Cyber-MAR: An Overview

About | Project Facts

Title: Cyber preparedness actions for a holistic approach and awareness raising in the MARitime logistics supply chain.

Topic: SU-DS-2018: Cybersecurity preparedness-cyber range, simulation and economics

Contracting Authority: European Commission H2020

Project ID: 833389

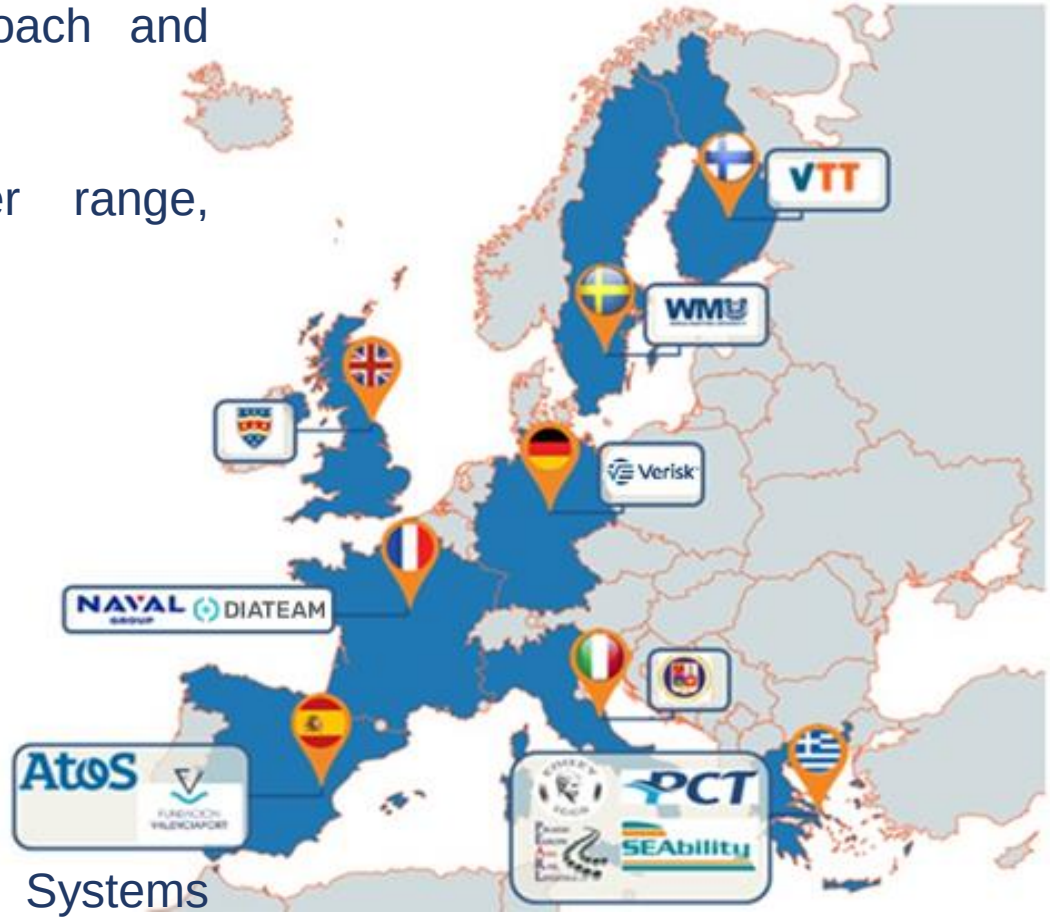
Funded scheme: IA – Innovation Action

Duration: From 2019-09-01 to 2022-08-31

Total cost: EUR 7 154 505.00

EU contribution: EUR 6 018 367.507

Coordinator: Institute of Communication and Computer Systems (ICCS), Greece



Challenges & Goal

- **Maritime information systems** in many cases designed without accounting for the **cyber risk**
- **Digital infrastructure** has become essential & critical to the **safety** and **security** of shipping and ports
- Importance of **handling cyber preparedness** as a highly prioritized aspect is paramount
- Estimation of accurately cybersecurity investments based on valid risk and econometric models

Cyber-MAR ultimate goal unfolds in **two main directions**:

Establishing a "**cyber ecosystem for preparing of cyber attacks**"

Estimating the **impact of cyber-attack** from a financial perspective and supporting the **undertaking of prompt decisions**

Cyber-MAR Key Objectives (1/2)

O1. Enhance the **capabilities** of cybersecurity professionals and **raise awareness** on cyber-risks

Deploy Cyber-MAR cyber range, training modules through LMS, improvement in response times in specific resilience metrics

O2. Assess cyber-risks for operational technologies (OT)

Maritime Cyber-Risk Assessment deployment and integration in Cyber-MAR platform

O3. Quantify the **economic impact** of cyber-attacks across different industries with focus on **port disruption**

Quantify economic risk in terms of Time-to-Recover or Product Value at Risk, integration in Cyber-MAR platform

Cyber-MAR Key Objectives (2/2)

O4. Promote **cyber-insurance market maturity** in the maritime logistics sector (adaptable to other transport sectors as well)

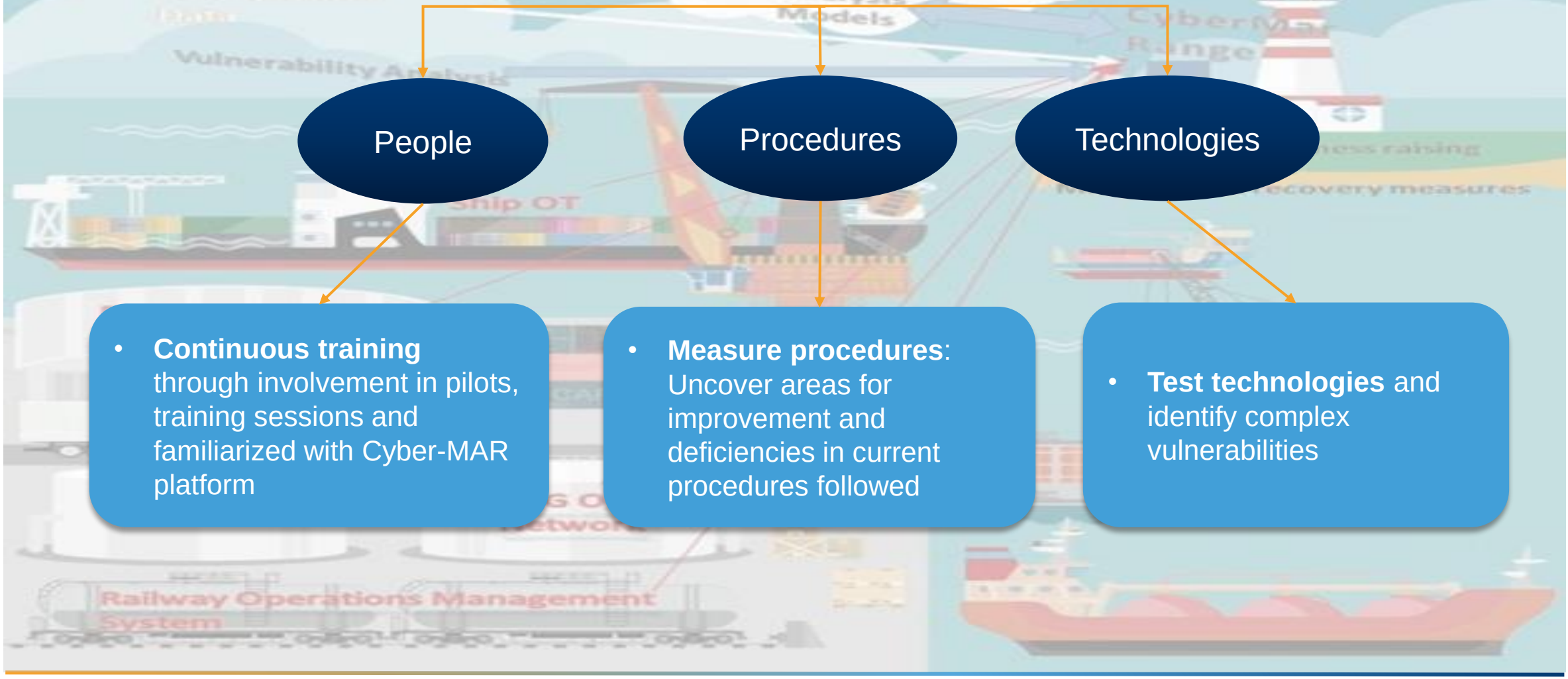
Develop recommendations based on findings and outcomes from Cyber-MAR pilots and simulations

O5. Establish and **extend** CERT/CSIRTs, competent authorities and relevant actors **collaboration** and **engagement**

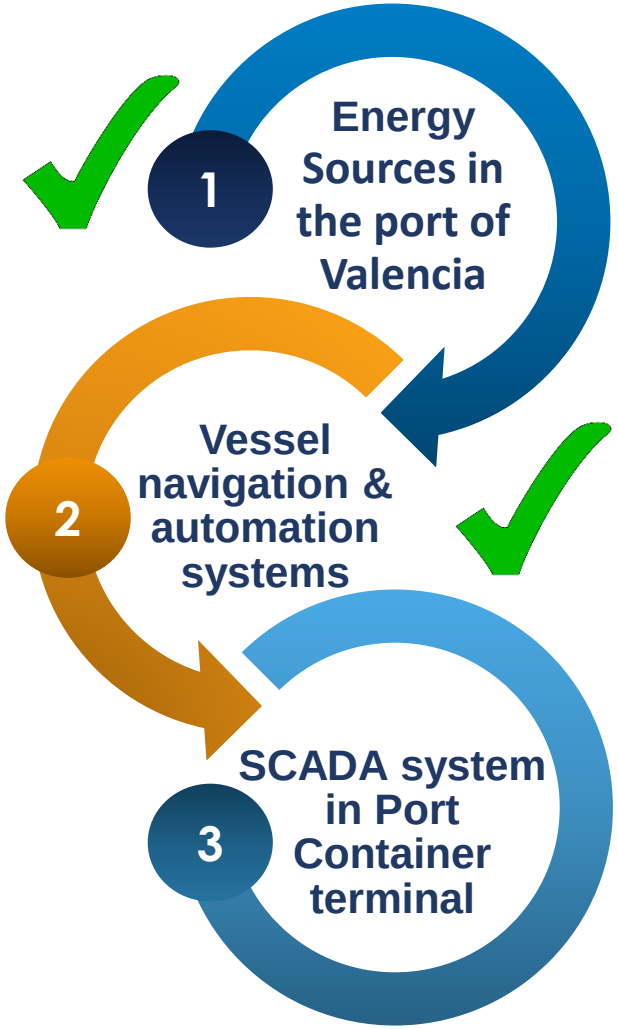
Create a maritime Malware Information Sharing Platform (MISP) community, engage CERT/CSIRTs in Cyber-MAR activities

Cyber-MAR Concept & Methodology

Cyber-MAR takes advantage of cyber range environment and adopts a three-tiered approach in:



Pilot Scenarios



The Cyber-MAR platform was applied to simulate **the electrical grid of the port of Valencia**, including protocols for protecting the grid and crisis management after attack.

The Cyber-MAR platform was applied to simulate **a ship bridge cyber-attack**, including attack to control systems and calculating the impact on the port operations and wider econometric impacts

The Cyber-MAR platform will be applied to simulate **a SCADA attack to the Port Container Terminal of Piraeus Port**. In particular, the consequences of a cascade effect extending the attack to the railway operator network.

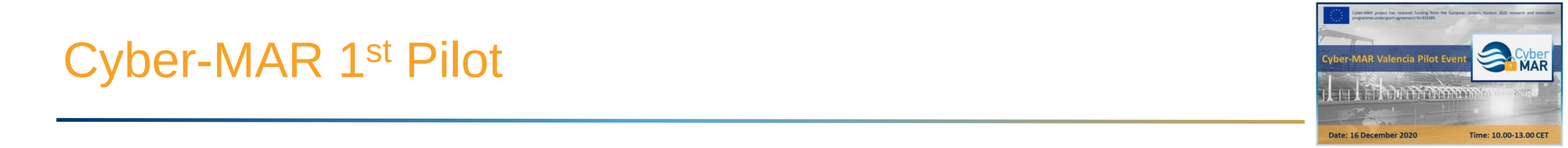
Cyber-MAR 1st Pilot

Testing and validating an initial version of the Cyber-MAR system in the scope of a cyber-attack scenario on the port authority's electrical grid, in the **Port of Valencia**.

Simulation of a remote access attack on the IT and OT infrastructure, and energy grid.

- cut off the power supply to the port, by shutting down the grid management OT system.
- simulated a Ransomware attack triggered by the Command & Control server, that cryptolocked all workstations within the infrastructure of the port

Cyber-MAR 1st Pilot



Recording available on YouTube:
http://youtu.be/7dUEBOc_Gik

Pilot Objectives:

1. Assess the electrical grid system to adapt it to avoid any kind of cyber-attack
2. Be prepared to mitigate and restore the system in the case of having an attack
3. Train port personnel in the necessary skills in cyber threats and quick response in case of emergency
4. Test some of the components of the Cyber-MAR platform

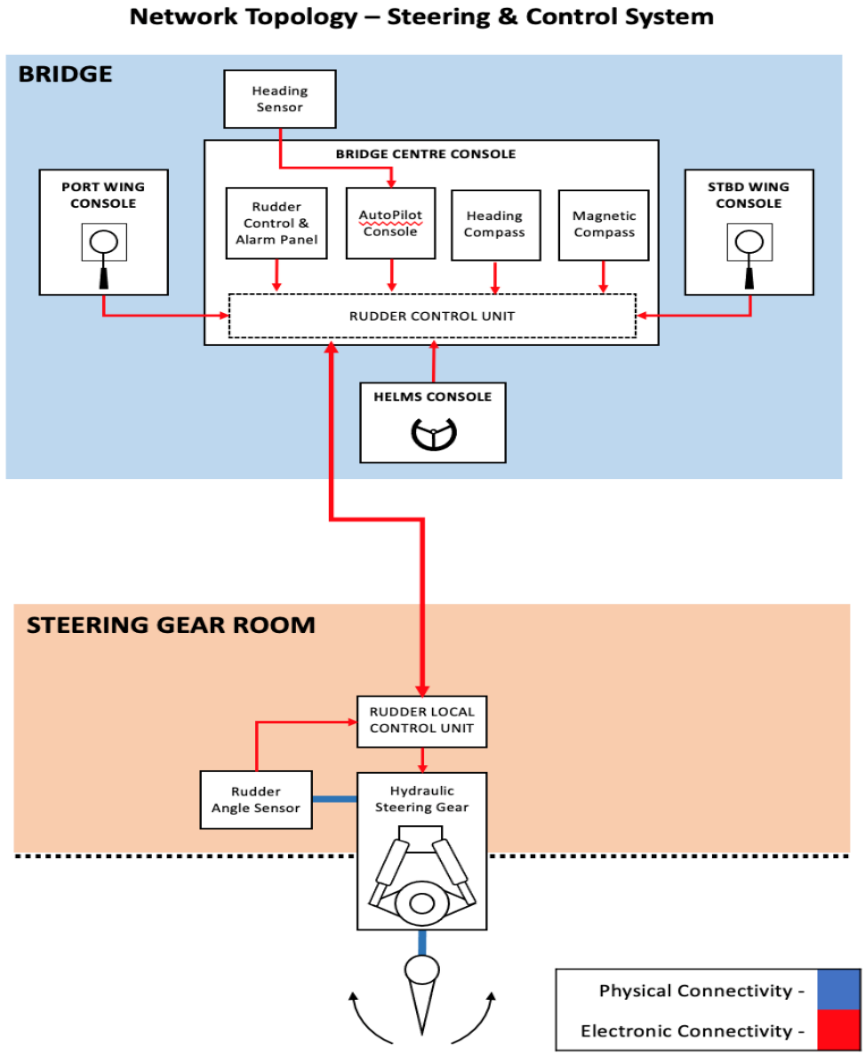
Cyber-MAR 2nd Pilot

The Vessel Pilot demonstrated how various elements of the Cyber-MAR solution are integrated allowing the platform to model a complex **ship bridge** cyber-attack and its impacts.

Simulation of a cyber attack that allowed the attacker to alter the course of a large container vessel and thus causing a blockage on the approach channel:

- Downloading and Propagation of Attack (within IT Infrastructure)
- Installing and Initiating the Attack on Vessel Control System
- Attack realisation and crew response

Cyber-MAR 2nd Pilot



Pilot Objectives:

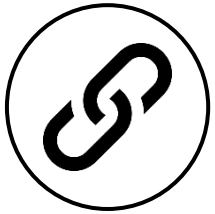
1. Demonstrate the consequences to a port terminal when a cyber attack targets a visiting vessel
2. Highlight the importance of robust cybersecurity practices on board ships to ensure safety and security of operations
3. Create simulations that can be used to raise cybersecurity awareness for seafarers
4. Test more components integrated into the Cyber-MAR platform

Expected Impacts

Impact on Resilience to Cyber-Threats & Data Privacy Breaches

Enhancement of the **resilience of target organizations** to new and emerging threats through the **identification of recurring or emerging patterns of cyber-attacks** and **privacy breaches** with a decent degree of accuracy.

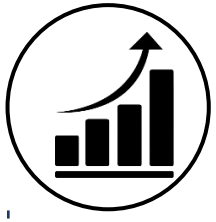
Impact on Supply Chain Efficiency



Cyber-MAR aims to offer the potential to **big players of logistics domain** to **join forces on estimating cyber-risk** and **mitigate** such **threats**, while **fostering open tools** that will improve the internal processes within each organization.

Impact on Appropriate Investments for Cyber-Security

Cyber-MAR focuses on the provision of a fully customizable and tailored view on the trade-offs, aims to **increase the available open tools** in number and variety, while offering an **intuitive integration to all** (physical and virtual) **IT components**.



Societal Impact

Cyber-MAR overemphasizes the importance of **accessible training infrastructures for cyber-defense**, in OT, transport and logistics domains and at the same time aims to contribute to the **standardization efforts** to make such issues prominent in the society.

www.Cyber-MAR.eu

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THANK YOU FOR YOUR ATTENTION

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