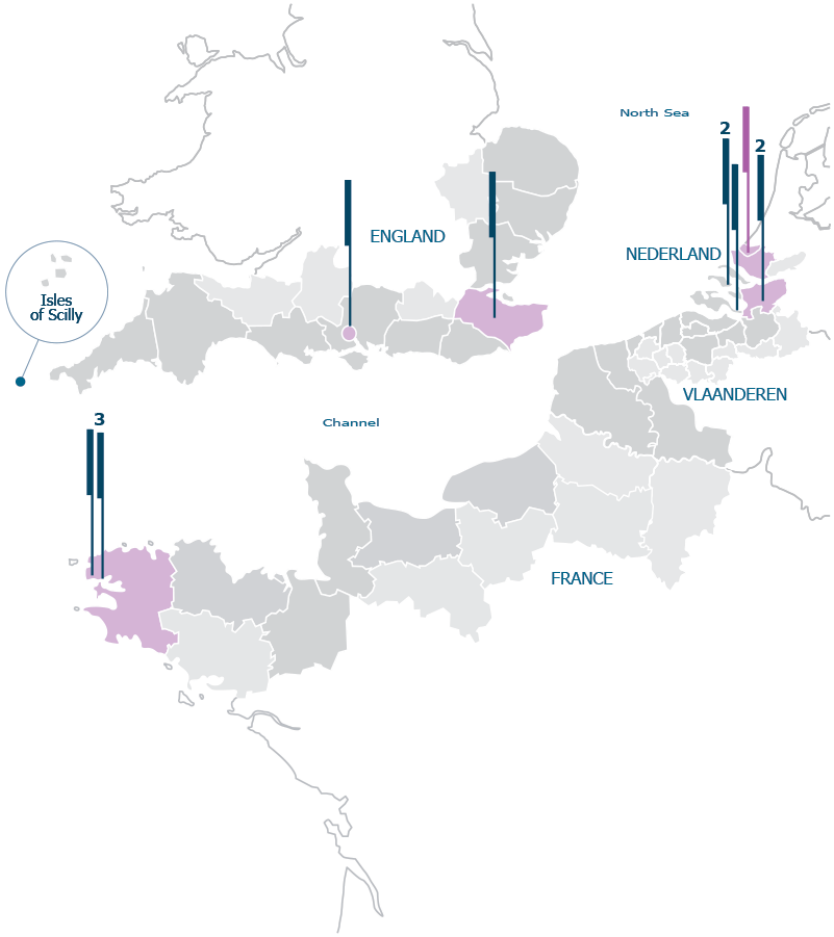
3i

Integrated Coastal Zone Management via Increased situational awareness through Innovations on Unmanned Aircraft Systems

■ Project summary



The 3i project aims to improve maritime safety in the cross-border area by using new technologies, implementing remotely piloted aircraft or autonomous systems. These systems also called Unmanned Aircraft Vehicles (UAV) will allow the creation of a new, cost effective and reliable monitoring service, for maritime safety organisations that border the English Channel and southern North Sea. The 3i project will gather a consortium of scientific & specialist organisations (Further and Higher Education institutes, SMEs and economic development agencies) and Public Sector bodies (Police, harbour agencies, fire-fighting & emergency departments). The partners will work together in research and development activities, setting up a joint prototype UAV and performing joint testing and demonstrations. The main applications and scenarios for unmanned aircraft will be for search and rescue purposes, border and customs control as well as environmental screening. This cross-border project will improve knowledge on unmanned aircraft for maritime security applications and will help develop a new range of technology and business opportunities for the 2 Seas area.

■ Activities

What was the project trying to achieve?

The Specific aims and objectives of the 3i project are: 1. Research and development on possible applications and scenarios for unmanned aircraft (eg. search and rescue, border and smuggling control, environmental control, etc.) 2. Research and development on important technology for

the use of unmanned aircraft (eg. flight control, data communication, man-machine interface, regulation). 3. Demonstrate the operational properties of possible applications and scenarios for UAV via computer simulations. 4.Together exchange knowledge and develop innovations and new technology. 5. Create a joint 2Seas UAV specialists team by working together in a joint project office. 6. Build together a joint prototype unmanned aircraft system that will function as project-laboratory. 7. Test together the innovations and technology at the build prototype unmanned aircraft system. 8. Demonstrate the operational properties of pre-selected scenarios for UAV via real life flights with the project UAV system. 9. Joint UAV demonstrations in various harbors and coastal sites within the 2Seas Area (NL, F, En, B). 10. Evaluate the UAV-demos with project partners and project observers (NL, F, En, B). 11. Advice the Research and development activity via feedback from the demo-evaluations. 12. Disseminate the results with the 2Seas area/member states and the EC-working groups on UAV 13. Retain the results by indentifying and setting-up new innovation projects. 14. Search for organizations that are interested in the gathered knowledge or to set up new innovation projects. 15. Encourage the use of the results within the 2Seas area and the EU. 16. Develop a frame work for a joint ‘European Knowledge Center for UAV’ that will build on the results of the 3i-project and will create a sustainable result.

What were the activities implemented?

We have implemented five activities: 1. Research and Development-> value driven UAV design and operational modeling + autopilot+safe operations for maratime UAV (sense and avoid) + Man-machine interface + Data communication for maratime UAV + scenairios for cross border maritime safety applications with UAV + UAV Flight crew and maintenance training, setup of Aircraft operator certificate 2. Build and test-> A UAV has been built and tested, a mobile ground station was built and tested, and a daylight/IR sensor was built and tested. 3. Demonstration-> The flying capabilities of the UAV in a maritime environment have been demonstrated by test flights in the Port of Ramsgate on February 18-19, 2014. The capabilities of the ground-station and the camera system have been demonstrated at the End-event on September 18th, 2014. During the End-event, the camera-system was placed on a 100 meter high factory roof 3 km away from the event location, while it was controlled from the ground-station that was at the End-event location. 4. Communication-> A project kick-off conference was organised on June 21st 2012 in the town hall of Woensdrecht. There was large media attention for the kick-off event. A project website, logos, newsletters and press releases were created for the project. The project was concluded with an End-event on September 18th 2014 on the Maasvlakte, in which the results of the project were presented to the public through workshops and demonstrations. 5. Management and coordination-> Steering group meetings have been organised in Delft, The Netherlands (13-3-2013 and 20-9-2014), Southampton, UK (31-3-2014) and Brest, France (10-10-2013).

■ Results

What were the key results of the project?

AP1 More than five work group meeting have been achieved. Six research papers have been publised. The workspace for the joint project office was available. A scenario document has been produced, from which the set of specifications for the UAV has been developed. AP2 Four

UAV's have been built in the project. There is also a mobile ground station. In the mobile ground station are multiple screens and computers that run special software that is developed in this project. This ground station includes the man/machine interface. There is also a daylight/ir sensor build into a payload pod that can be attached under the aircraft. A dedicated data-link for the camera system has been designed and built in order to perform communication between the camera system and the ground station. AP3: A test flight in the maritime environment (Port of Ramsgate) has been performed. AP4: An extensive list of results has been achieved in the Communication activity. The most important ones are: Project movie, Project magazine (To Drone or not to Drone?), Project website, communication flashes, newspaper articles, radio interviews, etc.

Did all partners and territories benefit from the results?

Ports and authorities responsible for port development have benefits from the project outcomes, since they have gained knowledge about the possibilities of using UAV's in their operations. Universities, knowledge and research institutes and education institutes have a direct benefit from the research outputs of the project. The papers are openly available and the software for the autopilot has been made available as well. Regional development agencies, business support actors, incubation facilities, innovation centers can pick up on the increased awarness and demand in the UAV market. Specific target groups, such as Veiligheidsregio Zeeland (NL) and firebrigade Gent (BE), have a direct benefit from the project, since they have become partners in the follow up project BERISUAS. Several other beneficiaries, for example Havenbedrijf Amsterdam (NL) have shown interest in the project and follow up projects.

What were the effects / outcomes for the territories involved?

The 3i project aims to improve safety in maritime areas and, at the same time, to protect the maritime environment. This leads to a better place for people to work and live in. Through the research activities, the 3i poject has strengthened research collaborations between universities in the member states. Specifically, the project has had an impact on the following indicators: Improving the conditions for innovation, research and development, strenghting the scientific base, fostering international research collaboration, removing obstacles to the growth of SMEs, enhancing the international attractiveness of Europe’s higher education, promoting cross-border cooperation of Universities, improving the protection of land and water bodies. For example, the scientific base is strengthened by publishing all scientific results from the project and to make it freely available for other scientist and to the general public. Another example is that current regulations for the use of unmanned vehicles are an obstacle in the growth of many SME's in this field. Within the 3i project, we aimed to increase awarness on this topic. At the same time we went into a discussion with the regulators to see how future UAV operations can be made more practical and safe.

■ Distinctiveness

What was the real added-value of doing this cross-border project?

There is a need for international and cross border cooperation. Integrated Coastal Management and Maritime security in the Channel and North Sea is an issue concerning all 4 member states of the Programme area. The 3i-project brought together partners who wished to solve this

cross-border issue. Without the cross border element, national initiatives to use new UAV technology for Maritime security would not have the scale and cross border commitment to be effective. For the design and test activities, the expertise that was required to make such a complicated system was not available within one member state. The UK delivered the 3D-printing facilities, France delivered the human machine interface and The Netherlands delivered the camera system.

Have any synergies been developed with other projects or networks?

Yes, we have developed two clusters together with the 2Seas MIRG-EU project: the Berisuas and the Digisol clusters.

What are the key messages , key lessons learned you would like to share?

- Work together "in real life" as much as possible - Plan some extra time, to have a buffer. Nothing will work the first time. - Plan the last months free of activities. You always end up later that you expected. - Make a detailed plan what will happen with the project results after the project eglible period. - Start small, test-evaluate-improve, and when you are really happy with the results you scale up - Make sure there is a equal balance between government/SME/Universities

Project Information

Title	Integrated Coastal Zone Management via Increased situational awareness through Innovations on Unmanned Aircraft Systems
Total project budget	€ 3 621 462
ERDF	€ 1 810 731
Priority & objective	Priority 4 a. Promote cross-border cooperation issues and implement joint actions on issues of common interest throughout the whole area, and in particular those with a maritime dimension
Timeframe	2010-08-01 - 2014-09-30
Lead partner	Delft University of Technology
Project Coordinator	E. van Kampen(e.vankampen@tudelft.nl)