



COMMON SENSE

MARINE SENSORS - MARINE MONITORING

HEAVY METALS SENSOR

DropSens (www.dropsens.com)

FINAL DISSEMINATION EVENT

BARCELONA, 27 – JANUARY - 2017

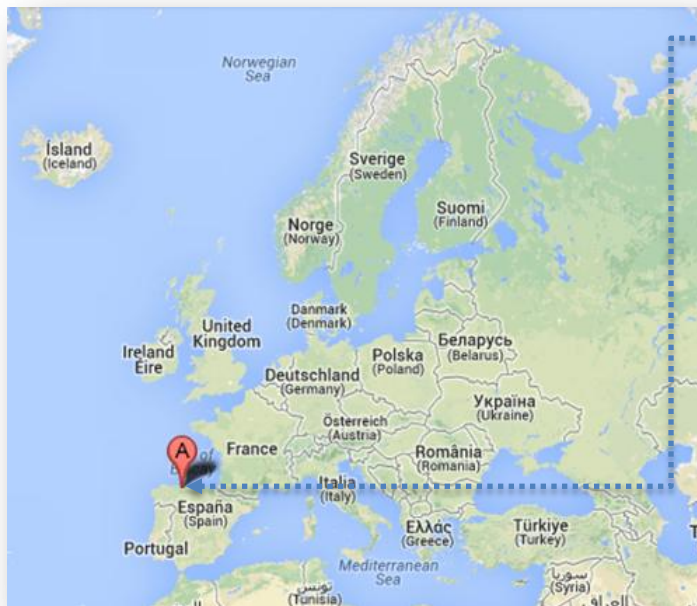




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DropSens



www.dropsens.com

Asturias (SPAIN)



This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 614155.

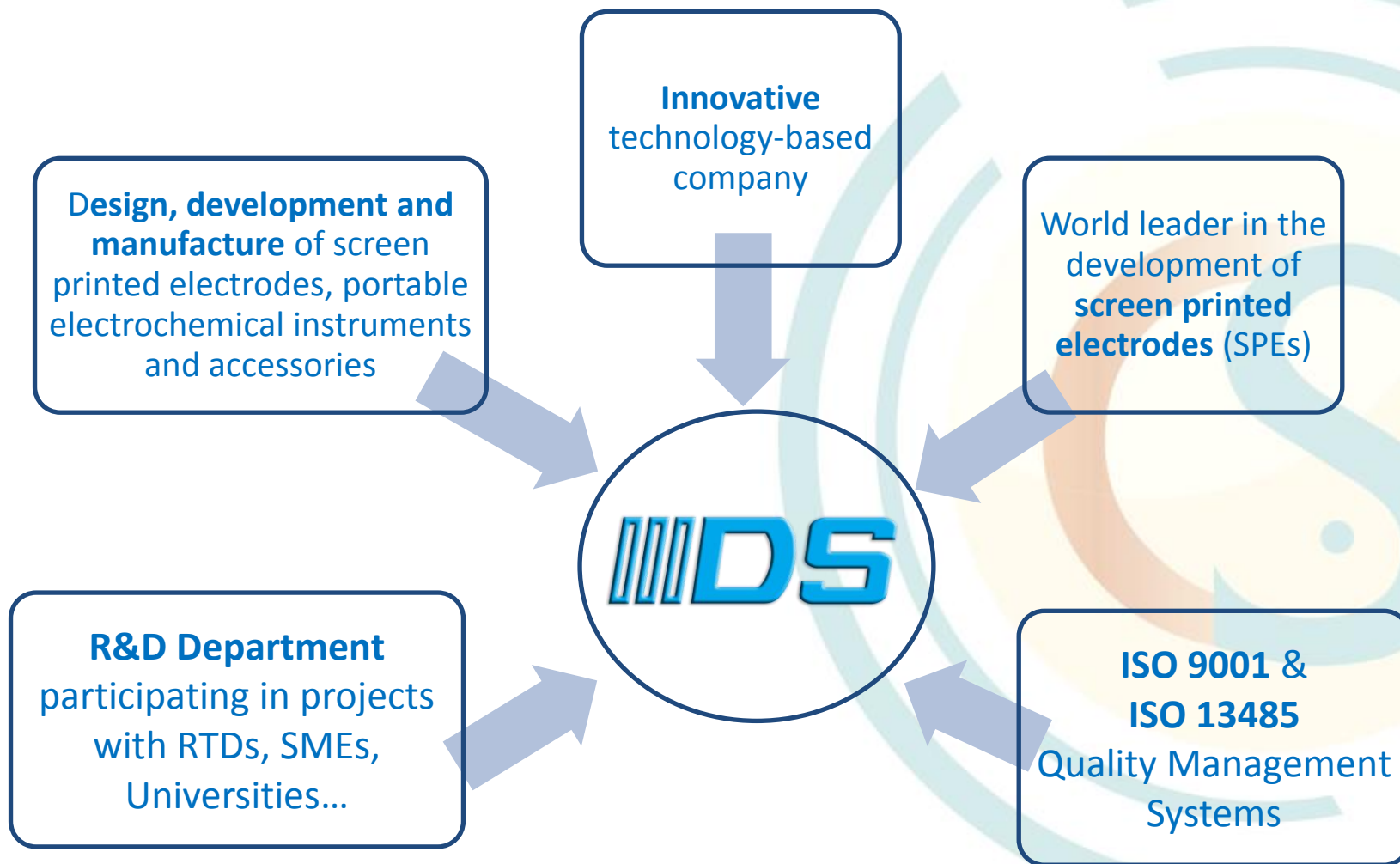
www.commonsenseproject.eu



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DropSens info



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Research, development, manufacture and commercialisation of instruments and devices for chemical analysis

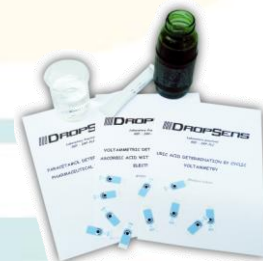
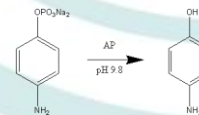
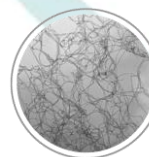
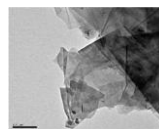
Screen-printed electrodes and portable potentiostats



Spectroelectrochemistry and Electrochemiluminescence Instruments



Accessories for SPEs, IDEs, nanomaterials, electrochemistry reagents and lab kits



- Role on Common Sense project:

Sensor for in situ monitoring of heavy metals:

To develop a sensor module for the automatic detection of low concentrations of heavy metals in seawater, which can be integrated with other sensors developed in the project.



Traditional methods for heavy metals detection



Atomic absorption



Inductive coupled plasma – mass spectrometry


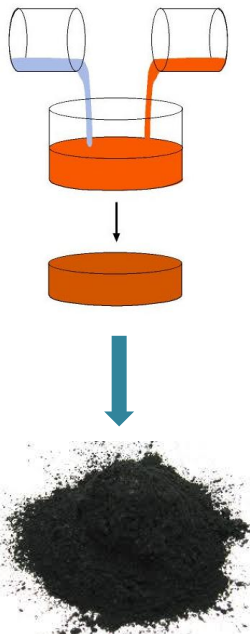


- ✓ *Allow detection of heavy metals at trace levels (ppb)*
- ✓ *High sensitivity*
- ✓ *Specificity*
- ✓ *Very reproducible*
- ✗ *Remain in the laboratory once installed*
- ✗ *Expensive*
- ✗ *Require trained operators*
- ✗ *Extensive sample preparation*
- ✗ *High power consumptions*


The future...



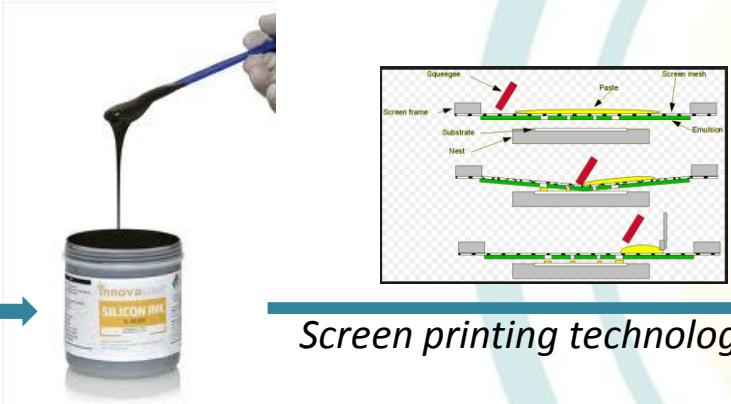
- ✓ *Portable (in-situ analysis of heavy metals)*
- ✓ *Autonomous*
- ✓ *Easy to use*
- ✓ *Cost effective*
- ✓ *Specificity, high reproducibility and sensitivity*

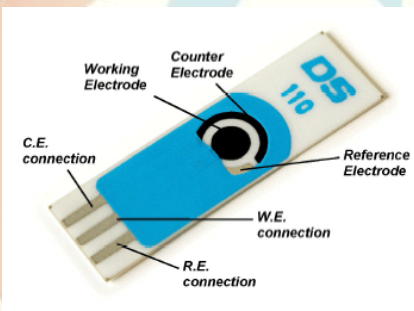
Synthesis & assesment of sensing material



Ink formulation



Screen printed electrode



Screen printing technology

2.5 cm

“Screen-printed electrodes for environmental monitoring of heavy metal ions: a review” Microchim Acta (2016) 183:503-517

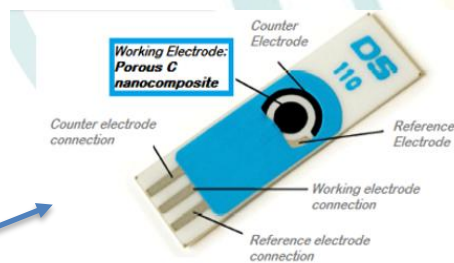
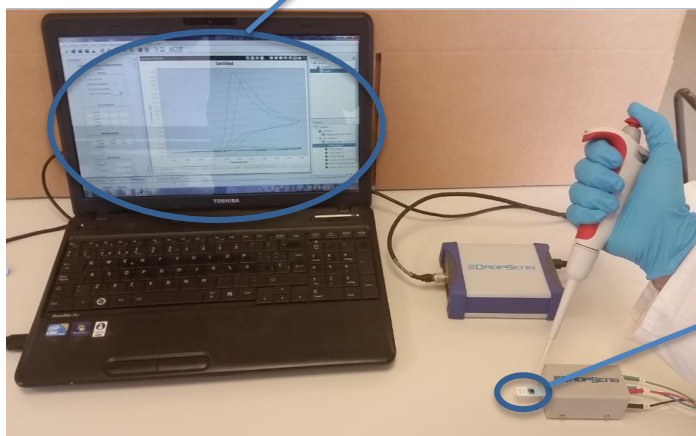
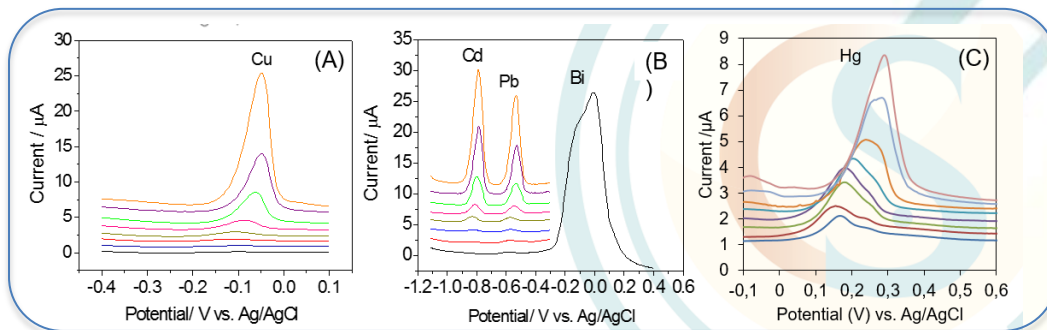
(Partners involved: DropSens, DCU, CNR, UCC)

“Screen-printed electrodes made of a bismuth nanoparticle porous carbon nanocomposite applied to the determination of heavy metal ions”

Microchim Acta (2016) 183:617–623 (Partners involved: NAPCOM-CSIC, IMB-CSIC, DropSens)



CSIC Laboratory development of an analytical method for the detection of heavy metals in seawater samples



Reference standards and artificial marine samples for validation purpose

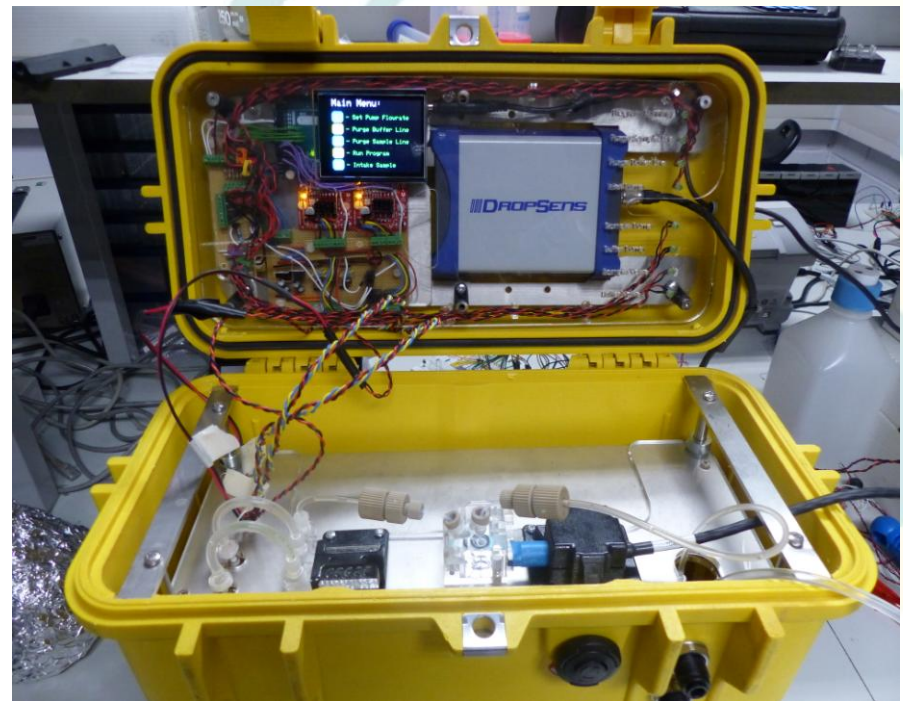


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Technical contribution



Heavy metals prototype development



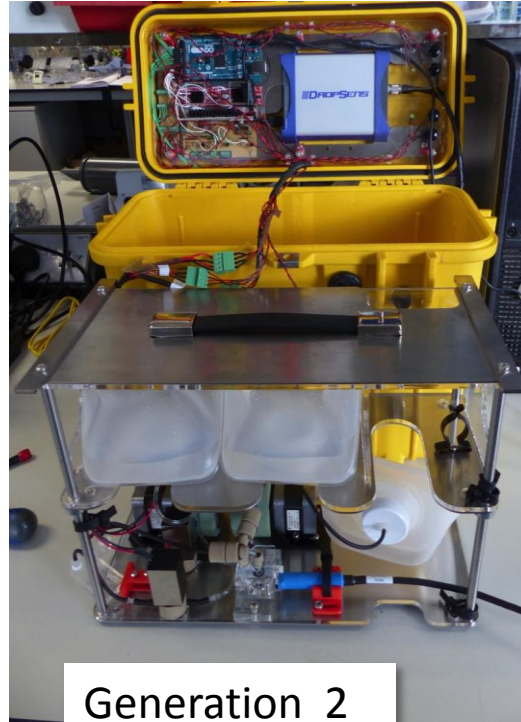
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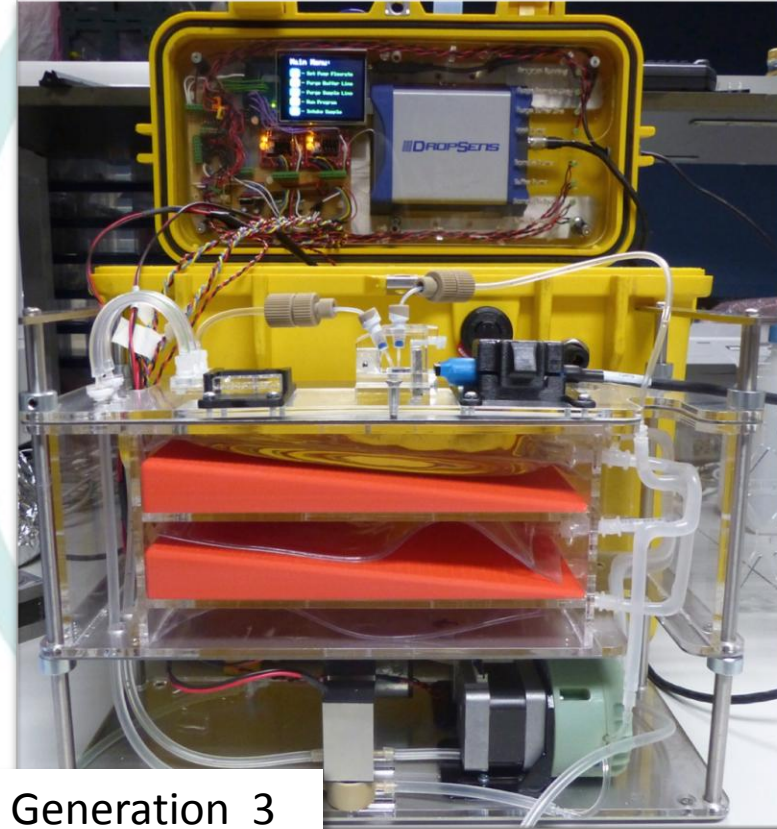
Generation 1

Tested on-board Minerva Uno
Ichunussa cruise

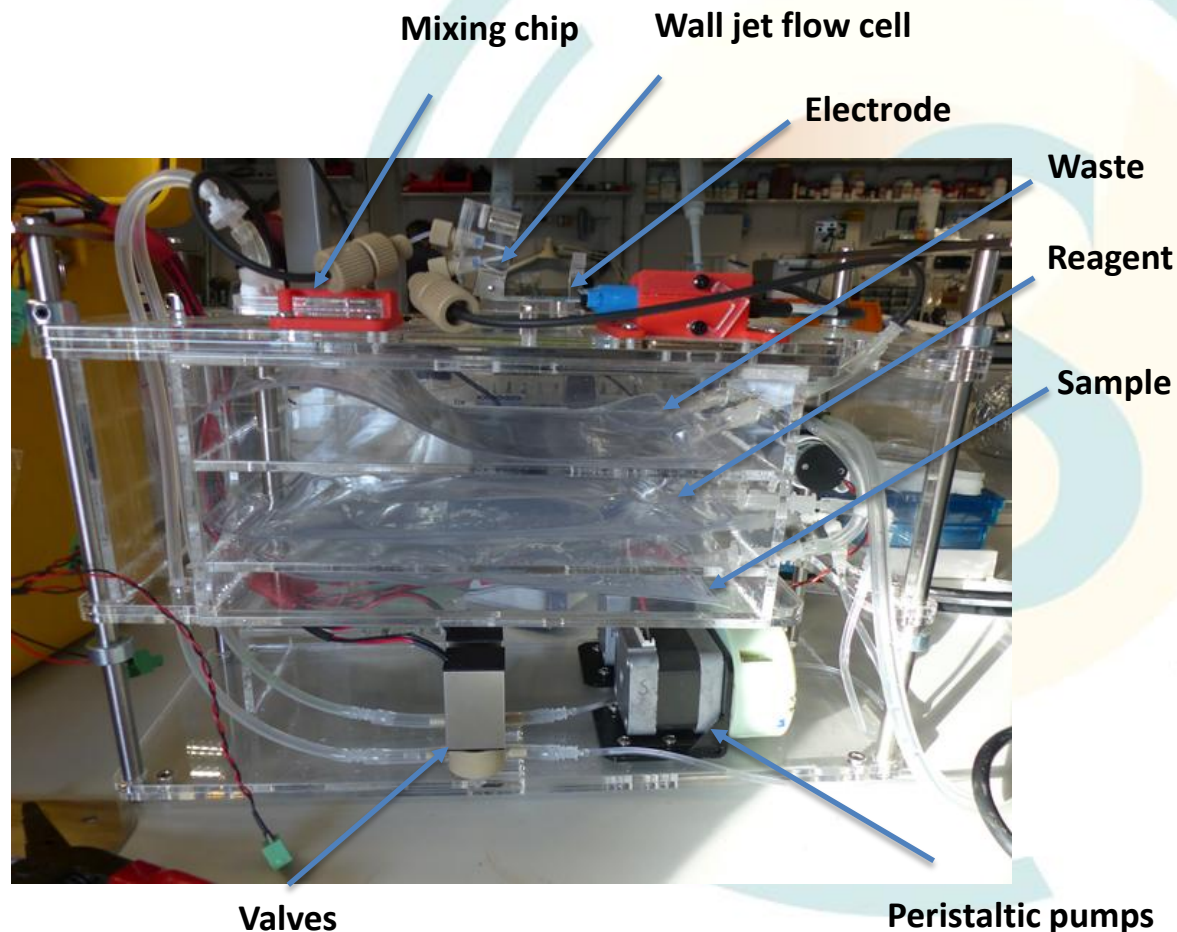
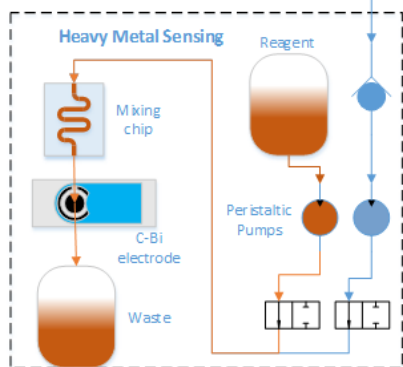
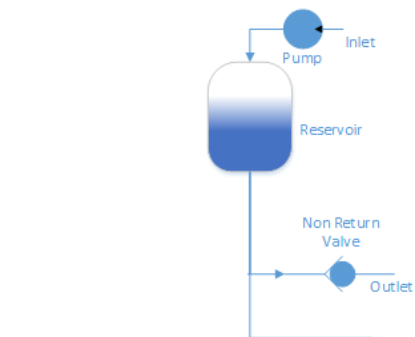
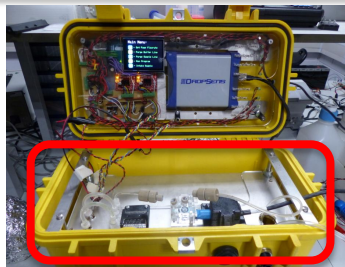


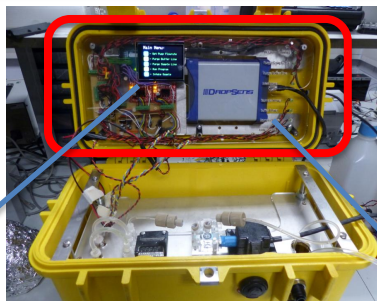
Generation 2

Validation and Testing
February and April 2016
DropSense DCU ICNAB



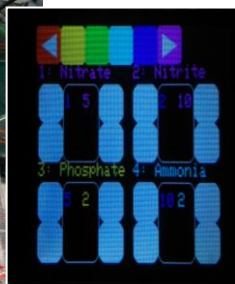
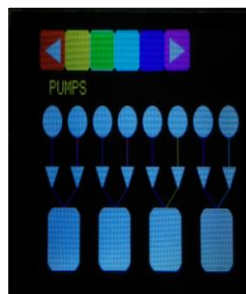
Generation 3



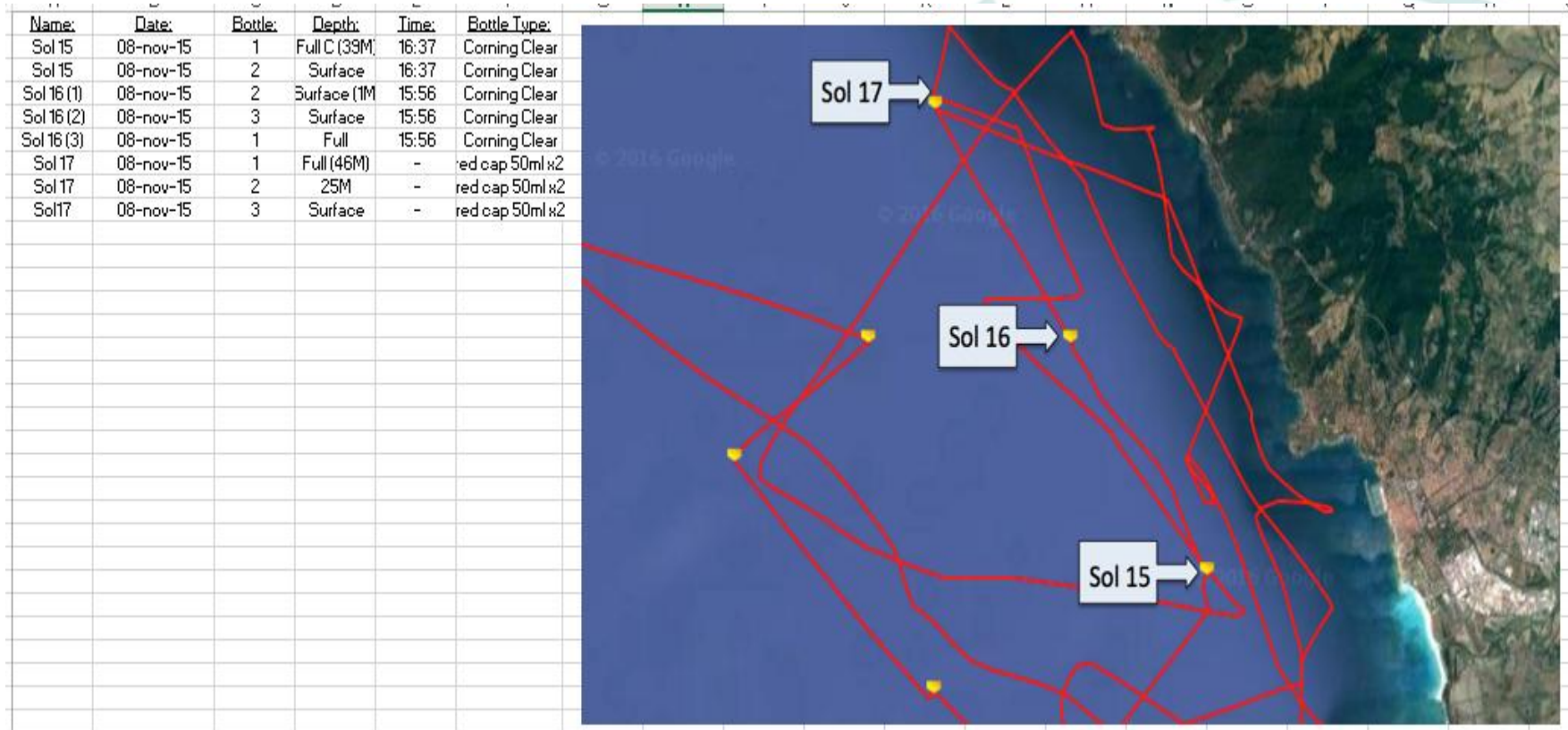


LCD screen to control flow

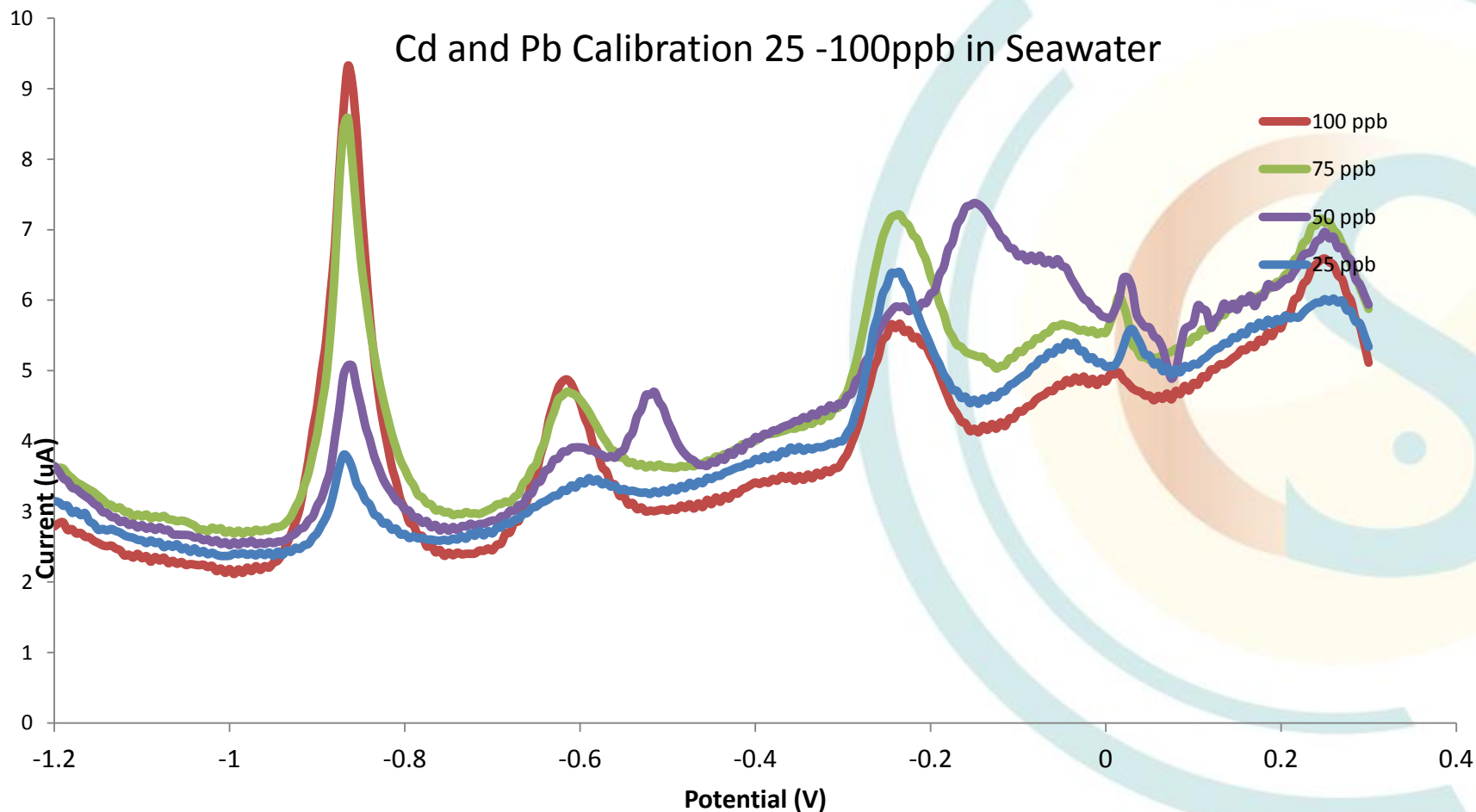
Potentiostat: instrument used to perform the experiments





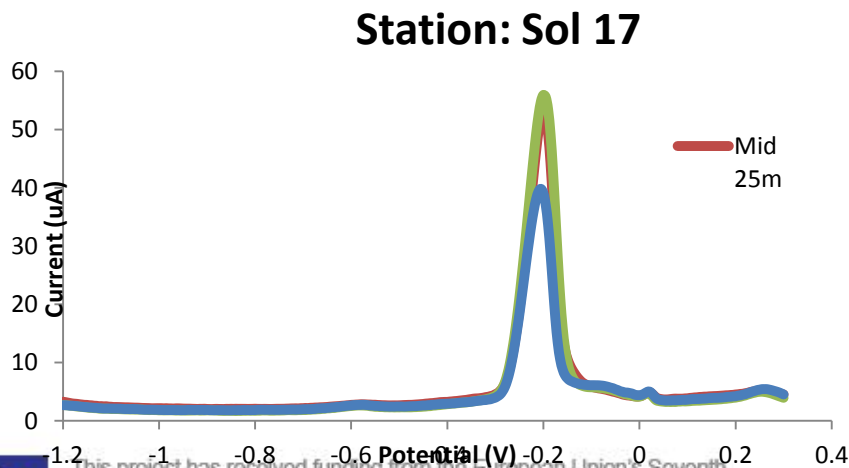
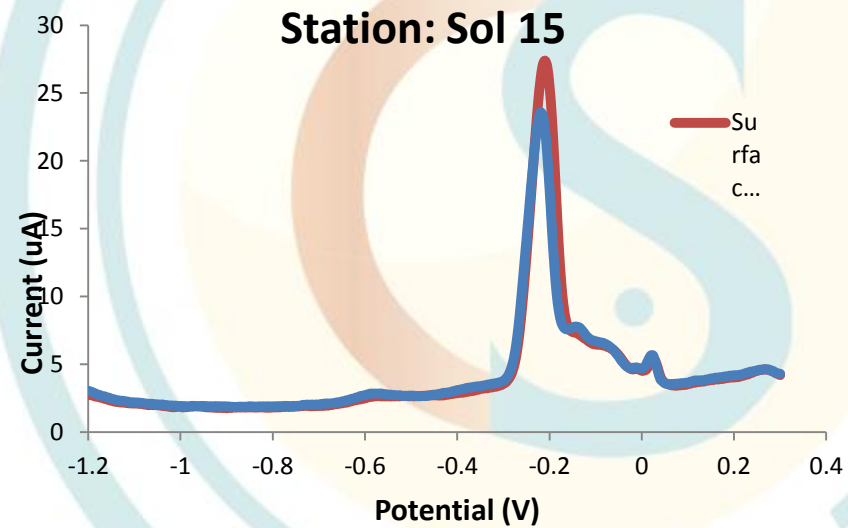
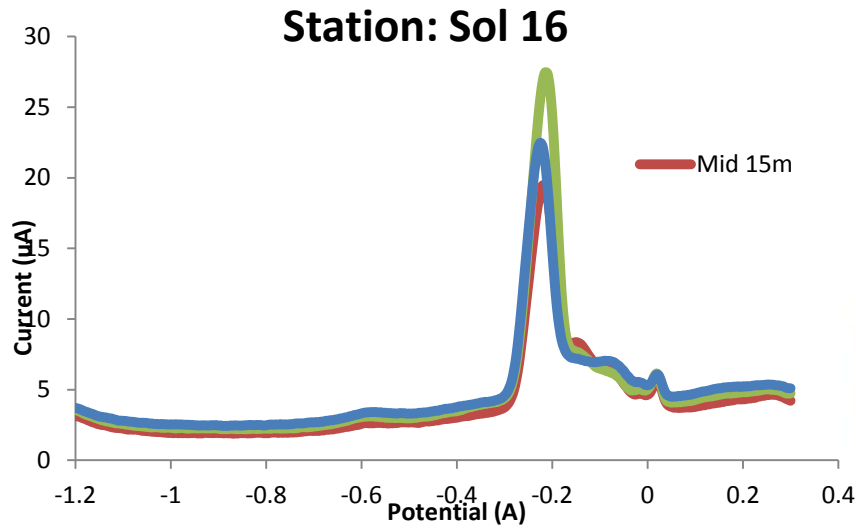


Cd and Pb Calibration 25 -100ppb in Seawater





Deployments





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Heavy metals team



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TRL 6

Further validation will allow the system to be deployed autonomously for longer periods and for simultaneous determination of more heavy metals.





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Thank you for your Attention

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