Autonomous profiler platform in coastal waters (EOL)

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MOBILIS

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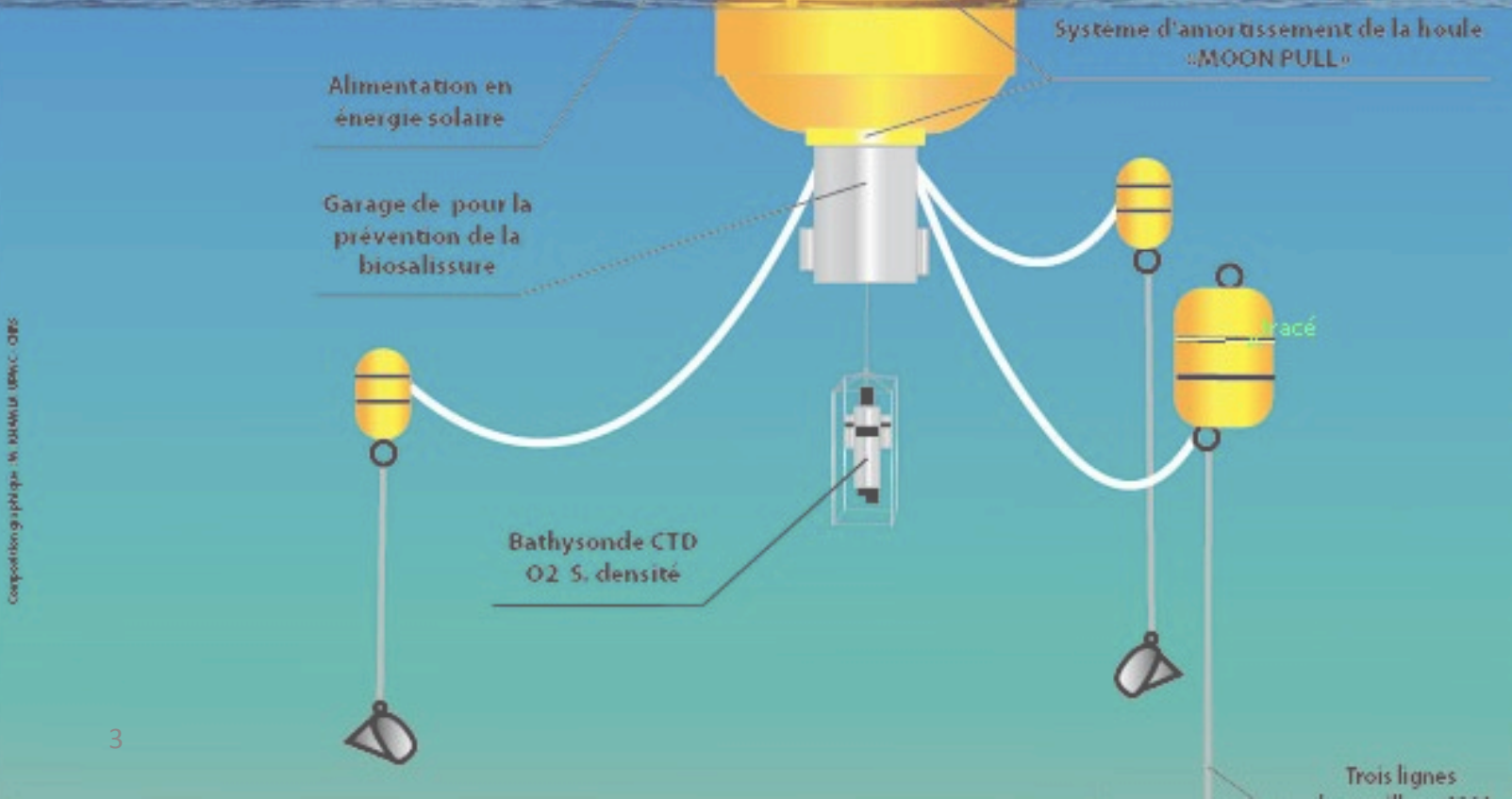
OBSERVATOIRE OCEANOLOGIQUE • VILLEFRANCHE/MER •

Objectives:

- Detect in near real-time change in the water column (stratification, bloom, nitracline,…): need high frequency measurements and autonomous system
- Need to observe the vertical resolution in the Mediterranean Sea: mixing vs stratification
- Need to acquire ocean-atmosphere measurements at the same site: radiation, heat budget, precipitation, dust impact
- Autonomous surface platform: energy and anti-biofouling techniques
- Data transmission in a database available for scientists and policy markers

EOL innovations:

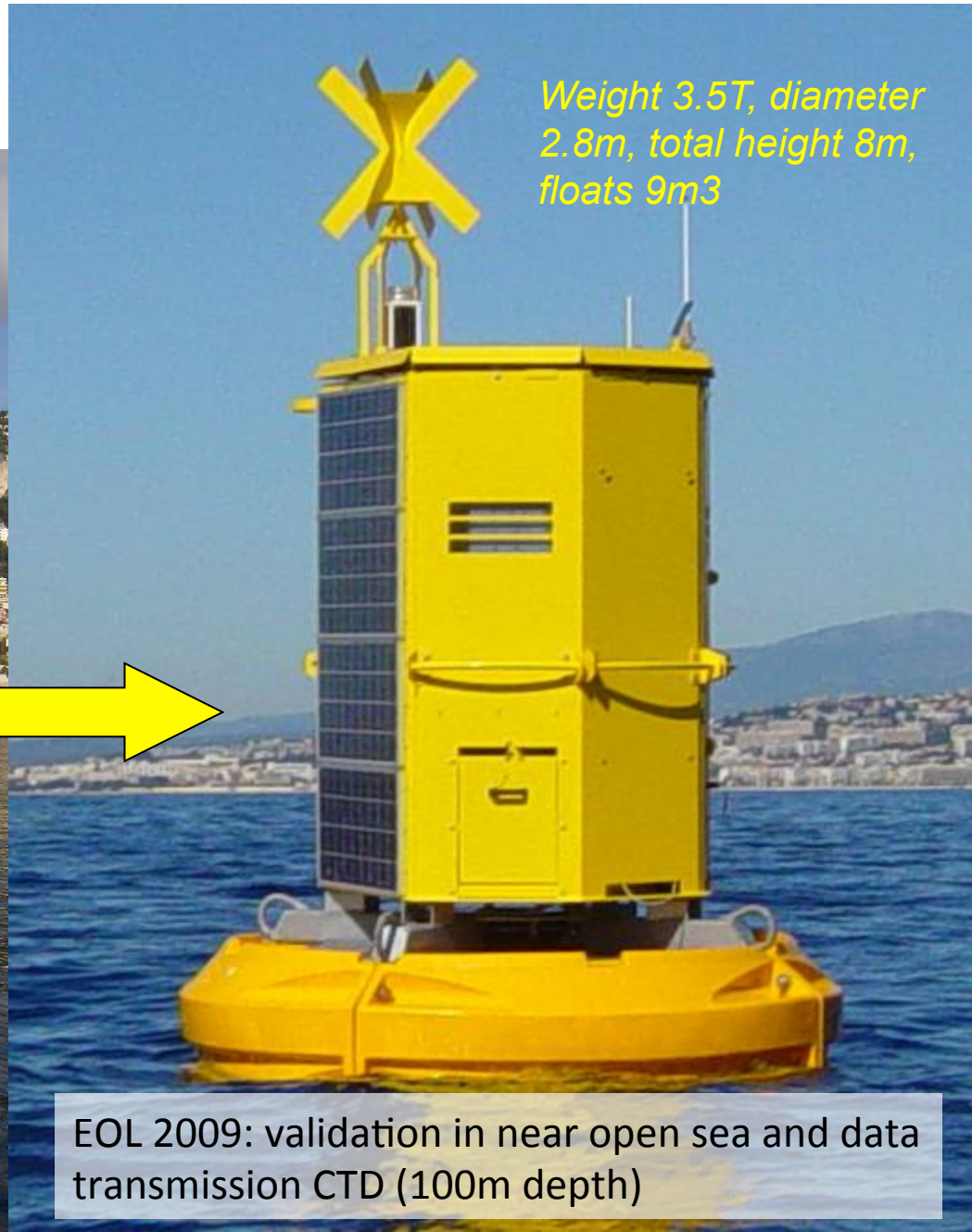
- First autonomous profiler from 0 to 100m depth
- Anti-biofouling system: chlorination by electrolysis
- Technical validation (4 yrs): buoyancy, winch, energy, software
- Data transmission by wifi and GSM



First prototype (LEO) in coastal waters from 2004 to 2008

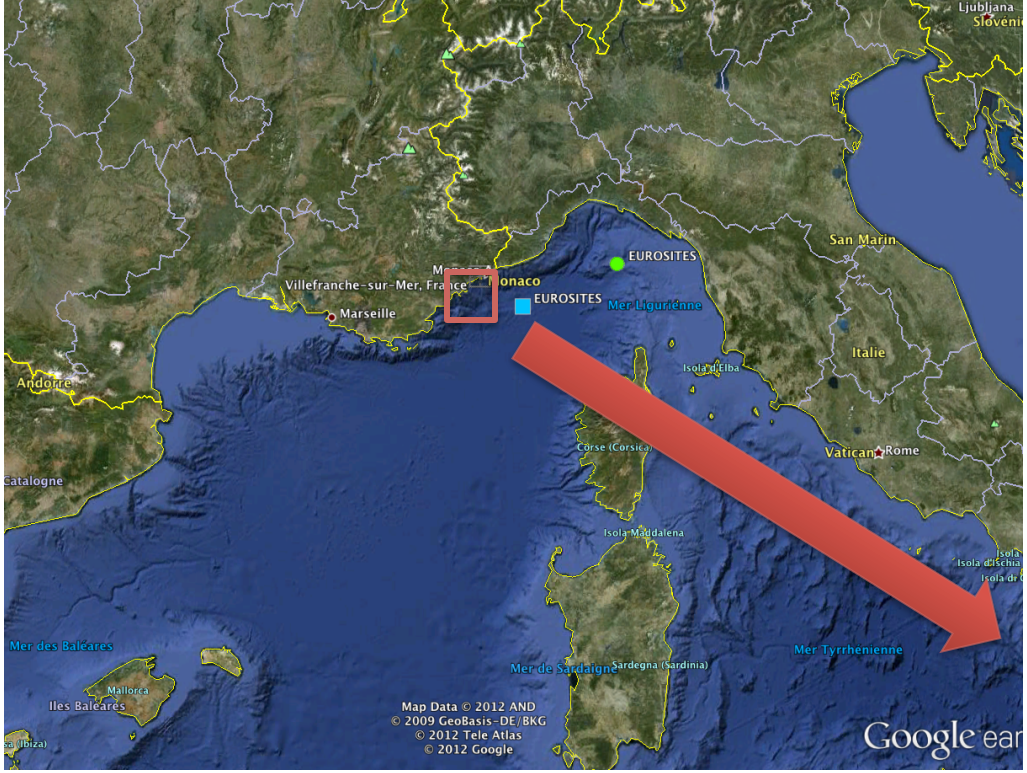
Pictures with same scale

LEO 2004-2008: technical validation (30m depth)



Weight 3.5T, diameter 2.8m, total height 8m, floats 9m3

EOL 2009: validation in near open sea and data transmission CTD (100m depth)


Ljubljana
San Marin
EUROSITES
Villefranche-sur-Mer, France
EUROSITES
Mer Ligurienne
Marseille
Italie
Andorre
Isola d'Elba
Corse (Corsica)
Vatican
Rome
Catalogne
Isola Maddalena
Mer des Baléares
Mer de Sardaigne
Sardegna (Sardinia)
Mer Tyrrhenienne
Mallorca
Iles Baléares
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Beaulieu-sur-Mer
anche-sur-Mer, France
Villefranche-sur-Mer
Rade de Beauli
LEO
2004-2008
Saint-Jean-Cap-Ferrat
EOL
2009-
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Les acquis de LEO pour EOL:

1. La capacité en énergie: 4 panneaux de 80w (320W)

Tension et intensité nominale 69.2V/4.6A
Consommation ensemble treuil, tarom, chloration, GSM = 40Wh/j
Consommation PC avec µP 90.7Wh/j TOTAL = 130 Wh/j
Marge de sécurité x2 TOTAL = 260Wh/j
Ensoleillement optimal NICE Décembre 60° 1.12kwh/m2/j
Puissance crête 260/(1.12x0.8)= **290WC** (0.8 coef sécu salissure)

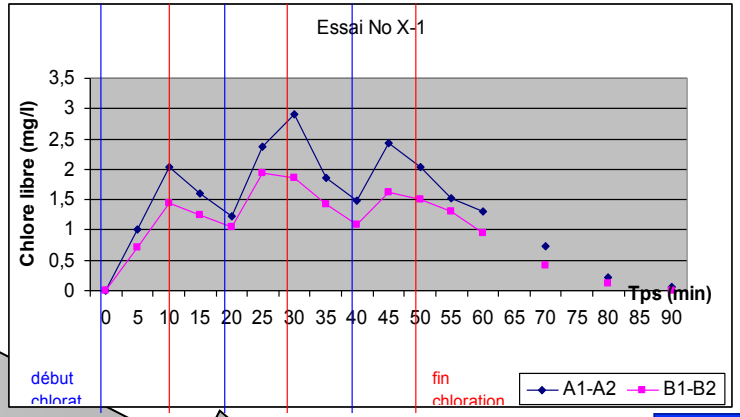
6 jours d'autonomie sans recharge d'énergie !

Conception de l'idée, test en labo

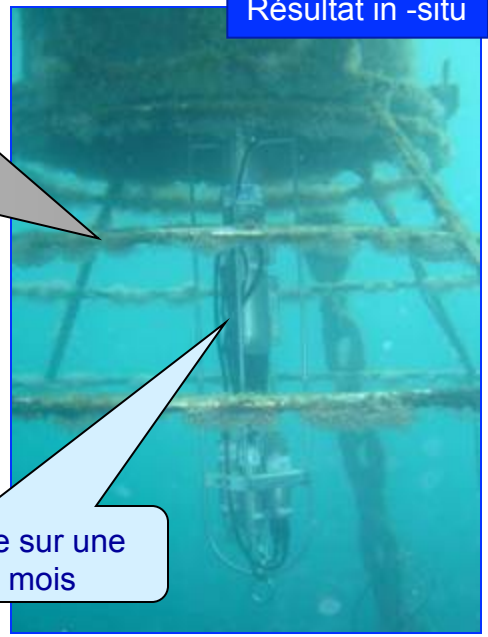
électrochlorateur

Fabrication et test in-situ 12 mois

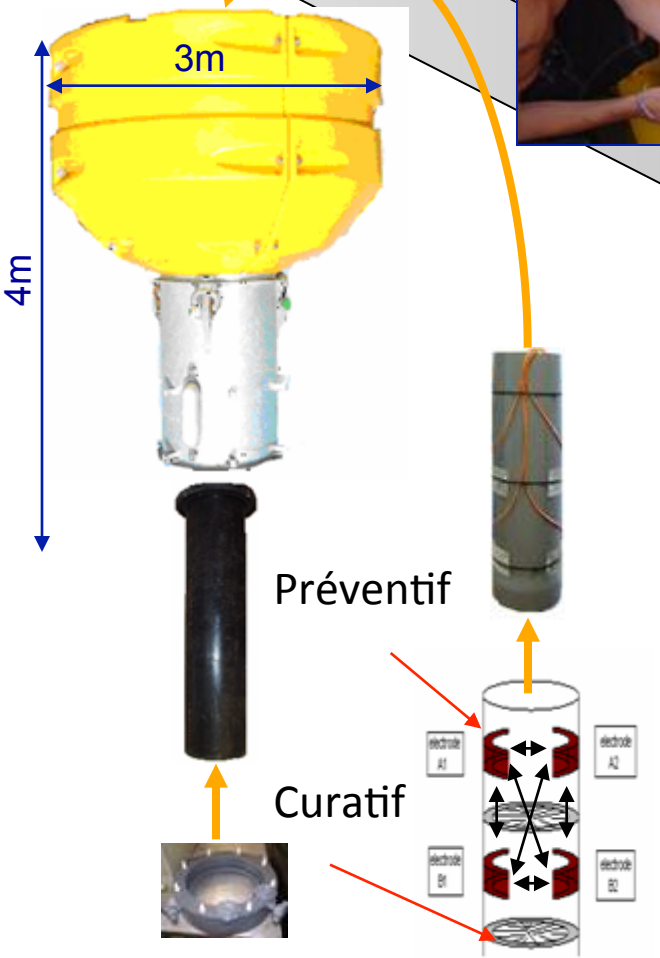
validation des fréquences et intensités



Résultat in -situ



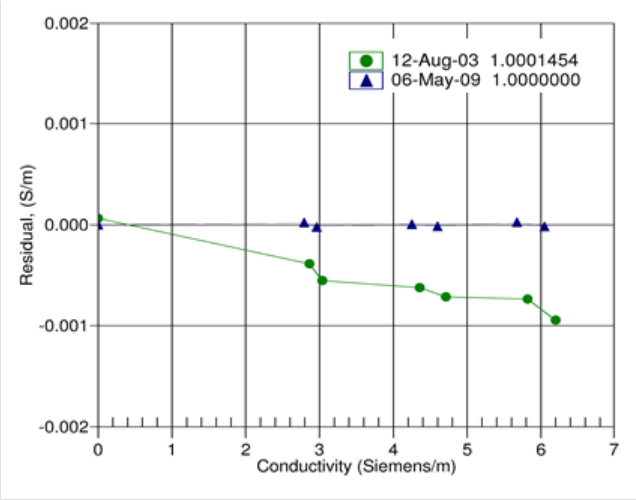
Capteurs propre sur une durée de 13 mois

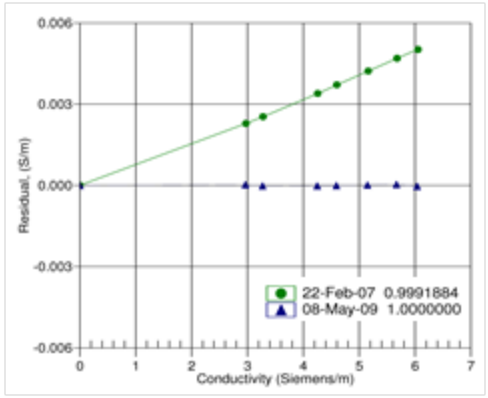


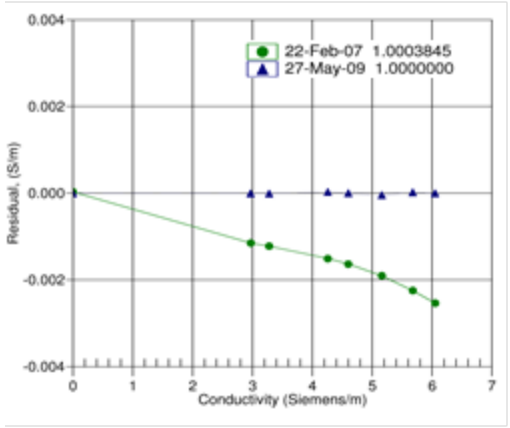
Electrolysis chlorination

Validation of the system during 4 years in waters (eg. conductivity sensor)

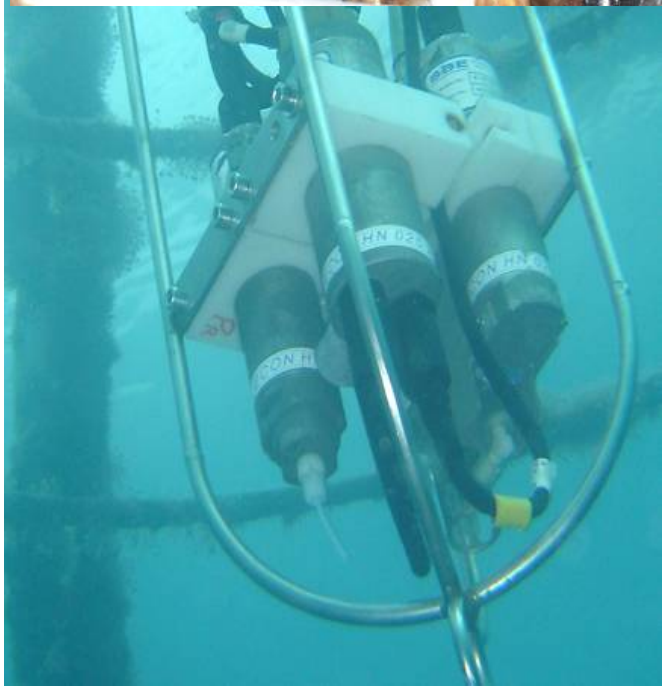
Post calibration for EOL sensor (slope 1.0001454)



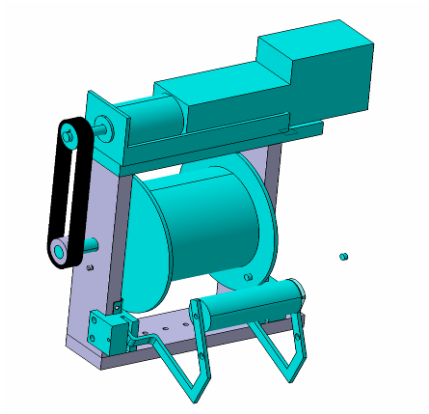


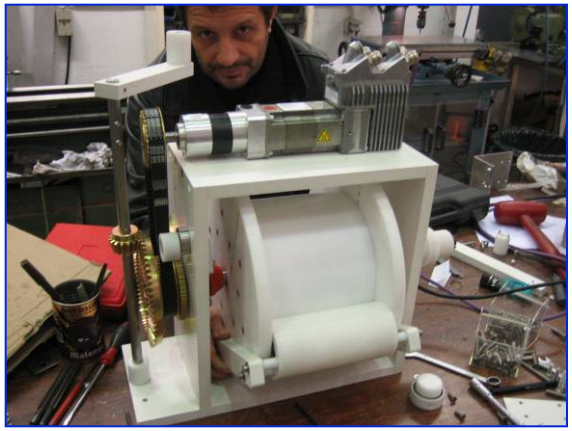


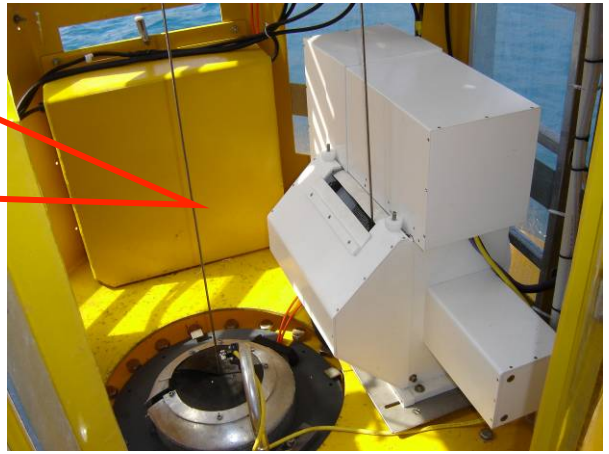
Post calibration in open sea without chlorination after one year (slope 1.0003845)



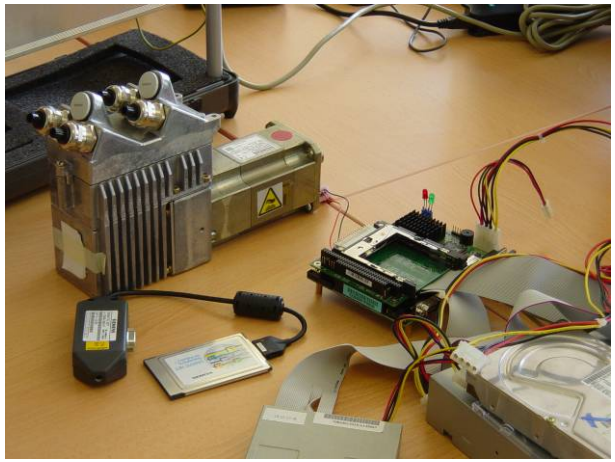
3. La fiabilité du treuil:

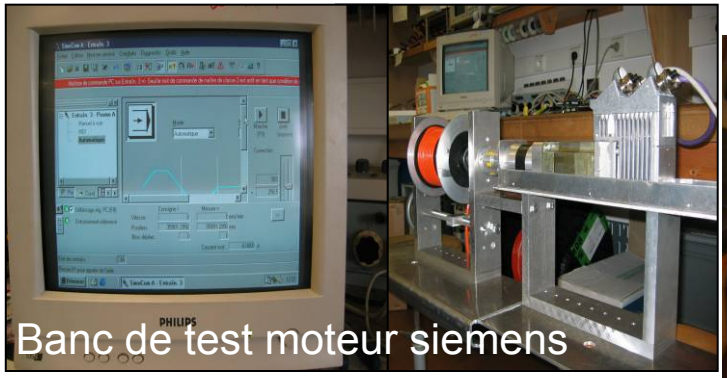




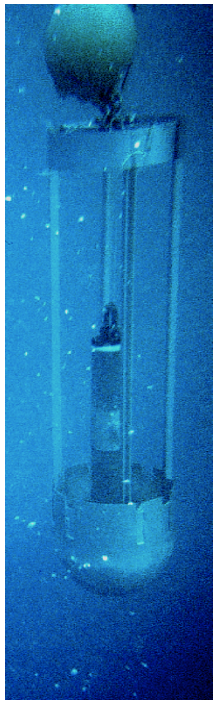


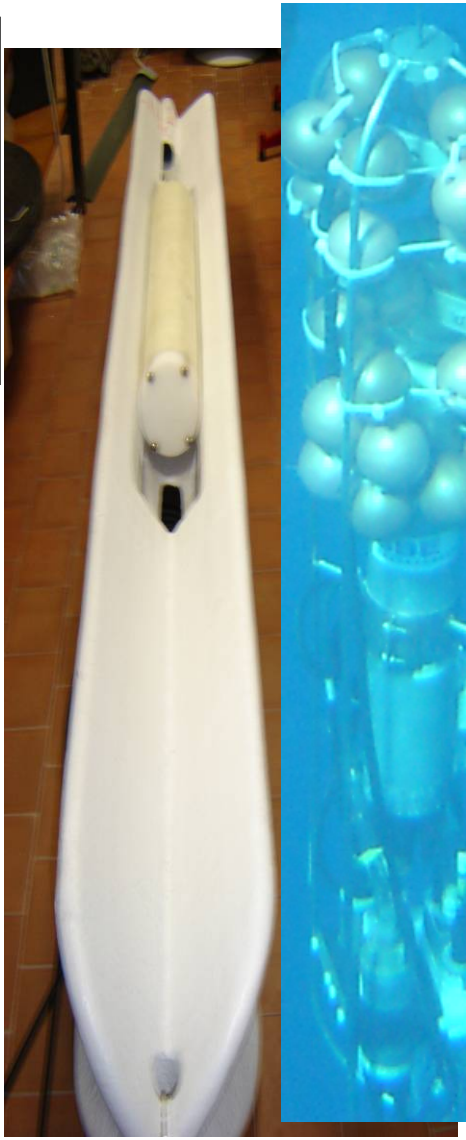
4. La fiabilité du moteur et du soft de commande:





Banc de test moteur siemens

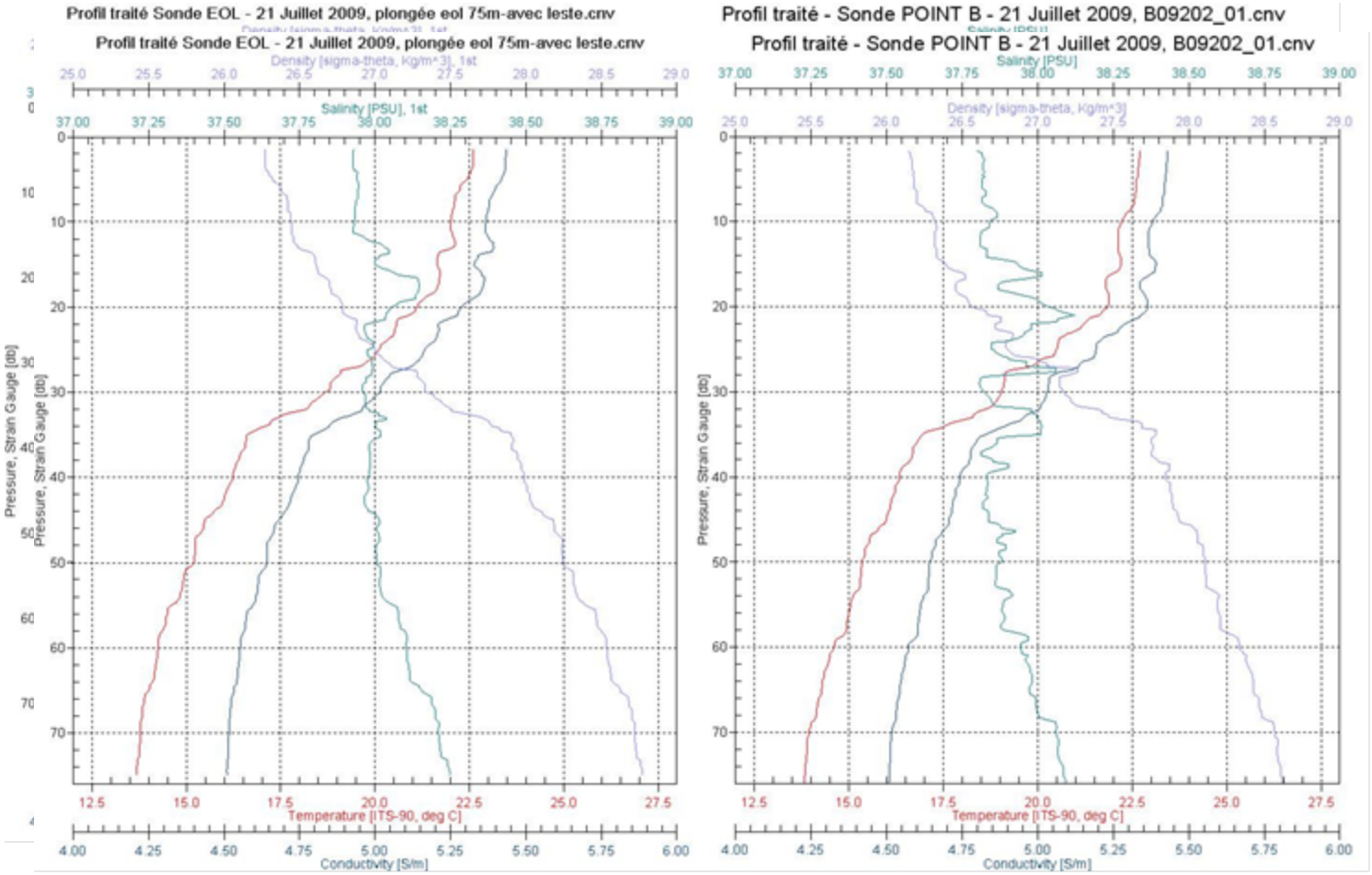




Validation of the buoyancy (eg. storm in May 2010)

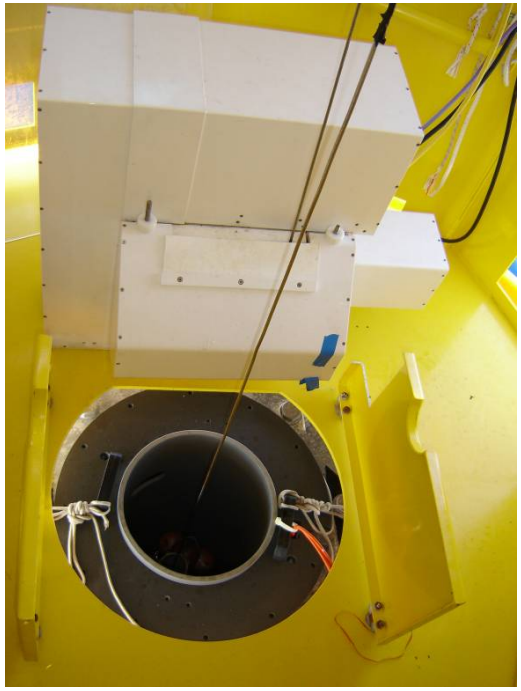
Validation of the T-S profiles (on going…)

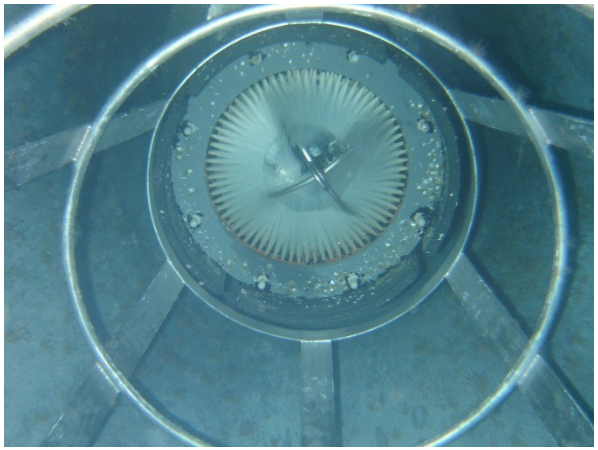
Comparison between CTD profiles from EOL and ship based measurements (sensor SBE19+)



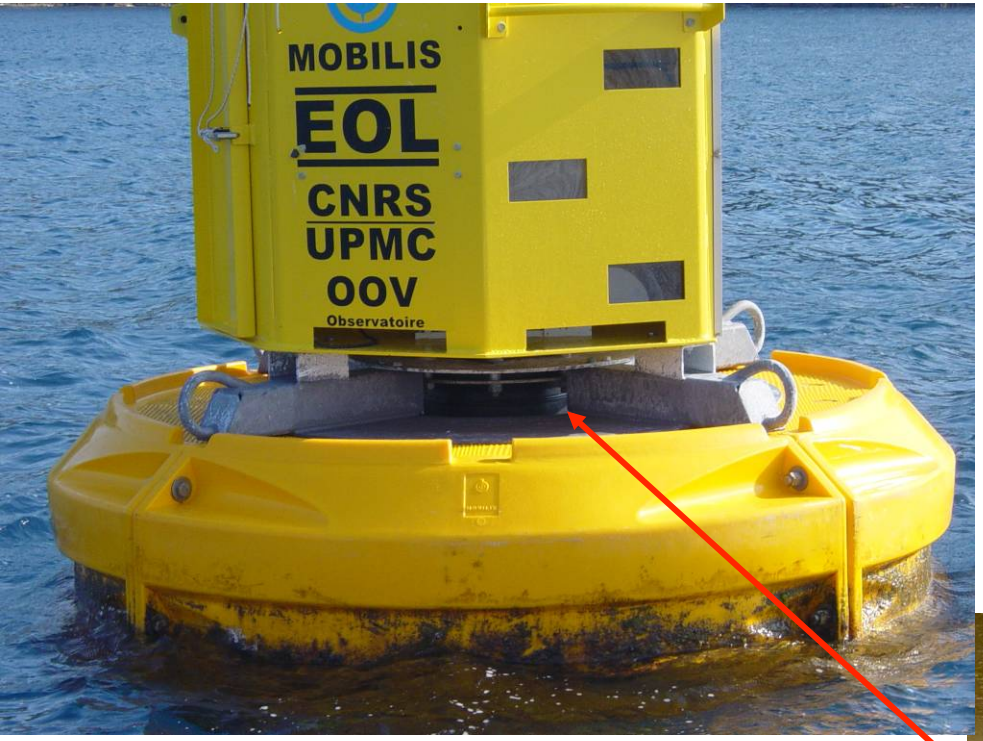
EOL since April 2009:

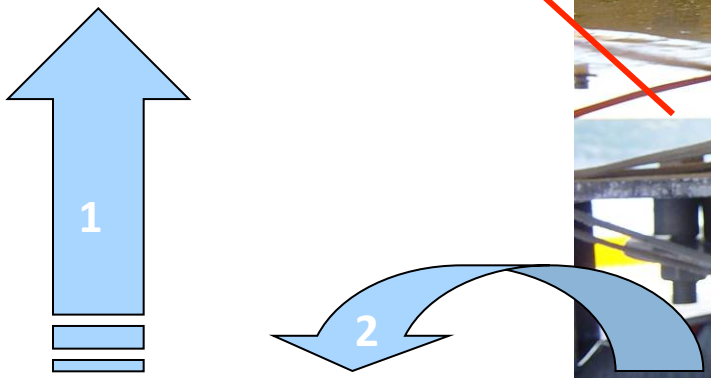
- Increase buoyancy
- Increase ventilation
- Increase the size of the cabin





Wave absorber on EOL buoy





Ventilation to control the air inside the cabin (protect electronic)