

**autonomous swarm of heterogeneous
RObots for BORDER surveillance**



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beAWARE in H2020

- H2020-EU.3.7. - Secure societies - Protecting freedom and security of Europe and its citizens
 - SEC-BES-20-2016 Border Security: autonomous systems and control systems - Sub-topic: 1.Autonomous surveillance
- ROBORDER
 - Innovation Action
 - 25 European partners (Portugal, Greece, Germany, Esthonia, Italy, Spain, Belgium, UK, Finland, Hungary, Romania, Bulgaria, Switzerland)
 - Coordinated by TEKEVER II AUTONOMOUS SYSTEMS LDA Portugal
 - Budget ~ 8,99 M€ / EC funding ~ 7,99 M€
 - Expected starting date: May 2017
 - Duration: 3 Years



beAWARE partners

- 1 TEKEVER II AUTONOMOUS SYSTEMS LDA Portugal
- 2 CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS Greece
- 3 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V. Germany
- 4 SISEKAITSEAKADEEMIA Estonia
- 5 Teknologian tutkimuskeskus VTT Oy Finland
- 6 everis Spain SLU, Succursale en Belgique Belgium
- 7 Police Service of Northern Ireland United Kingdom
- 8 MINISTERIO DA ADMINISTRACAO INTERNA Portugal
- 9 NATO SCIENCE AND TECHNOLOGY ORGANISATION Belgium
- 10 ORSZAGOS RENDOR - FOKAPITANYSAG Hungary
- 11 ROBOTNIK AUTOMATION SLL Spain
- 12 SERVICIUL DE PROTECTIE SI PAZA Romania
- 13 ELETTRONICA GMBH Germany
- 14 MINISTRY OF NATIONAL DEFENCE, GREECE Greece
- 15 SHEFFIELD HALLAM UNIVERSITY United Kingdom
- 16 AUTORITA PORTUALE LIVORNO Italy
- 17 OCEANSCAN - MARINE SYSTEMS & TECHNOLOGY LDA Portugal
- 18 INSTITUT PO OTBRANA Bulgaria
- 19 Copting GmbH Germany
- 20 ETHNIKO KAI KAPODISTRIAKO PANEPISTIMIO ATHINON Greece
- 21 CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT Switzerland
- 22 CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE TELECOMUNICAZIONI Italy
- 23 Ministério da Justiça Portugal
- 24 CAPRITECH LIMITED United Kingdom
- 25 INSPECTORATUL GENERAL AL POLITIEI DE FRONTIERA Romania



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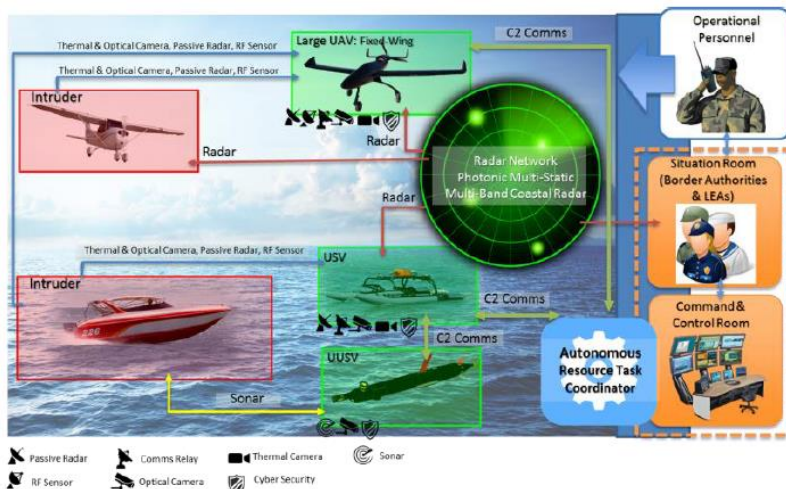


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- Border authorities and Law Enforcement Agencies (LEAs) across Europe face important challenges in how they patrol and protect the borders.
 - heterogeneity of threats, the wideness of the surveyed area, the adverse weather conditions and the wide range of terrains.
 - nowadays border authorities do not have access to an intelligent holistic solution providing all aforementioned functionalities.
- ROBORDER aims at developing a fully-functional autonomous border surveillance system with unmanned mobile robots including aerial, water surface, underwater and ground vehicles, capable of functioning both as standalone and in swarms, which will incorporate multimodal.
 - The system will be equipped with adaptable sensing and robotic technologies that can operate in a wide range of operational and environmental settings.
 - To provide a complete and detailed situational awareness picture that supports highly efficient operations, the network of sensors will include static networked sensors such as border surveillance radars, as well as mobile sensors.
 - Detection capabilities for early identification of criminal activities and hazardous incidents will be developed.
 - This information will be forwarded to the command and control unit that will enable the integration of large volumes of heterogeneous sensor data and the provision of a quick overview of the situation at a glance to the operators, supporting them in their decisions.



ROBORDER high level architecture

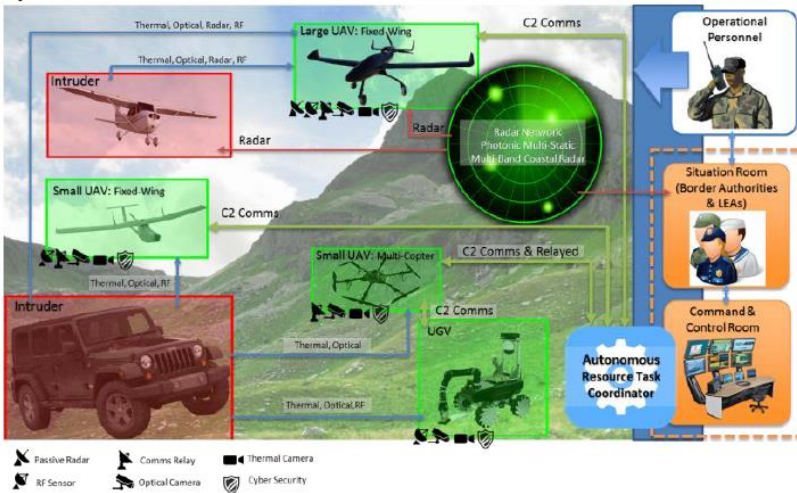


Maritime surveillance scenario

- Coastal radar network
- Large fixed wing UAVs with on-board sensors: high quality/long range optical and thermal cameras, passive radar, RF comms sensor and optionally others such as LiDAR
- USVs with on-board sensors: optical and thermal cameras, passive radar, RF comms sensor and optionally other payloads
- UUV with on-board sensors: sonar and optionally other payloads

Land border protection scenario

- Fixed radar network
- Large fixed wing UAVs flying at high altitude to provide a general situational awareness, with on-board sensors
- Small fixed-wing UAV flying at medium to low altitude, providing a closer view of the situation
- Small multi-copter UAV flying at low altitude, keeping a close eye on the target.
- UGVs with on-board sensors: optical and thermal cameras, RF comms sensor and optionally other payloads.
- Small tethered multi-copter UAV operating in cooperation with a carrier UGV.



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