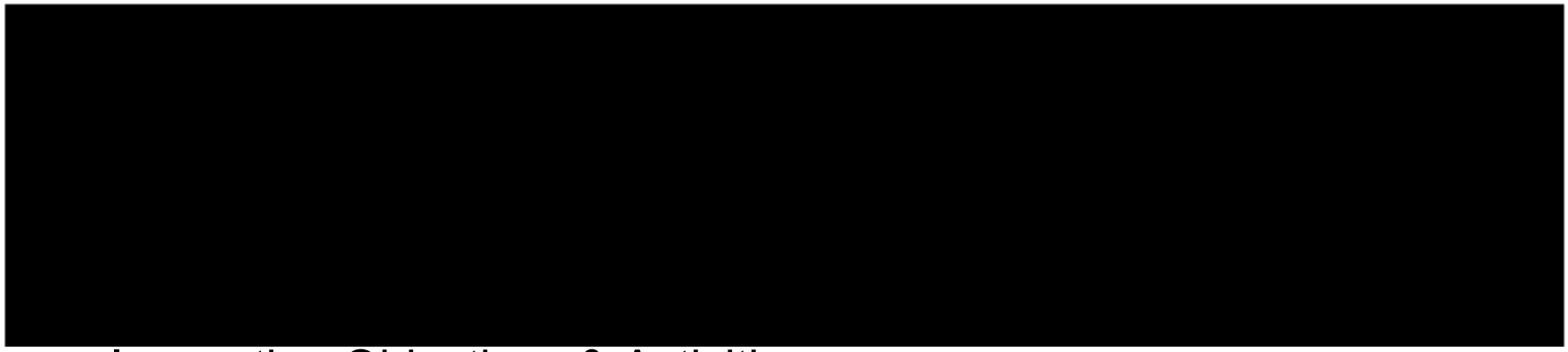
[redacted]
Information Technologies Institute (ITI)
Centre for Research and Technology Hells (CERTH)

Autonomous Swarm of Heterogeneous Robots for Border Surveillance

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 740593

Overview



- Innovation Objectives & Activities
- Work Packages and Milestones
- Status per Work packages and Advancements
- Use Case Scenarios and Demonstration
- Expected impact and results
- Exploitation & Dissemination

General Information

[redacted]

- **Type of Action**: Innovation Action (IA)
- **Total cost:** 8.997.781,50 €
- **Consortium:** 25 partners (4 private companies, 4 SMEs, 5 border authorities, 2 LEAs, 2 security organizations, 1 port authority, 4 research centres and 3 academic institutions)

Consortium

- Centre for Research and Technology Hellas
- Romanian border police
- Fraunhofer Institute for high frequency physics and radar techniques
- Estonian academy of security sciences
- VTT technical research centre of Finland
- Everis Spain SLU Succursale Belgique
- Police service of Northern Ireland
- Portuguese national guard
- NATO STO organization centre for maritime research & experimentation
- Hungarian national police
- Robotnik Automation SLL
- Romanian protection and guard service
- Elettronica GmbH
- Hellenic Ministry of defense
- Centre of excellence in terrorism, resilience, intelligence and organized crime research
- North Tyrrhenian Sea Port System Authority(AdSP-MTS)
- Oceanscan-Marine systems & technology
- Defence institute “Professor Tsvetan Lazarov”
- Copting GmbH
- National and Kapodistrian University of Athens
- Swiss center for electronics and microtechnology SA
- National interuniversity consortium for telecommunications
- Policia Judiciaria-Portugal
- CyberLens Limited

Problem statement

- Heterogeneity of threats
- Wideness of the suveyed area
- Adverse weather conditions
- Wide range of terrains
- Complex operational environments

Context & Vision

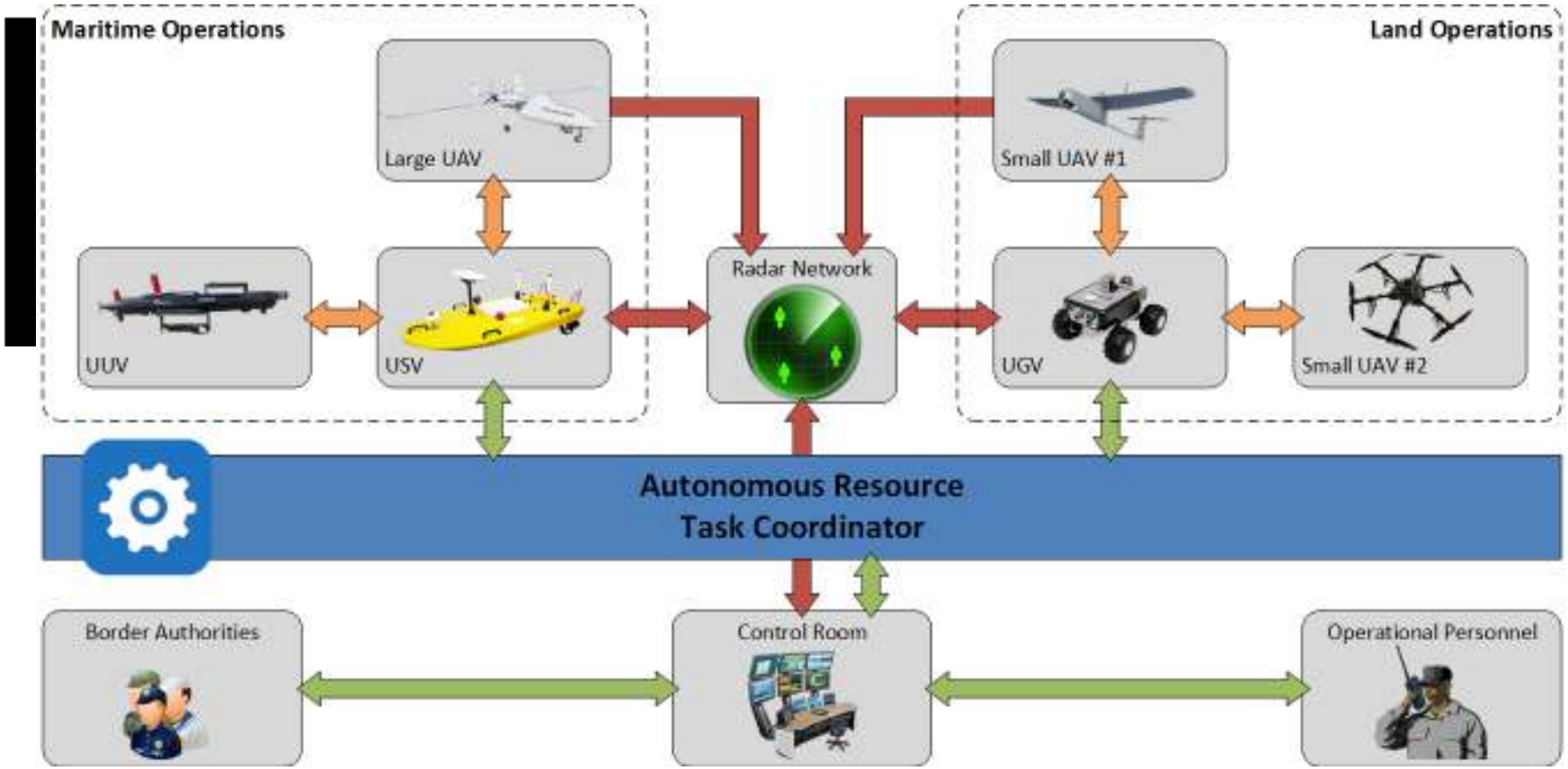
[redacted]ns

- Vision
  - Develop and demonstrate a fully-functional autonomous border surveillance system
  - Unmanned mobile robots equipped with multimodal sensors
  - Interoperable with existing infrastructure
  - Enhanced detection capabilities for early identification of criminal activities and marine pollution events

Objectives

- [redacted]ts
  - [redacted]
  - Complete and situational awareness picture
  - Early identification of criminal activities and hazardous incidents
- Innovation objectives
  - Adaptable sensing, robotics, and communication technologies
  - Tele-operation of autonomous agents through a 3D user interface and decision support

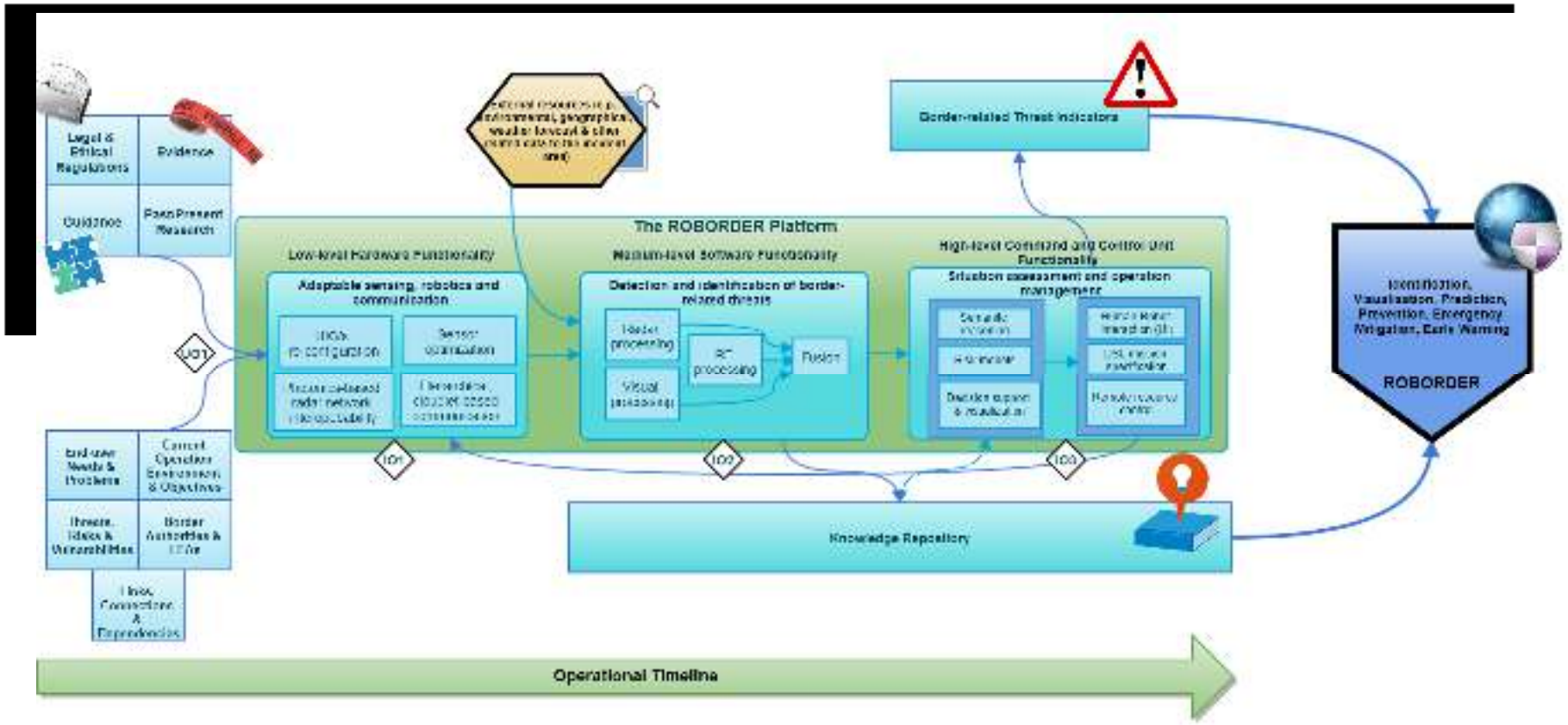
ROBORDER Architecture



Overall structure

- Package list
  - [redacted]
  - **WP6**: Demonstrations and evaluation
  - **WP7**: Dissemination and exploitation
  - **WP8**: Project management
- Milestone List
  - **MS1**: Project setup and platform development roadmap
  - **MS2**: Operational prototype
  - **MS3**: 1st prototype
  - **MS4**: 2nd prototype
  - **MS5**: Final system

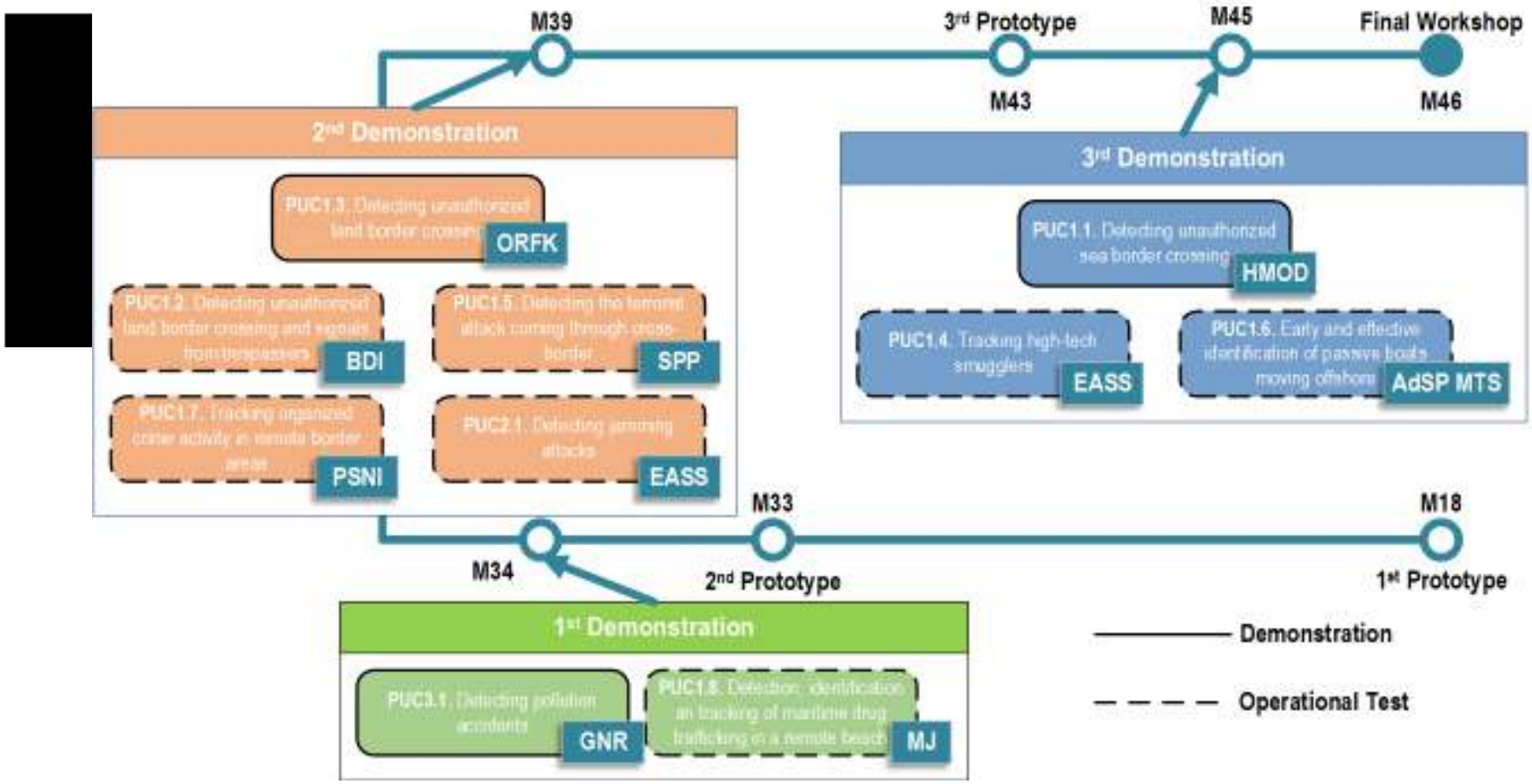
Operational timeline



Use case scenarios

- Early identification and tracking of illegal activities
  - [redacted]
  - Early and effective identification of passive boats moving offshore
  - Tracking organized crime activity in remote border areas
  - Detection, identification and tracking of maritime drug trafficking in a remote beach
- Early identification and tracking of illegal communications
  - Detecting jamming attacks
- Detection of pollution and other accidents occurred in the borders
  - Detecting pollution accidents (**Demo**)

Operational tests and demonstrations



Impact & Results

- [redacted]
  - Perform improved search and rescue operations
  - Improve environmental protection for governmental agencies
- Expected results
  - Provide an overall border security solution
  - Effective operation of heterogenous multi-asset system
  - Photonic radar network and UAV onboard passive radar
  - Threat recognition and identification of cyber physical attacks

Exploitation and Dissemination

- Exploitation of results

  - Visits of website a social media (http://roborder.eu/)
  - Downloads of publicly available online material
  - Participation/attendance in workshops
  - Demonstration of results in end-users group
  - Communication kits: https://roborder.eu/resources/
  - Social media
    - Facebook: https://www.facebook.com/robordereu/
    - Twitter: https://twitter.com/roborder_eu
    - LinkedIn: https://www.linkedin.com/in/roborder/

Contacts