

# DEMONSTRATION 7

## Fusion of data gathered from different data sources

Speaker:

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# Slovenian CISE node & LS

- Cooperation Agreement : **signed in 2022**
- Node owner: **Slovenian Maritime Administration**
- Connected nodes (9): **EMSA, SATCEN, IT (ASI), FR, GR, ES, BG, DE, IT (GC)**
- Planned connections: **HR, EFCA**
- Cise services: **Vessel of Interest List, Area of Interest, Risk profile, Request for Operational Assistance (Assets), Location Document, Document**
- Legacy systems: **VTS Console/Pelagus/VTMIS**



# General - Use Case Scenario

- This **use case is principally intended to test the Area of interest (AOI) CISE Operational service** intended for use in the situation where a maritime authority or EU Agency connected to CISE has an interest in a specific maritime geographical area for security, safety or other reasons, and is requesting specific information that other participants may have in their legacy system about the area

## **Protection of critical maritime infrastructures in the Port of Koper + anchorages (AOI)**

- This CISE-ALERT scenario is used for testing the:
  - **sharing of the Area of interest and**
  - **receiving the requested specific information from contributors**



#StrategicCompass

## EU MARITIME SECURITY STRATEGY

### MAIN OBJECTIVES



Protect EU interests at sea - citizens, economy, infrastructure and borders



Protect our natural resources and the marine environment



Uphold international law, particularly the United Nations Convention on the Law of the Sea



React promptly and effectively to growing threats (e.g. cyber and hybrid threats)



Ensure relevant training and education to counter threats (e.g. cyber skills)

- One of the strategic objectives within the Action plan of the revised **EU Maritime Security Strategy** is Action point 3.1.3, indicating the use of CISE to exchange maritime surveillance information **to boost resilience and protect the Critical Maritime Infrastructure (CMI)**
- Protecting **CMI is one of key objective of the EUMSS** because these infrastructures are vulnerable to various threats
- **Top political priority** after September 2022 (attacks on the Nord Stream pipelines in the Baltic sea)



# Critical Maritime Infrastructure - CMI

- Use case applicability according to the types of CMI:
  - **Shipping** (port, installations, traffic separation schemes, channels, lighthouses...)
  - **Energy** (fixed installations, oil/gas platforms, windfarms, underwater pipelines and electricity cables)
  - **Communications** (fiber optics cables)
  - **Fishing** (ports for fishing, aquaculture farms)
  - **Marine biodiversity**

## Maritime domain Awareness (MDA)

understanding of anything that could impact security, safety, the economy or the marine environment

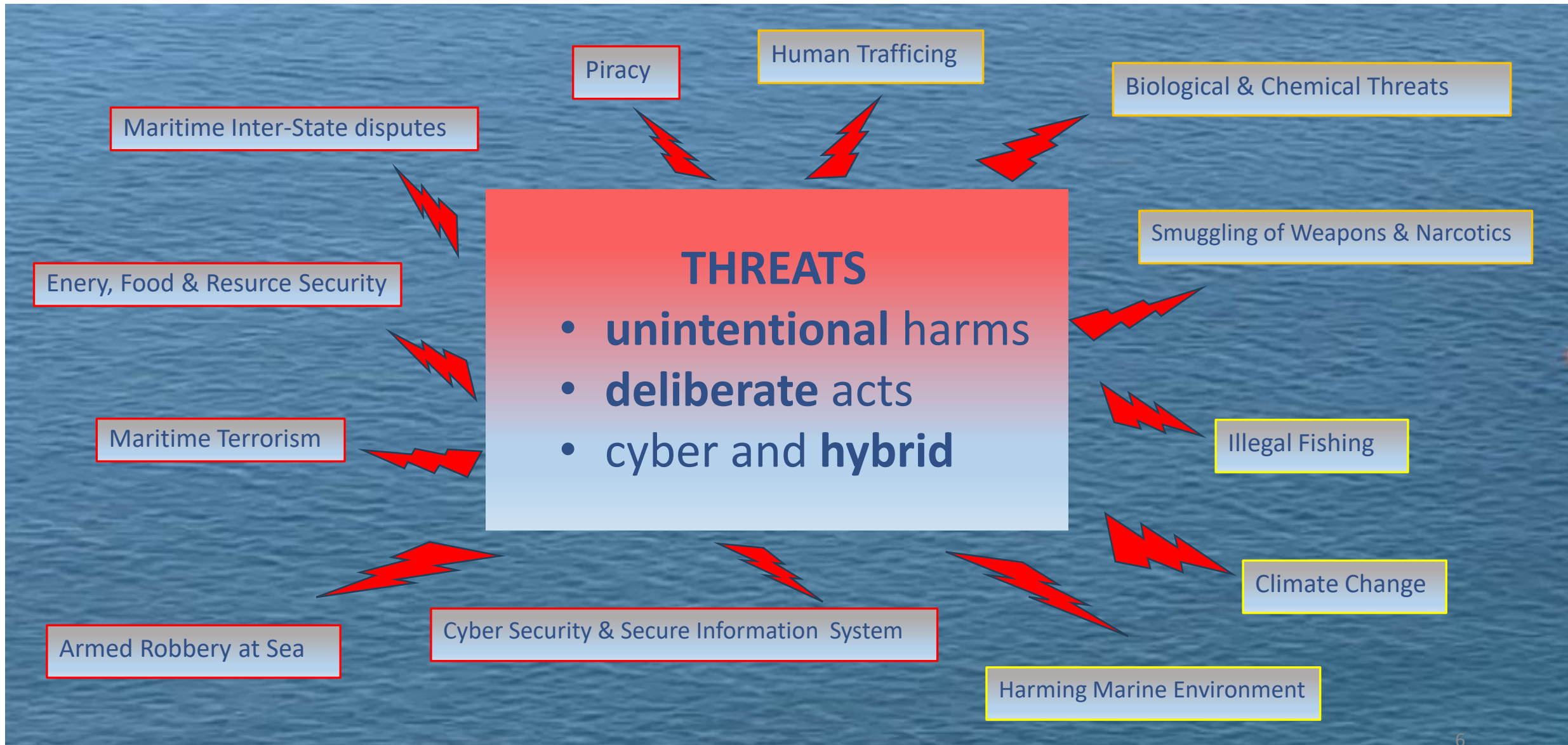
- routing and position data, AIS
- radars and CCTV
- patrols, satellites, unmanned vehicles
- identification of suspicious behavior and patterns
- Challenges:
  - **surveillance of small boats**
  - **surveillance under the sea surface**
  - **underwater vehicles and drones**







# Threats





# Reference Use Case

**Initiator CISE-ALERT partner: Slovenian Maritime Administration (MzI)**

**Applicable Use Cases (WP2): Use Case - Protection of critical infrastructures**

**Storyboard:** The Slovenian Maritime Administration (initiator) is interested to **perform the necessary checks using the specific data available through CISE** exchange mechanism about the activities/situations detected in the AOI which may raise suspicion such as:

- **presence of VOI in the AOI**
- **abnormal behaviors** of a vessel as sudden change of heading, sudden change of destination port, anomalous route, rendezvous with (small) vessels, loss of AIS while sailing ...
- **unreliable information** (e.g. AIS spoofing, AIS jamming, discrepancies between declared voyage and track of the ship...) of any vessel located in the AOI

Validity period of AOI is updated every 6 months. In case of availability of data or suspicious activities/situations detected MzI receive the information by the contributors.

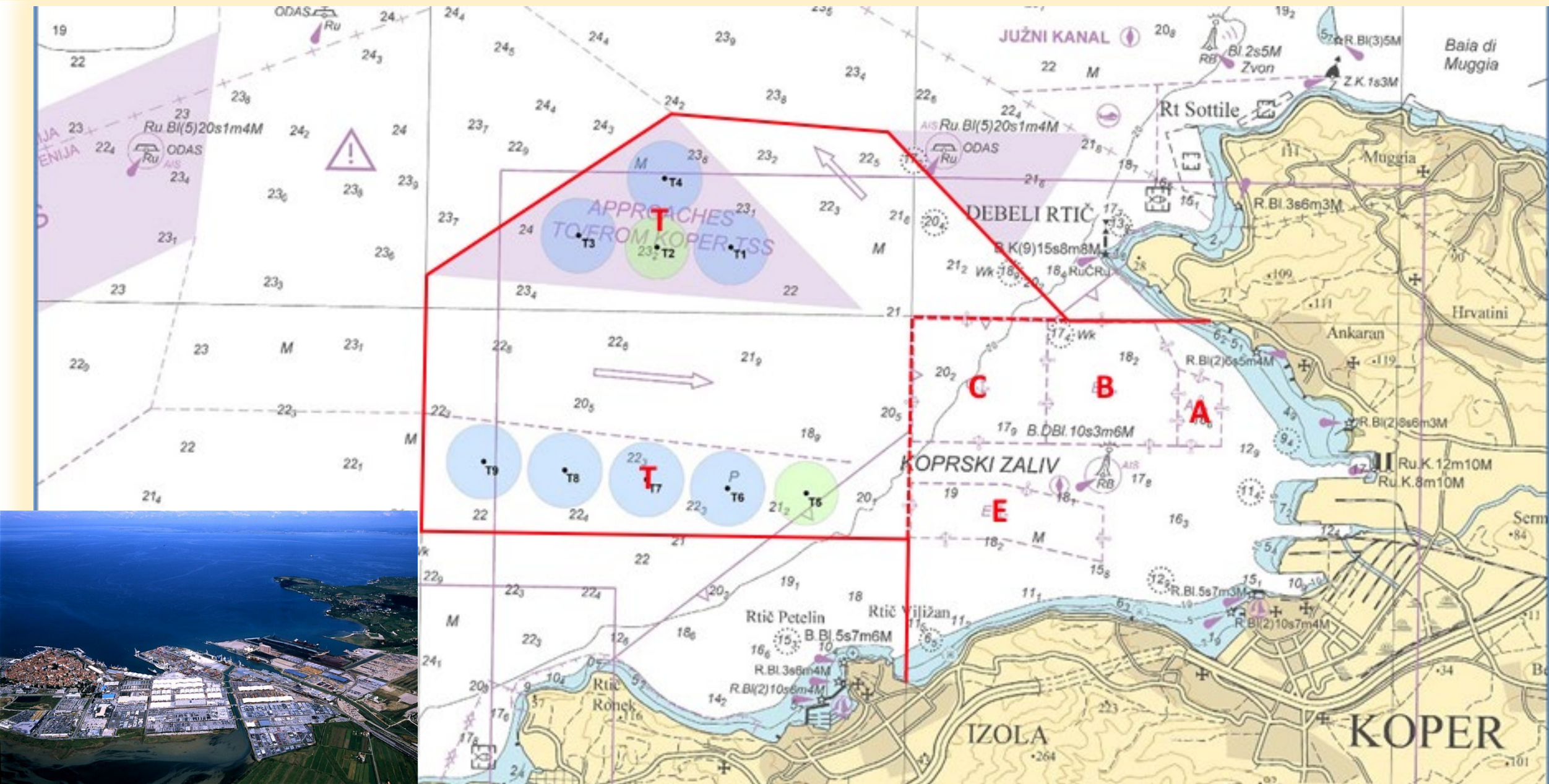
Involved CISE participant: HMOD, ASI, EMSA, SATCEN

Involved CISE-ALERT operational services: **AOI Service**





# Area of interest - anchorages & TSS







# Script

- 1) The Initiator (Mzi) **share an area of interest (AOI)** to CISE participants by defining a polygon, which serves to provide a geographical location of AOI.
- 2) First step is the **generation of AOI service** on sides of initiator and participant, then the push of AOI and the push response with available data notification is possible.
- 3) Focusing on needs related to the of Protection of critical infrastructure **MZI request a specific type of information** from the participants that it would like to be notified of, such as (list not exhaustive):
  - **presence of vessels of interest (VOI)** in the AOI
  - **report on event** (i.e. detection of any illegal activities, anomalous vessel behavior such as change of speed) in the AOI
  - **sensors data** (i.e. satellite images, video streaming by aerial assets) in the AOI and/or their derived products (vessel detection in satellite imagery, activity detection, etc.)



# Script

- 4) All the CISE participants that have available information about the AOI shared by the Initiator provide relevant data, such as:
  - **Satellite imagery (optical & radar data)**
  - **Satellite imagery analyses**
  - **Report on anomalies**
  - **Information about presence of Vessels of interest (VOI)**
- 5) The Initiator (Mzi) processes the information shared by CISE participants and performs the risk analysis based on data that enrich the actual national situational picture
- 6) The data received in AOI response are saved in the legacy system



# List of participants

CISE-ALERT partner	Role	Available CISE services	Dataset	Examples (i.e. request/response xml message)
Mzl	Initiator	si.nodesi.VTMadaptor.action.push.provider.aoi si.nodesi.VTMadaptor.action.subscribe.provider.aoi si.nodesi.VTMadaptor.action.push.consumer.aoi si.nodesi.VTMadaptor.action.subscribe.consumer.aoi  si.nodesi.wmsadapclient.location.document.pull.consumer	AOI_REQ_VOI  AOI_REQ_ANOMALY  AOI_REQ_SATELIMAGES AOI_REQ_SATELRADARDETECTION	(link to the CISE-ALERT Teams folder where xml examples are stored)
EMSA	Contributor	eu.emsa.emsawmsprovider.locationdocument.pull.provider	AOI_RESP_SATELIMAGES AOI_RESP_SATELRADARDETECTION Location Document service	(link to the CISE-ALERT Teams folder where xml examples are stored)
Satcen	Contributor	eu.satcen.sim-satcen.action.subscribe.consumer eu.satcen.sim-satcen.action.push.provider	Document	(link to the CISE-ALERT Teams folder where xml examples are stored)
HMOD	Contributor	gr.nodegr.nss-adaptor.subscribe.consumer gr.nodegr.nss-adaptor.push.provider	AOI_RESP_VOI AOI_RESP_ANOMALY	(link to the CISE-ALERT Teams folder where xml examples are stored)
ASI	Contributor	it.nodeit.sim1.action.subscribe.consumer it.nodeit.sim1.action.push.provider	AOI_RESP_SATELRADARDETECTION	(link to the CISE-ALERT Teams folder where xml examples are stored)



# Trial execution – defining AOI

The screenshot displays the VTSConsole interface. The 'Resources' menu is open, with 'AOI AOI Area' highlighted. The map shows a coastal area with a blue polygon representing an AOI. The 'AOI Editor' dialog is open, showing the 'Points' table and 'Validity Period' settings.

**Resources Menu:**

- Responsibility Areas...
- AOI AOI Area**
- PMIS-ANP Areas...
- DR Dead Reckoning Areas...
- Anchorage Areas...
- Buoys...
- Control Areas...
- Depth Areas...
- Guard Lines...
- Obstacle Areas...
- Reference Points...
- Routes...
- Notes...

**AOI Editor Dialog:**

Name: AOI1  
Description:   
Attachment:   
Structure Style:   
Geometry Type: POLYGON

Index	Latitude	Longitude	Order	Add...	Edit	Remove	Up	Down
0	45°34.9039'N	013°41.0639'E						
1	45°34.9039'N	013°43.0058'E						
2	45°33.4010'N	013°43.0058'E						
3	45°33.4010'N	013°41.0639'E						

Validity Period: From Feb 20 2024 14:21 To Feb 23 2024 14:21  
Perimeter: 34844.8 ft Area: 7.03 Km<sup>2</sup>

**AOIs Expired Table:**

Name	From	To	Extend	Delete
AOI1	Feb 20 2024 14:21	Feb 15 2024 14:21		
AOI2	Feb 20 2024 14:23	Feb 06 2024 14:23		
AOI3	Feb 20 2024 14:23	Feb 12 2024 14:23		

Buttons: Delete All AOIs expired, OK





# Trials execution – requesting type of info

The screenshot shows a software interface with a map on the left and a data table on the right. A context menu is open over the map, with 'Add to VOI List' highlighted. The 'VOI List' table is titled 'VOI: 2' and contains the following data:

Own...	Name	MMSI	IMO	Type	Call Sign	Flag	Speed...	COG +
U mod...	ADMI	13602	9437228	NonS...	052V8		0.1	177.8
U mod...	BBC L	30968	9513658	NonS...	V2852		0.1	360.0

Below the table is a 'VOI Service' dropdown menu and a 'Document List' table with columns: Owner ID, DT, Latitude, Longitude, Attachment +. The 'Document List' table is currently empty, with the text 'No content in table' below it.

The screenshot shows the 'System Options' dialog box with the 'CISE' section selected. The 'CISE' section has three checkboxes: 'Push Data Exchange Service', 'Consume Data Exchange Service', and 'Report Data Exchange Service', all of which are unchecked. The 'AOI' section has three checkboxes: 'Push Data Exchange Service', 'Consume Data Exchange Service', and 'Report Data Exchange Service', all of which are checked. The 'Payloads' section has five checkboxes: 'VOI Exchange Service', 'Anomaly Exchange Service', 'History Exchange Service', 'Satel Image Exchange Service', and 'Satel Radar Detect Exchange Service', all of which are checked. The 'History Period (days)' is set to 30. The 'Apply and Close' button is highlighted.



# Trial execution – report on anomalies received

The screenshot shows a maritime monitoring interface with a map of a coastal area. A notification box is displayed in the foreground, stating: "AOI Anomaly Event. You have received an Anomaly event within an AOI. From gr.nodegr.nss-adaptor. Type UNEXPECTED\_MOVEMENT." Below the notification are "Open Bookmark" and "OK" buttons. In the background, a "VOI List" table is visible, listing various vessels with columns for Owner ID, Name, and other details. Blue arrows point to specific locations on the map where anomalies were detected.

Owner ID	Name
si.nodegr.nss-adaptor	PUFFIN
si.nodegr.nss-adaptor	RUBY
si.nodegr.nss-adaptor	NOCC
si.nodegr.nss-adaptor	ANDRO
si.nodegr.nss-adaptor	GHALA
si.nodegr.nss-adaptor	KLEDES
si.nodegr.nss-adaptor	MSC CH
gr.nodegr.nss-adaptor	test4
gr.nodegr.nss-adaptor	test1
gr.nodegr.nss-adaptor	test2
gr.nodegr.nss-adaptor	test3
gr.nodegr.nss-adaptor	test

The screenshot shows the "Event Bookmark" dialog box open over the maritime monitoring interface. The dialog contains the following information:

- Name:** (auto)gr.nodegr.nss-adaptor
- Type:** Anomaly
- Description:** (empty text area)
- Position:** Latitude 45, Longitude 13
- Anomaly Event:** UnexpectedMovement
- Picture:** (empty image area)
- Involved Targets:** (checkbox unchecked)
- Start Time:** Jun 20 2024 10:36
- End Time:** Jun 21 2024 10:36

Buttons for "Set from File...", "Set from Map", "Clear", "Pick", and "Clear All" are visible. The background shows a "VOI List" table with columns for Owner ID, Name, MMSI, IMO, Type, Call Sign, Flag, and Speed L. A "Details" panel on the right side of the interface shows various ship attributes such as Name, Flag, MMSI, IMO Number, Call Sign, ENI Number, Ship and Cargo Type, Length, Width, Departure, ETD, Draught, Number of Persons, Crew Members, Passengers, Destination, ETA, Gross Tonnage, Special Tag, Categories, Identification, Target Type, and ID.

Owner ID	Name	MMSI	IMO	Type	Call Sign	Flag	Speed L
si.nodegr.nss-adaptor	PUFFIN	939019	3164871	NonSpe	D2VH	0.1	
si.nodegr.nss-adaptor	RUBY	538006	3714707	NonSpe	VTK3	0.1	
si.nodegr.nss-adaptor	NOCC	257102	3624029	NonSpe	LAVB	0.0	
si.nodegr.nss-adaptor	ANDRO	240599	3315793	NonSpe	3YH4	0.0	
si.nodegr.nss-adaptor	GHALA	338006	3714707	NonSpe	3FFX	0.1	
si.nodegr.nss-adaptor	KLEDES	338006	3714707	NonSpe	3FFX	0.1	
si.nodegr.nss-adaptor	MSC CH	338006	3714707	NonSpe	3FFX	0.1	





# Trial execution – satimagery & analyses received

The screenshot displays the CISEConsole interface with several key components:

- File Preview:** A window showing document details for "Port of Koper - Slovenia Protection of Critical Infrastructures". It includes ACI Coordinates (45°33'51.20"N 13°46'21.87"E), a publication date of 23 June 2024, and a reporting purpose: "Information about presence of potential VOIs in the ACI".
- Map:** A central map showing the Port of Koper area with various overlays including EMISA WMS, GRIB, Chart, Resources, Targets, Weather, CISE, CISE Document Notes, and STM. A scale bar indicates 5.1 NM.
- VOI List:** A table listing VOI 10 with the following data:

Owner ID	Name
sunodesi.vomadaptor	ITAL BO
sunodesi.vomadaptor	NORW
sunodesi.vomadaptor	NEPTU
sunodesi.vomadaptor	PUFFR
sunodesi.vomadaptor	RUBY
sunodesi.vomadaptor	NOCC
sunodesi.vomadaptor	ANDRO
sunodesi.vomadaptor	GHAL
- Base Layer:** A panel on the right showing a list of map layers with checkboxes for EMISA WMS, GRIB, Chart, Resources, Targets, Weather, CISE, CISE Document Notes, and STM.
- Image Overlays:** Three satellite images are overlaid on the map: a large satellite image of the port area (bottom right), a smaller satellite image of a ship (top right), and a grayscale satellite image of a coastal area (bottom center). Blue arrows point from the main map to these satellite images.



# Fusion of data

- Different data sources in the context of involving, integrating and combining information:

**Radars**

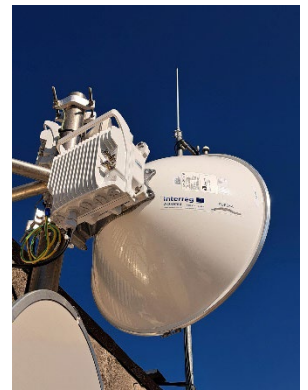
**Automatic Identification Systems (AIS)**



**Satellite imagery's information**

**Port & Coastal information**

**Weather data**



**Vessel Traffic Management Systems (VTMS)**

**Drones**





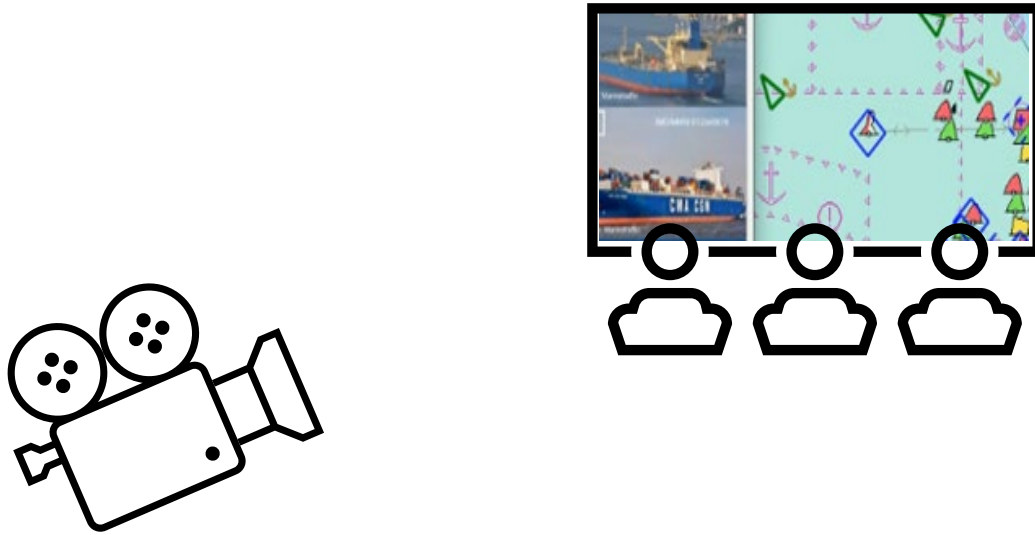


# Benefits of merging data

- **Improved Situational Awareness:** By combining data from multiple sources CISE enables a more comprehensive view of a situation, having a unified picture enhances understanding and response capabilities.
- **Enhanced Decision-Making:** Decision-makers can rely on more accurate and timely information to assess risks, allocate resources effectively, and respond swiftly to emerging situations.
- **Reduced Duplication of Effort:** Integrated systems reduce the time and effort required to gather and interpret data from multiple sources.
- **Interoperability, Collaboration and Coordination:** Data fusion in CISE facilitates interoperability among different systems and stakeholders, what is crucial for coordination among agencies, nations and other entities involved in complex operations or responses.
- **Early Detection and Response:** By integrating diverse data sources, CISE can enable early detection of potential threats or incidents, proactively preventing escalation or minimizing impact.
- **Enhanced Maritime Security:** By merging data from intelligence sources, surveillance systems, and maritime traffic databases, CISE helps authorities detect anomalies and respond proactively to emerging threats.



# Demo video



**Let's see the video now!**



# Looking forward

- Adriatic Sea SARex 2024 – Search & Rescue exercise 2024
- North Adriatic Sea Basin focus
- MSPTN (Maritime Safety Permanent Transnational Network) eNAV Thematic WG
- CSG and other CISE Expert Groups



## CISE-ALERT

### CISE's operationalization launch through A Long Endurance and Real live Test



# Thank you for your attention!



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