

The WiMUST H2020 project: Widely scalable Mobile Underwater Sonar Technology

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Coordinator - ISME





WiMUST
Widely scalable Mobile
Underwater Sonar Technology

WiMUST - Widely scalable Mobile
Underwater Sonar Technology
Grant agreement no: 645141

H2020 ICT-23-2014: Robotics
Started on February 1st, 2015
Duration 36 months
Maximum grant amount is EUR
3,970,081.25





9 partners (5 Ind. + 4 Acad.) from 6 Countries

ISME (UNIVERSITA' DEGLI STUDI DI GENOVA) - IT

ASSOCIACAO DO INSTITUTO SUPERIOR TECNICO PARA A INVESTIGACAO E DESENVOLVIMENTO - PT

CINTAL - CENTRO INVESTIGACAO TECNOLOGICA DO ALGARVE - PT

THE UNIVERSITY OF HERTFORDSHIRE HIGHER EDUCATION CORPORATION - UK

EVOLOGICS GMBH - DE

GRAAL TECH SRL - IT

CGGVERITAS SERVICES SA - FR

GEO MARINE SURVEY SYSTEMS BV - NL

GEOSURVEYS - CONSULTORES EM GEOFISICA LDA - PT



WiMUST

Widely scalable Mobile

Underwater Sonar Technology



Evo
Logics®



Girona, Spain 16 May 2017 - EMRA 2017 Workshop





Lisbon, 27 November 2015





ISME Active Nodes
in WiMUST:

GENOVA (Formal
Beneficiary)

Linked Third Parties
PISA
CASSINO
LECCE





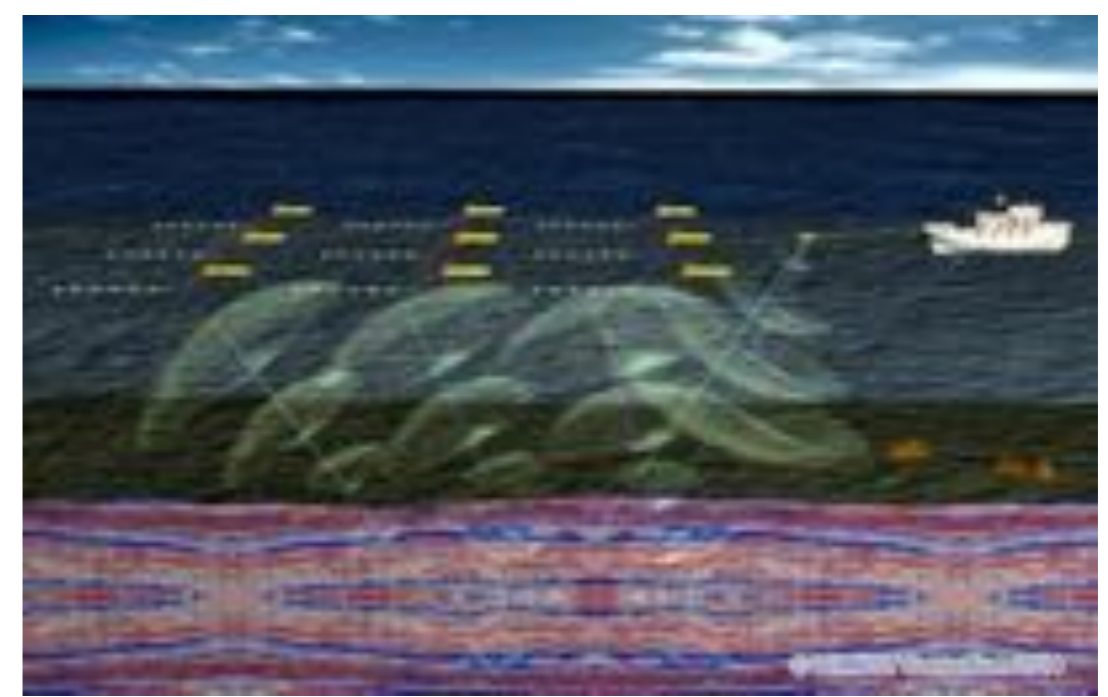
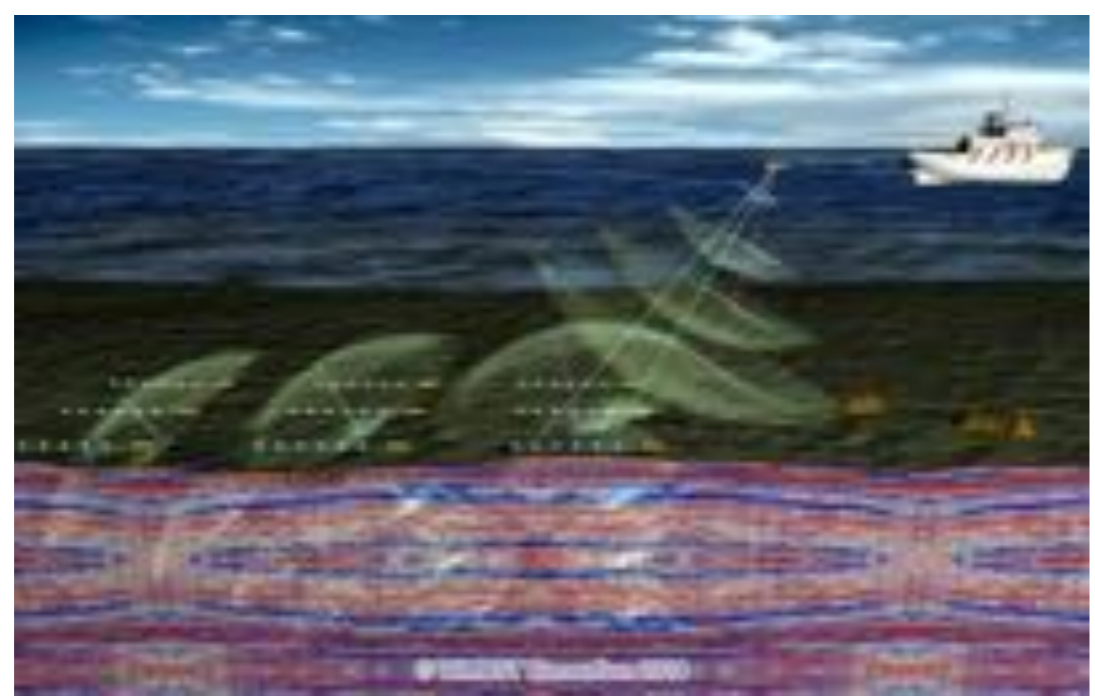
CINTAL (Beneficiary)



**University of Algarve
(Linked Third Party)**



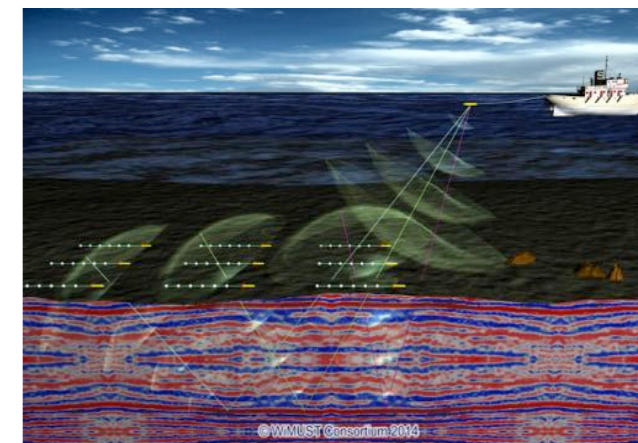
The Big Picture





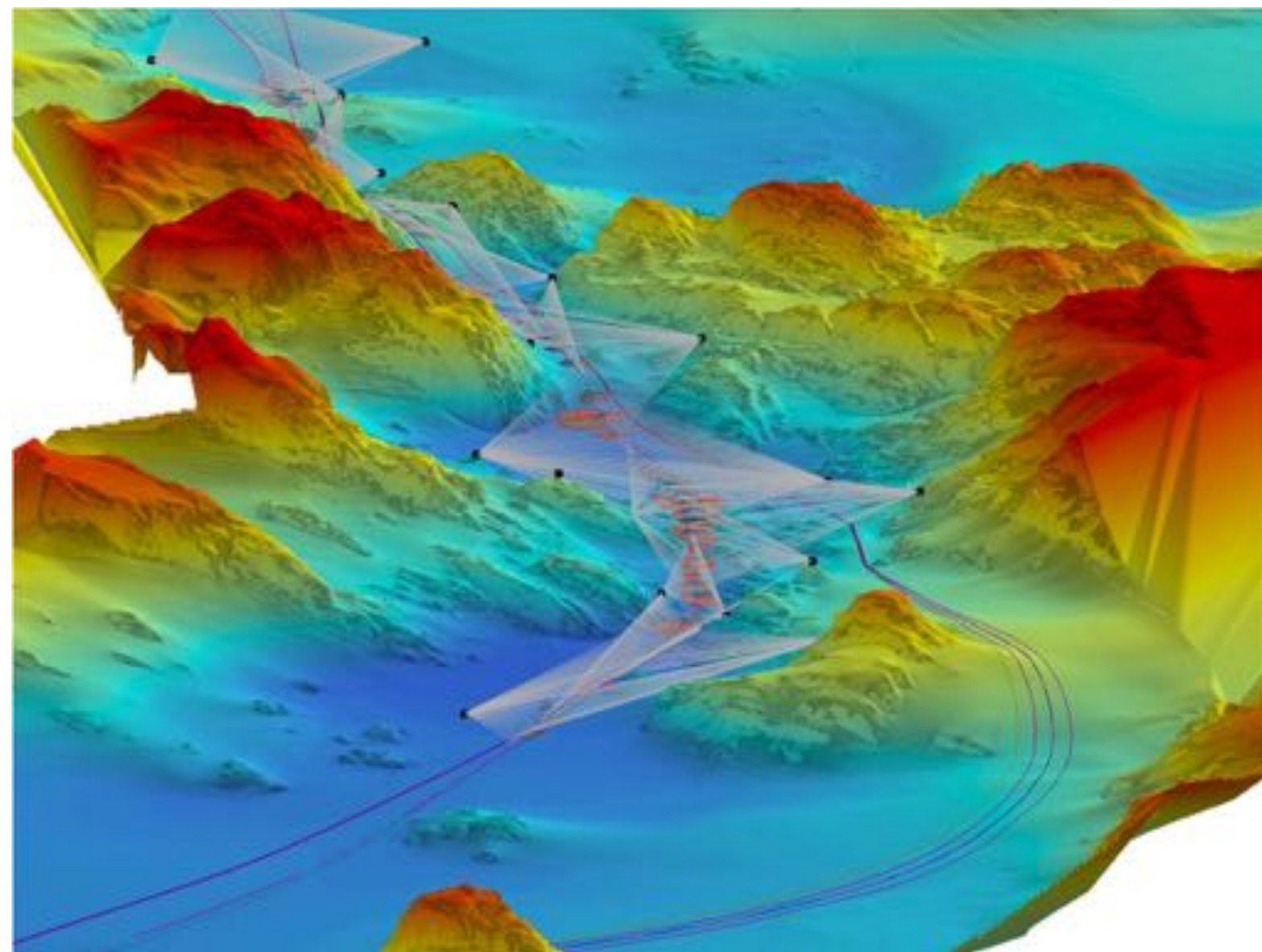
Introduction Video





Market domain:
Marine Robotics (Civil &
Commercial)

- Geotechnical Surveying
- Distributed Sensor Array
- Geophysical Surveying
- Monitoring

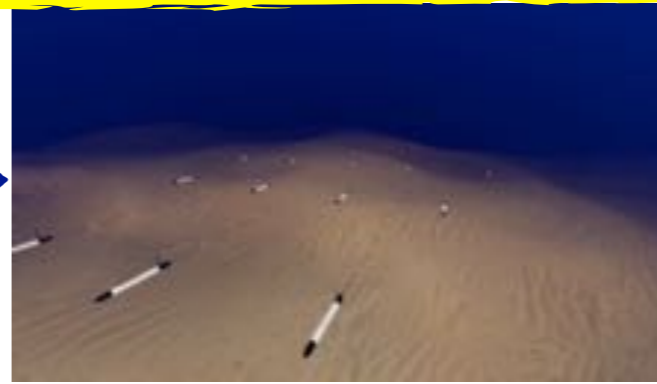




Main challenges

- Acoustic Distributed Sensor Array;
- Communications (short and long range);
- Geotechnical surveying and Geophysical characterization;
- Clock synchronization (below 50 μ sec);
- Cooperative Navigation and Motion Control: accurate formation control;
- HW integration of the acoustic acquisition system with the navigation one;





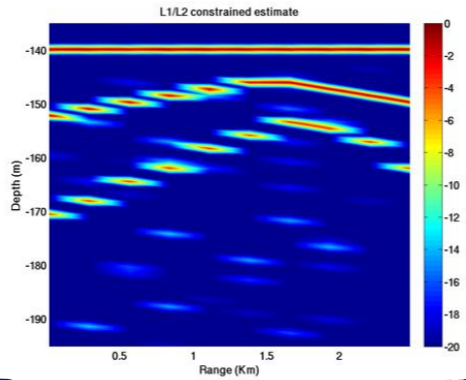
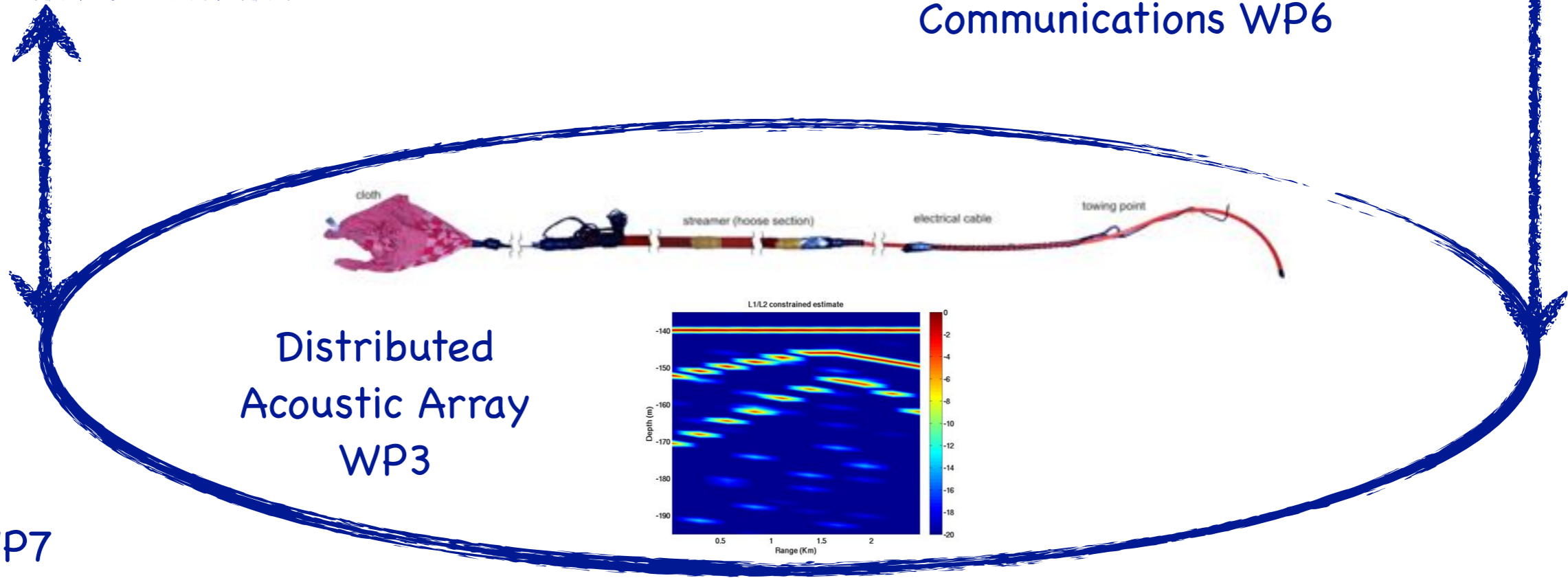
WP2

Mission Planning
WP5

Navigation Guidance & Control
WP4



Communications WP6

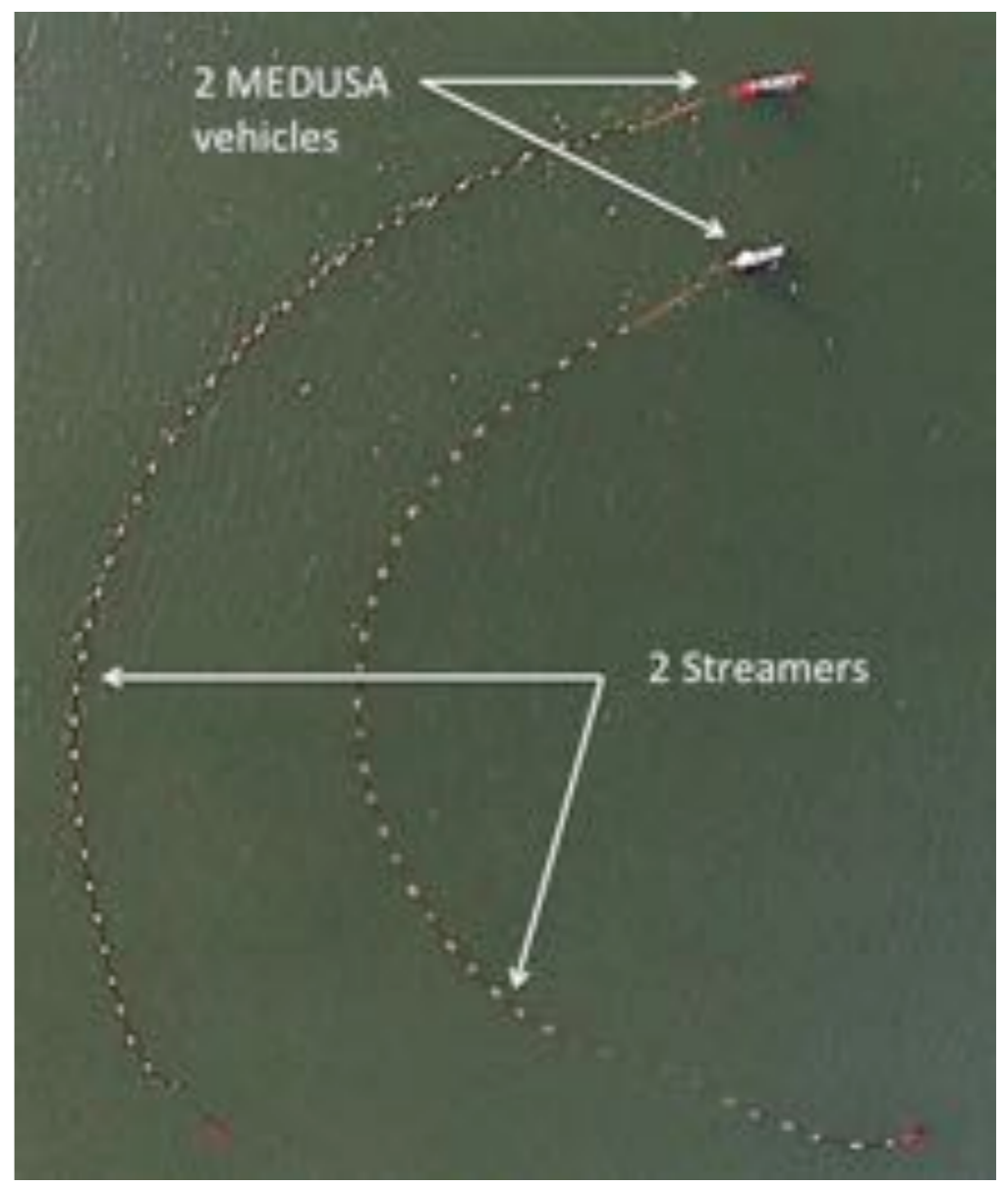


WP7

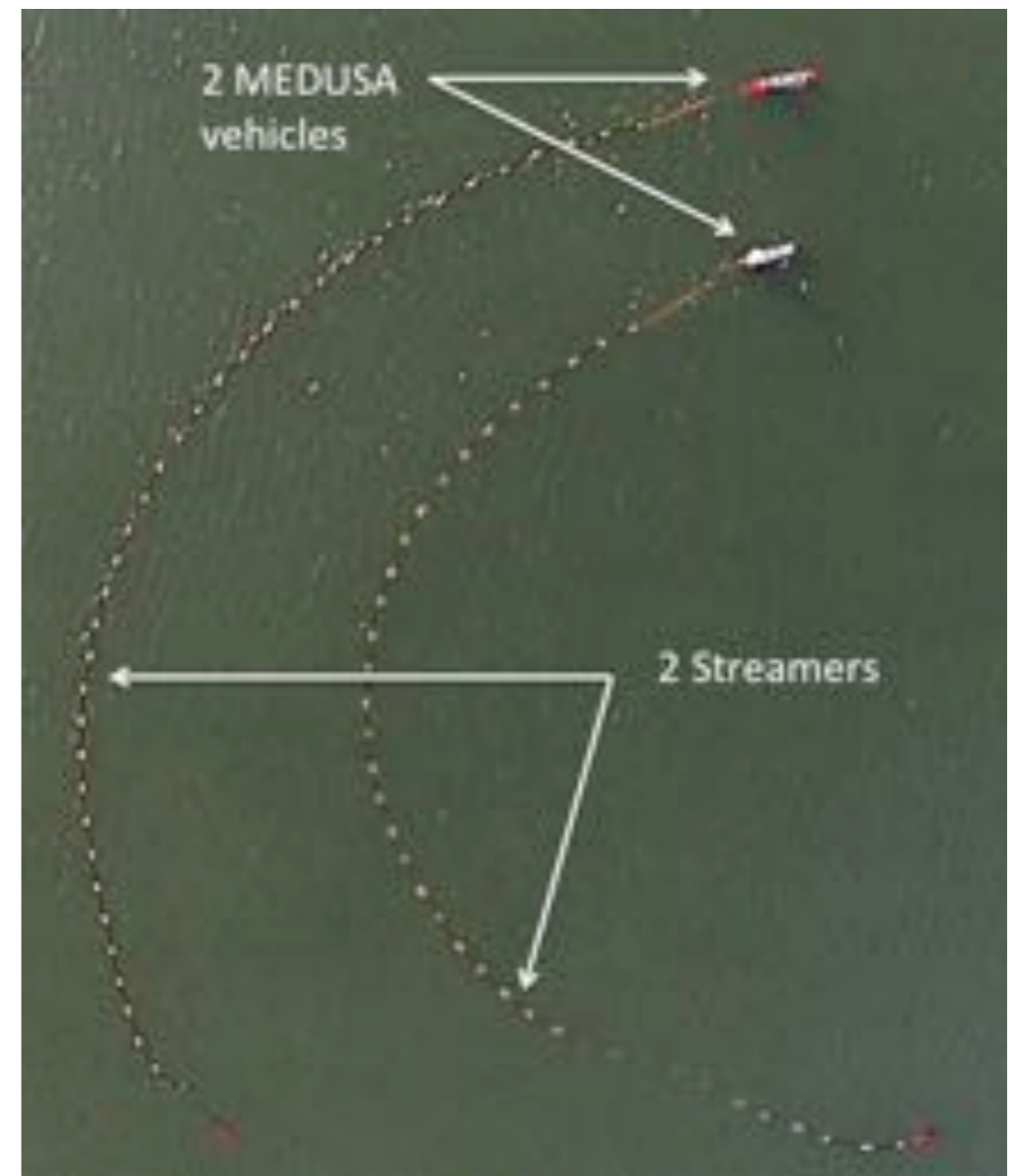




Ship vs ASC source



1. MEDUSA AUVs: minimum speed ~ 0.5 m/s (to keep the streamers straight), maximum speed ~ 1 m/s;
2. FOLAGA AUVs: minimum speed ~ 0.5 m/s (to keep the streamers straight), maximum speed ~ 1 m/s;
3. Typical Ship (not equipped with DP): minimum speed ~ 3 knots (~ 1.5 m/s);





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2. FOLAGA AUVs: minimum speed ~ 0.5 m/s (to keep the streamers straight), maximum speed ~ 1 m/s;
3. Typical Ship (not equipped with DP): minimum speed ~ 3 knots (~ 1.5 m/s);

1. All AUVs have to maintain line of sight visibility to the two MF modems at the back of the ship;
2. All AUVs are equipped with directional HF modems that have to be approx. pointing towards the HF modem installed on the ship and this modem has to be pointing to the “center of the formation”;



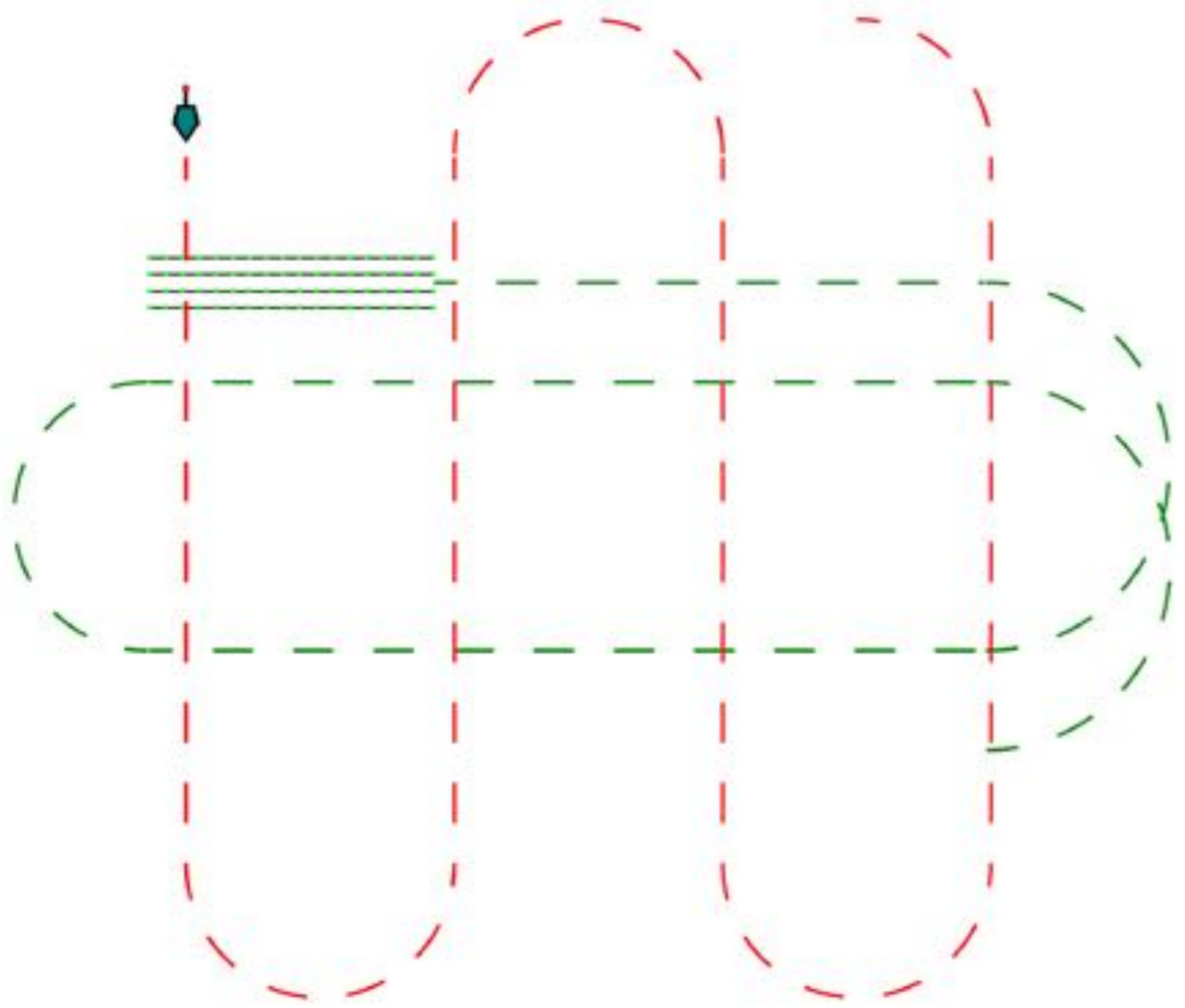


Figure 1 Alternative loom survey strategy

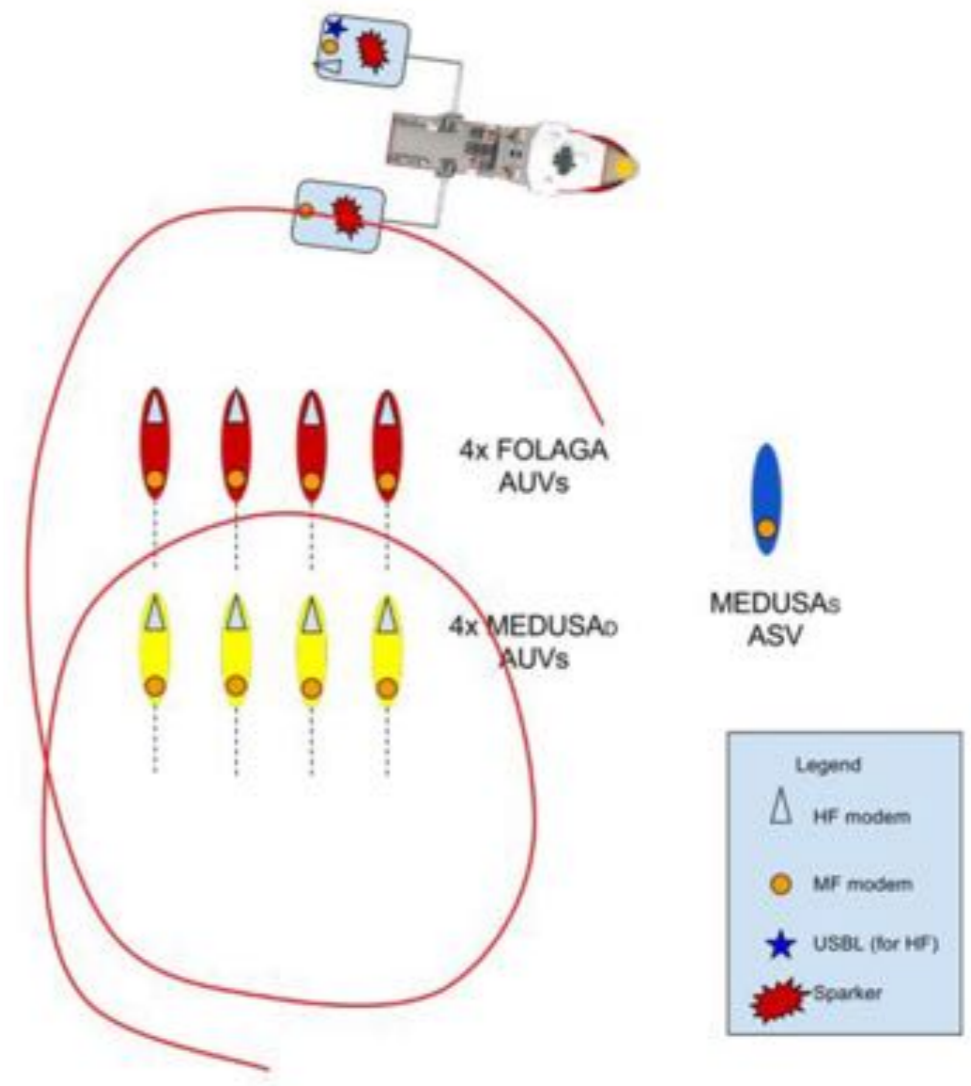
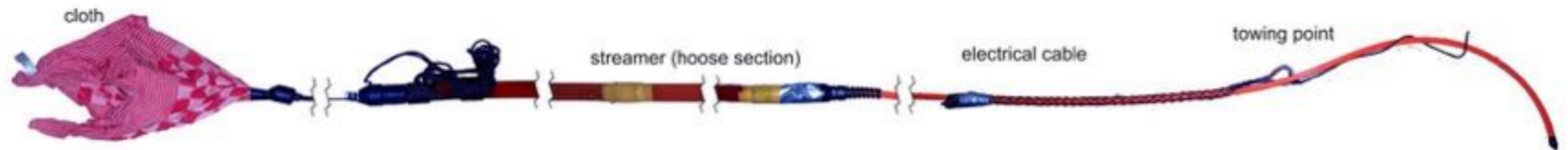
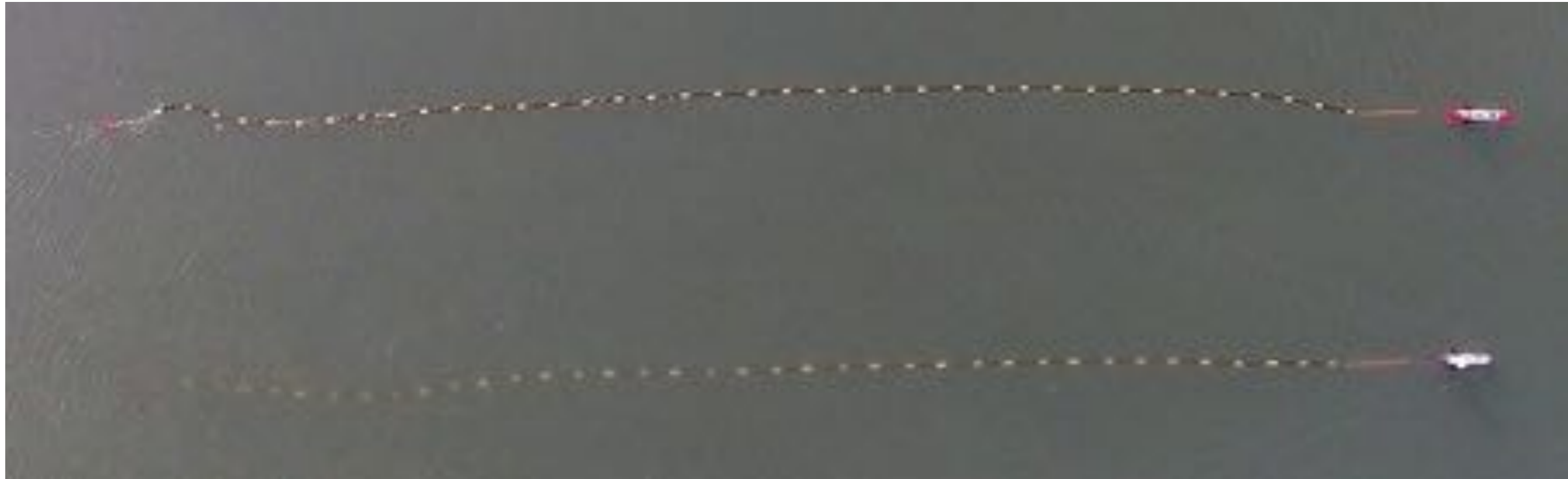


Figure 2 Alternative circle survey strategy



Dummy Streamers, November 2015, Lisbon



Folaga Towing a Dummy Streamer (March 2016)



Mechatronic / Electronic Integration

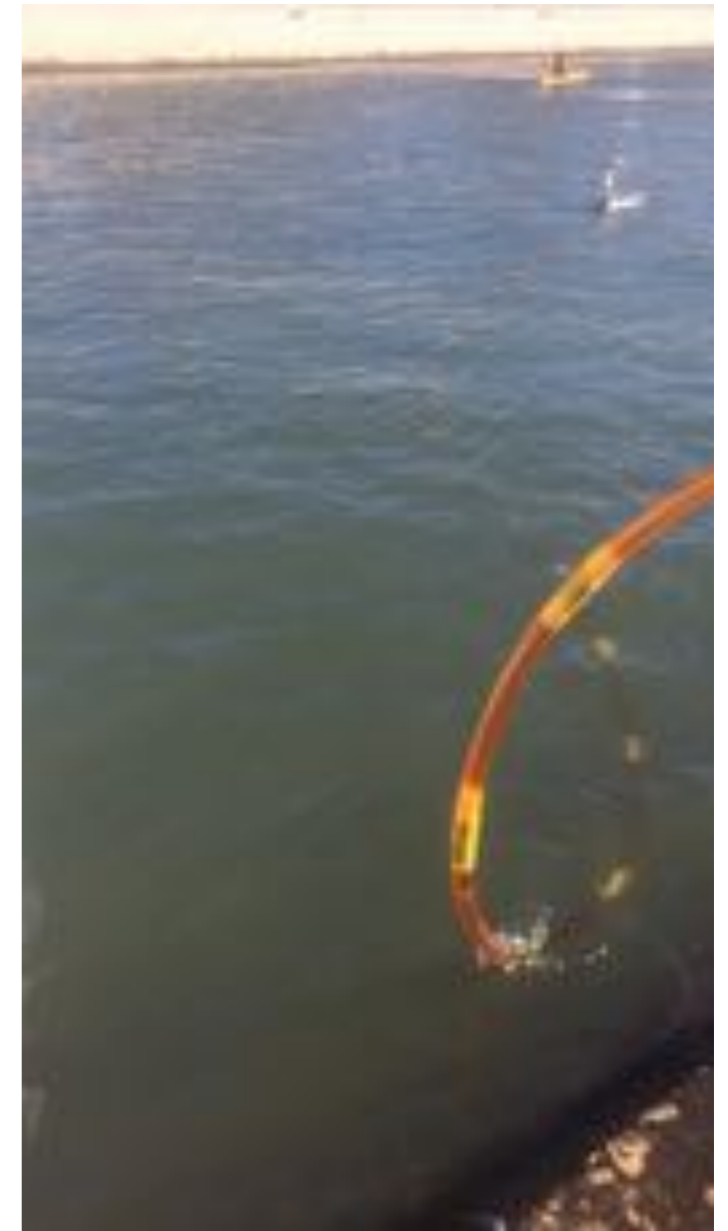


Sines
November 2016

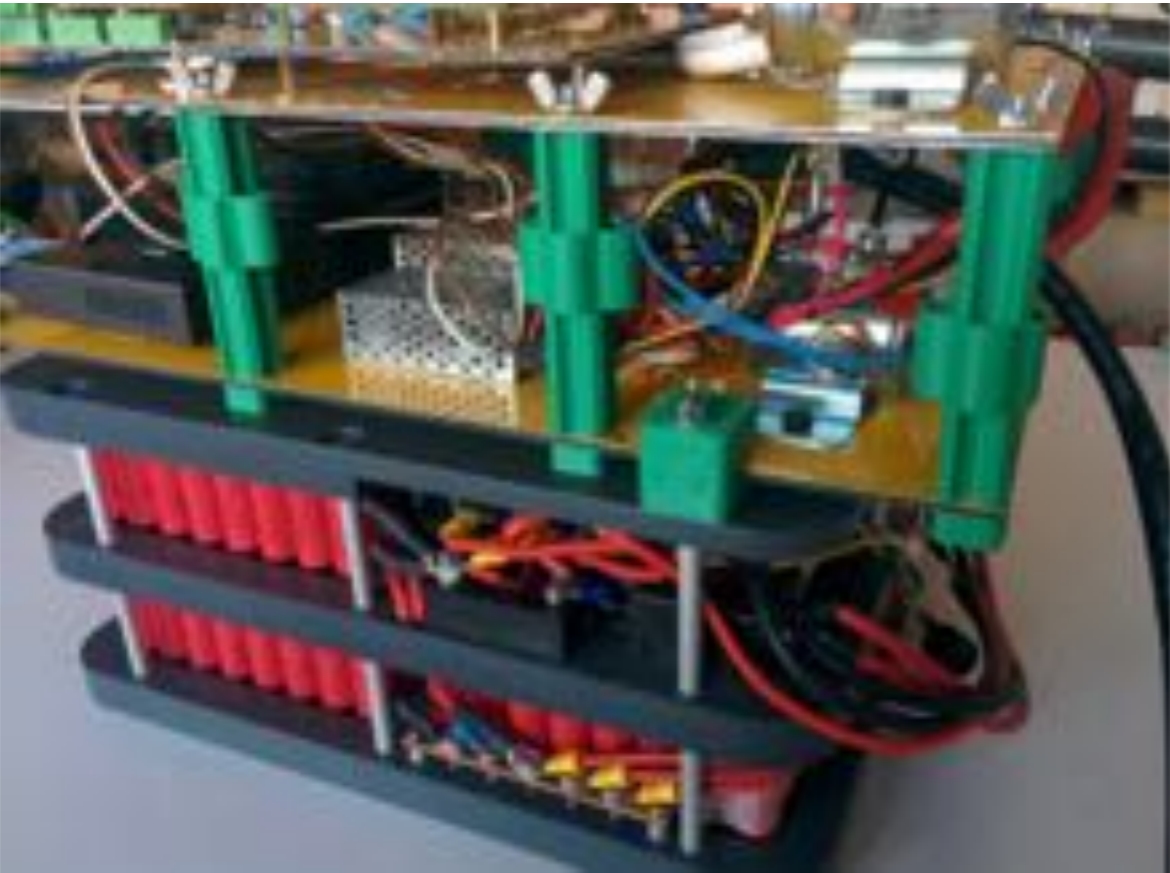


Mechatronic / Electronic Integration

Real Streamers 3rd
November 2016, Lisbon









Sparker Electronics
needs to be installed on
the catamarans

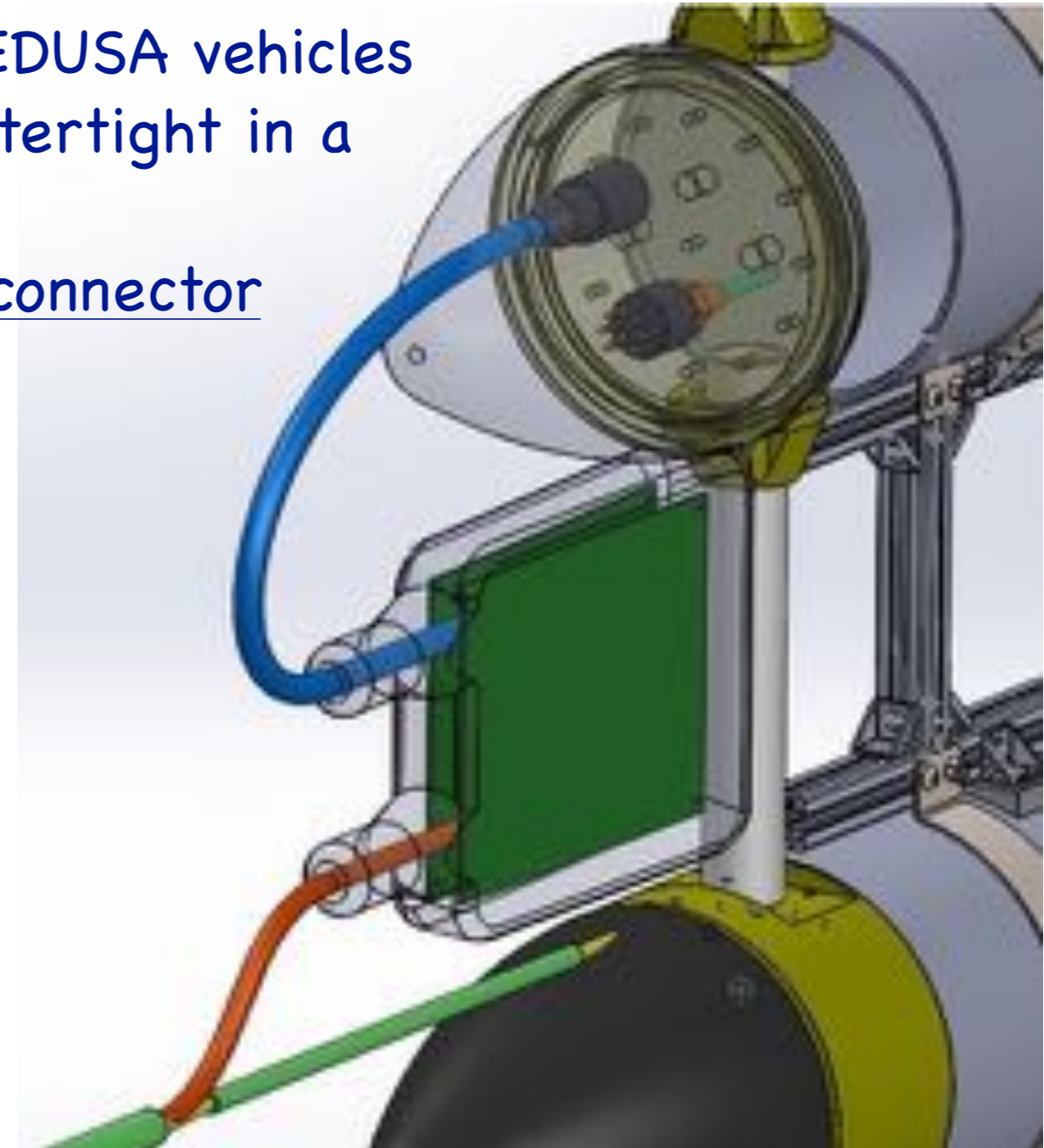
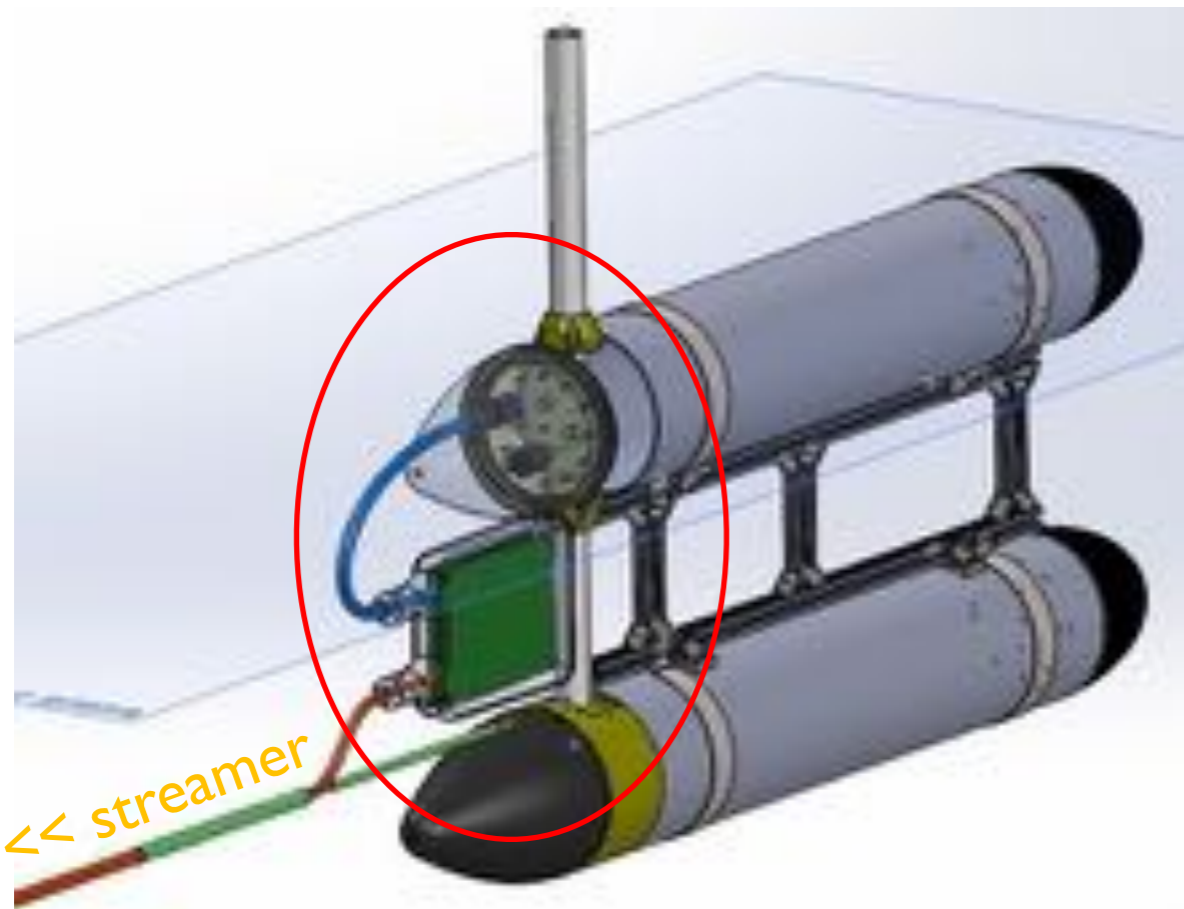
The sparker will be
towed



Mechatronic / Electronic Integration

Multitrace acquisition System on MEDUSA vehicles

- fully encapsulated to make it watertight in a minimal space
- with a single Ethernet + power connector



Mechatronic / Electronic Integration

The encapsulation process

1



2



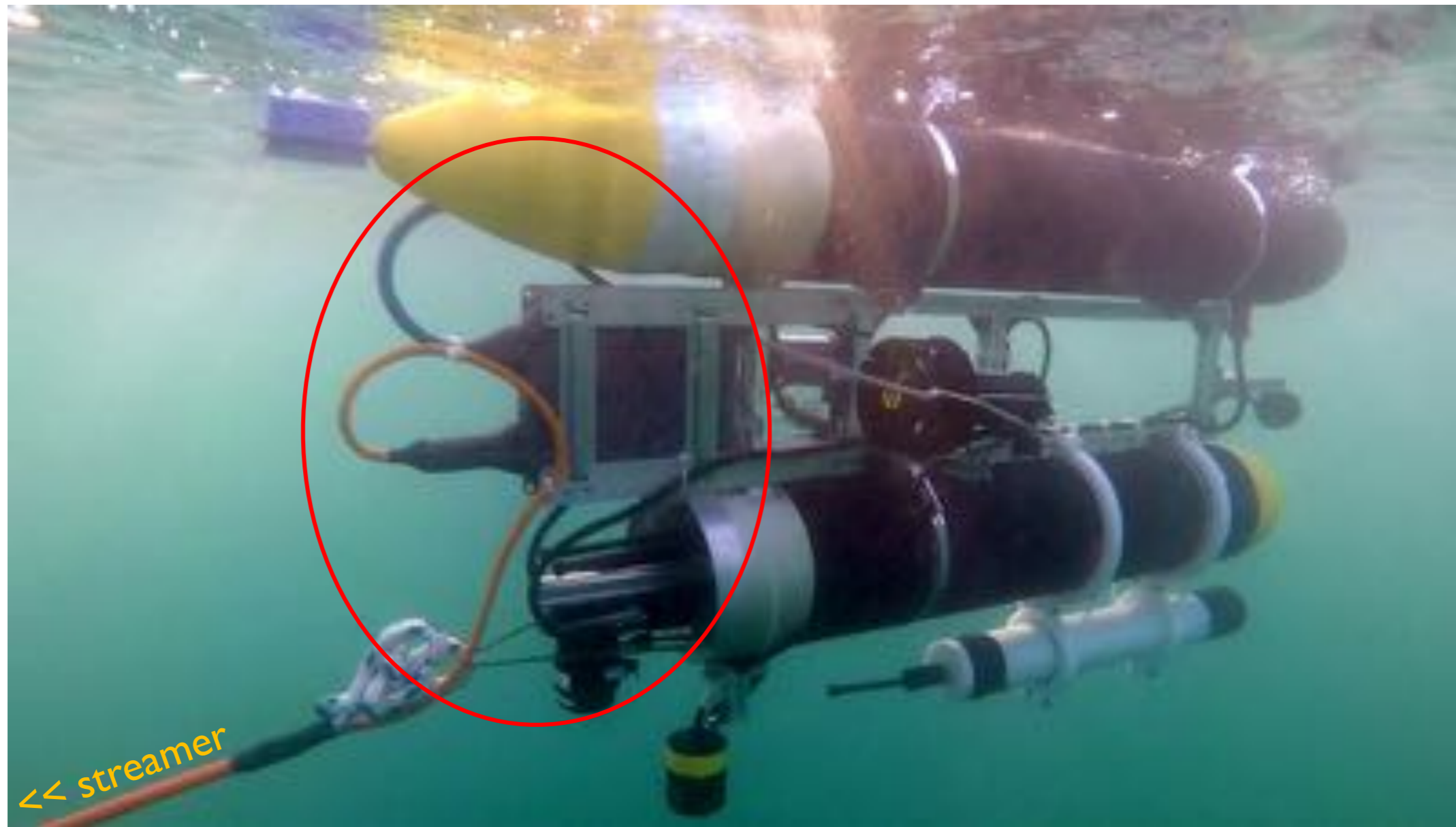
3





Mechatronic / Electronic Integration

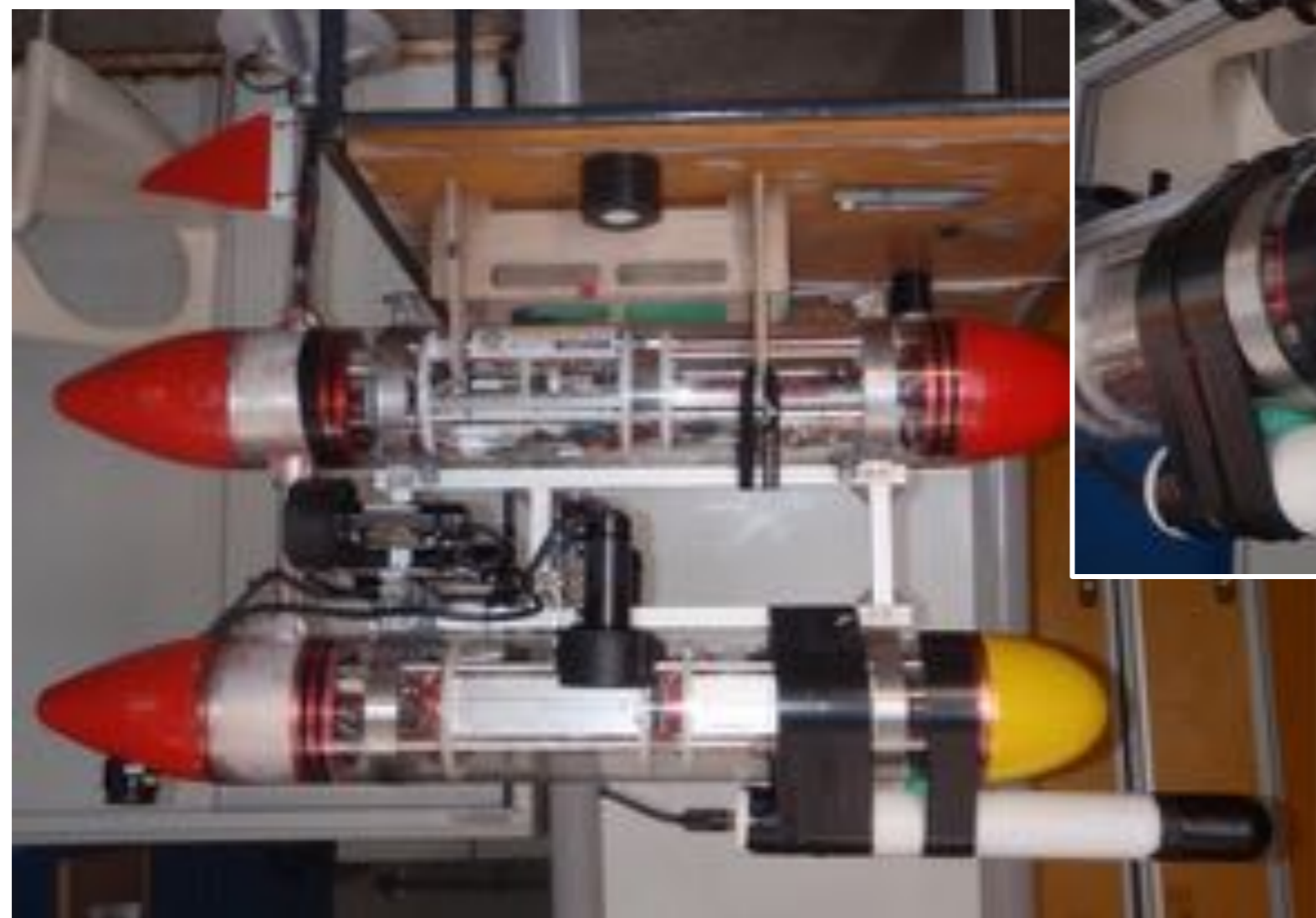
Multitrace Integrated, acquiring seismic data in Sines, PT





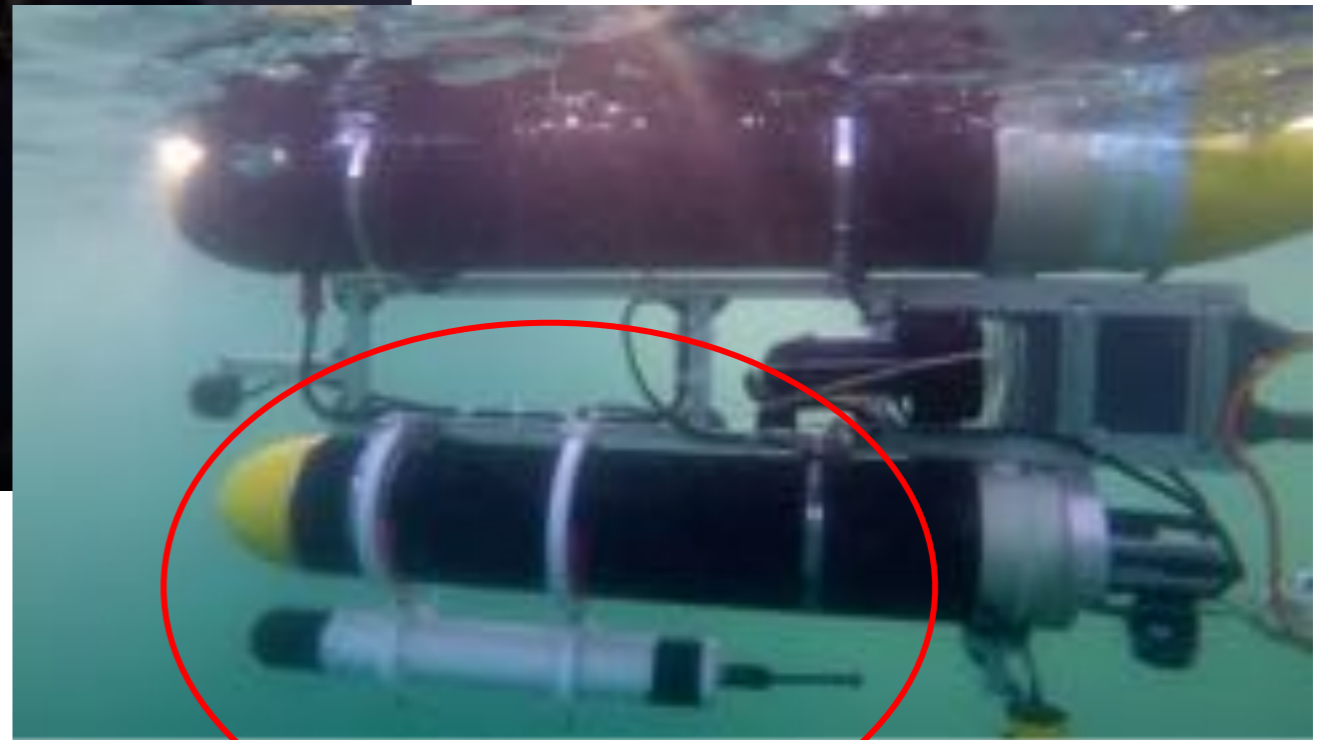
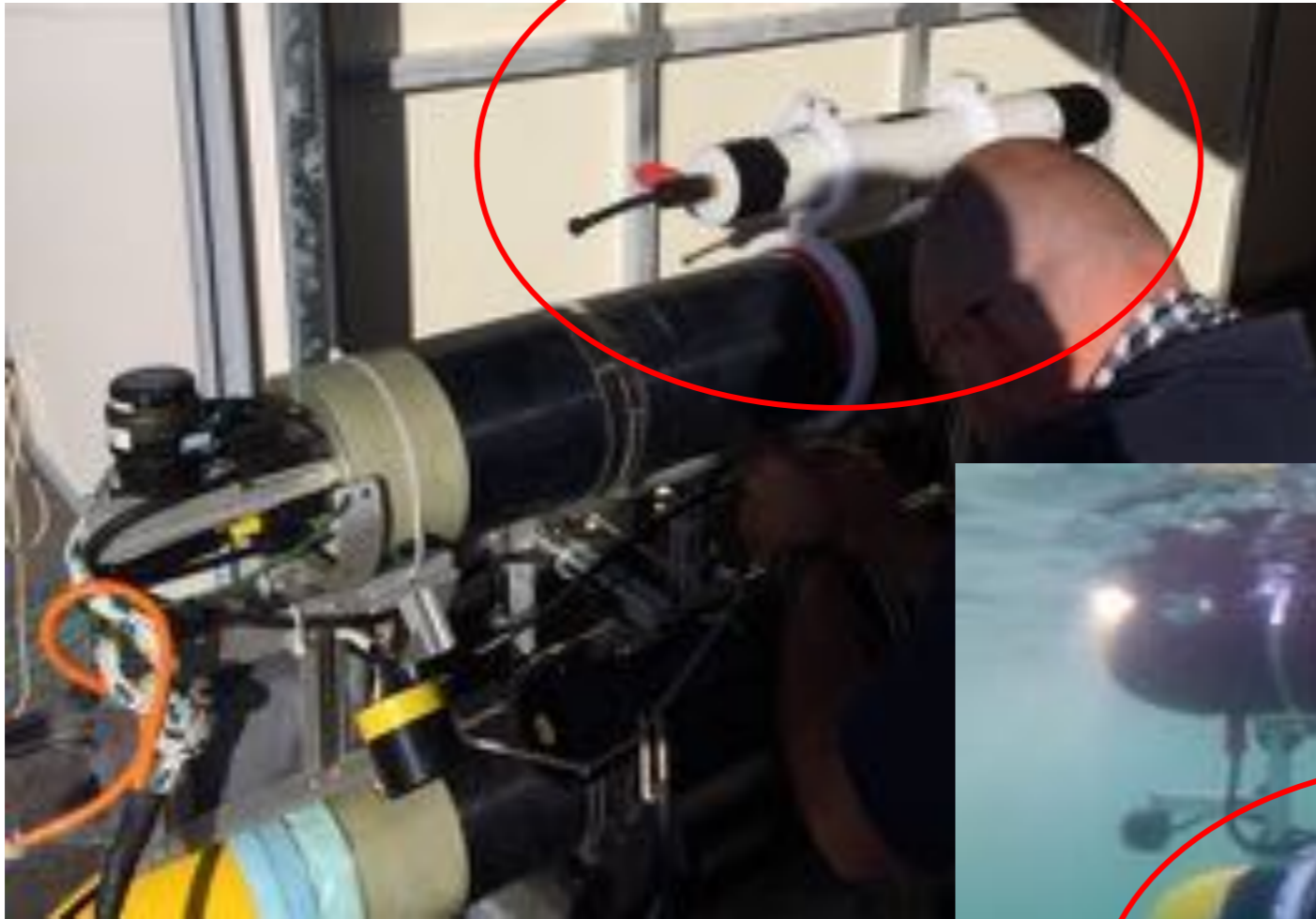
Mechatronic Integration

DAVS integration on MEDUSA vehicle
- 1st preliminary approach for
validation and vehicle self-noise assessment

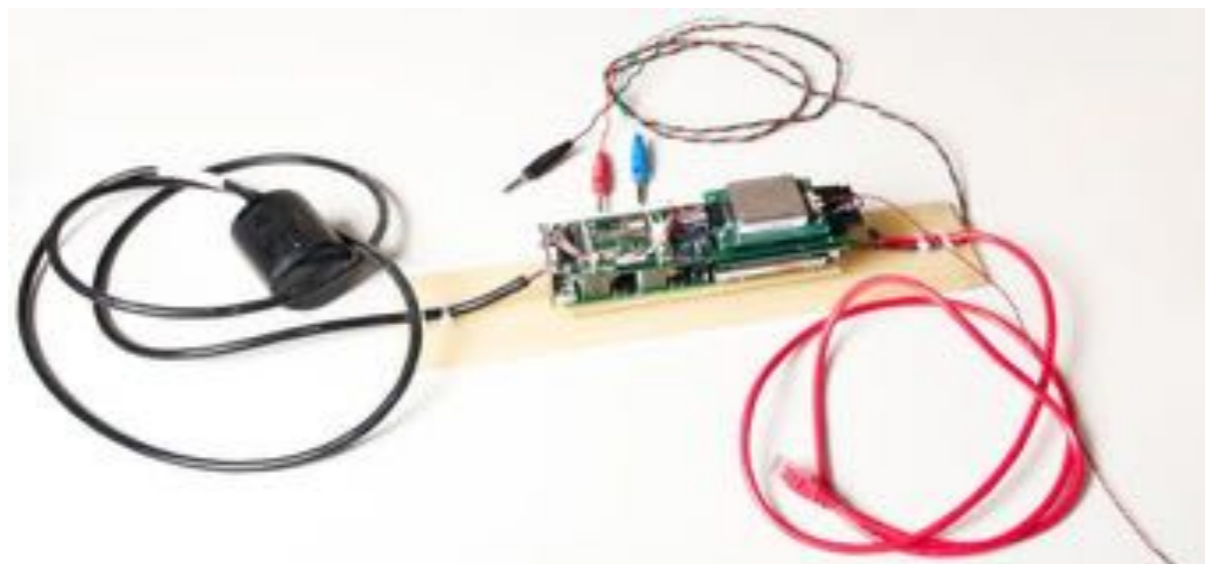


Mechatronic Integration

DAVS integration on MEDUSA vehicle
- final arrangement in Sines, PT



Modems integration



a)



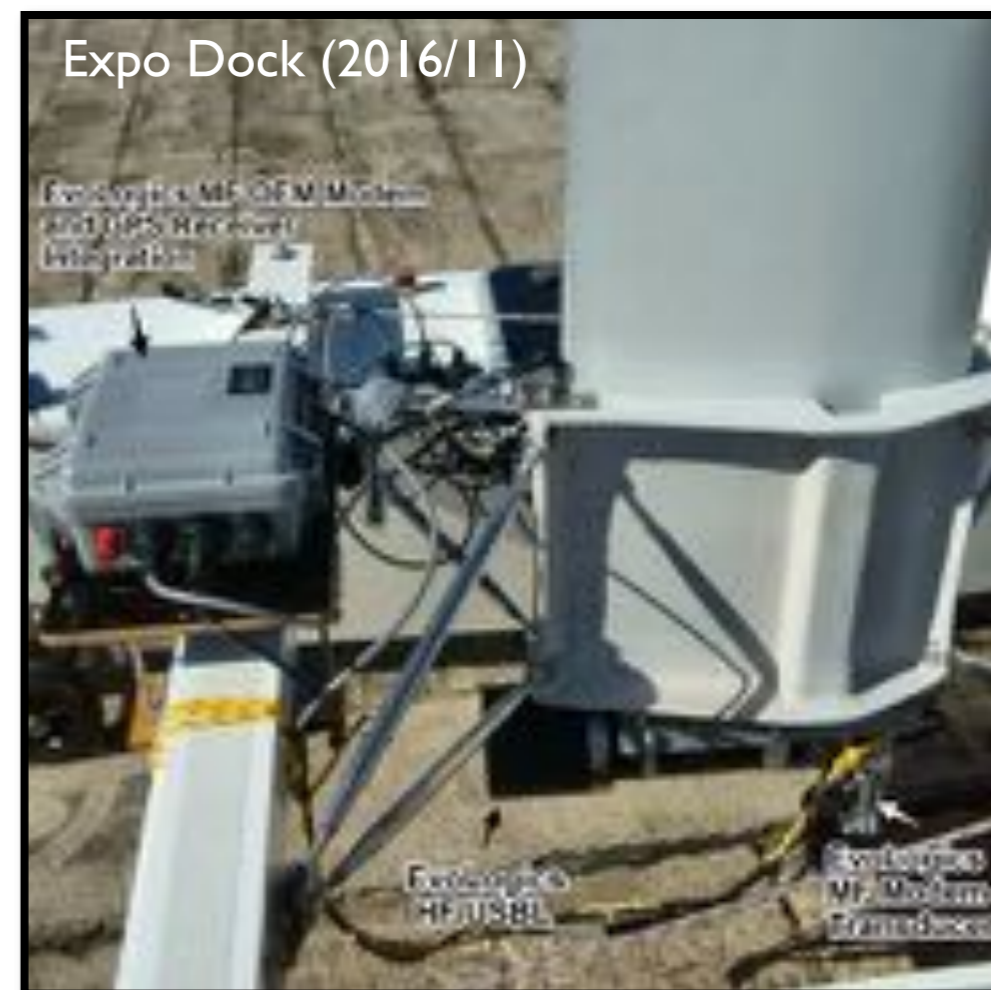
b)

Fig. 27. Modem electronics S2CM18/34OEM in M20: a) modem photo after re-design, all components including atomic clock SCAC SA.4s, b) placement of the atomic clock on the modem electronics



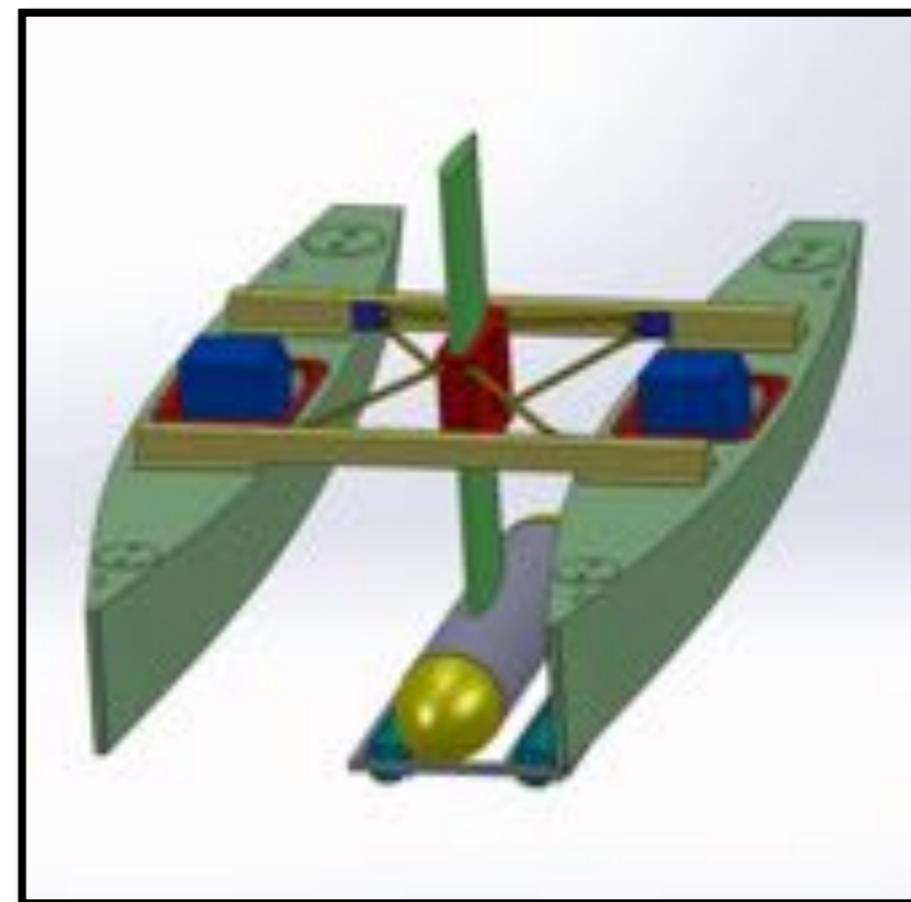
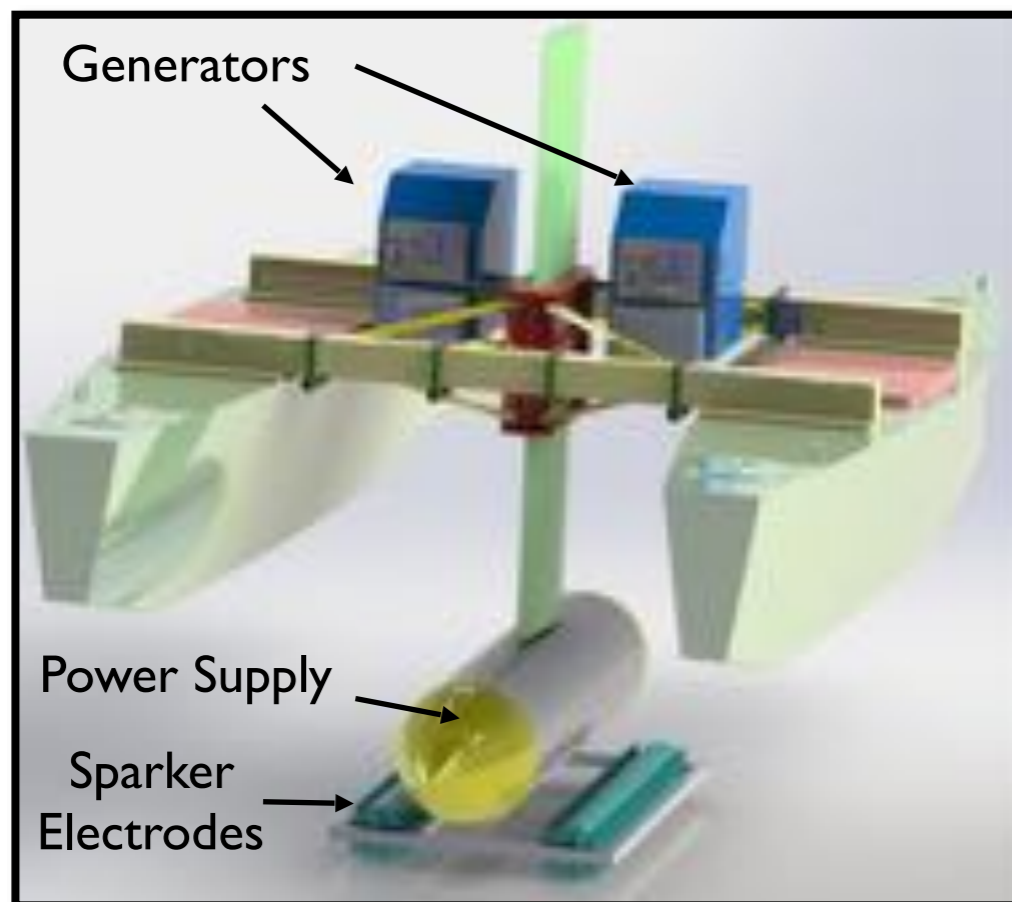
DELFIN Catamaran (IST-ID): EL Acoustic Modems Integration on board DELFIN Catamaran

- **IST-ID DELFIN Catamaran** equipped with EL modems:
 - Medium-Frequency OEM
 - High-Frequency USBL
- Both modems mechanically attached to the lower end of the keel (vertical wing), providing:
 - georeferenced range measurements (MF with atomic clock and PPS signal from a dedicated GPS receiver)
 - absolute positioning of underwater assets



DELFIN Catamaran (IST-ID): GEO Power Supply and Sparker Integration On Board DELFIN

- Multiple integration solutions are being studied in CAD environment
- GEO Sparker Power Supply demands a considerable amount of power... two gasoline 2 kW generators running in parallel already demonstrated to be a good solution





Sines,
November
2016





Sines, November 2016 Video



<http://www.wimust.eu>

Thank you!

