The MariaBox project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 614088

MariaBox

A fully automated marine water analytical device for prolonged autonomous operation in the field

8th FerryBox Workshop
Color Fantasy 2017
17-19 October

Eftychios Christoforou, CyRIC
e.christoforou@cyric.eu

What is MariaBox ?

- Autonomous, analytical device to monitor chemical & biological pollutants in seawater
- Based on novel, accurate biosensors in the form of a CD
- Installation on free-floating devices, buoys, ships or to be used as a portable instrument
- On a buoy photovoltaics and batteries provide energy autonomy

MariaBox Device

- 6-months unattended deployment
- Dimensions:100×100×55 cm
- Supports open data-sharing through cloud-platform where data are sent automatically
- Facilitates the implementation of MSFD (Marine Strategy Framework Directive)
- Compatible to directives and other systems:
  - INSPIRE
  - Copernicus
  - GOOS
  - SeaDataNet
  - OGC SOS

MariaBox Device

- Data transmission: 4G/3G/GPRS, Satellite connection, Wi-Fi
- Conventional sensors: pH, Temperature, D.O. and Conductivity
- Additional sensors
- Modular/customizable design
- Main parts:

  disc storage/retrieval, sample preparation and automated filtering, disc-spinning, optical analysis, main controller (CORE), cooling/heating and temperature control unit

Biosensors:
The heart of the system

SEVENTH FRAMEWORK PROGRAMME

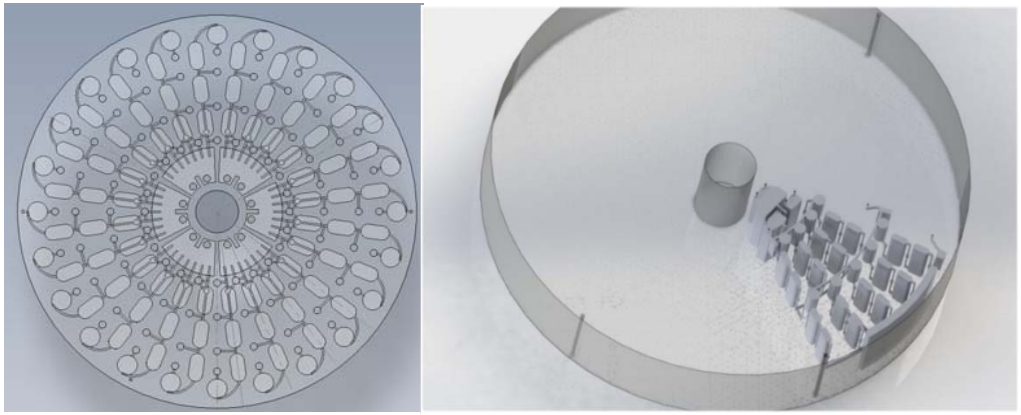
Eight (8) biosensors for 4 categories of man-made chemicals & 4 categories of microalgae toxins

Highly sensitive (meet EC regulations thresholds)

Targetted pollutants:

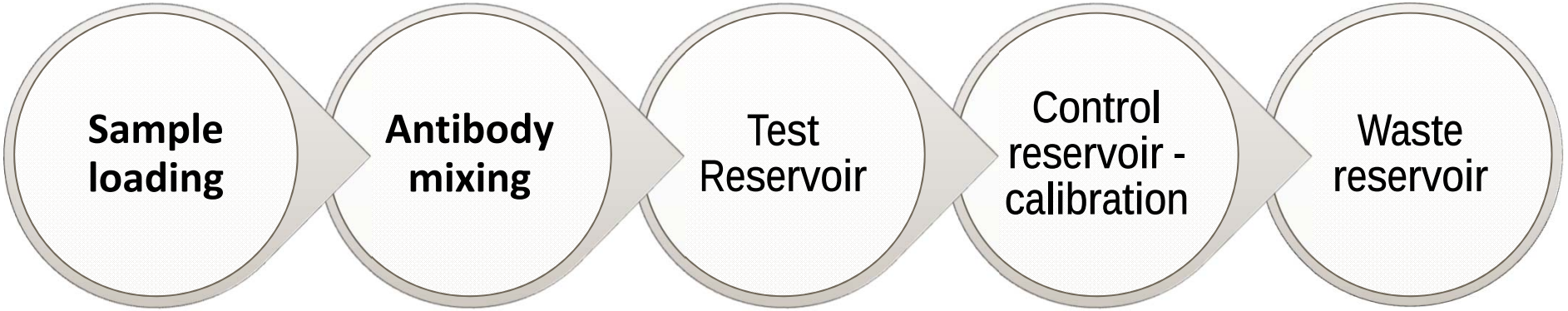
PFOS	Saxitoxin
Naphtalene	Microcystin
Heavy metals	Azaspiracid
Camphechlor	Domoic acid

Biosensors:
The heart of our system



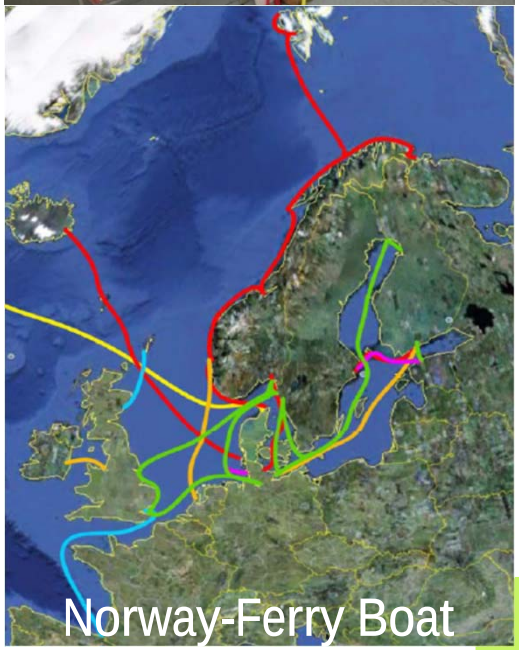
- Designed in the form of CDs (custom design)
- Each CD supports 24 tests: 8 targeted pollutants, 3 tests for each (3-day disc)
- Incubation and reaction only by spinning (microfluidics)
- Fluorescence-based optical analysis

Analysis takes place in 5 steps:

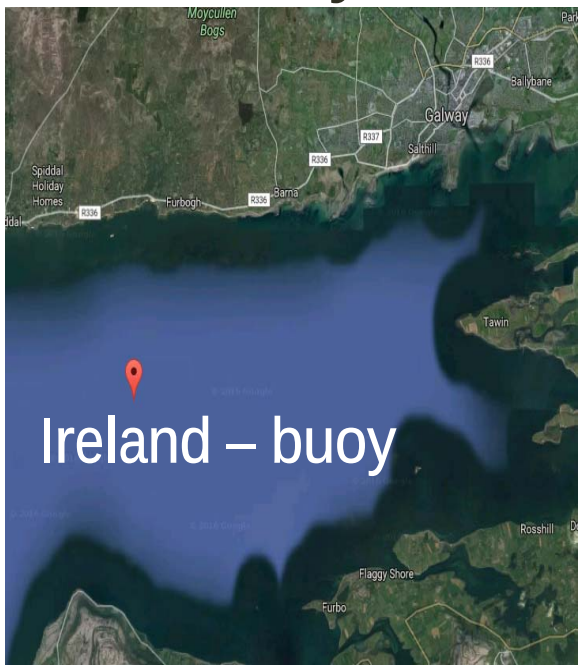


Testing and Validation

On ferryboat



On Buoys




Thank You!