Press release
FOR IMMEDIATE RELEASE 16 July 2014

The Portuguese Navy, the NATO Centre for Maritime Research and Experimentation and the University of Porto operate together for the first time in the REP14-Atlantic exercise

From 7 to 28 July, off the coast of Portugal, four naval units and ten international partners conduct collaborative experimentation in the fields of underwater communications, autonomy and multi-domain cooperative robotics.

What's next in the enhancement of anti-submarine warfare, mine countermeasures, maritime security, environmental knowledge, search and rescue and maritime law enforcement operations? Multi-domain cooperative robotics could significantly improve current capabilities of Navies at sea. The Portuguese Navy and the Faculty of Engineering of University of Porto (FEUP), along with the NATO Centre for Maritime Research and Experimentation (CMRE), based in La Spezia (Italy), are at sea off the coast of Portugal, from 7 to 28 of July 2014, to test networks of unmanned maritime vehicles (surface, underwater and aerial) and develop new solutions in the fields of underwater communications and autonomy in operational scenarios. The exercise, called REP14-Atlantic (Recognized Environmental Picture Atlantic 2014), is a joint effort also involving the Monterey Bay Research Institute (MBARI-USA), the University of Rome - La Sapienza (Italy), the Norwegian University of Science and Technology (Norway), the Royal Institute of Technology (UK), the German Defence Research and Testing Agency (Germany) and the companies Evologics (Germany) and Oceanscan (Portugal). It includes several Autonomous Surface Vessels (ASVs), Autonomous Underwater Vehicles (AUVs) and Unmanned Aerial Vehicles (UAVs) equipped with different sensors and acoustic payloads, which will be deployed from Portuguese Navy ships NRP ("Navio da Republica Portuguesa" i.e. Ship of the Portuguese Republic) Pégaso, NRP Auriga, submarine NRP Arpão and the NATO Research Vessel Alliance.

During REP14-Atlantic, the Portuguese Navy will also address the demonstration of a solution regarding the operational use of SeaCon Class AUV´s in combination with Tridente Class Submarines. Several experiments were conducted to evaluate the performance of networked vehicle systems in environments targeted at simulating real operations concerning Mine Warfare, Harbor Protection, Expeditionary Hydrography, Search and Rescue, Maritime Law Enforcement, and Rapid Environmental Assessment. For example, AUVs were launched and recovered at sea to map an area located inside one harbour.

CMRE will have two areas of focus: the first one dedicated to anti-submarine warfare (ASW) using autonomous sensor platforms, and the second devoted to acoustic underwater communications (ACOMMS). CMRE scientists on board the NATO Research Vessel Alliance will test collaborative autonomous behaviours of underwater vehicles for ASW applications, while also testing the performance of network-based solutions for vehicle localization and navigation. For underwater acoustic communications, CMRE scientists will experiment networking and equipment capabilities, including Wave Gliders being used as autonomous gateways. The exercise includes an assessment of the capabilities of JANUS, an underwater digital communication protocol, developed at CMRE, which is in the process of becoming a NATO standard and is currently being promoted in the maritime industry.

FEUP will be evaluating, testing, and demonstrating tools and technologies for persistent operations of collaborative underwater, surface and air vehicles. Applications include minewarfare, oceanography, expeditionary hydrography, search and rescue, and harbour protection. First, inter-operated underwater and radio communication networks will be used for multi-vehicle coordination and control with support for disruptive tolerant networking. Second, long range AUVs will provide support for 24+ operations. Third, deliberative on-board planning capabilities will provide unprecedented levels of autonomy. Fourth, deliberative planning techniques will also be used to support coordinated planning and execution control of multiple vehicles. Fifth, unmanned air vehicles will be used as communication relays and also for tasking autonomous underwater vehicles. Sixth, USBL techniques will be used for localization and tracking of multiple targets. Finally, launch and recovery of autonomous underwater vehicles from NRP Arpão will be done at sea as a first step towards automating the launch and recovery process from manned submarines.

The REP14-Atlantic features and objectives have been presented on 16 July in Setubal, in the presence of Portuguese Ministry of Defence.

The Research, Development and Innovation (RD & I) Department in the Portuguese Navy aims to develop a framework of partnerships with industry, universities, science and technology institutions to enhance industrial and technical solutions in order to support its mission.

The NATO CMRE (Centre for Maritime Research and Experimentation) is an executive body of the NATO Science and Technology Organization. Located in La Spezia, Italy, the Centre focuses on research, innovation and technology in areas such as anti-submarine warfare, underwater communications and networking, mine countermeasures systems, maritime security, modelling and simulation, development of the common operational picture, maritime component of expeditionary operations, and marine mammal risk mitigation.

The University of Porto participates in this exercise through the **Laboratório de Sistemas e Tecnologias Subaquáticas,** installed in Faculty of Engineering of University of Porto. The Laboratório de Sistemas e Tecnologias Subaquáticas designs, builds and operates unmanned underwater, surface and air vehicle systems for networked operations, whose applications include oceanography, biology, security, defense and environmental surveys. The LSTS successfully tested unmanned air, surface and underwater vehicles in innovative operations in the Atlantic and Pacific oceans, as well as in the Mediterranean Sea. The LSTS has been organizing, in cooperation with the Portuguese Navy, the Recognized Environmental Picture (REP) annual exercise since 2010.

Portuguese Navy: Paulo Rodrigues Vicente, rodrigues.vicente@marinha.pt; + 351 919 002 002
CMRE: Francesca Nacini, fnacini@cmre.nato.int; +39 335 7809721
Faculty of Engineering of University of Porto (FEUP): Raquel Pires, raquelp@fe.up.pt; + 351 918 010 189