

Exercise REPMUS 23

REPMUS is a Portuguese-led exercise which focuses on maritime unmanned system experimentation, capability development and interoperability. REPMUS stands for Robotic Experimentation and Prototyping augmented by Maritime Unmanned Systems.

REPMUS 23 takes place from 11 – 22 September 2023.

The exercise has been held in the Portuguese Troia Bay since 2010. In 2014 the NATO Centre for Maritime Research and Experimentation (CMRE) joined REPMUS for the first time. Since 2019 the involvement of the NATO Maritime Unmanned Systems Initiative (MUSI) has helped widen and coordinate participation from both NATO and partner nations.

Participating nations in REPMUS 23

NATO Allies: Portugal (host nation), Belgium, Canada, Denmark, France, Greece, Germany, Italy, Latvia, the Netherlands, Poland, Romania, Spain, the United Kingdom and the United States; plus partners Sweden and Ireland.

Several other NATO and partner nations are sending observers.

Personnel involved

More than 1,400 civilian and military personnel are involved in the exercise, with nearly 400 of these participating as part of the crews on the ships.

Participating commands and civilian institutions include:

- NATO Allied Command Transformation (ACT, United States)
- NATO Allied Maritime Command (MARCOM, United Kingdom)
- NATO Defence Investment Division (Belgium)
- NATO Maritime Unmanned Systems Initiative (MUSI, Belgium) (co-organiser)
- University of Porto (Portugal) (co-organiser)
- Centre for Maritime Research & Experimentation (CMRE, Italy)(co-organiser)
- Naval Mine Warfare Centre of Excellence (NMW COE, Belgium) (Mine Countermeasures co-ordinator)
- Operations in Confined and Shallow Waters Centre of Excellence (CSW COE, Germany)
- Combined Joint Operations from the Sea Centre of Excellence (CJOS COE, United States)
- Maritime GEOMETOC Centre of Excellence (GEOMETOC COE, Portugal) (Rapid Environmental Assessment co-ordinator)

The co-organiser MUSI is a multinational cooperation framework launched by NATO and partners in 2018 to improve the operational effectiveness, interoperability and interchangeability of maritime unmanned systems.

The nations participating in MUSI are Australia, Belgium, Canada, Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Turkey, the United Kingdom and the United States. Estonia and Sweden have formal observer status.

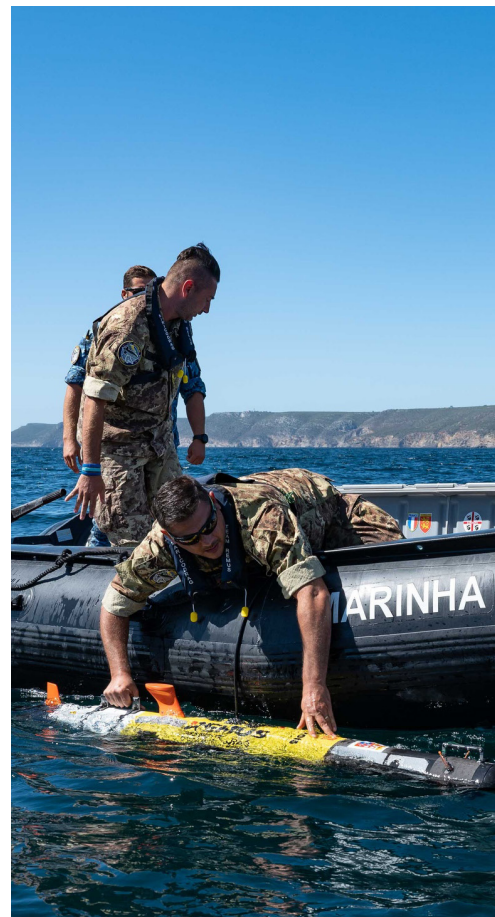
Over 30 industry partners that support national navies and the host nation are also participating in the exercise, as well as several academic institutions and EU entities.

Assets involved in REPMUS











The participating nations are providing unmanned underwater, surface and aerial systems. The NATO CMRE and University of Porto are also providing unmanned underwater and surface systems.

In total, REPMUS 23 gathers over 90 maritime unmanned systems, comprising:

- More than 35 Unmanned Underwater Vehicles
- More than 15 Unmanned Surface Vehicles
- More than 40 Unmanned Air Vehicles.



10 warships and 1 trial ship are also involved:

-  France: FS PLUTON (Combat diver ship)
-  Italy: ITS CARABINIERE (Frigate)
-  Portugal: NRP Dom Francisco de Almeida (Frigate)
-  Portugal: NRP Sines AND NRP Setúbal (2 x Offshore Patrol Vessels)
-  Portugal: 1 x Fast Patrol Boat (FPB)
-  Portugal: NRP Arpão (Submarine)
-  Portugal: NRP Dom Carlos (AGS)
-  Portugal: NRP Andrómeda (2 x Survey Vessels)
-  Spain: ESPS FUROR (Offshore Patrol Vessel)
-  United Kingdom: Trial ship XV PATRICK BLACKETT

Live experimentation and testing during REPMUS 23 includes:

- **Maritime interoperability experimentation, testing and capability development based around a common Unmanned Systems Command and Control (C2) network.** This allows allied maritime unmanned systems from different nations to integrate and operate alongside manned platforms, and evaluate and validate C2 concepts above, on and below the waves.
- Activity is coordinated from a combined Maritime Experimentation and Operations Centre (MEOC) in Troia and tested in a number of fictitious warfighting scenarios to achieve specific objectives such as Anti-Submarine Warfare, Maritime Interdiction Operations, Maritime Surveillance and Intelligence Collection, Force Protection and Amphibious Operations.
- **Mine Countermeasures (MCM).** Experimentation takes place in a series of dedicated mine warfare areas off the port of Sesimbra, where a Naval Mine Warfare Operations Centre is established, driving forward the development of interoperable unmanned systems to conduct and support mine warfare operations.
- **Dedicated Anti-Submarine Warfare (ASW) experimentation taking place further offshore.** This helps build and refine the capabilities for a multinational unmanned ASW barrier concept (a flagship NATO Smart Defence Project).
- **Rapid Environmental Assessment (REA) testing and experimentation above, on and below the waves to provide a 24/7 real time feed of oceanographic and meteorological data to command.** REA enables a full understanding of the maritime operating environment and how it is changing over time. Data is fed into the Maritime Experimentation and Operations Centre (MEOC) in Troia and a Command Centre in Lisbon.



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