LCDR (OF-3) Florin CONSTANTINOIU (ROU N)
Oceanography staff officer

Building a Recognized Environmental Picture for COP integration present and future

CNE 2024

AGENDA

NATO MGEOMETOC COE

COE PROJECTS

REP CONCEPT

REP EXAMPLES

FINAL REMARKS & WAY AHEAD

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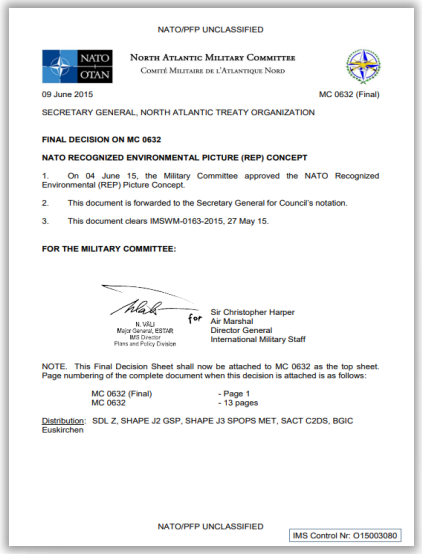
ACTIVITIES AND DIAMOND EVENTS



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NORTH ATLANTIC MILITARY COMMITTEE
COMITÉ MILITAIRE DE L'ATLANTIQUE NORD

09 June 2015 MC 0632 (Final)

SECRETARY GENERAL, NORTH ATLANTIC TREATY ORGANIZATION

FINAL DECISION ON MC 0632

NATO RECOGNIZED ENVIRONMENTAL PICTURE (REP) CONCEPT

1. On 04 June 15, the Military Committee approved the NATO Recognized Environmental (REP) Picture Concept.

2. This document is forwarded to the Secretary General for Council's notation.

3. This document clears IMSWM-0163-2015, 27 May 15.

FOR THE MILITARY COMMITTEE:

for
N. VALI
Major General, ESTAR
IMS Director
Plans and Policy Division

Sir Christopher Harper
Air Marshal
Director General
International Military Staff

NOTE. This Final Decision Sheet shall now be attached to MC 0632 as the top sheet. Page numbering of the complete document when this decision is attached is as follows:

MC 0632 (Final) - Page 1
MC 0632 - 13 pages

Distribution: SDL Z, SHAPE J2 GSP, SHAPE J3 SPOPS MET, SACT C2DS, BGIC Euskirchen

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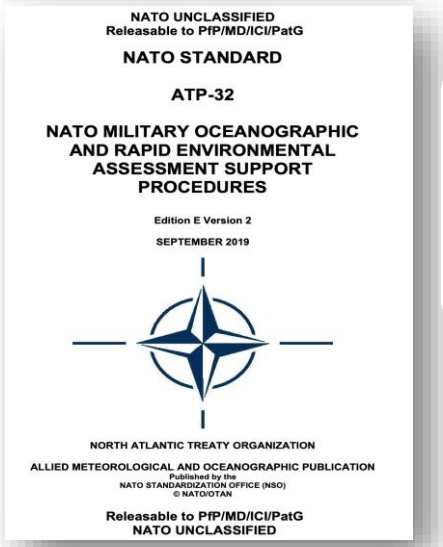

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NATO STANDARD

ATP-32

NATO MILITARY OCEANOGRAPHIC AND RAPID ENVIRONMENTAL ASSESSMENT SUPPORT PROCEDURES

Edition E Version 2

SEPTEMBER 2019

NORTH ATLANTIC TREATY ORGANIZATION

ALLIED METEOROLOGICAL AND OCEANOGRAPHIC PUBLICATION

Published by the
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Concept Development and Experimentation

- *REPMUS exercise*
- *CWIX exercise*
- *DACIA OPEX exercise*

Products and Services

- *Federated Mission Networking*
- *Develop a SWx cell in PRT AF*

Knowledge Management

- *Custodianship of ATP-32*
- *Revision of MC 0632 REP concept*
- *NATO Geo and METOC Orientation Courses*

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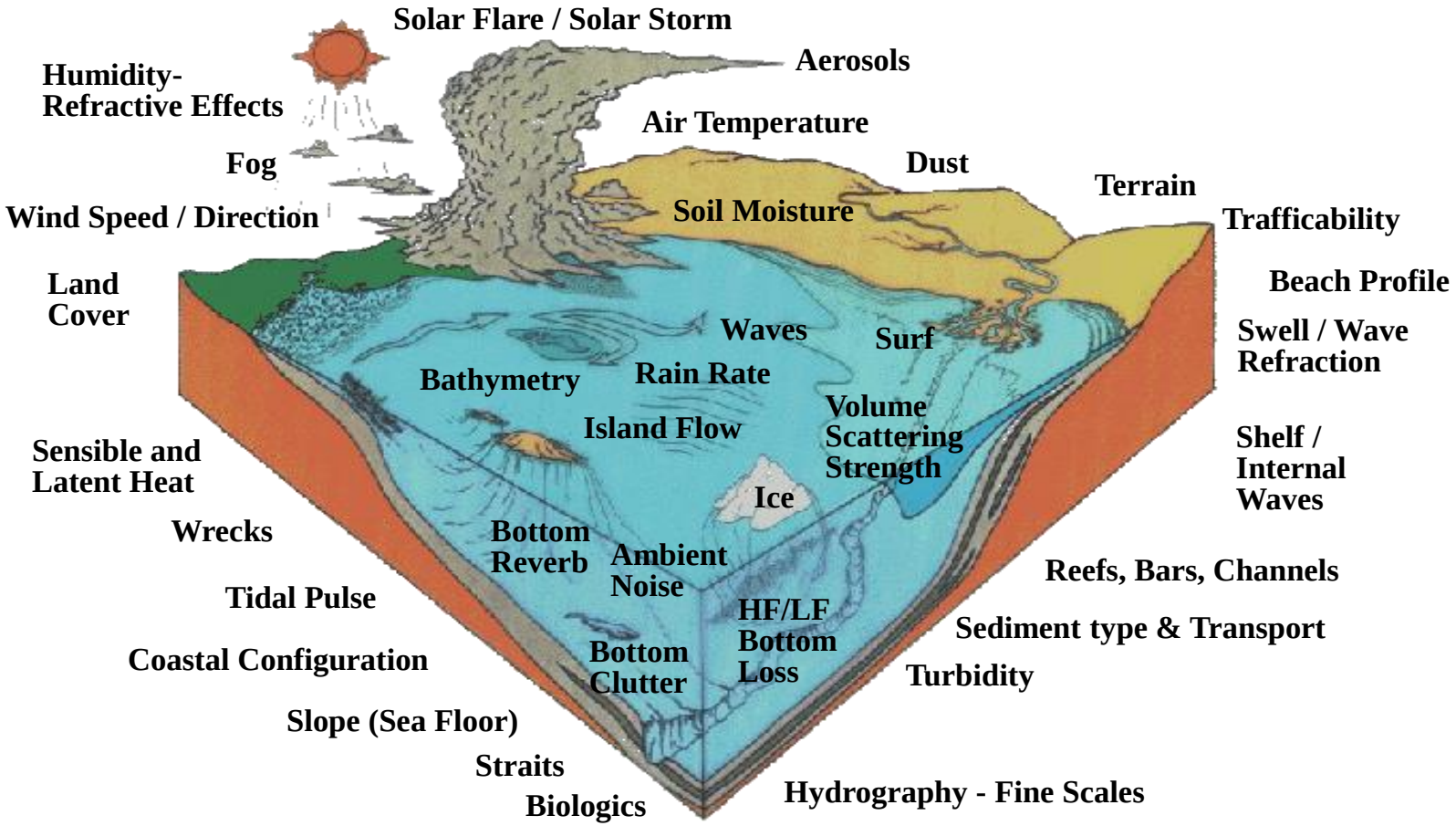
RECOGNIZED ENVIRONMENTAL PICTURE (REP)

Physical Environment



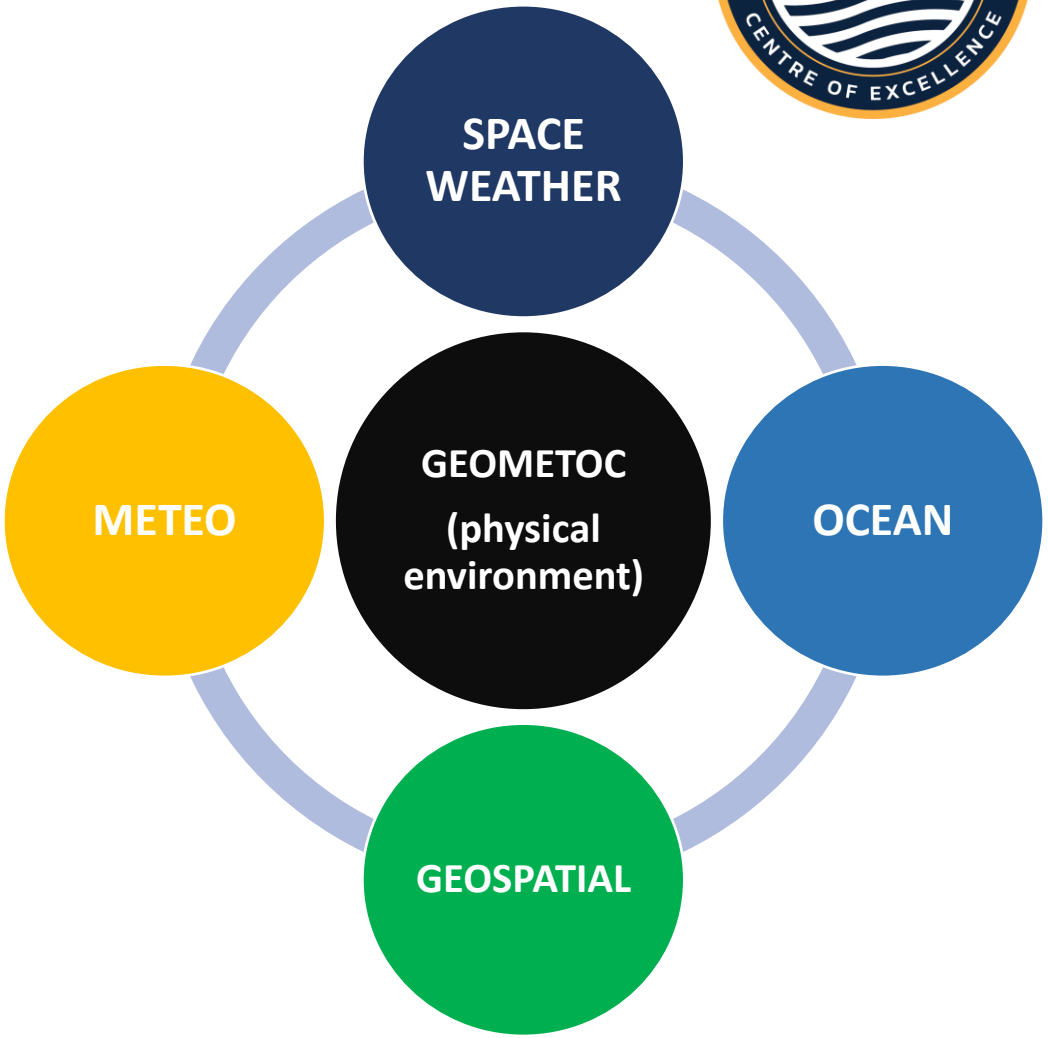
Characterization of the Physical Environment is a complex aggregation of GEOMETOC information …

Adapted from Lt Cdr RUSSAR Romain, GEO Support to Maritime Operations Lecture, NSO NGOC, APR 2019.

RECOGNIZED ENVIRONMENTAL PICTURE (REP)

What is the Recognized Environmental Picture?

"Complete and seamless depiction of Geospatial, Meteorological and Oceanographic (GEOMETOC) information, designated for the planning and conduct of joint operations in a specific area at a specific time and which supports the unity of effort throughout the battlespace."



Approval date: 2006-06-20
Source: NATOTerm Database (https://nso.nato.int/natoterm) record 841

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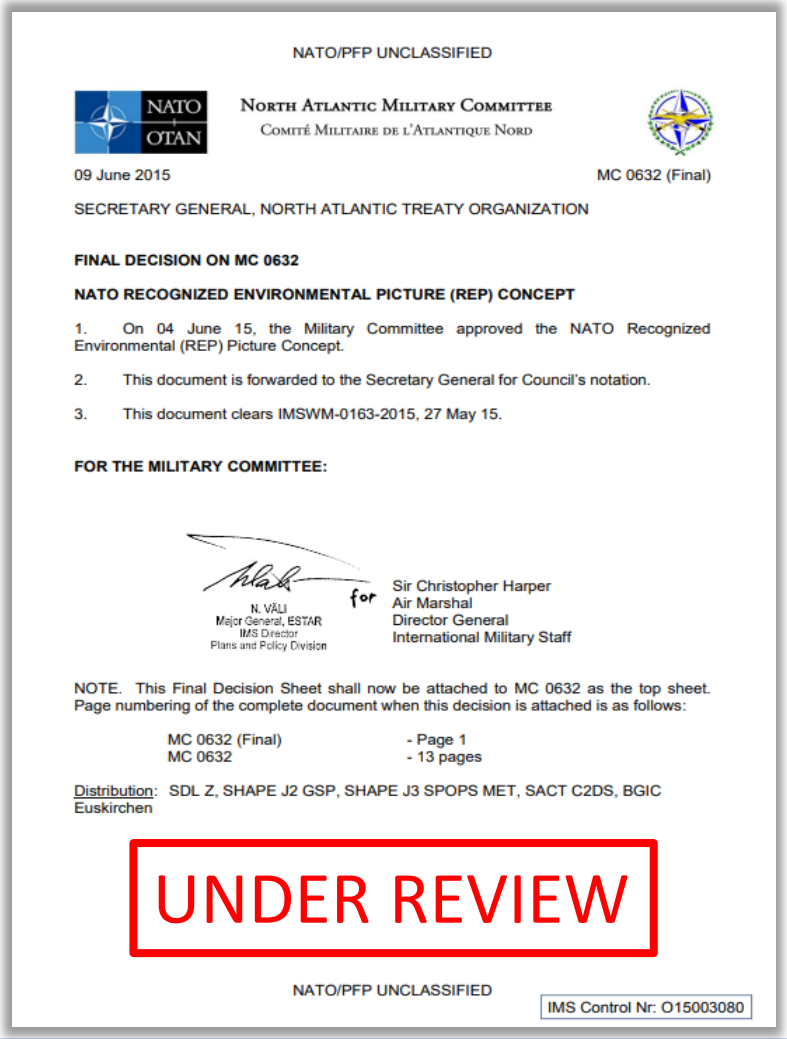
RECOGNIZED ENVIRONMENTAL PICTURE (REP) CONCEPT

MC 0632 (Policy)- NATO Recognized Environmental Picture (REP) Concept



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UNDER REVIEW

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REP provides **seamless**, **accurate**, **relevant**, **coherent** and **timely environmental information** within the NATO Common Operational Picture.

Requirements:

- Ability to disseminate GEOMETOC information and guarantee its accessibility by multiple users.
- Networks, tools, display mechanisms , doctrine… and training.

Without REP, operational **planning is incomplete**, and the conduct of **operations could be hampered or stopped** due to environmental limitations (i.e. mudslides, sandstorms, snowfall (visibility), flooding, etc, etc, etc).

Adapted from MC 0632 (NATO REP Concept), JUN 2015.

(Writing Team working in the review of NATO REP concept)

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REP CONCEPT

What are the Recognized Environmental Picture Principles?

- **Uniqueness** – " (…) single authoritative source of environmental information (…)"
- **Supportiveness** – "(…) focus on the strategic and operational levels initially, but must ultimately be able to **support (as appropriate) all levels of command** (…)"
- **Efficiency** – "(…) **incorporate data inputs from the various environmental data providers**, bringing them into an enhanced and efficiently coordinated service (…)"
- **Interoperability** – "Interoperability between **all NATO forces and commands at all levels** (…)"

Source: MC 0632

REP CONCEPT

What are the Recognized Environmental Picture Principles?

- **Professionalism and Technical Competence** – "(…) professional and **technically competent** Geospatial and METOC staff are required to advise the relevant Command (…)"

- **Provision Responsibility** – "(…) Geospatial and METOC staff will need to liaise and work closely together for the coherent provision and dissemination of environmental information and services for operations. (…)"

- **Adaptability** – " Where operational requirements exceed the individual products and services supplied by nations, there will be a need to create further operation and **mission tailored products** and services based on existing or newly procured source data. (…)"

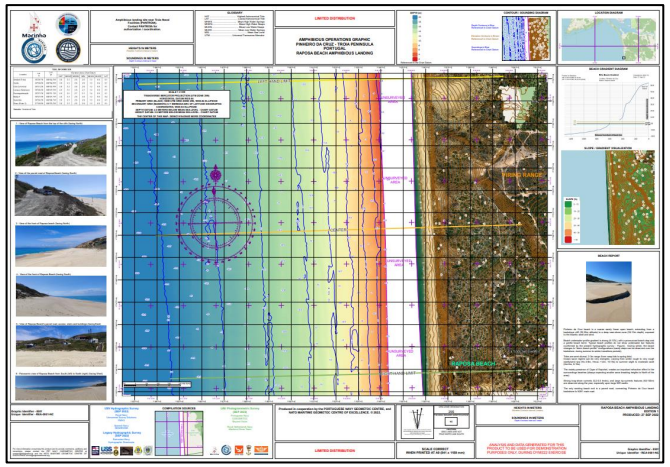
Source: MC 0632

REP PRODUCTS & SERVICES EXAMPLES

REP P&S that combine GEO and METOC

- **Amphibious Operations Graphic (AOG)**
  REPMUS REA product exclusively by MUS

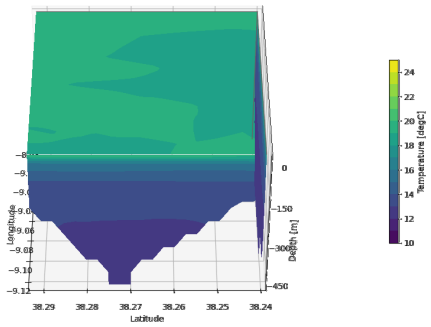
➢ Product Specification created by GMWG.
➢ Mainly GEO but also METOC and INTEL
➢ Tailored for tactical support



- **ASW REA SUPPORT PRODUCTS**

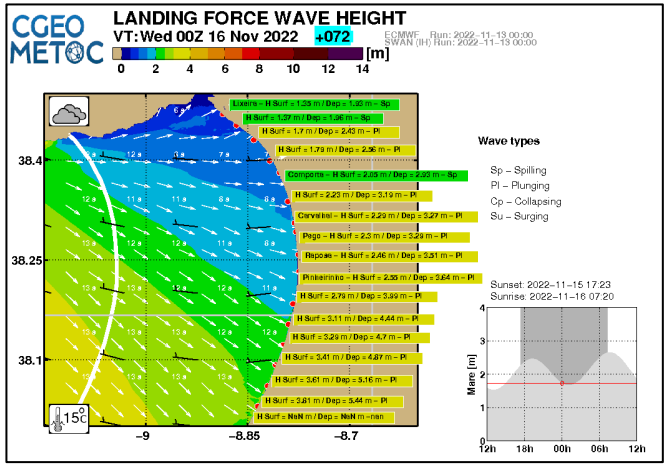
REMPUS REA Oceanographic support by MUS

➢ Used by ASW community.
➢ Mainly OC but also GEO
➢ Tailored for operational/tactical support



- **Landing Force Wave Height Service**

➢ PRT Navy Service
➢ Mainly METOC but also GEO
➢ Tailored for operational/tactical support



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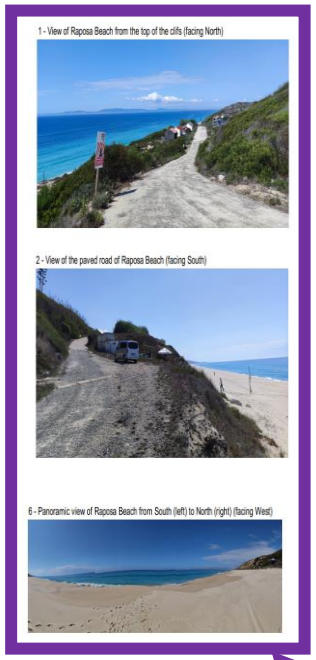
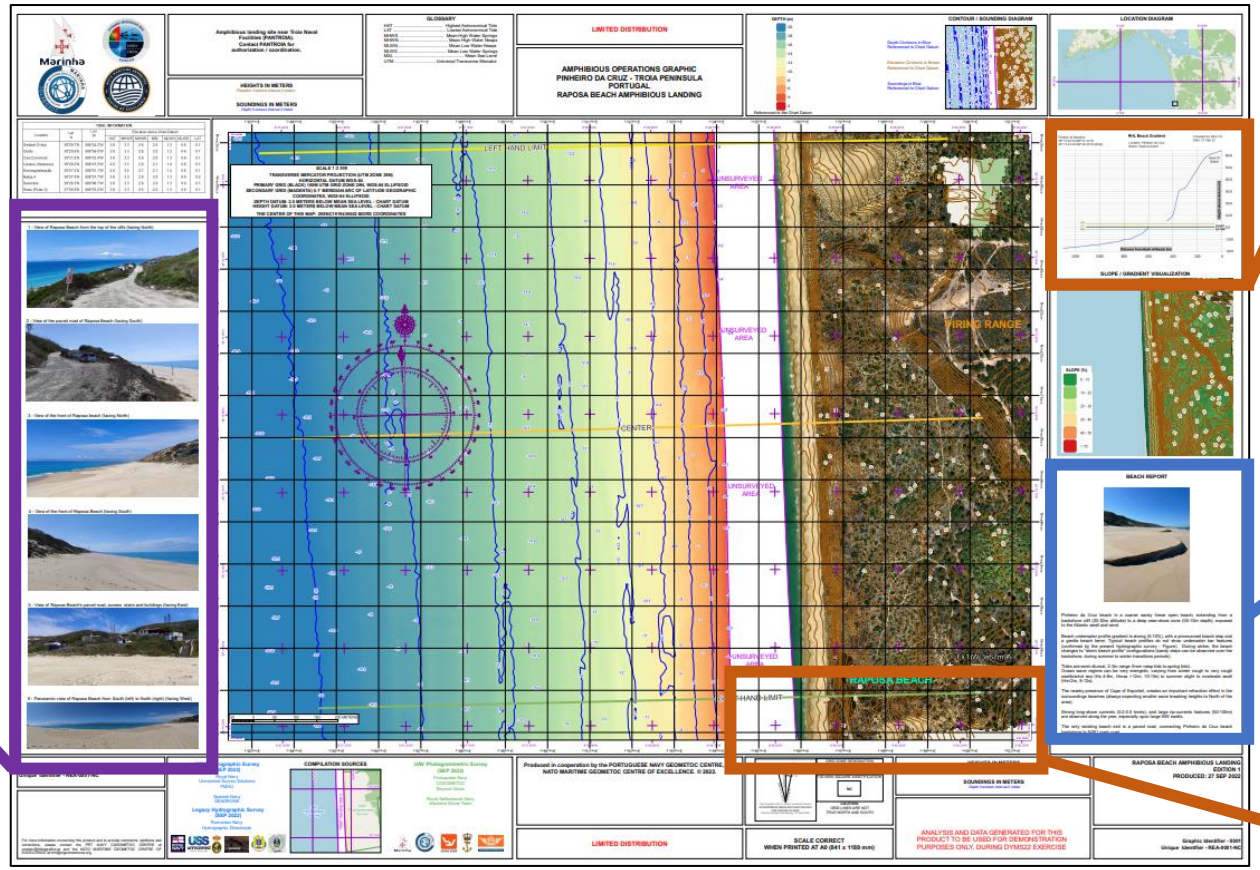
REP PRODUCTS & SERVICES EXAMPLES

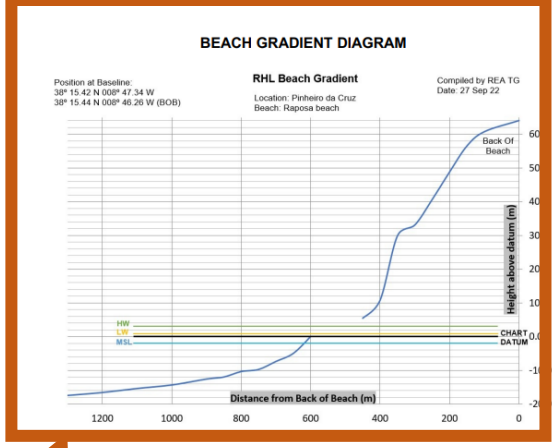
The Amphibious Operations Graphic (AOG) REPMUS 22



INTEL



GEOMETOC



Pinheiro da Cruz beach is a coarse sandy linear open beach, extending from a backshore cliff (20-30m altitude) to a deep near-shore zone (05-10m depth), exposed to the Atlantic swell and wind.

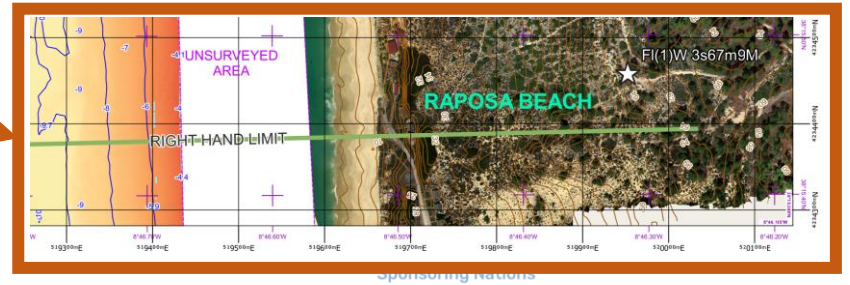
Beach underwater profile gradient is strong (5-10%), with a pronounced beach step and a gentle beach berm. Typical beach profiles do not show underwater bar features (confirmed by the present hydrographic survey - Figure). During winter, the beach changes to "storm beach profile" configurations (sandy steps can be observed over the backshore, during summer to winter transitions periods).

Tides are semi-diurnal, 2-3m range (from neap tide to spring tide).
Ocean wave regime can be very energetic, varying from winter rough to very rough swells/wind sea (Hs 4-8m, Hmax >12m, 10-15s) to summer slight to moderate swell (Hs<2m, 8-12s).

The nearby presence of Cape of Espichel, creates an important refraction effect in the surroundings beaches (always expecting smaller wave breaking heights to North of the area).

Strong long-shore currents (0.2-0.5 knots), and large rip-currents features (50-100m) are observed along the year, especially upon large NW swells.

The only existing beach exit is a paved road, connecting Pinheiro da Cruz beach backshore to N261 main road.



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Amphibious Operations Graphic (AOG) REPMUS 2023

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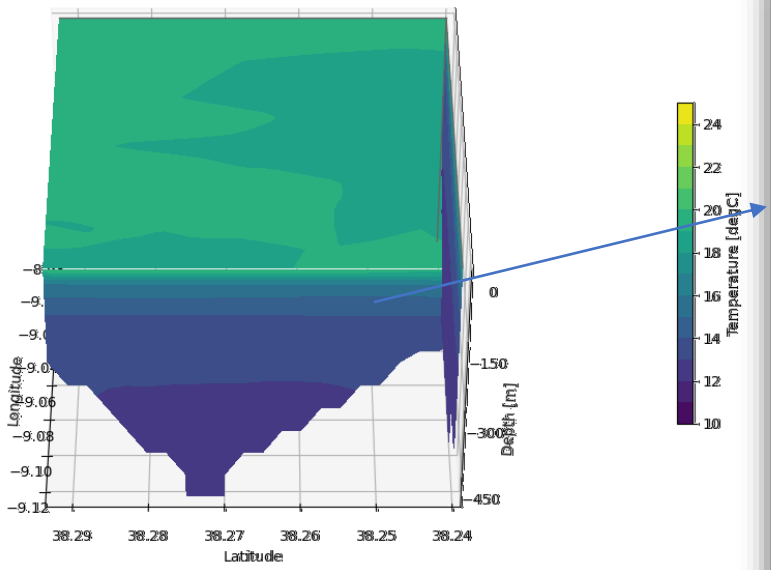
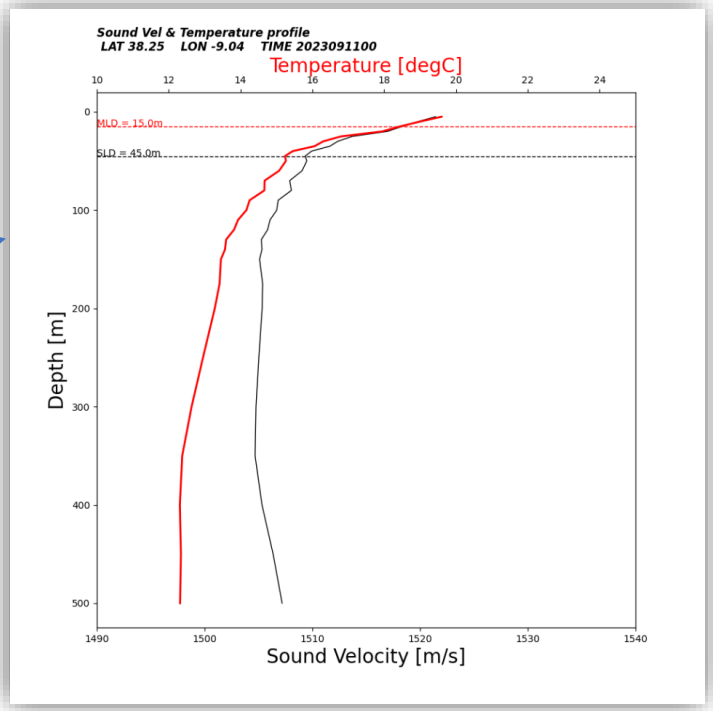
REP PRODUCTS & SERVICES EXAMPLES

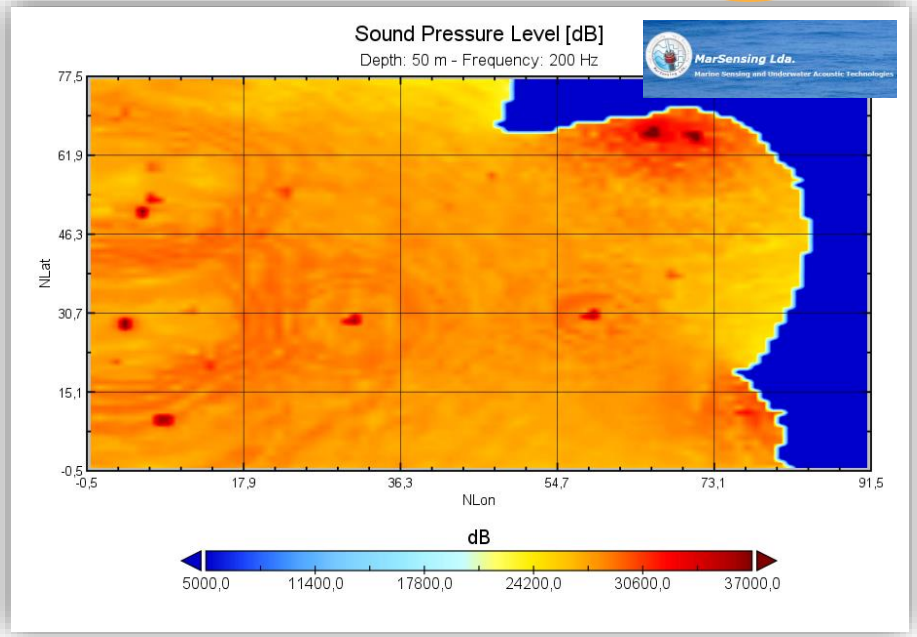
4D Oceanographic volume REPMUS 23



4D Oceanographic Volume (created every 24h)
OC PRODUCT



Sound velocity info
OC PRODUCT



Ambient noise maps of the area
OC PRODUCT and GEO

INTEROPERABILITY

netCDF format as the NATO standard to exchange GEOMETOC data

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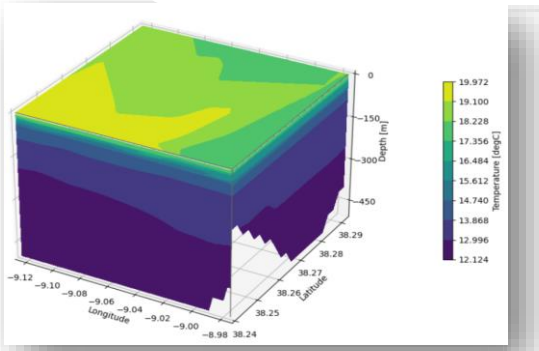
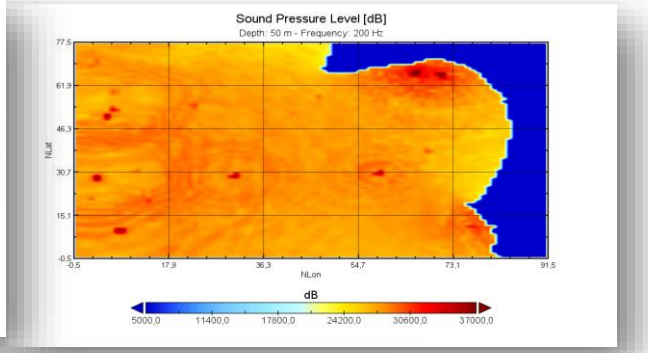
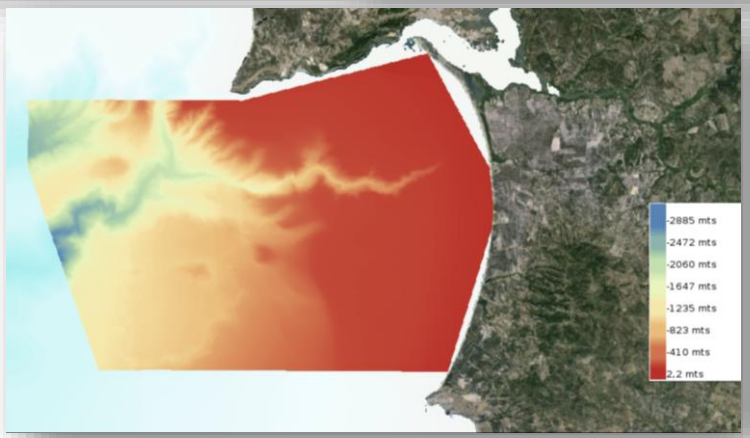
REP PRODUCTS & SERVICES EXAMPLES

4D Oceanographic volume REPMUS 23

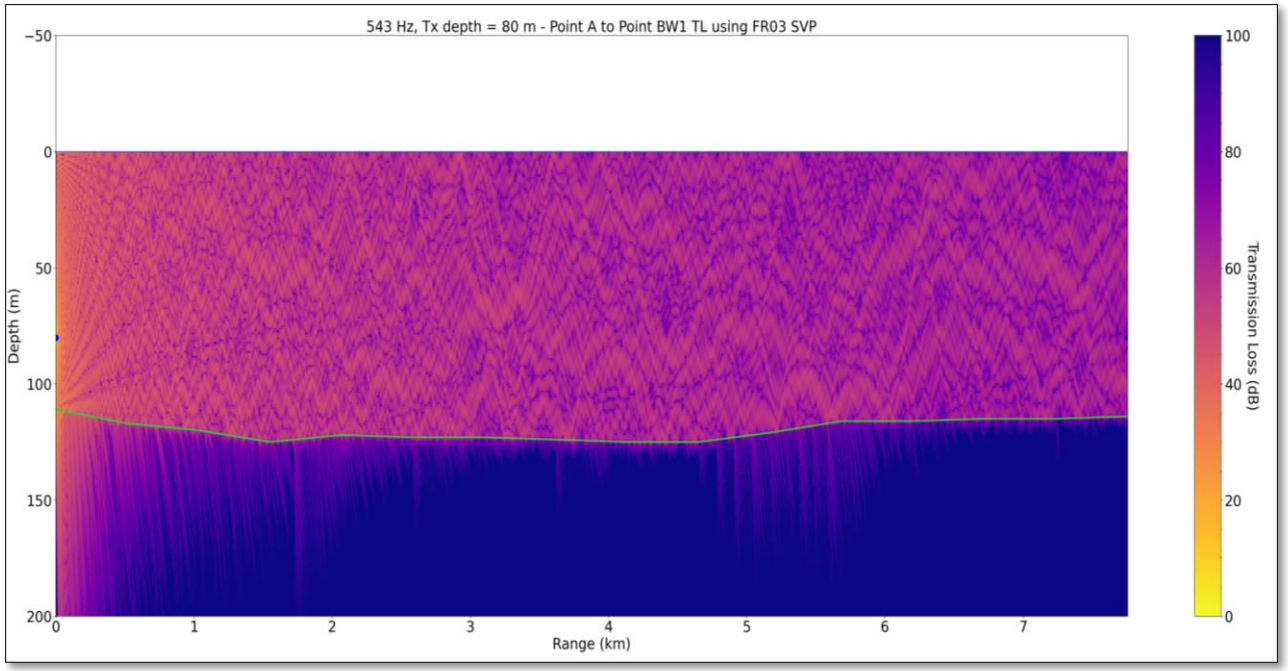
GEOMETOC data analysed to support sonar propagation computations







Sound transmission loss information



Final REP product

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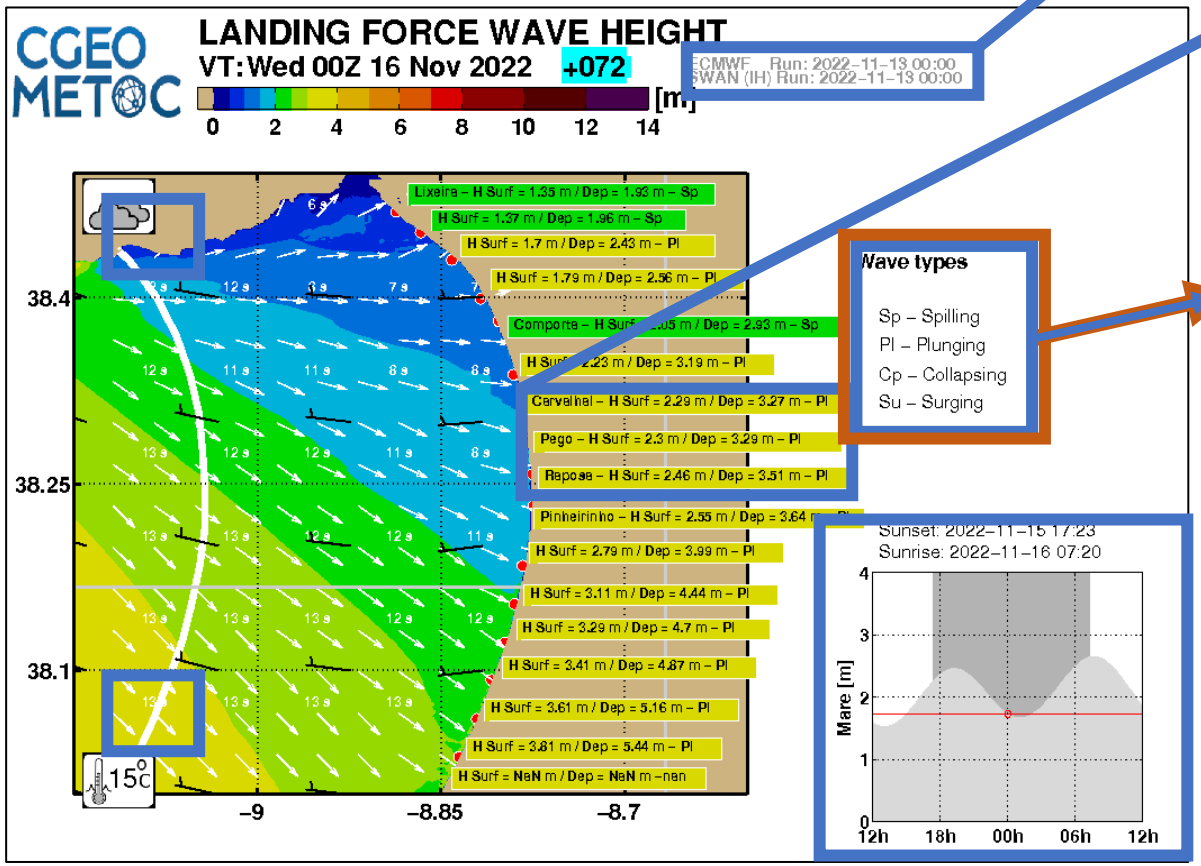
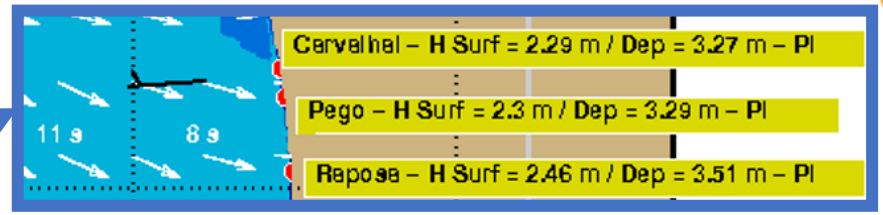
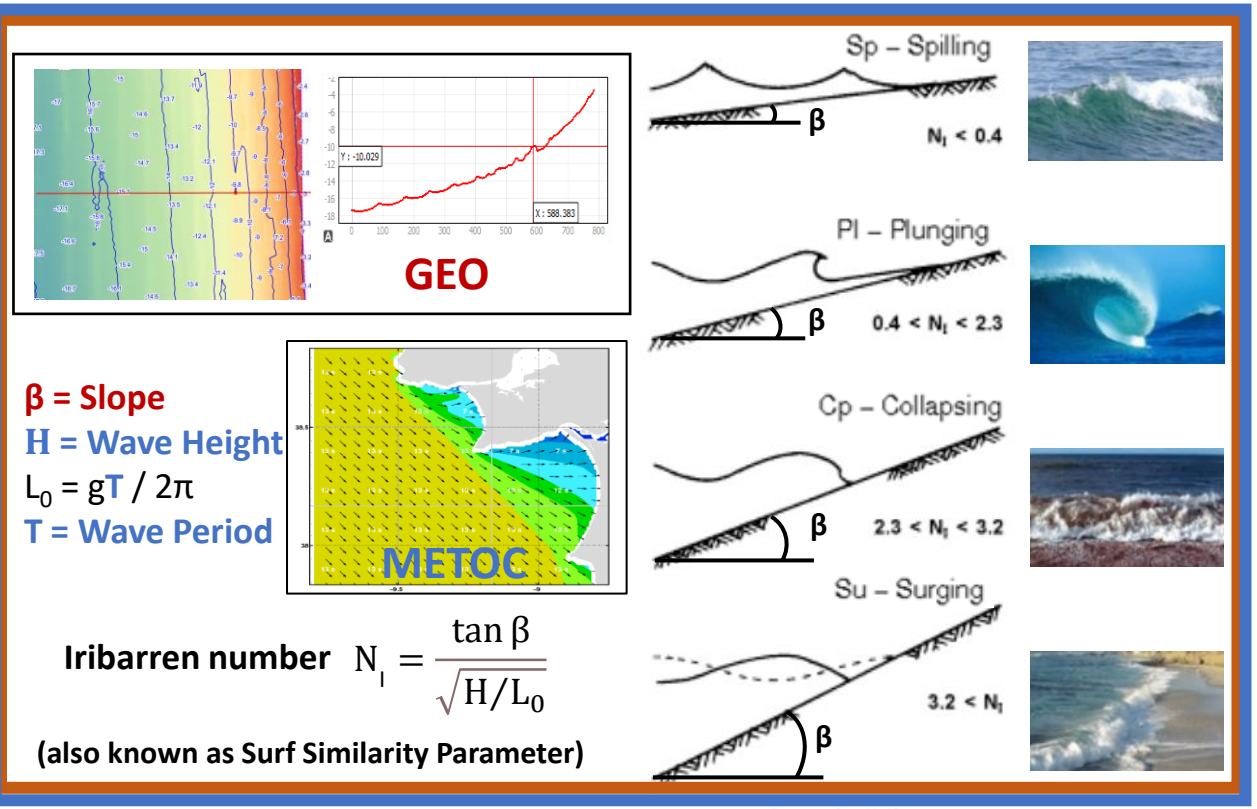
REP PRODUCTS & SERVICES EXAMPLES

The Landing Force Wave Height service



GEOMETOC





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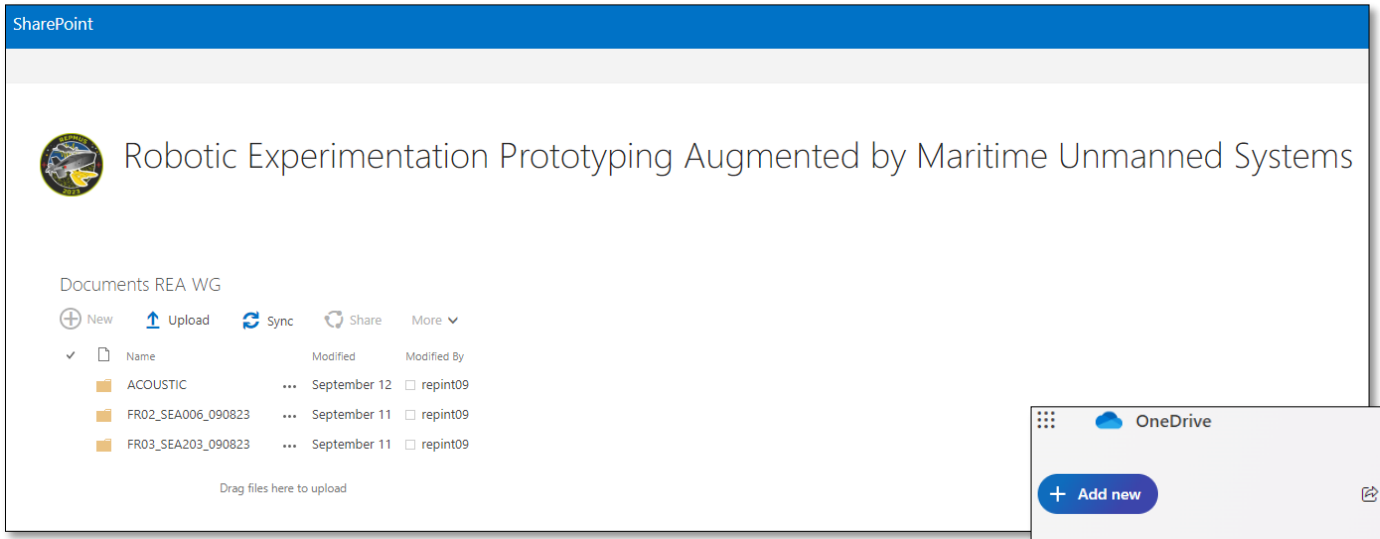
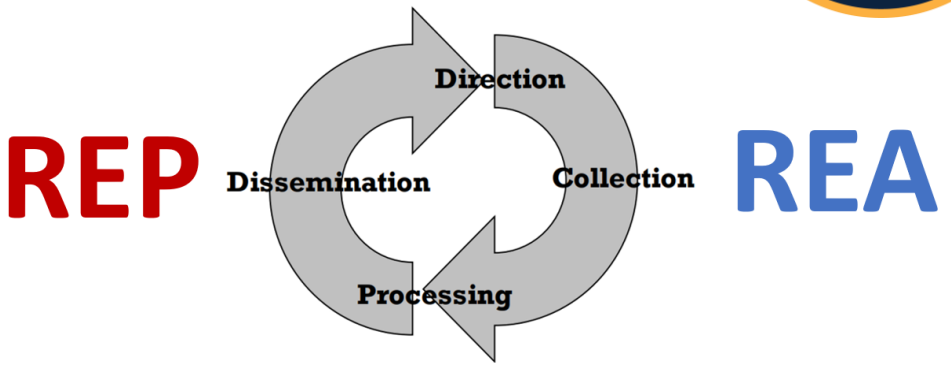
REP PRODUCTS & SERVICES

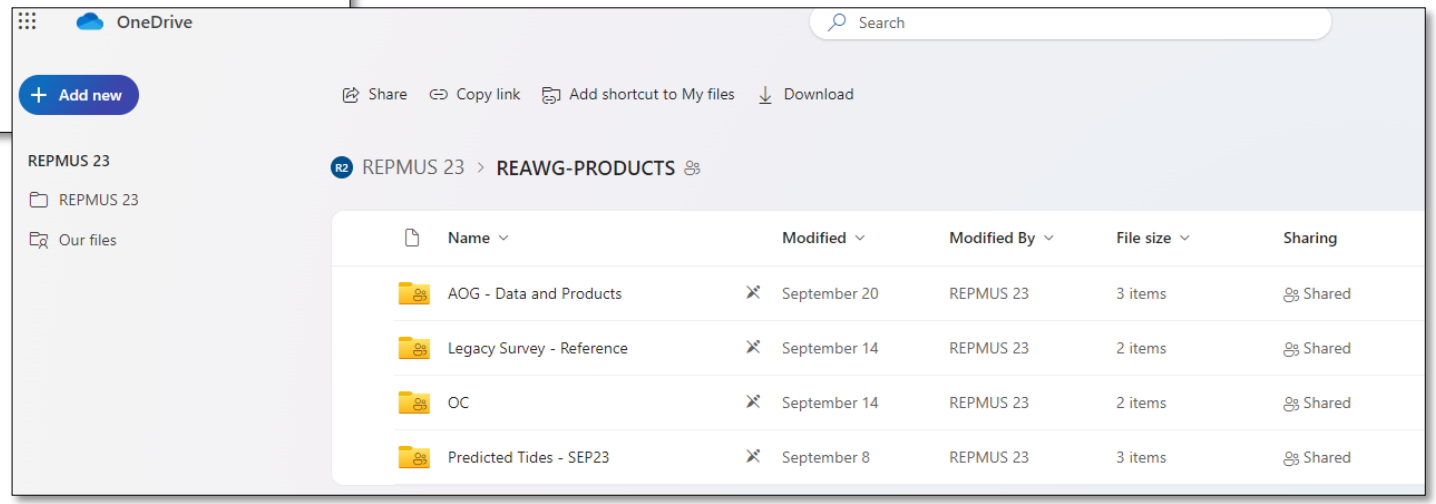
GEOMETOC information dissemination REPMUS23



PRT Navy REPMUS Portal



Simple and easy to use GEOMETOC information for decision making



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FINAL REMARKS & WAY AHEAD

- **NATO GEO and METOC communities have the "toolset" to assure that GEOMETOC data is provided, verified and designated** (GEOMETOC policies: MC 0296, MC 0594, and doctrine AJP-3.17, AJP-3.11).

- **The REP is not necessarily a layer or group of GEO and METOC layers available in a Common Operational Picture**, but instead should be an enhanced combination of both datasets, depicting impacts that the physical environmental might pose to the effectiveness of Multi-Domain Operations.

- **To achieve the REP, it is critical to ensure that GEO and METOC communities work collaboratively** to capture requirements, process data and deliver combined and tailored products, services and analysis.

- **MC 0632 is under review**, **aiming to align** the **REP Concept** with the most **recent developments and capabilities** (Nations and NCS) to **deliver the REP,** and **ATP-32** will be **reviewed to align** it with a larger **spectrum of support**.

- **Federated Mission Network (FMN) is "driving" the future IT systems interoperability standards and procedures**. Nations and NCS are affiliates in the FMN and GEOMETOC is one of the focus areas, with **CWIX (Coalition Warrior Interoperability eXploration, eXperimentation, eXamination eXercise) and REPMUS** exercises as the perfect "playground" for development and testing (OPEX interoperability testing of GEOMETOC products and services).

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NATO MARITIME GEOMETOC COE

Questions?

TRANSFORMING MARITIME ENVIRONMENTAL KNOWLEDGE

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