

# BRAAVOO Stakeholder Forum

Messina, Italy – Monte di Pietà  
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## Overview

A public workshop concluded the BRAAVOO mesocosm tests and the sixth consortium meeting organized in Messina, Italy in May 2016.

BRAAVOO coordinator Prof. Jan van der Meer from University of Lausanne described the current status of the BRAAVOO project and Dr. John Wallace from IDS monitoring gave an overview of the BRAAVOO biosensor systems. In the following Round Table discussion expectations of end-users, future trends and a possible market introduction were discussed.

The workshop attracted 43 participants. The selection of stakeholders was carried out on the basis of their commitment to the marine environment monitoring. The local BRAAVOO partner from the Institute for Coastal Marine Environment in Messina has had in the past several occasions to interact with local and national authorities, industries and research partners working on the field of marine environment monitoring. On the basis of this previous experience representatives of three sectors were invited: Public authorities, private sector and academia. The invitations included a general description of the project, objectives and the results achieved to date.

The intention of the meeting was to inform the experts in the field on the technology developed within the project and to get feedback from a diverse user community. Moreover, the workshop aimed to identify any gaps in the technology or its application.

Each participant received a folder with technical specifications of the individual modules of biosensors. In addition, in order to get reasoned feedback, a questionnaire was distributed.

## Participants

### Public bodies responsible for protecting and use of marine environment:

- Regional agency for environmental protection, ARPA
- Higher Institute for Environmental Protection and Research, ISPRA (through which the Ministry of Environment operates).
- Navy, COMFORPAT coordinators of the national plan of action in case of oil spills
- Research centres interested in microelectronics, Naval District on transport,
- Port Authority, operator of the port space, and a partner in several monitoring projects

### Research centres:

- IAMC-CNR Institute for Coastal Marine Environment
- IMM-CNR Institute of Microelectronics and Microsystems
- ITAE CNR Institute of advanced technologies for energy and the naval district coordinator
- University of Messina Naval Engineering

### Private sector:

- Milazzo refinery
- Syndial-ENI environmental remediation
- Castalia intervention pollution
- Intermarine shipyard
- Poliservices Marine Agency



## Outcomes

The Round Table discussion revealed the following findings:

BRAAVOO is a multidisciplinary and complex endeavour combining the genetic potential of a living cell with engineering expertise, microelectronics and environmental needs to build a useful monitoring system.

Marine environmental monitoring requires a continuous interaction between scientific community and end-users of new technologies. It is important to consider the needs of the industrial sector by offering them solutions supporting them during the different phases of production and operations (refineries, naval operations, monitoring plan).

For continuous monitoring, there is interest in having more sensors at a time and an increase of detection rate and duration.

The biosensor system is seen as a useful strategy to observe the toxic effect of a combination of metals without specifying the different metals.

On the question “Would you buy it?” a representative of a public body answered that despite of the interesting technology, the agencies are required to follow approved protocols. Even European regulations are conditioned by these rules which are often obsolete, time-consuming and expensive. It is necessary to be open to innovative technologies considering the benefits in cost and speed in getting the result. Before the use of biosensors protocols for their use need to be established and results validated by a comparison with classical methods. As dredging in the ports is not governed by very strict regulations about monitoring protocols, the BRAAVOO technology may be used more easily for this purpose.

Aquaculture plants may be supported by BRAAVOO technology. The early detection of an arising toxicity state can avoid a severe economic loss.

It is convenient to receive information from a site of interest directly in the office, timeless response is much appreciated.

The biosensors need to be ready for offshore use as well.

*Mesocosm facilities at CNR, Messina.*



Opportunities for use of the BRAAVOO technology the participants see in the following areas: Marine coastal environment observations; harbour dredging; monitoring following spill or supposed spill and intervention strategies; waste-water plants; industrial areas, sites of community importance (SIC), sites of national interest (SIN), accident spill pollutant, marine environment recovery or remediation; lakes; transition areas; protected areas for maintaining biodiversity; emergency conditions; water quality; teaching of innovative solutions.

From the questionnaires we learned that all participants are interested in further interactions towards collaborations or product purchase.

An oceanographer from IAMC-CNR Messina states that they also have developed automatic systems to be placed in a buoy with remote control reporting chemical and physical data for currents in Messina Strait, Lampedusa, and Ganzirri lake. They will be happy to host the BRAAVOO biosensors in the same devices and to compare the results with their systems.

Oil routes may be monitored by this technology.

Pollutants may be accumulated in the instruments, falsifying the results.

There is room for higher sensitivity and miniaturization.

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*The audience at the workshop.*

