

ERATOSTHENES Centre of
Excellence (ECoE)



ERATOSTHENES:
Excellence Research Centre for Earth Surveillance
& Space-Based Monitoring of the Environment

1st virtual EXCELSIOR International Technical Workshop

15 July 2020

Remote and in situ sensing of water combining Copernicus services with biosensor and IoT technologies

@excelsior2020eu    

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This project has received funding from the Government of the Republic of Cyprus through the Directorate General of the European's Programmes, Coordination and Development

CONSORTIUM



CyRIC Philosophy



Our Mission

- provide research and innovation services,
- support local entrepreneurs and startups developing their products & businesses and
- develop breakthrough products for the international markets



Our Vision

CyRIC aims to become the leading business, research and innovation center in the Eastern Mediterranean region.



Our Values

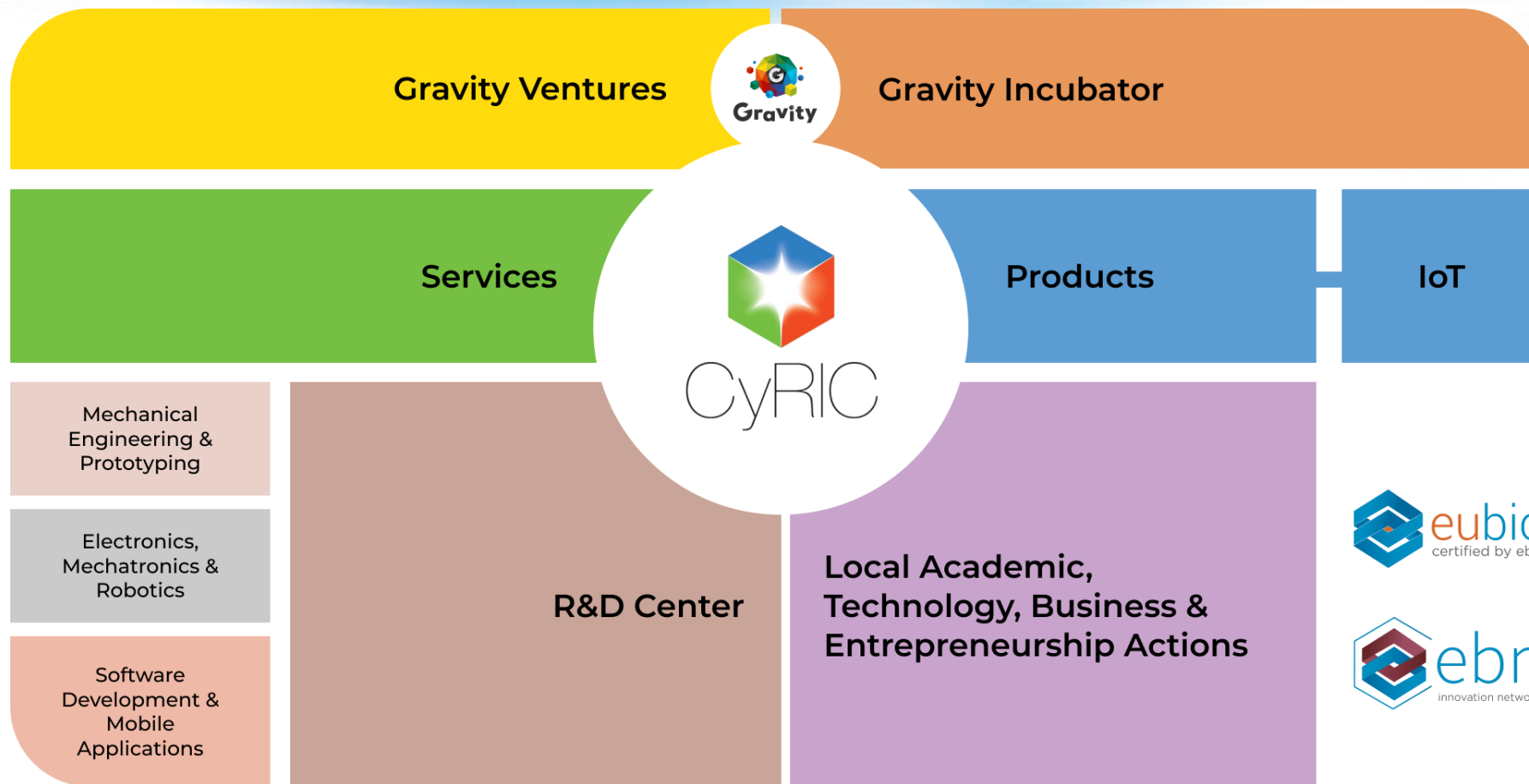
Nurture innovation through free thinking and creative spirit.



CyRIC



CyRIC BIC Structure



Research & Innovation Portfolio

Robotics Mechatronics



Custom fluidics controllers,
industrial automation

Internet of Things (IoT) – Biophotonics Electronics-Wearables & Embedded



Custom electronics development, photonics
integration, wearable consumer devices

Energy/Building/Agri Management & Automat.



Environmental sensors and
controllers

Firmware and Software Development – Cloud and Mobile Applications



Remote monitoring platform, Proactive safety module firmware, content watermarking

Challenges in Water Sensing

Satellite data can track the growth and spread of harmful algae blooms (HAB) in order to alert and mitigate against damaging impacts for tourism and fishing industries.

Without in situ measurements, it is difficult to distinguish the type of algae that covers the sea as many different types of algae grow in these waters.

Large summer blooms can contain toxic algae that are dangerous for both humans and other animals.



https://www.esa.int/Enabling_Support/Preparing_for_the_Future/Space_for_Earth/Space_for_the_oceans

https://www.esa.int/ESA_Multimedia/Images/2019/12/Baltic_blooms#.Xw4gSW1282o.link © contains modified Copernicus Sentinel data (2019), processed by ESA, [CC BY-SA 3.0 IGO](https://creativecommons.org/licenses/by-sa/3.0/)

Research & Innovation Focus on Water Sensing

Technologies for real-time in situ water analysis and contaminant detection

Relevant CyRIC Expertise

- Real-time water-quality monitoring
- In-situ contaminant analysis
- Autonomous remotely operated marine devices
- Photonics know-how
- Biosensors know-how

SmartWater2020 (Tender)

LoRaWAN AMR Pilot Deployment for Larnaca Water Board

- 10 Gateways
- 360 AMR water meters



WaterSpy

www.waterspy.eu

High sensitivity, portable photonic device for water quality analysis
EU project to develop water quality analysis photonics technology suitable for inline, field measurements.

Budget: 4 MEUR



MariaBox

mariabox.net

MARine environmental in situ Assessment and monitoring tool BOX
EU Project to produce a marine pollution-monitoring device, based on new biosensors

Budget: 7 MEUR

CYANOBOX

ENTERPRISES/0618/157

Automated In-situ Cyanotoxin Assessment Toolbox for Real-Time Surface Water Monitoring

Budget: 260 KEUR



FLOBIT

EXCELLENCE/0918/0282

Smart Water Usage And Savings Enablement Metering System Supported By AI/ML

Budget: 270 KEUR



Technologies for real-time in situ water analysis and contaminant detection

Automated In-situ CYANOtoxin Assessment ToolBOX for Real-Time Surface Water Monitoring



Problem:

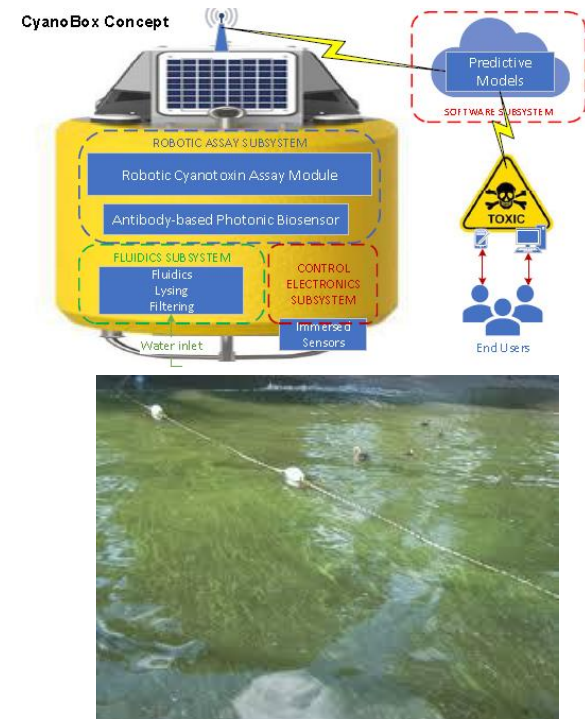
Eutrophication of surface waters can lead to the formation of cyanobacteria harmful algal blooms (cyano-HABs) that directly affect water quality by producing undesirable colour, taste, and by releasing harmful cyanotoxins into the water.

Problem's effects:

- Hazards effects on human health
- Detrimental effects on wild life
- Costs billions per year in restoring the ecosystems and clearing HAB

Key Objective:

- The development of a system that can perform continuous monitoring of the quality of cyanobacterial contaminated water
- A system able to detect diverse groups of cyanotoxins and provide an early warning for the prevention of cyanobacteria blooming from public and private waterbody administrators



Technologies for real-time in situ water analysis and contaminant detection

MARINE environmental in situ Assessment and monitoring tool BOX



- The MARIABOX project developed and demonstrated a wireless marine environment analysis device for monitoring chemical and biological pollutants while installed into a buoy,
 - The device, based on novel biosensors, was of high-sensitivity, portable and capable of repeating measurements over a long time, allowing permanent deployment at sea.
- | | |
|--|---|
| <ul style="list-style-type: none"> • MariaBox-BIO analytes <ul style="list-style-type: none"> • Microcystin LR • Saxitoxin • Domoic acid • Azaspiracid | <ul style="list-style-type: none"> • MariaBox-CHE analytes <ul style="list-style-type: none"> • PFOA • NAFTHA • heavy metals • CHOR |
|--|---|



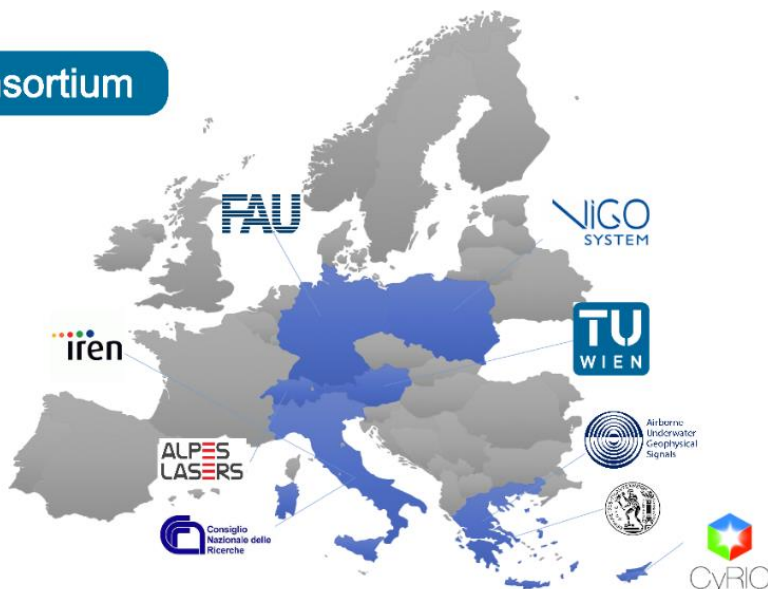
mariabox.net

Technologies for real-time in situ water analysis and contaminant detection

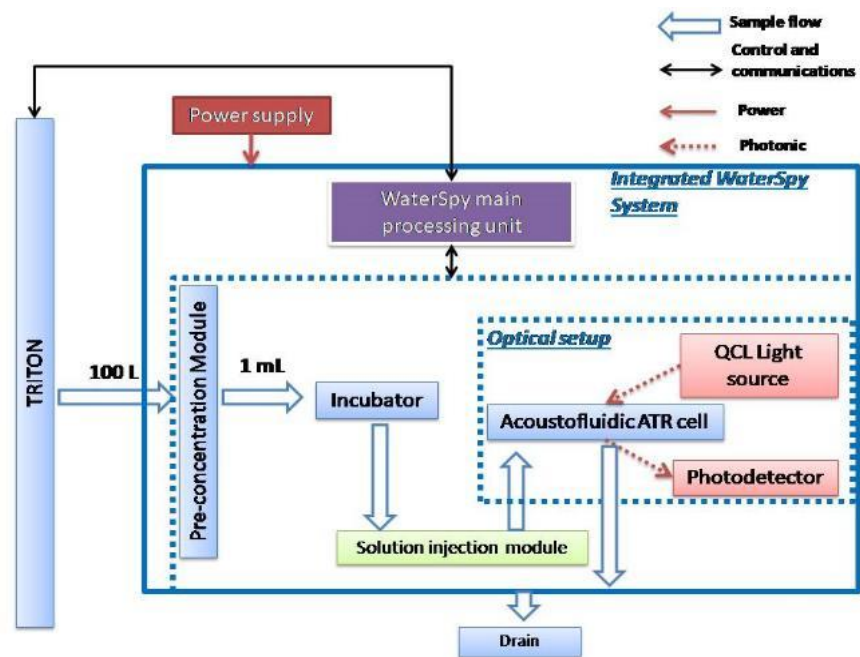
High sensitivity, portable photonic device for pervasive water quality analysis



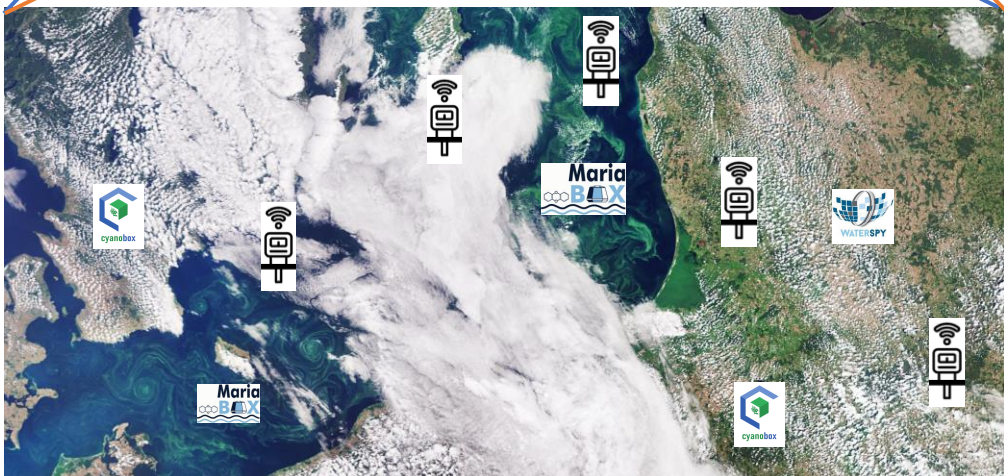
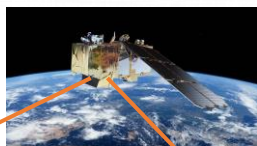
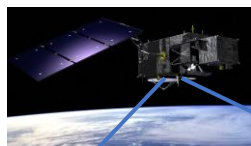
Consortium



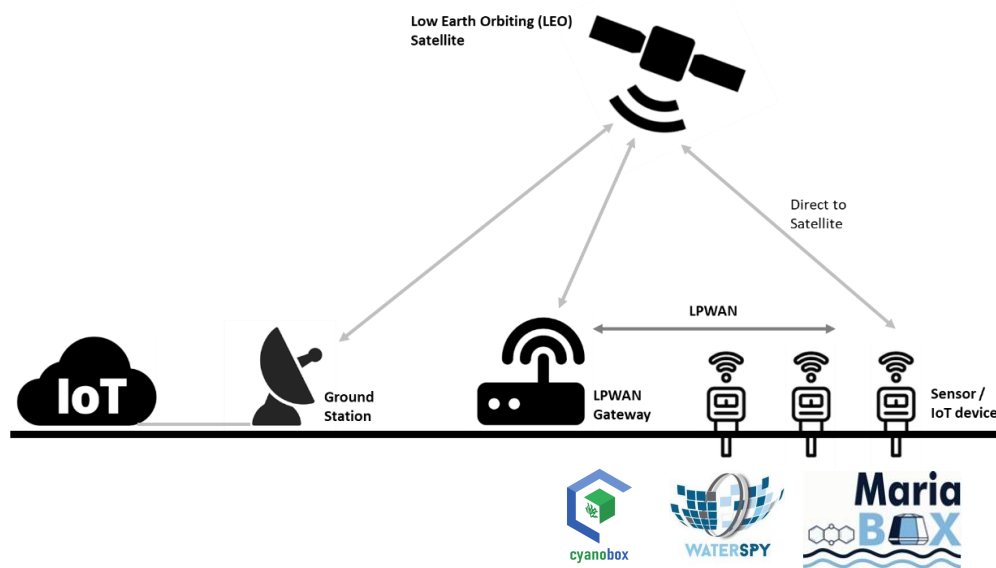
www.waterspy.eu



Combining Copernicus services with Biosensing/IoT for water sensing



In Situ



THANK YOU FOR YOUR ATTENTION



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www.cyric.eu

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