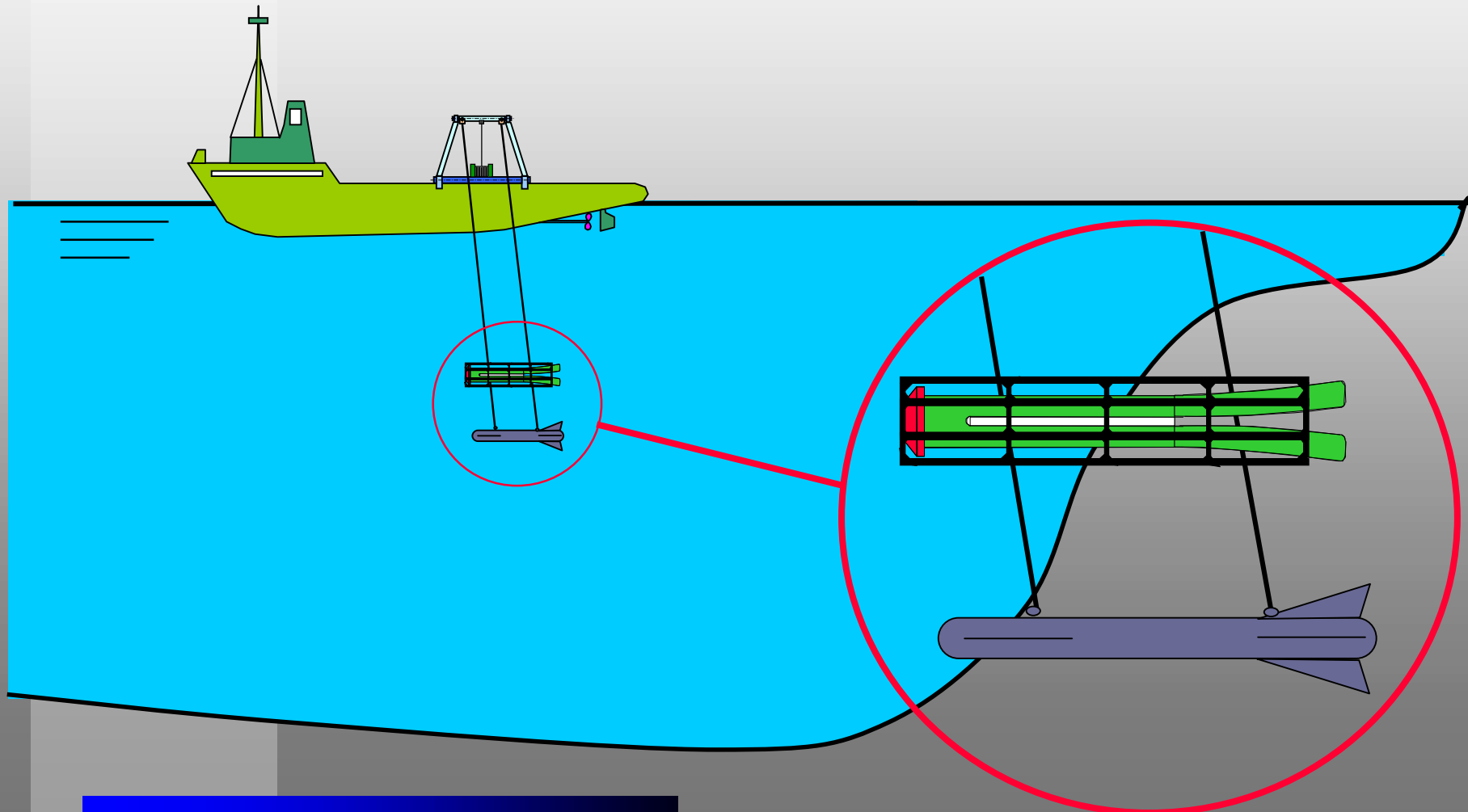
Bottom deployment concept



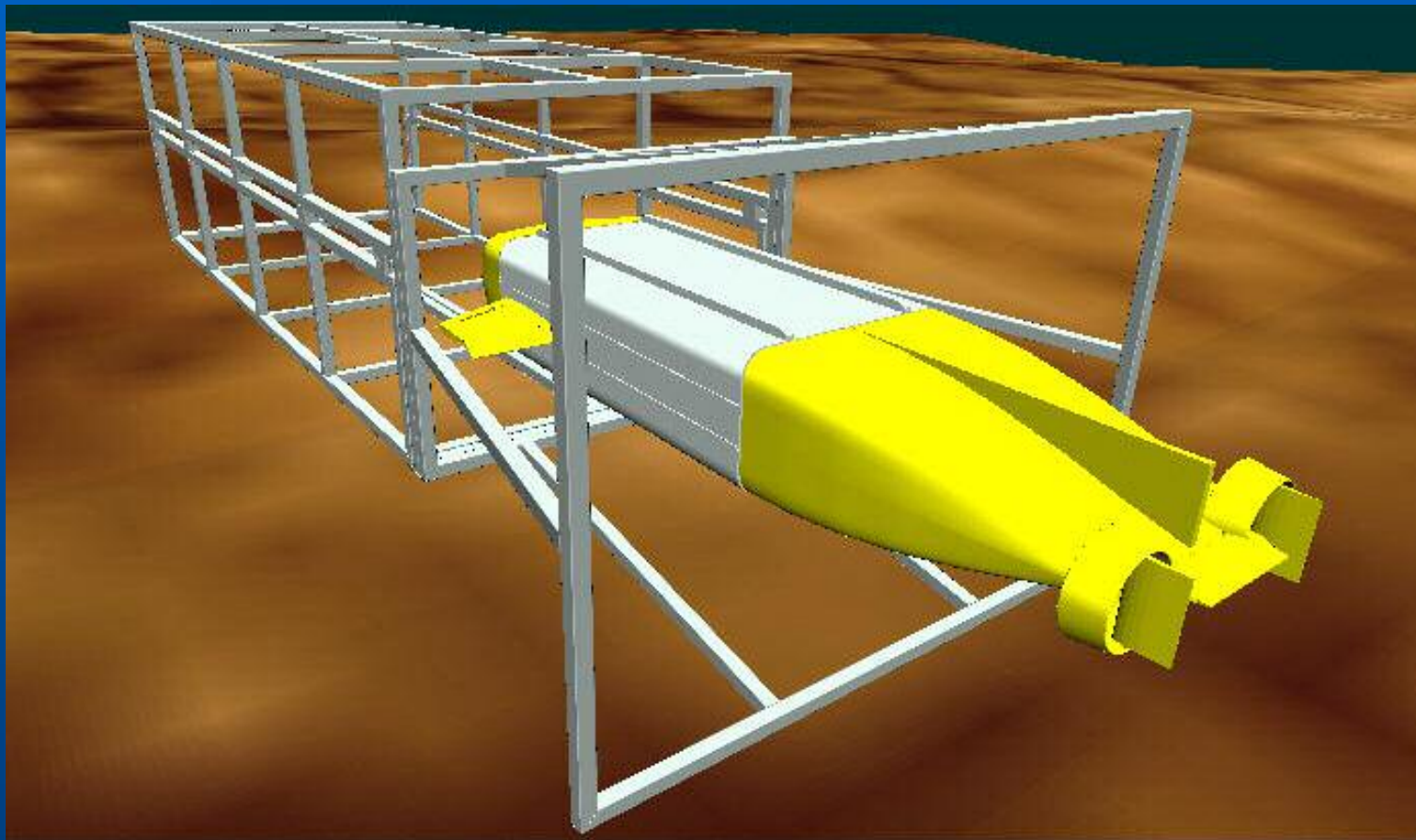
← **AUV entrance**

GARAGE
Bottom support case

Surface deployment



Garage concept

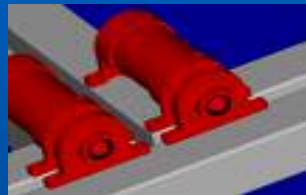




Integration modules



Release System



Locking Device



Bumper Element



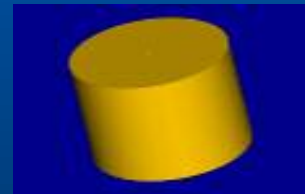
Reference System



Water Bags



Connector



Buoyancy System



Docking Sensors



Control Unit



Acoustic Location



Acoustic Homing



MMI

Construction



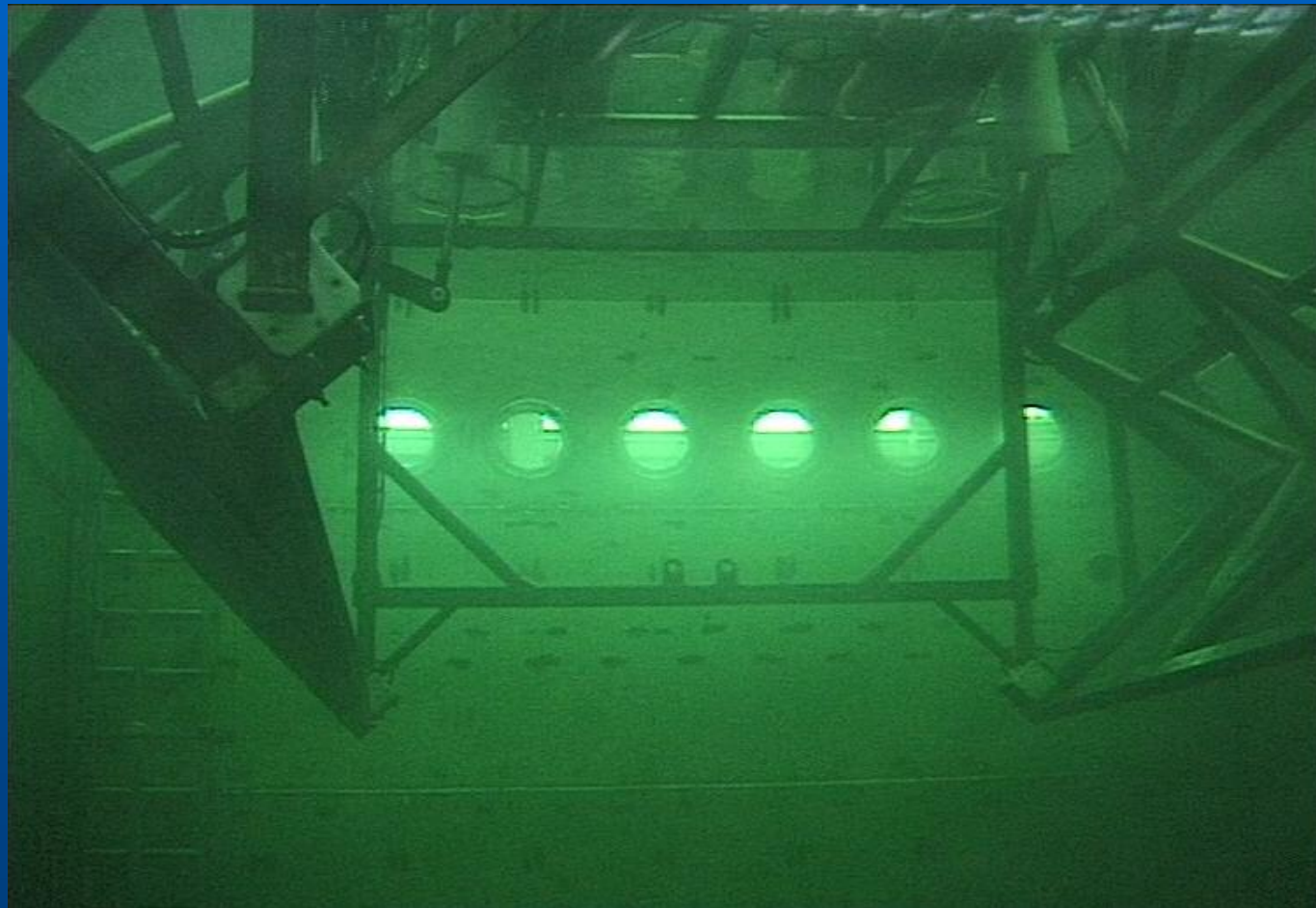
Connector



Control Unit



Tank test



Sea tests



Sea tests



Sea tests



Sea tests





Main milestones

- **Baseline spec.** Sep. '98
- **Design compl.** Aug. '99
- **Construction compl.** Oct. 2000
- **Final sea trials** May 2001



Project Consortium

Institut Fuer Werkstoffkunde (IW)	DE
Maridan	DK
Studio 3 Ing. (SATE)	IT
Orca Instrumentation	FR
IAU, Technical Univ. Denmark	DK