NATO OTAN
INTERNATIONAL STAFF
DEFENCE INVESTMENT
SECRÉTARIAT INTERNATIONAL
INVESTISSEMENT POUR LA DÉFENSE

12th December 2022 (MUSIC_PRT-N)(2022)0002

**EXERCISES REPMUS[1] 23**

**Information for Industry**

Annexes:

A. Planning Cycle Overview
B. Working Group Structure

**REPMUS 23 INFORMATION TO INFORM POTENTIAL INDUSTRY PARTICIPANTS**

**Introduction.**

1. REPMUS is an experimentation exercise conducted annually by the Portuguese Navy, designed to allow a large scale Operational Experimentation (OPEX), where Operational Communities work together with Academia and Industry to develop and test operational requirements, technological advances and new progresses in sensors, actuators and C4 on Maritime Unmanned[2] Systems (MUS) in maritime operations.

2. It should be noted that the NATO Exercise DYNAMIC MESSENGER (DYMS) which is an annual series of experimentation exercises, under the co-leadership of the NATO Maritime Commander (MARCOM) and the Allied Command Transformation (ACT), will directly follow REPMUS 23 in the same Areas. More information for Industry about exercise DYMS 23 will be forwarded separately by the NATO Maritime Commander in due course.

3. The exercises will be conducted in the North Atlantic Portuguese Exercise Areas, as follows:

[1] Robotic Experimentation and Prototyping augmented by Maritime Unmanned Systems

[2] NATO uses the term "Unmanned" some nations prefer the use of the term "Uncrewed" The use of the term "unmanned" in the NATO context is entirely gender neutral.

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| 04th - 08th Sep | REPMUS 23 Week 1 - Set Up and Integration Week |
| 08th Sep | REPMUS Pre-Sail Conference(PSC) |
| 11th - 16th Sep | REPMUS 23 Week 2 – Live Serials IAW the SOE[3] |
| 17th – 21st Sep | REPMUS 23 Week 3 – Live Serials IAW the SOE in conjunction with DYMS 23 Experimental Enhancement (EE) & Force Integration Training (FIT) phase for DYMS 23 components, including Command Team workshops. |
| 22nd Sep | Distinguished Visitor (DV) Day |
| 25th – 29th Sep | DYMS 23 - Live Serials |

4. The NATO Maritime Unmanned Systems Initiative is a co-organising entity of REPMUS 23, will collaborate, advise and assist the Host Nation, Portugal, in the planning and coordination of REPMUS 23.

**Aim.**

1. The aim of this document and its enclosure is to:

   a. Encourage early understanding for industry about the nature of exercise REPMUS 23 and encourage potential contributions.
   b. Outline the planning cycle to which participants will be expected to contribute through national sponsorship.
   c. Outline the construct of the planning teams and in particular the REPMUS working Groups to which industry, through national sponsorship can contribute to the planning phase.
   d. To provide an overview of the NATO Goals and Objectives for the exercise.
   e. To give a basic overview of the operational Scheme of Manoeuvre (SOM) for the exercise
   f. To share an overview of the initial vignettes which might be used to assist in developing potential industry contributions.

**Overview of the Planning Cycle.**

2. An overview of the REPMUS 23 planning cycle and key planning events appears at Annex A.

3. Industry which is sponsored to participate will be expected to provide an appropriate contribution with expertise into the planning cycle. Presence at the MPC and FCC will be a prerequisite for participation.

**REPMUS Working Groups.**

4. The structure of the REPMUS 23 CPT Working Groups (WGs) is laid out at Annex B.

5. SMEs from participating industries will be invited to join the relevant WGs and Syndicates.

[3] Schedule of Events (An Annex of the Exercise Plan)

**NATO Goals and Objectives (G&Os) for REPMUS 23.**

6. The REPMUS 23 NATO overarching G&Os are drawn from NATO priorities and will look to build upon the success of REPMUS 22, they are as follows:

a. Overarching NATO Goals;

i. Acceleration of Allied MUS development programs.

ii. To experiment with new and emerging technology in the field of MUS (including sensors, C3, autonomy AI and others) by testing and evaluating them in live scenarios.

iii. To develop and refine through operational experimentation with MUS platforms, systems and enablers, concepts of operation and viable doctrine.

iv. To enable through trials testing and experimentation, interoperability and standardisation between Allied MUS systems and between them and manned assets;

v. To develop the technological exploitation of MUS capabilities to fulfil the NATO maritime capability gaps, aligned with the NATO Defence Planning Process (NDPP) capability targets.

b. Overarching NATO Objectives;

i. To demonstrate NATO's and Nations' technological and operational capability, present and potential, with respect to the use of MUS in maritime operations to relevant communities.

ii. To experiment and develop the C4 systems to enable technical and operational integration of MUS into maritime operations with a cross domain Common Operational Picture (COP), common mission planning, asset discovery and tasking, sensor product dissemination concepts of operation, across a wide range of Allied systems.

iii. To experiment and develop interoperability and Interchangeability (I2I) of MUS systems, in all warfare areas, amongst as many Allies as possible, including the use of manned – unmanned teaming.

iv. To continue the development of MUS technologies and capabilities to support the development of future ASW missions, including supporting the ASW Barrier Smart Defence project.

v. To continue the development of MUS technologies and capabilities, through trials and experimentation, that promote autonomous and collaborative operation of MUS.

vi. To continue to develop techniques and experiment with technologies to enable the development of high bandwidth underwater communication and the possibility of underwater mission networks.

vii. To continue with the development of unmanned systems and support tools for over the horizon MCM operations, including ensuring maximum

interoperability between allies, standardization of data formats and products and the tactical development of MCM through trialling warfighting doctrines and concepts.

viii. To develop and improve the capture, analysis and dissemination of meteorological and oceanographic data, including near real time Rapid Environmental Assessments (REA) to support Allied maritime operations using unmanned systems.

ix. To continue to develop and demonstrate technology and capabilities that enhance the contribution MUS capabilities can make to Allied maritime ISR and maritime situational awareness in all domains.

x. To increase the training of military operators in the use of MUS including in planning and execution of MUS operations.

**Scheme of Manoeuvre (SOM) for REPMUS 23.**

7. For the NATO MUSI community, the overall REPMUS 23 SOM will build upon the success of REPMUS 22 and is likely to focus on the following five main thematic areas:

a. Interoperability to Interchangeability (I2I) and the development of NATO STANAG 4817.

b. Underwater Operations, including ASW & UW communications.

c. Oceanographic support including Rapid Environmental Assessment (REA).

d. Stand-off Naval Mine Warfare.

e. Joint Common Operational Situation Awareness and C2.

8. I2I activity will likely continue the focus on broadening the interoperability with allies by linking MUS C2 systems and integrators into a common network (I2I) centred in a combined Operations Room at Troia and distributed to warship and trials ship platforms at sea. A REPMUS wide Common Operating Picture will be established. Interchangeability will see mission planning and tasking between allies across the I2I network and the establishment of a wider C2 process for transferring control between allied systems and mission execution through shared system tools.

9. UW will expand upon the work of the ASW Barrier done in REPMUS 22, again using mostly synthetic ASW targets, ASW detection systems will be trialled in an expanded barrier concept, consisting of components from multinational elements, CMRE, industry and Academia to enable system development and gap analysis. The work on developing UW comms technologies will continue, including developing common standards and protocols for secure high bandwidth data transmission underwater.

10. Oceanographic and meteorological data collection and Rapid Environmental Assessment (REA) will focus on an integrated collection capability and near real time data collection, assessment and dissemination process, utilising command decision tools to best utilise the REA product in the various warfare disciplines. The process of integrating REA operations into the same Operational Areas as other assets including Autonomous Underwater

assets and building the trust in MUS systems as integral operational components will continue and this will include ensuring all REA activity is reflected across the COP.

11. The Naval Mine Warfare effort will be focussed on a Mine Warfare Centre of Operations in Sesimbra and concentrate on building and enhancing the capability of MCM MUS and their payloads and tactical development of MCM. This will include continuing the work on data fusion and standardisation, developing command decision tools and C2 capabilities and techniques, within a combined allied force mix of MCM operating with the C2 nodes at range from the Mine Danger Area. Tactics will continue to be developed and evaluated. Common standards for MCM operations will be defined and developed as well as the underwater mission networks needed for operational success.

12. Building on the successes of REPMUS 22 it is intended in REPMUS 23 to fully develop an exercise wide Common Operational Picture, available at all exercise C2 nodes, ashore and afloat, and disseminated to wider authorities. It will also be an objective to expand the process for passing tasking and in some cases transfer of control of MUS between nodes and between allies.

**Industry Participation**

13. Industry will be key partners in the development and execution of REPMUS 23, their role will crucial and will continue, as it was for REPMUS 22 to be through national sponsorship rather than by direct entry through NATO or other mechanism. NATO may however act as a broker to connect interested and relevant industry to the right national sponsorship.

**Criteria for Industry Participation in REPMUS 23**

1. The participation of contractors and industry will be on the understanding that participation of any industry entity in REPMUS 23 will not create any liabilities or obligations on the part the Host Nation, Portugal or of any NATO entity.

2. The criteria and policy for allowing personnel from industry to participate directly in exercise REPMUS 23 will fall into two categories as follows:

    a. **Directly contracted industry personnel supporting a national MUS development programme:**

        i. Personnel in this category are those who form part of a contract arrangement between industry and the Navy or MOD of the contracting nation.

        ii. Such personnel will be treated like other military or MoD personnel from the nation concerned and can attend all planning or operational briefings and meetings and be allowed to work within the confines of the REPMUS exercise unescorted.(specific national rules will apply for embarkation to warships and government owned vessels).

iii. Such personnel must be cleared to the same basic security level as other Military and MoD staff from the contracting nation.

iv. It will be assumed that all data sharing, IPR provision and liability issues are inherently covered in the contract arrangements between the nation and the industry contracted.

v. Non-Disclosure Agreements will not be required as this is considered to be inherent in the contractual arrangements between the industry entity and the contracting nation.

vi. Nations which have personnel contracted that do not meet the requirements above, must bring this to the attention of the REPMUS Planning team.

b. **Industry sponsored to attend by a participating nation:**

i. The participation of sponsored industry is limited to industry headquartered in NATO nations, those of host nation, Portugal, invited nations, and those of official NATO MUSI partner nation participants, unless otherwise specifically approved by the REPMUS 23 XPG directing the exercise.

ii. Personnel in this category are those from an industry entity invited by a sponsor nation to attend to demonstrate or integrate a specific system into REPMUS in order for it to be evaluated by all participants. This may be at the industry partner's own expense or financially supported by the sponsoring nation.

iii. Such personnel can be invited by the sponsor nation to attend specific planning and operational briefings where they are pertinent to the system being demonstrated and its integration into the exercise. Whilst such personnel may be security cleared, this will not be mandatory, however, Sponsor nation must provide a NATO / Military / MoD escort at all times that such personnel are on exercise sites ashore and afloat.

iv. Sponsored Industry personnel may be asked to sign a Non-Disclosure Agreement undertaking not to disclose sensitive or commercial information not directly related to the demonstration of their specific system, which they may learn or be exposed to during the exercise.

**POCs.**

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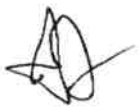

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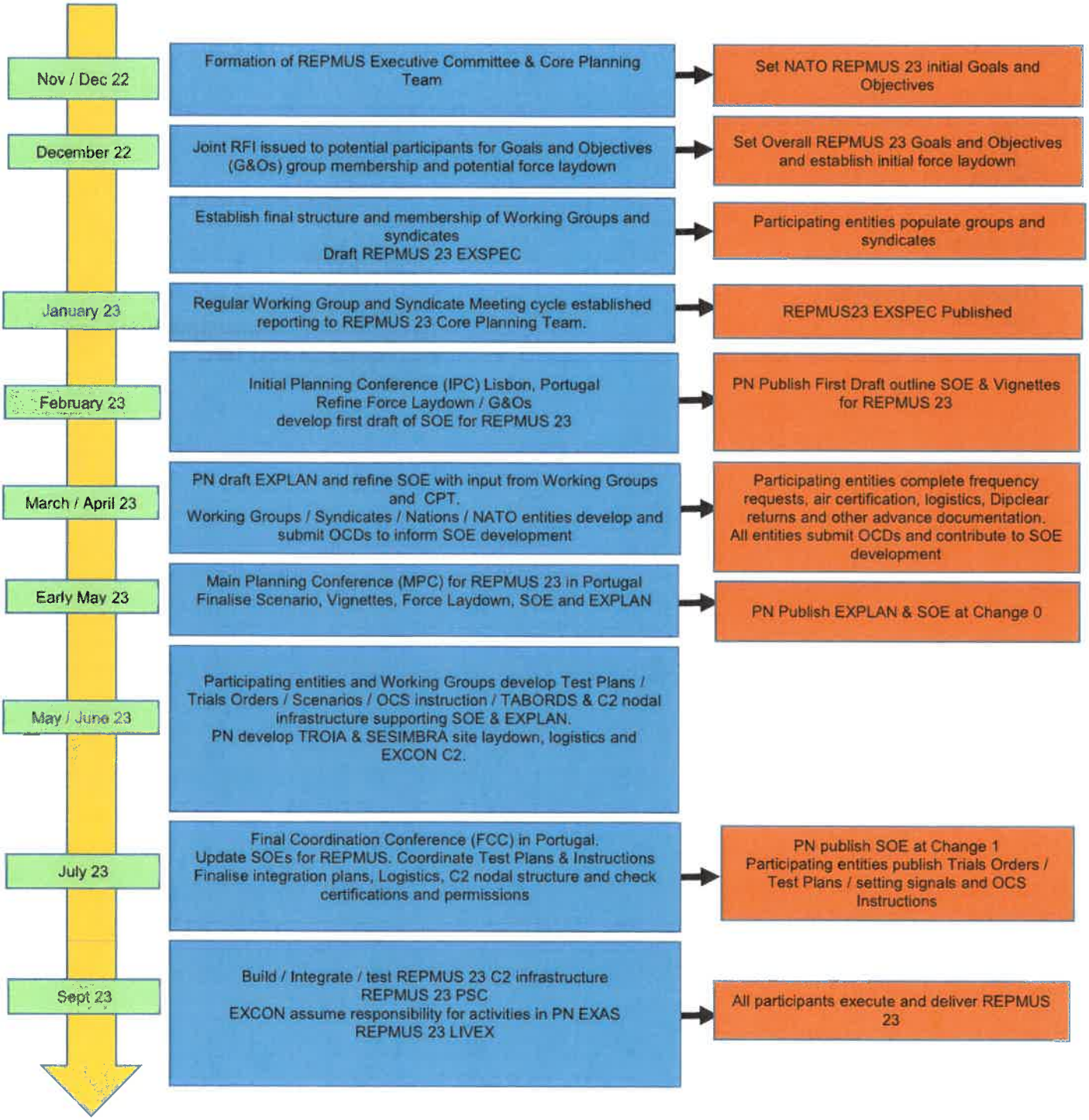
## REPMUS 23 Outline Planning Cycle



## REPMUS 23 Working Group Construct