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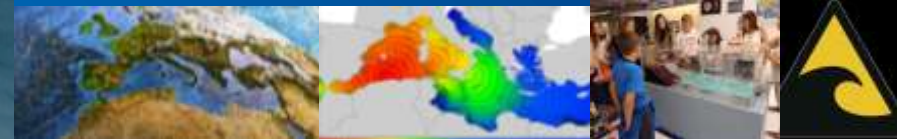


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ICG NEAMTWS

ICG/ NEAM Tsunami Warning and Mitigation System Status, Achievements and Challenges

Dr. G.A. Papadopoulos
Chair UNESCO/ICG/NEAMTWS





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Establishment

ICG/NEAMTWS was formally established during the twenty-third IOC Assembly Session

(21-30 June 2005) through Resolution IOC-XXIII-14

Operations

Gradually since summer 2012

Accreditation

Four centers: Sept. 2016

ICG/NEAMTWS

Purpose

To coordinate the establishment and performance of the tsunami Early Warning System and its activities in NEAM region

Activities

Tsunami (Early Warning)
Technical Support
Risk Assessment & Mitigation
Public Awareness
Meetings & Publications



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Member States

39 Member States

- | | |
|--------------|--------------------|
| Albania | Libya |
| Algeria | Malta |
| Belgium | Mauritania |
| Bulgaria | Monaco |
| Cape Verde | Morocco |
| Croatia | Netherlands |
| Cyprus | Norway |
| Denmark | Poland |
| Egypt | Portugal (NTWC) |
| Estonia | Romania (NTWC) |
| Finland | Russian Federation |
| France (TSP) | Slovenia |
| Georgia | Spain |
| Germany | Sweden |
| Greece (TSP) | Syria |
| Iceland | Tunisia |
| Ireland | Turkey (TSP) |
| Israel | Ukraine |
| Italy (TSP) | United Kingdome |
| Lebanon | |



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Governance of NEAMTWS

Officers

Chairperson

Gerassimos A. Papadopoulos

(Natl. Observatory of Athens)

Vice-chairpersons

Anna Gyldenfeldt (Federal Maritime
and Hydrographic Agency,
Germany)

Stefano Lorito (Istituto Nazionale di
Geofisica e Vulcanologia, Italy)

IOC/UNESCO

Head of Tsunami Section

Thorkild Aarup

ICG/NEAMTWS Technical Secretary

Denis Chang Seng



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Technical Working Groups and Task Teams

There are four technical Working Groups (WGs):

- **Working Group 1** - Hazard Assessment and Modelling

Co-chairs:

[Mauricio González](#) (University of Cantabria, Spain)

[Jörn Behrens](#) (University of Hamburg, Germany)

- **Working Group 2** - Seismic and Geophysical Measurements

Co-Chairs:

[Marinos Charalampakis](#) (Institute of Geodynamics, National Observatory of Athens, Greece)

[Francesco Mele](#) (National Institute of Geophysics and Volcanology, Italy)

- **Working Group 3** - Sea Level Data Collection and Exchange, Including Offshore Tsunami Detection and Instruments –

Co-Chairs: [Carlos Santos Fernandes](#) (Oceanographic Division of Instituto Hidrográfico, Portugal)

[Dov S. Rosen](#) (NEMA, Israel)

- **Working Group 4** - Public Awareness, Preparedness and Mitigation

Co-chairs:

[Areti Plessa](#) (Institute of Geodynamics, National Observatory of Athens)

[Marzia Santini](#) (Department for Civil Protection, Italy)



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Task Teams

Task Team on NEAMWave17

Co-chairs:

[Ceren Ozer Sozdinler](#) (Kandilli Observatory and Earthquake Research Institute, Turkey)

[Raluca Partheniu](#) (National Institute for Earth Physics, Romania)

Task Team on Operations

Co-chairs:

[François Schindele](#) (CENALT, France)

[Öcal Necmioglu](#) (Kandilli Observatory and Earthquake Research Institute, Turkey)

Task Team on Documentation

Co-chairs:

• [Brian McConnel](#) (Geological Survey Ireland, Ireland)

[Alessandro Amato](#) (Istituto Nazionale di Geofisica e Vulcanologia Roma, Italy)



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TOWS WG Task Teams

•TOWS WG Task Team on Operations

François Schindele (CENALT, France)

Fernando Carrilho (Portugese Sea and Atmosphere Institute, Portugal)

•TOWS WG Task Team on Disaster Management and Preparedness

Marzia Santini (Dept. of Civil Protection, Italy)

Amir Yahav (National Emergency Management Authority, Israel)



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Accreditation of NEAMTWS Tsunami Service Providers (TSPs)

Following an Accreditation process established by the ICGNEAMTWS, the ICG/NEAMTWS- XIII session in Bucharest, Romania, 26-28 September 2016 granted the status of NEAMTWS Tsunami Service Providers (TSP) to the following institutions:

1. **CENALT – Centre national d'alerte aux tsunamis (France)**
2. **NOA-Institute of Geodynamics, National Observatory of Athens (Greece)**
3. **INGV-Centro Nazionale Terremoti, Istituto Nazionale di Geofisica e Vulcanologia (Italy)**
4. **KOERI-Kandilli Observatory and Earthquake Research Institute (Turkey)**

Portugal and Romania to start their National Tsunami Warning Centers during 2017. IPMA Portugal is CTSP





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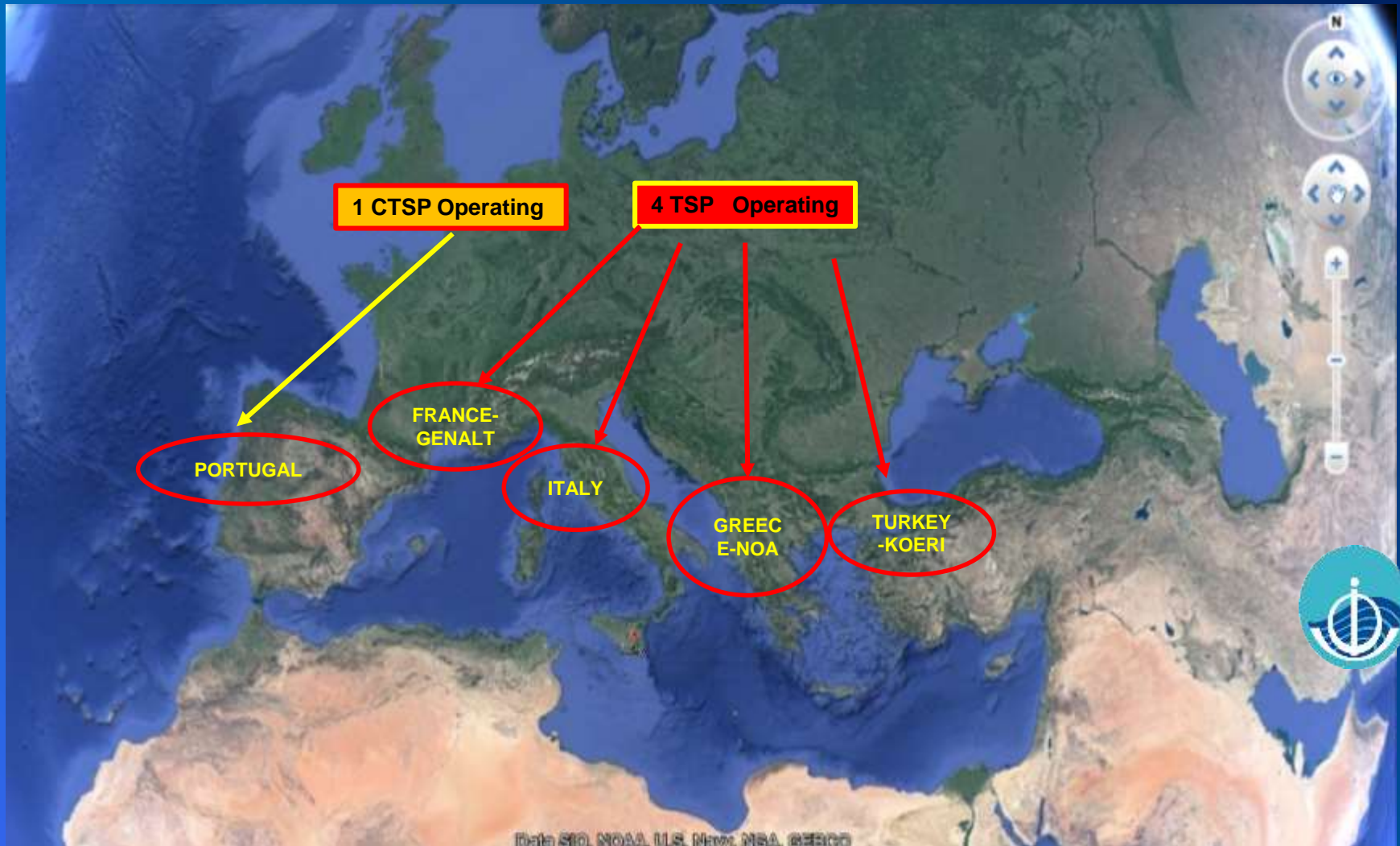
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IOC-UNESCO ICG-TWS Regional Tsunami Service Providers



7 New TSPs established since 2004 IO Tsunami

Warning time: 5-20 min; Warning means: e-mail, GTS, fax



Seismic Network

- In Europe alone, there are currently more than 1000 broadband seismic stations operating.
- At least 50% of these are available in real-time through various transmission means.
- For the purpose of NEAMTWS it is important to ensure the availability of geographically balanced station coverage.



Sea Level Network

- Sea Level stations have increased from 15 in 2007 to 185 in 2015
- Gaps exist particularly South of Mediterranean

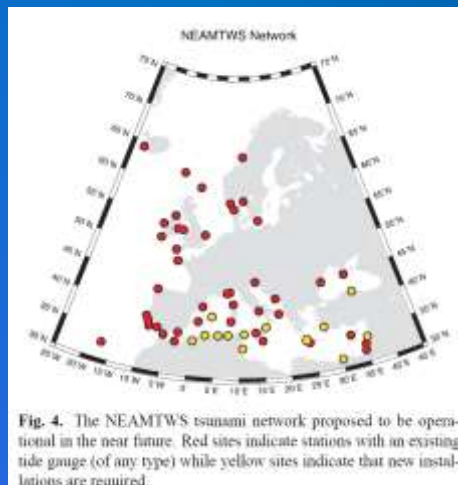
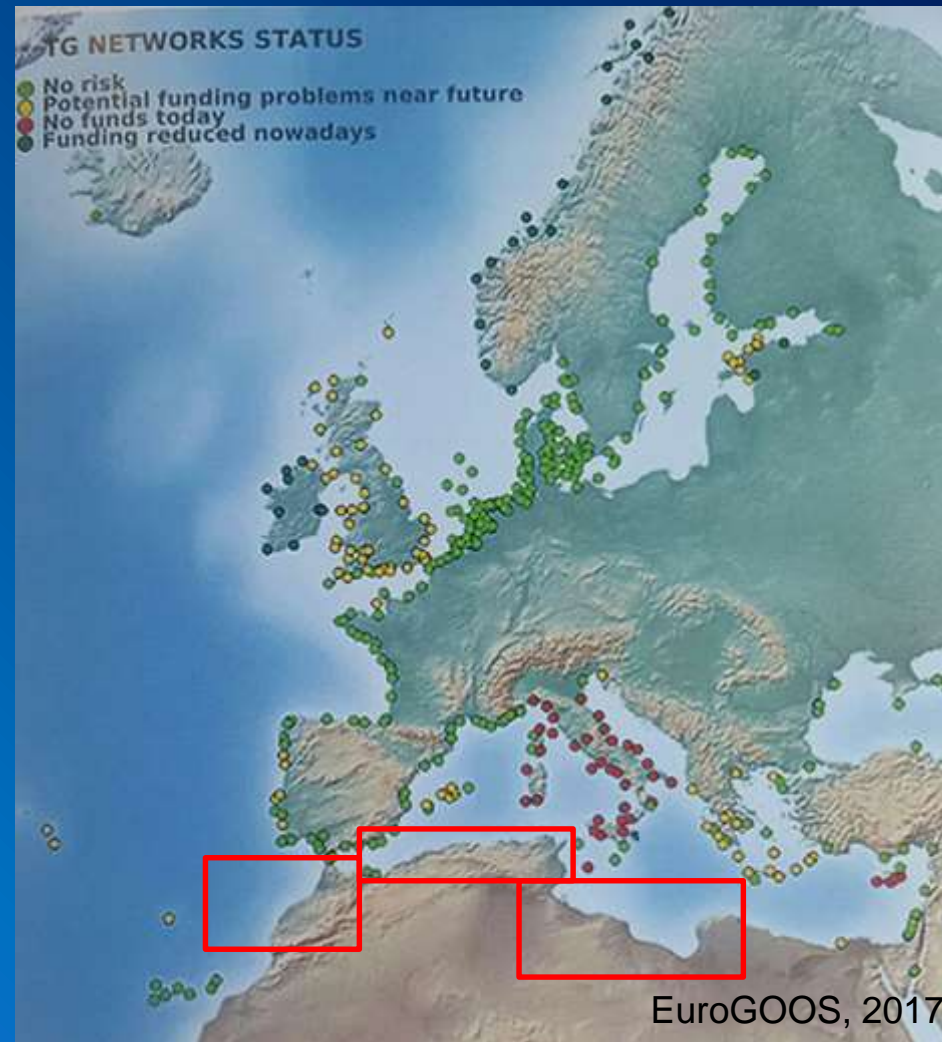


Fig. 4. The NEAMTWS tsunami network proposed to be operational in the near future. Red sites indicate stations with an existing tide gauge (of any type) while yellow sites indicate that new installations are required.





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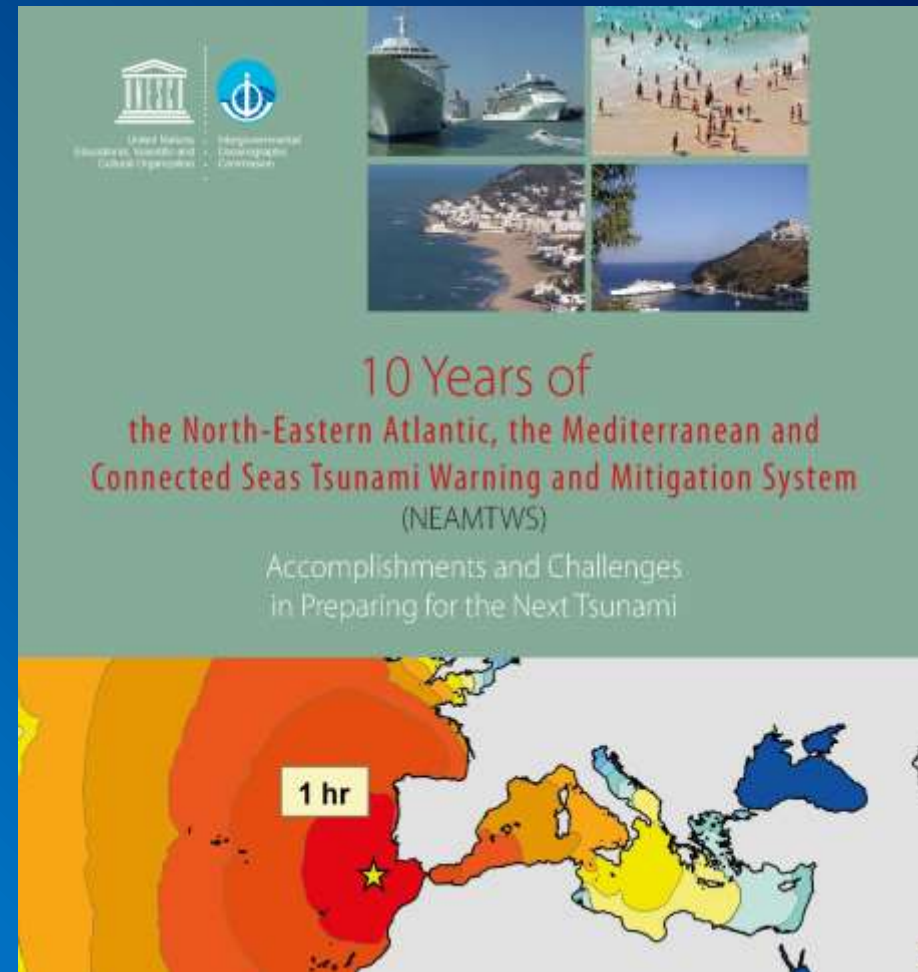
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10th Anniversary of NEAMTWS

Publication Booklet

10 Years of the North-Eastern Atlantic, the Mediterranean and Connected Seas Tsunami Warning and Mitigation System (NEAMTWS):

Accomplishments and Challenges in Preparing for the Next Tsunami





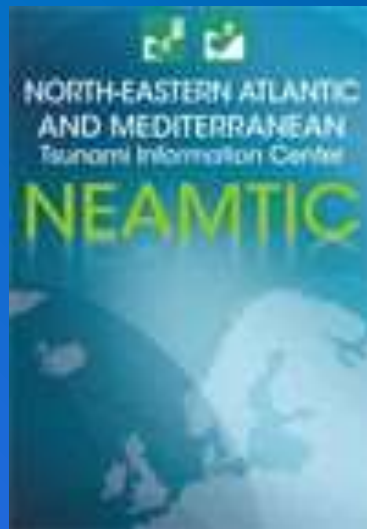
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NEAM Tsunami Information Centre (NEAMTIC)

- TWS must go hand in hand with awareness and preparedness of the general public.
- As part of this process, a **Tsunami Information Centre (NEAMTIC)** was established to provide information on warning systems, risks and good practices in respect of tsunamis and other sea-level related hazards for civil protection agencies, disaster management organizations, decision makers, schools, industries in the coastal zone and the general public.
- NEAMTIC supports the development of the NEAMTWS.



Awareness Raising and Education

Some of the NEAMTIC educational products



Awareness Raising and Education (Con't)

- **Italy:** Activities during the “I don't take risks – Tsunami” campaign
- **Greece:** Tsunami education for school children organized by HL-NTWC during the Athens Festival for Science and Technology, Athens, 3-8 April 2016. The tsunami education tank attracted great interest and caused enthusiasm among the kids. The tsunami education tank produced by HL-NTWC within the frame of EU-FP7 ASTARTE Project with the aim to educate in a funny way school children as regards tsunami generation and impact





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Awareness Raising and Education (Con't)

- **Turkey:** Education activities for school children by experts



- **Israel:** End to End full scale Tsunami Exercise 4 April 2016





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NEAMTWS Participation in TOWS Meetings

Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation

Paris,

25-26 Feb. 2016, 23-24 Feb. 2017

14-15 February 2018



IOC/UNESCO SYMPOSIUM

**Advances in Tsunami Warning
to Enhance Community
Responses**

12-14 February 2018

Summary Statement





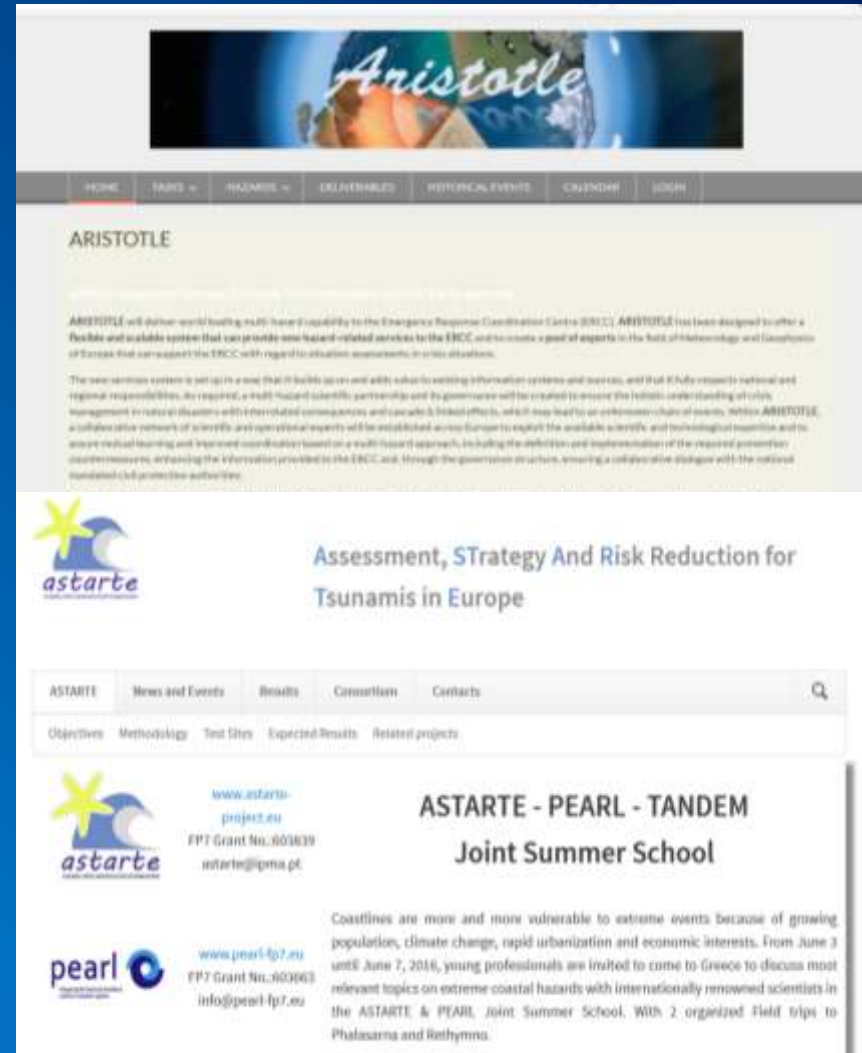
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NEAMTWS Related Projects

- [TRANSFER](#)
- [SAFER](#)
- [SEAHELLARC](#)
- [ARISTOTLE](#)
- [ASTARTE](#)
- [TSUMAPS-NEAM](#)
- [JRC/EC Tsunami Project](#)
- [GTM](#)



The screenshot shows the ARISTOTLE project website. At the top, there is a banner with the word "Aristotle" in a stylized font over a globe. Below the banner is a navigation menu with links for HOME, TABS, HAZARD, DELIVERABLES, HISTORICAL EVENTS, CALENDAR, and LOGIN. The main content area is titled "ARISTOTLE" and contains a paragraph describing the project's goal: "ARISTOTLE will deliver world leading multi-hazard capability to the Emergency Response Coordination Centre (ERCC). ARISTOTLE has been designed to offer a flexible and scalable system that can provide one hazard-related services to the ERCC, and to create a pool of experts in the field of Meteorology and Geophysics of Europe that can support the ERCC with regard to situation assessments in crisis situations." Below this is another paragraph: "The new system is set up in a way that it builds upon and adds value to existing information systems and services, and that it fully respects national and regional responsibilities. As a result, a multi-faceted scientific partnership and its governance will be created to ensure the holistic understanding of crisis management in natural disasters with interrelated consequences and cascading effects, which may lead to an extensive chain of events. Within ARISTOTLE, a collaborative network of scientific and operational experts will be established across Europe to exploit the available scientific and technological expertise and to ensure mutual learning and improved coordination based on a multi-hazard approach, including the definition and implementation of the required prevention countermeasures, enhancing the information provided to the ERCC and, through the governance structure, ensuring a collaborative dialogue with the national national civil protection authorities."

Below the main content, there is a section for the Astarte project. It features the Astarte logo (a yellow star and a blue wave) and the text "Assessment, Strategy And Risk Reduction for Tsunamis in Europe". Below this is a navigation menu with links for Astarte, News and Events, Results, Consortium, and Contacts. Below the menu is a search bar and a list of links: Objectives, Methodology, Test Sites, Expected Results, Related projects.

Below the Astarte section, there is a section for the Pearl project. It features the Pearl logo (a blue wave and a yellow star) and the text "ASTARTE - PEARL - TANDEM Joint Summer School". Below this is a paragraph: "Coastlines are more and more vulnerable to extreme events because of growing population, climate change, rapid urbanization and economic interests. From June 3 until June 7, 2016, young professionals are invited to come to Greece to discuss most relevant topics on extreme coastal hazards with internationally renowned scientists in the ASTARTE & PEARL Joint Summer School. With 2 organized field trips to Phalassarna and Rethymno."

Challenges and Opportunities

Tsunami hazard and risk assessment

- A holistic assessment of tsunami hazard and risk in the NEAM region, as a basis for long term risk mitigation planning, and as a tool for evacuation planning in case of a tsunami warning

Monitoring, warning and forecast

- Increased efforts to maintain and improve real time seismic and sea level observing networks ensuring a more uniform coverage around the NEAM region.





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Challenges and Opportunities (Con't)

Dissemination and communication of risk and information

- The NEAMWave exercise has shown that there is a need to further simplify the message distributed by TSPs. This will further improve the information flow to the end users.
- Provide tsunami information to maritime communities (Shipping)
- Discussion on the terminology used in tsunami bulletins



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Challenges and Opportunities (Con't)

Response capability

- NEAMTWS activities need to focus on providing civil protection personnel in all member states with a basic understanding of the early warning elements and features of NEAMTWS. The procedures for evacuation planning and the need for Civil Protection organizations to demonstrate and maintain a capability to respond effectively to a rare, though possibly devastating event by carrying out regular drills and exercise.
- Education and preparedness are the fundamental challenge to be addressed in the NEAM region.



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Challenges and Opportunities (Con't)

NEAMTWS sustainability

- The sustainability of the NEAMTWS strongly depends how it is successfully rooted within the communities at risk, and the level of participation of all Member States, relevant actors and stakeholders in the region.
- Funded projects (e.g. EU) does not cover all NEAMTWS Member States, and have so far focused on the technical early warning system and/or tsunami hazard assessments.
- It is important to be more inclusive; focus attention on the vulnerability and raise the awareness on tsunami hazard and risk.



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Challenges and Opportunities (Con't)

NEAMTWS development necessitates

- Active involvement of Member States and their Civil Protection Authorities (CPAs) in the routine activities of the ICG
- Improvement of real-time exchange of seismic and sea-level data between the countries along the southern rim of the Mediterranean Sea,
- Engagement and support of Member States
- [NEAM Tsunami Information Centre \(NEAMTIC\)](#), which works in tandem with the [NEAMTWS](#), and invited Member States through funding and secondments to contribute to its maintenance and further improvement



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THANKS FOR YOUR ATTENTION

**Dr. G.A. Papadopoulos
Chair**

Data: SIO, NOAA, U.S. Navy, NGA, GEBCO