ANACOM AUTORIDADE NACIONAL DE COMUNICAÇÕES

Regional Innovation Forum for Europe
September 2021

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Introduction


Elapsed Time:
00 hr
00 min
UTC:
1755
01 Nov
09:40 Z
Tsunami Wave Amplitude
ft.
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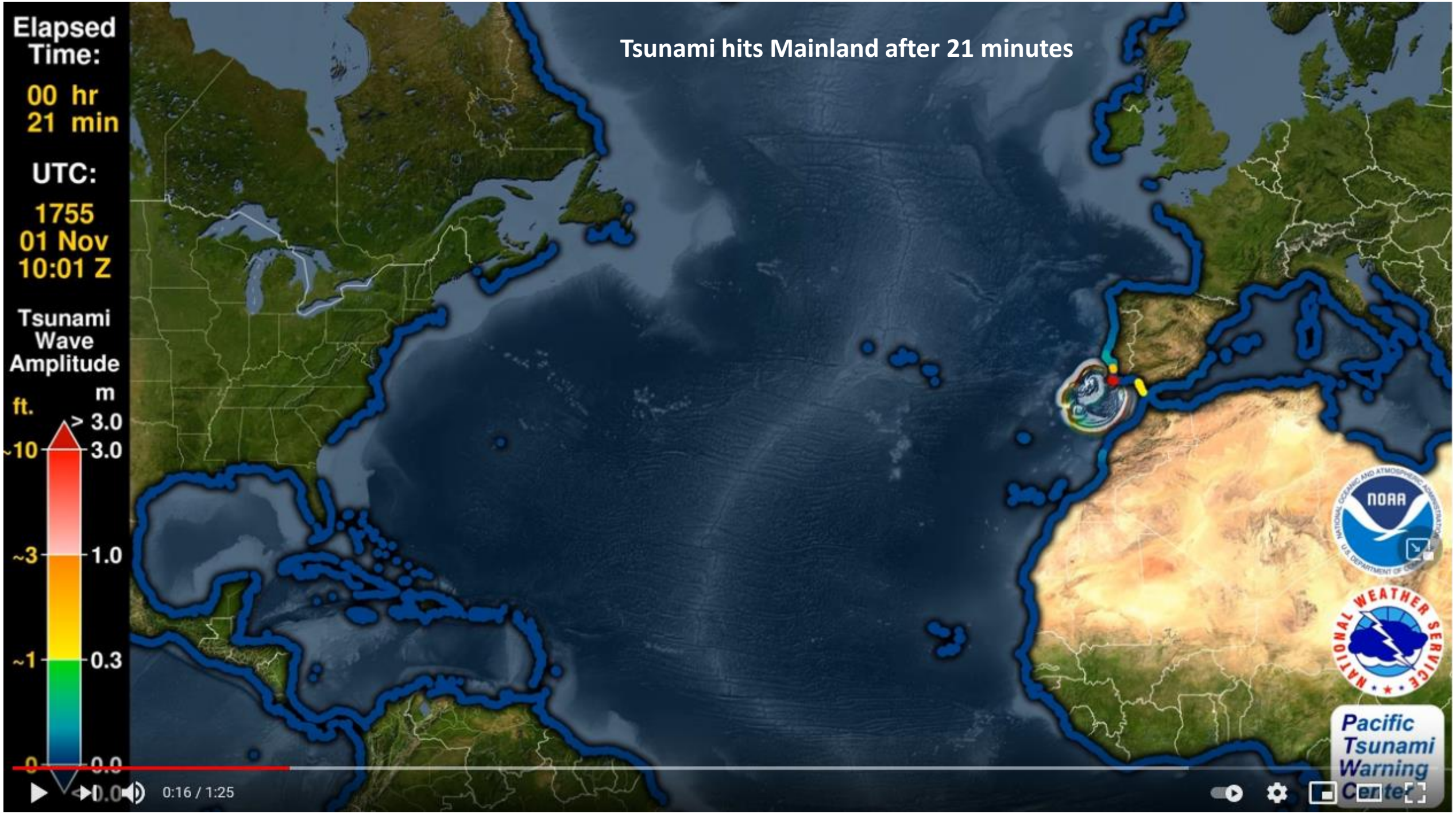
Coastal Runup Forecast Points
NOAA
NATIONAL WEATHER SERVICE
Pacific Tsunami Warning Center
0:10 / 1:25


Tsunami hits Mainland after 21 minutes
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Tsunami Wave Amplitude
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Pacific Tsunami Warning Center
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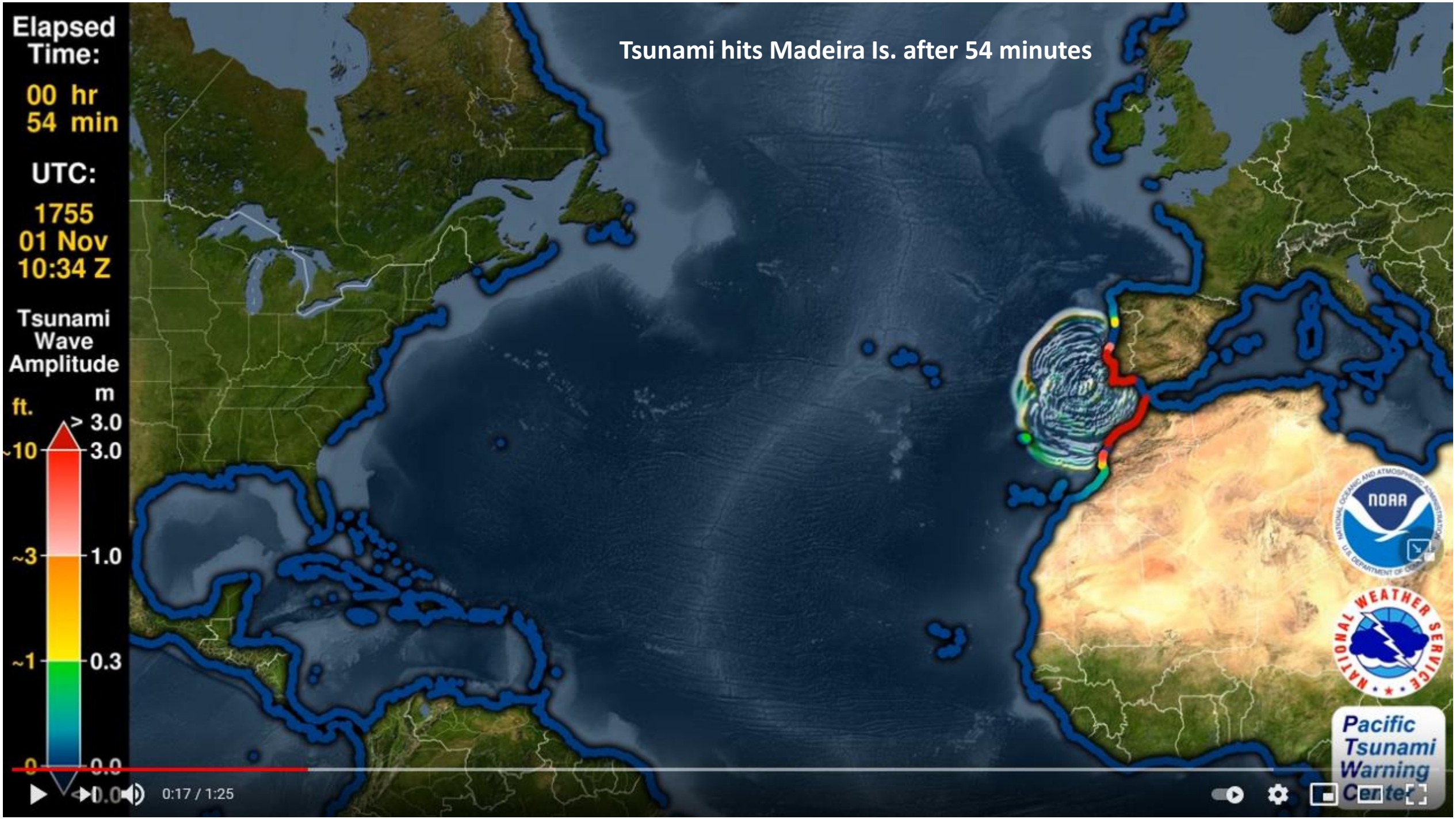
Tsunami hits Madeira Is. after 54 minutes
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Tsunami Wave Amplitude
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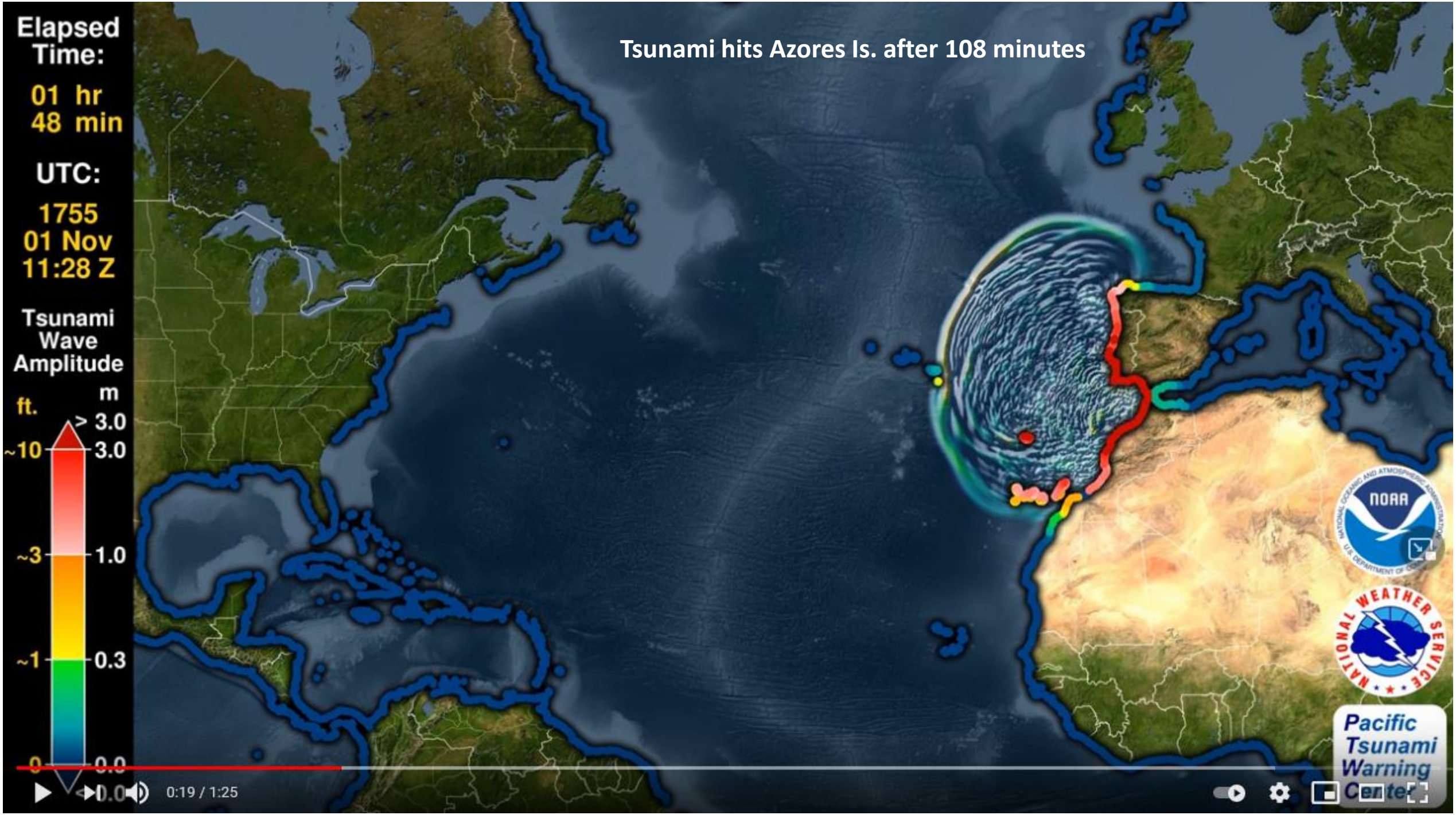
NOAA
NATIONAL WEATHER SERVICE
Pacific Tsunami Warning Center


Tsunami hits Azores Is. after 108 minutes
Elapsed Time:
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Tsunami Wave Amplitude
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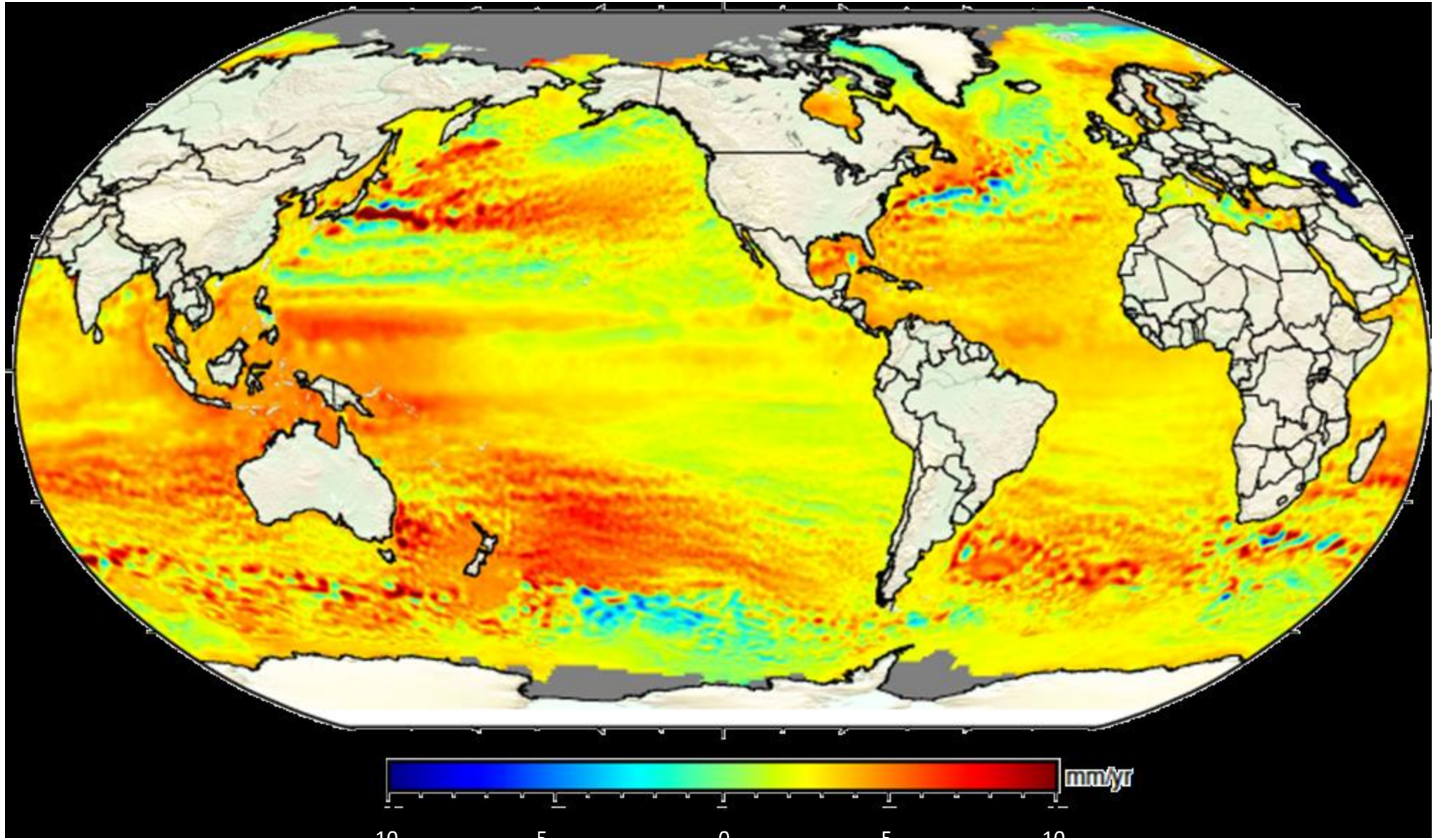
NOAA
NATIONAL WEATHER SERVICE
Pacific Tsunami Warning Center
0:19 / 1:25


JUNE 24, 2019
TIME
RISING SEAS. FLEEING RESIDENTS. DISAPPEARING VILLAGES.
OUR SINKING PLANET
by JUSTIN WORLAND
U.N. Secretary-General António Guterres off the coast of Tuvalu, one of the world's most vulnerable countries. Facing a rise in global sea levels, island nations are leading the fight against climate change
time.com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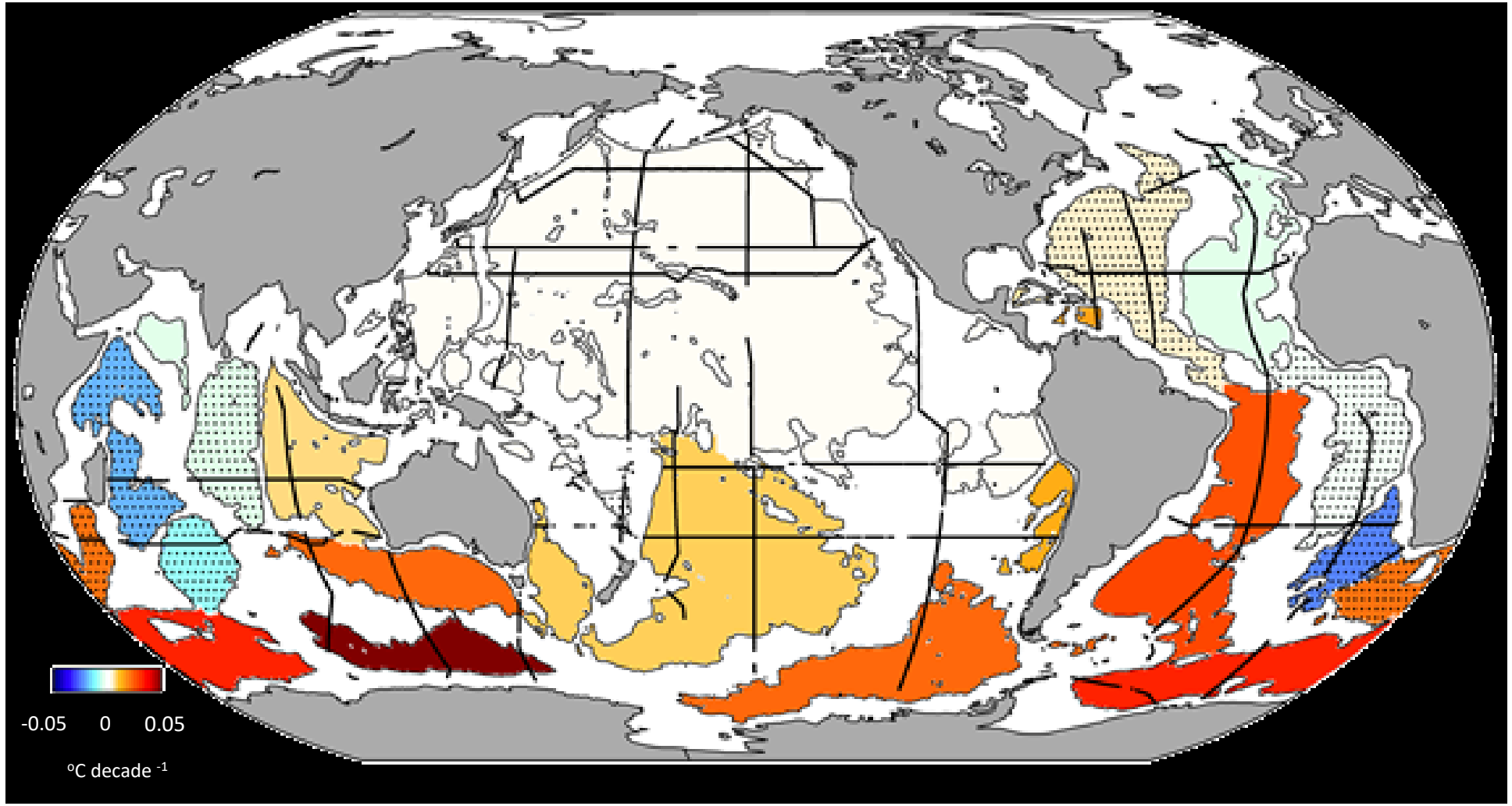
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Some facts

- More and more submarine cables are considered critical infrastructure.
- Data flows between Europe and other Continents depend almost 100% on submarine cables.
- Lifetime of submarine cables is 25 years.
- A lot of things will happen within next 25 years:
  - more and more demand of IoT and M2M traffic, 5G is coming, within 10/15 years 6G will come,
  - private global networks depend on owning fibre pairs on submarine cables (OTTs, Data Centres, Hyperscalers, …),
  - latency is becoming more and more an issue,
  - new relevant traffics will consumes more and more bandwidth (eg. scientific traffic),
  - new applications and services will tend to occupy vacant bandwidth.
- Existing submarine cable systems will not be enough to respond to the needs of future traffic (will have congestion on suppliers side, cables, repeaters, CLS equipment and vessels); strong dependency in just 4 global suppliers (ASN, NEC, Subcom, Huawei),
- Physical security is more and more a big concern (for each system and for the used routes).
- Collaboration will be needed among stakeholders - open access to Submarine Cables and Hypersccaler Data Centres will help to boost the global interconnection and enlarging participation of stakeholders (existing and new players).

EU Data-Gateway Platforms

i. **International Connectivity**

Europe's digital sovereignty and global competitiveness depend on strong internal and external connectivity.

Enhancing international connectivity is a pre-condition for the EU and EU-based companies to become more competitive in the market.

The greater the diversity of EU's international accesses, the better independence and greater importance the EU will have in terms of interconnection between Continents, therefore, creating critical mass, will enable EU to obtain better conditions in terms of commercial and quality of service.

ii. **Submarine Cables**

Submarine Cables are essential to International Connectivity. Submarine cables support almost 100% of EU interconnections with other Continents.

A submarine Cable Landing Station (CLS) is the new Data Port. In analogy with the common sea ports for goods, which receive/send, store and distribute goods, CLSs perform the same functions, but instead of goods they have Data (send Data to the sea, receive Data from the sea, store Data and distribute Data inland).

EU Data-Gateway Platforms

iii. **Data Centres**

Data Centres provide the storage of Data and are direct connected to CLSs (that is, Submarine Cables) and terrestrial networks.

Data Centres can be easily located nearby CLSs and they can be installed in land or even underwater (once again nearby CLSs).

iv. **Interconnection**

Interconnection services (short, medium and long distance) are essential to interconnect:

- Submarine cables in the same CLS, and submarine cables to Operators (traditional and OTTs),
- Operators (traditional, OTTs, IXPs, ISPs, …),
- Data Centres to Data Centres, submarine cables to Data Centres and Data Centres to other edge computing platforms.

v. **Data-Gateway Platform**

Integrates all the above. In a simplistic way, in addition of landing submarine cables, a **CLS can** also **perform** the functions of **Data Centre** and **Telehouse** (Data Port concept).

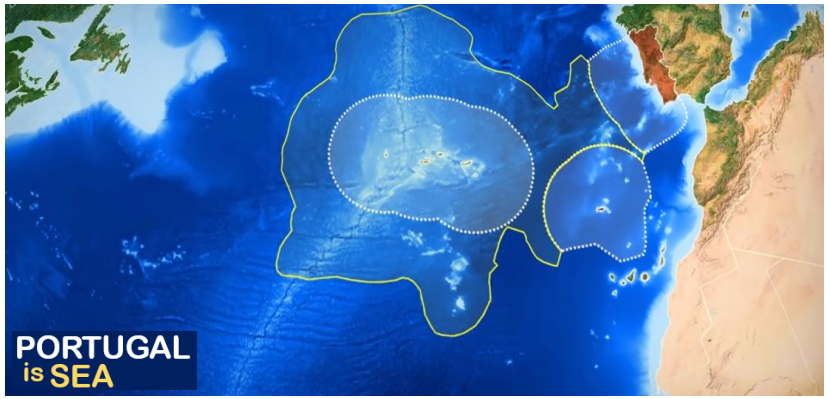
Portuguese contribution to the EU Atlantic Data-Gateway Platform

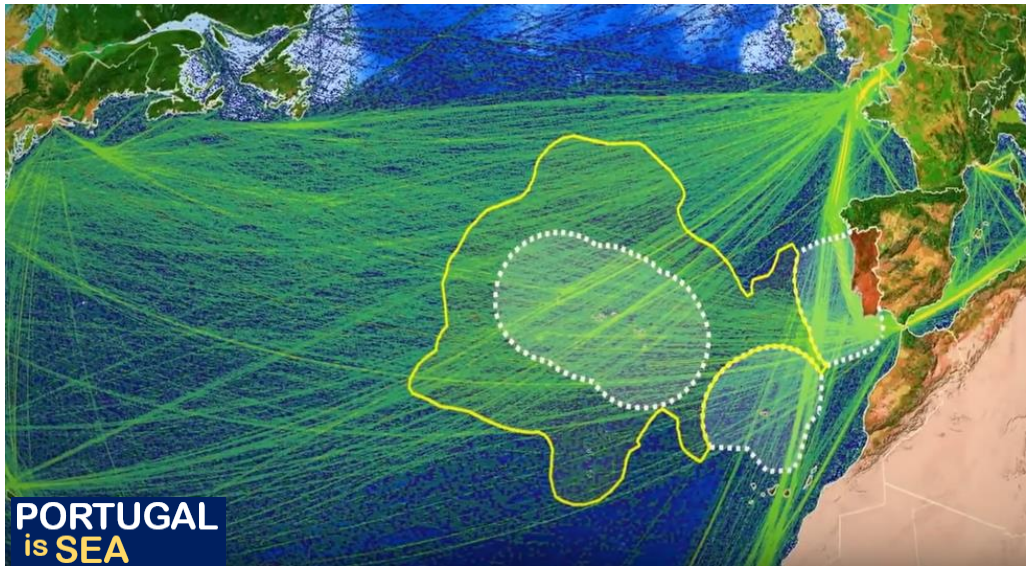
Portugal intends to contribute in a constructive and innovative way

to the constitution of the **EU Data-Gateway Platforms**, in particular with regard to

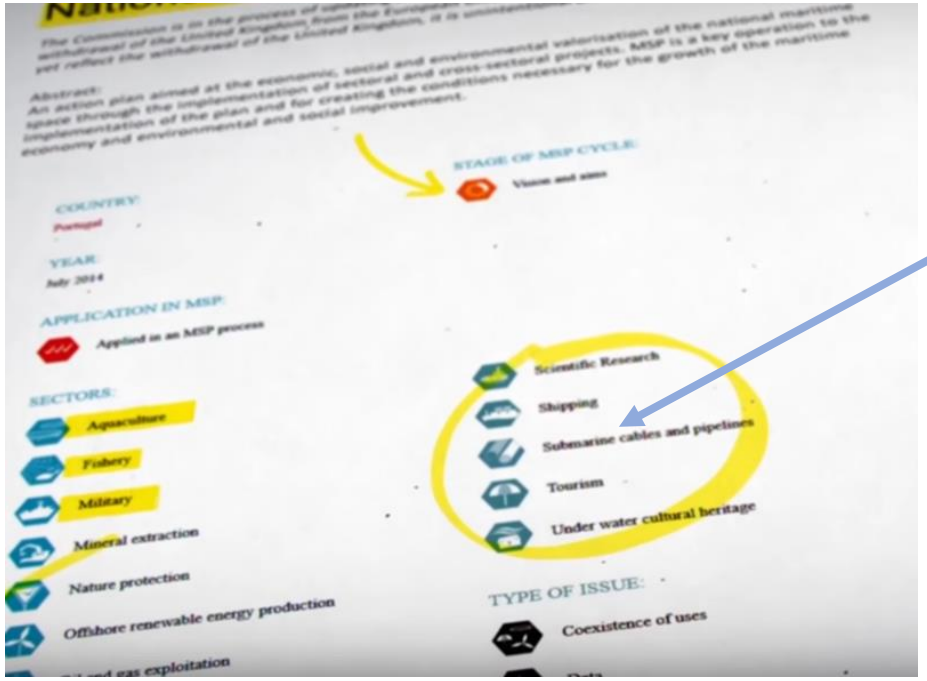
its contribution to the **EU <u>Atlantic</u> Data-Gateway Platform.**

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Portuguese EEZ





Maritime routes



Submarine Cables

The Portuguese EEZ will be increasingly used by **Submarine Cables** and that brings additional responsibilities for the country. In near future, it is foreseen up to 20% of total international **Submarine Cables** may cross Portuguese EEZ.

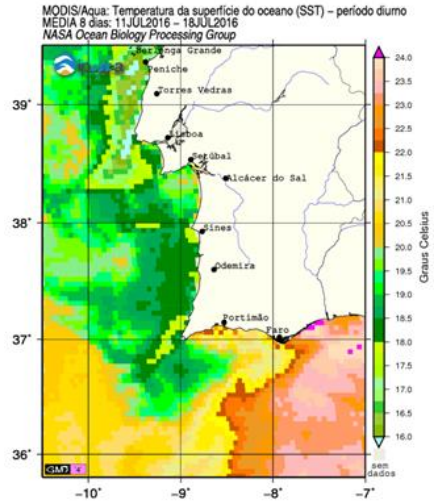
Source: CaspianReport

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Portuguese EEZ

Portuguese EEZ has natural conditions for International Submarine Cables

Sea depth

Sea water temperature



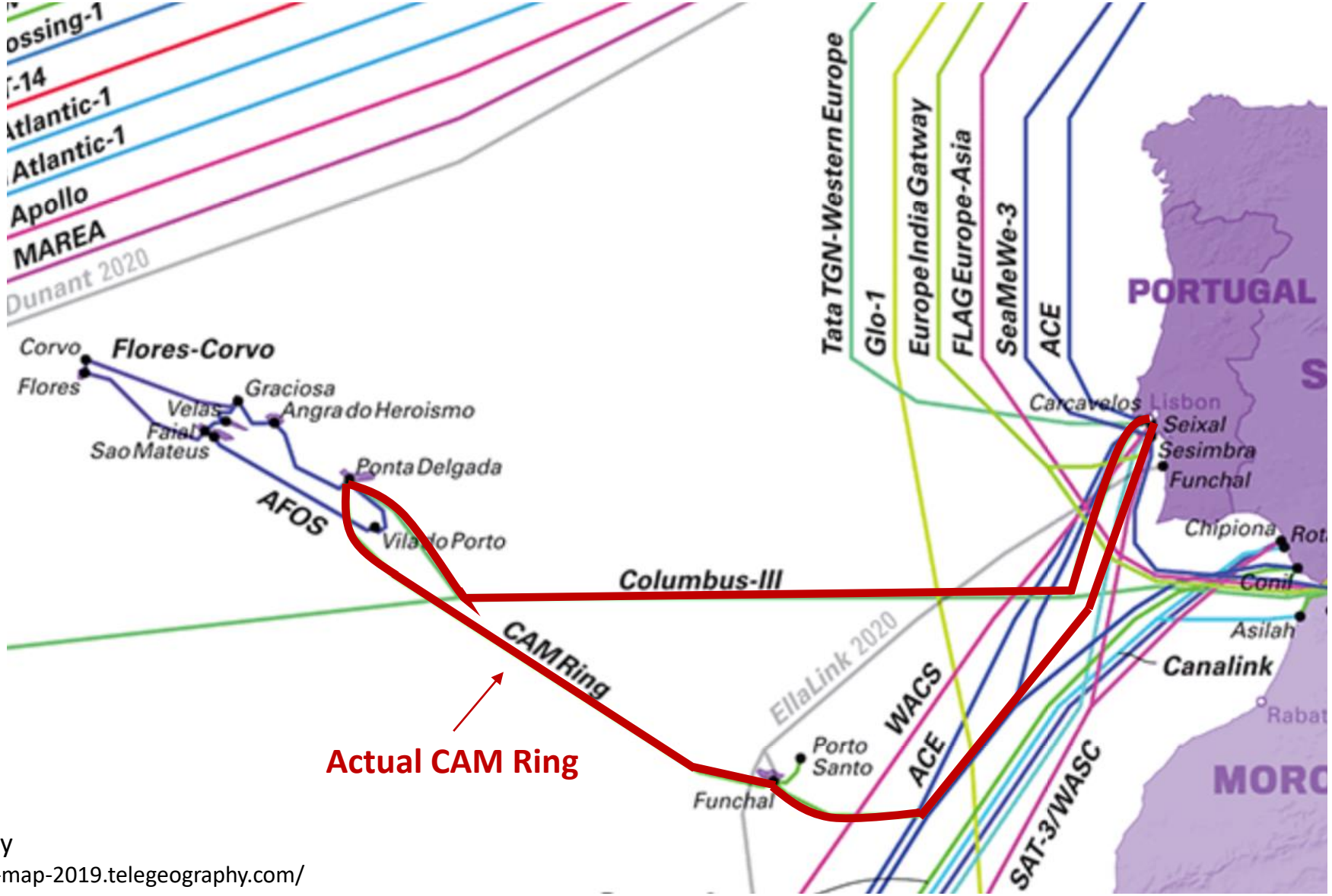
Mainland:
- 1st, **geographic location** (western and southern part of EU – easy to interconnect cables from the South, North and West without terrestrial transiting);
- 2nd, a variety of sandy coasts with abrupt slopes reaching deep sea quickly.

Azores Is.:
- 1st, **geographical location** (midway New York – Brussels, entering/outgoing door of EU reallocated 1.500 kms to West)
- 2nd, coasts with abrupt slopes reaching deep sea quickly.

Madeira Is.:
- 1st, **geographical location** (entering/outgoing door of EU reallocated 1.000 kms to South)
- 2nd, coasts with abrupt slopes reaching deep sea quickly.

There are already surveys of the seabed in the continental shelf.
95% of the continental shelf is deep sea and there is no need to use strong armored cables as it is in a shallow water situation.

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Existing Submarine Cables landing in Portugal



Source: Telegeography
https://submarine-cable-map-2019.telegeography.com/

Portuguese contribution to the EU Atlantic Data-Gateway Platform
5 Questions

1. Is there a need for a new 3.700 kms Ring connecting the Continent, Azores and Madeira Is. via submarine cable to solve a national and EU cohesion problem (social, territorial, economical, etc.)?
2. May Portugal contribute actively to the EU Atlantic Data-Gateway Platform for landing int´l submarine cables in association with Data Storage and Interconnection services?
3. According UN SDGs, can we use telecom submarine cables for additional purposes such as to obtain data for oceanography, environmental (climate change) and geophysics studies, as well as for seismic detections (warnings and alerts of tsunamis and if possible earthquakes too) serving Portugal and beyond (Spain, Morocco, France, …)?
4. Beyond seismic and environmental detection, can Portugal provide other public services to the industry of submarine cables, data storage and interconnection?
5. Will EU Atlantic Data-Gateway Platform have to respond to the needs of capacity for scientific traffic?

Portuguese contribution to the EU Atlantic Data-Gateway Platform
5 Questions

1. Is there a need for a <u>new</u> 3.700 kms Ring connecting the Continent, Azores and Madeira Is. via submarine cable to solve a national and EU cohesion problem (social, territorial, economical, etc)?
2. May Portugal contribute actively to the EU Atlantic Data-Gateway Platform planning new submarine cables in association with Data Storage and Interconnection Services?
3. According UN SDGs, using telecom submarine cables for additional purposes such as to obtain data for oceanography, environmental (climate change) and geophysics studies, as well as for seismic detections (warning alerts of tsunamis and maybe earthquakes too) serving Portugal and beyond (Spain, Morocco, France, …).
4. Beyond seismic and environmental detection, can Portugal provide other public services to the industry of submarine cables, data storage and interconnection?
5. Will EU Atlantic Data-Gateway Platform have to respond to the needs of capacity for scientific traffic?

YES to all...

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 1

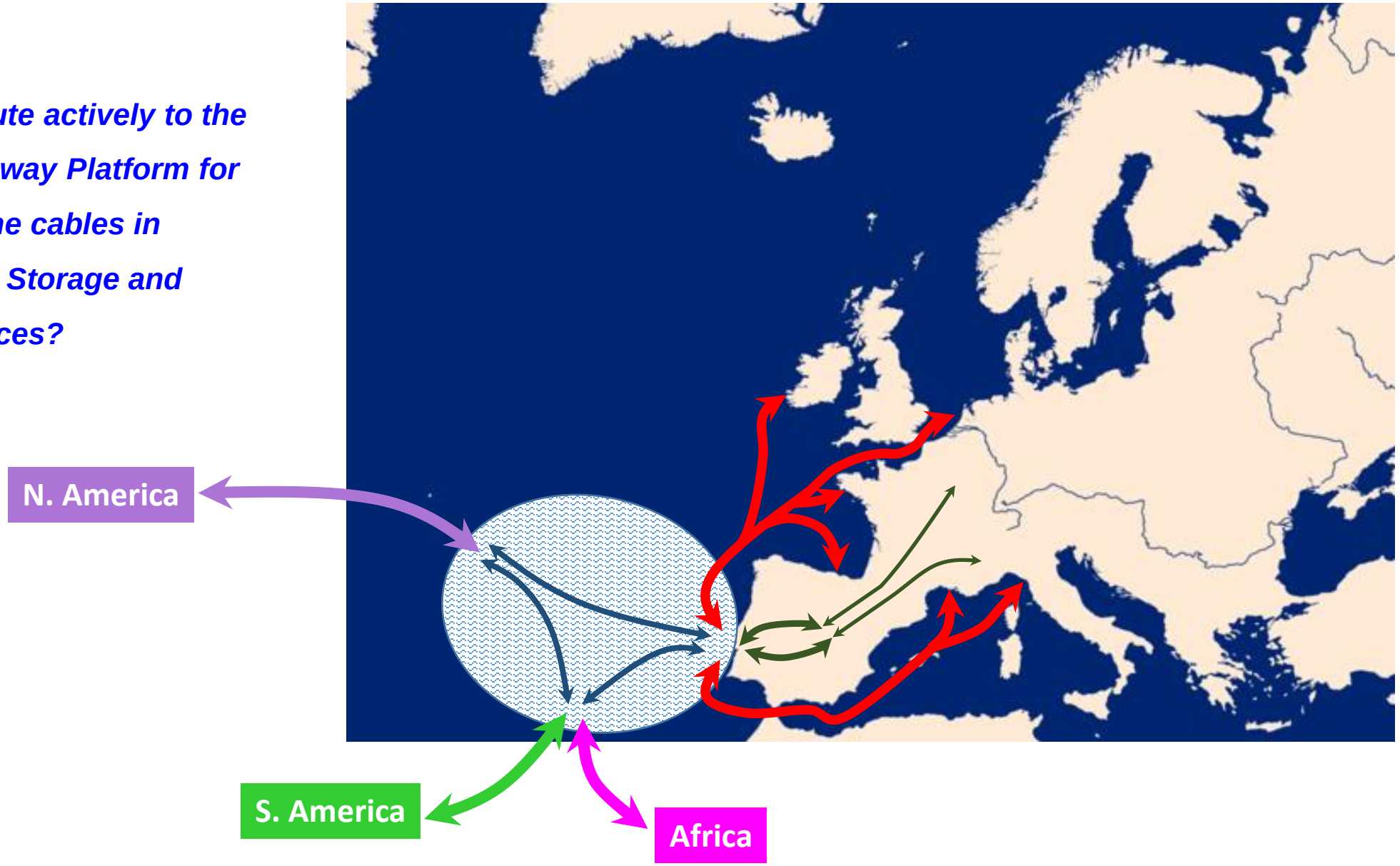
Is there a need for a new 3.700 kms Ring connecting the Continent, Azores and Madeira Is. via submarine cable to solve a national and EU cohesion problem (social, territorial, economical, etc.) ?

- Yes, a new CAM Ring will have to be RFS until the end of 2024.

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 2

May Portugal contribute actively to the EU Atlantic Data-Gateway Platform for landing int´l submarine cables in association with Data Storage and Interconnection services?

- Yes!



Portuguese contribution to the EU Atlantic Data-Gateway Platform
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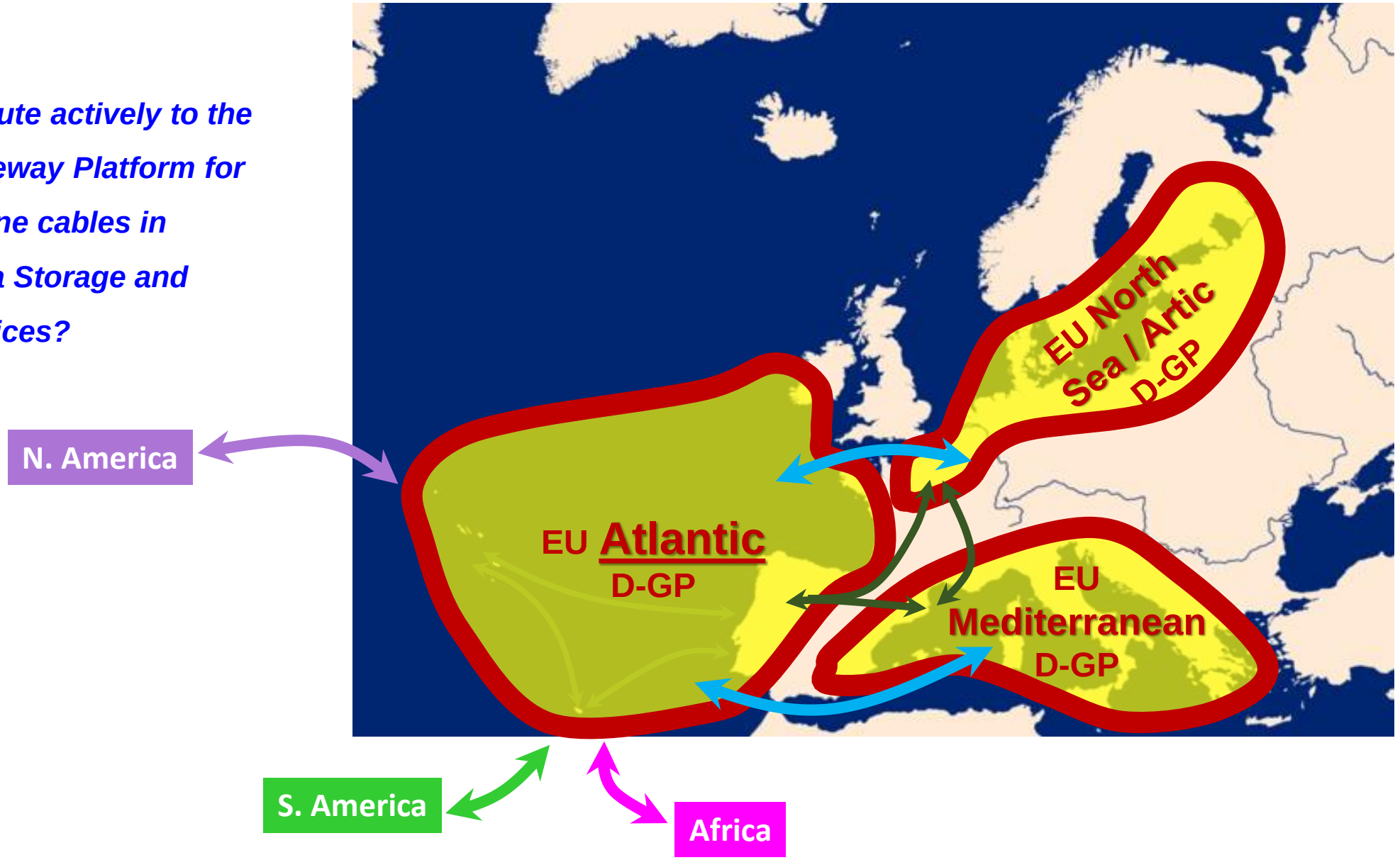
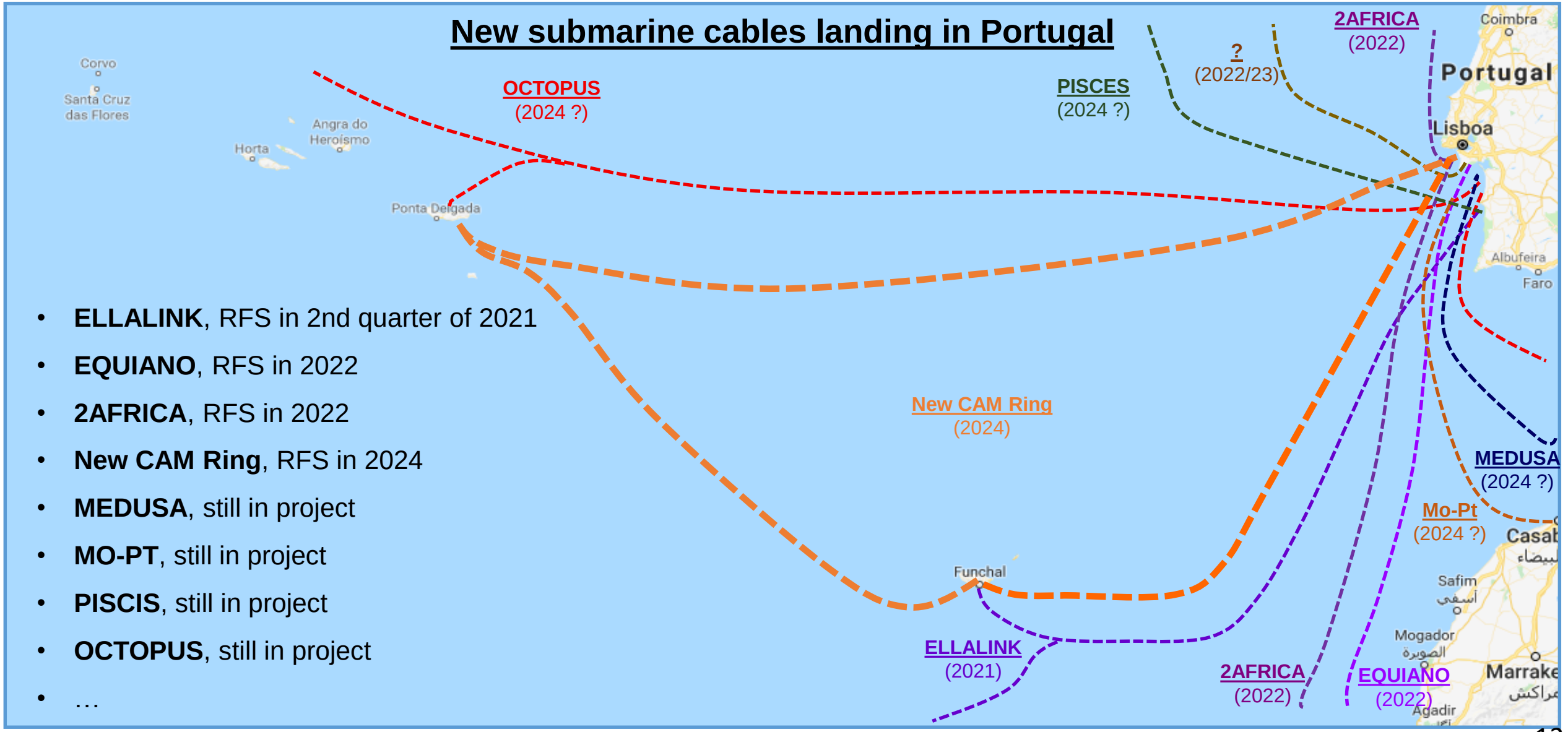


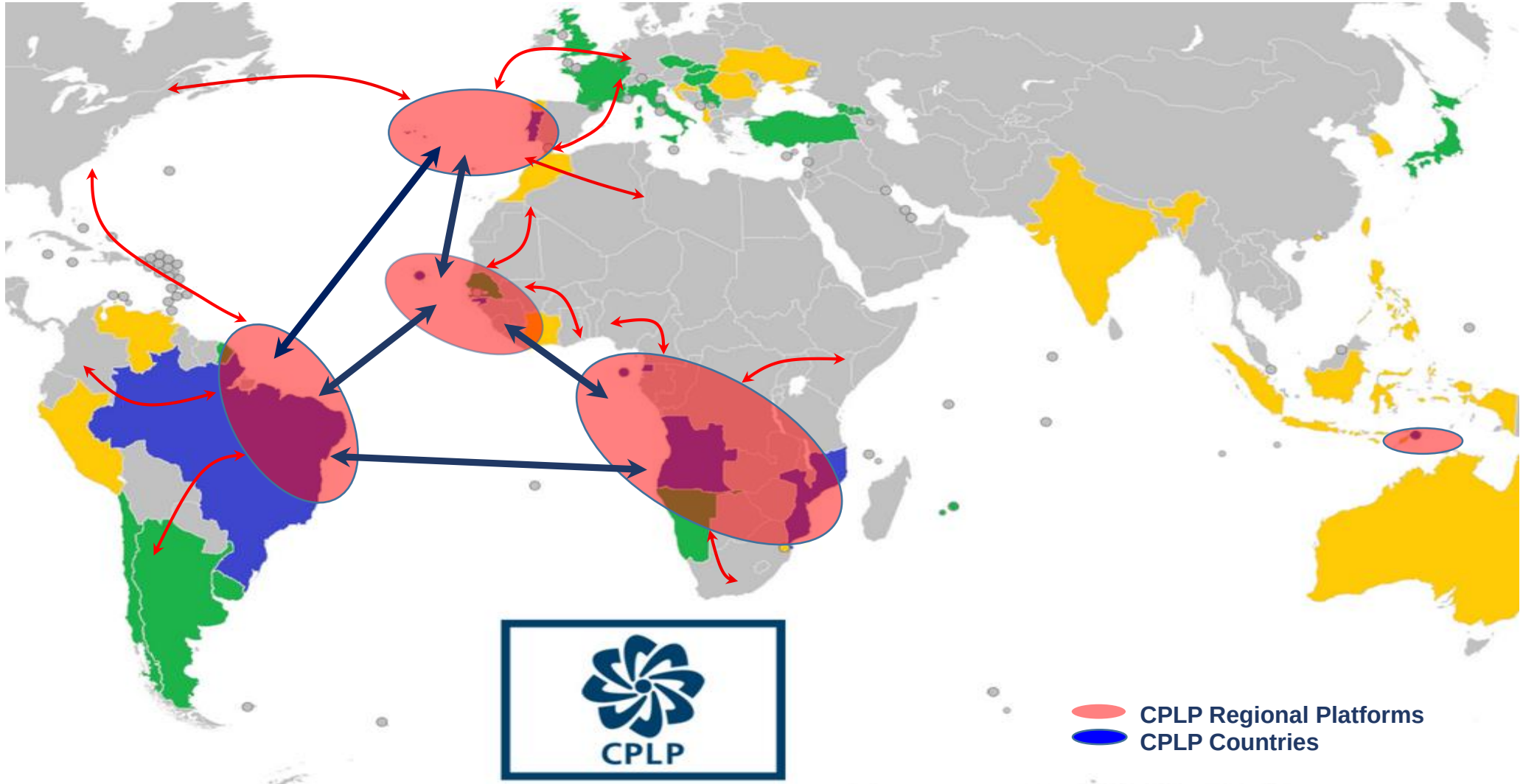
Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 2



- **ELLALINK**, RFS in 2nd quarter of 2021
- **EQUIANO**, RFS in 2022
- **2AFRICA**, RFS in 2022
- **New CAM Ring**, RFS in 2024
- **MEDUSA**, still in project
- **MO-PT**, still in project
- **PISCIS**, still in project
- **OCTOPUS**, still in project
- …

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 2

EU Atlantic D-GP to be interconnected to regional overseas platforms such as those from CPLP



Portuguese contribution to the EU Atlantic Data-Gateway Platform
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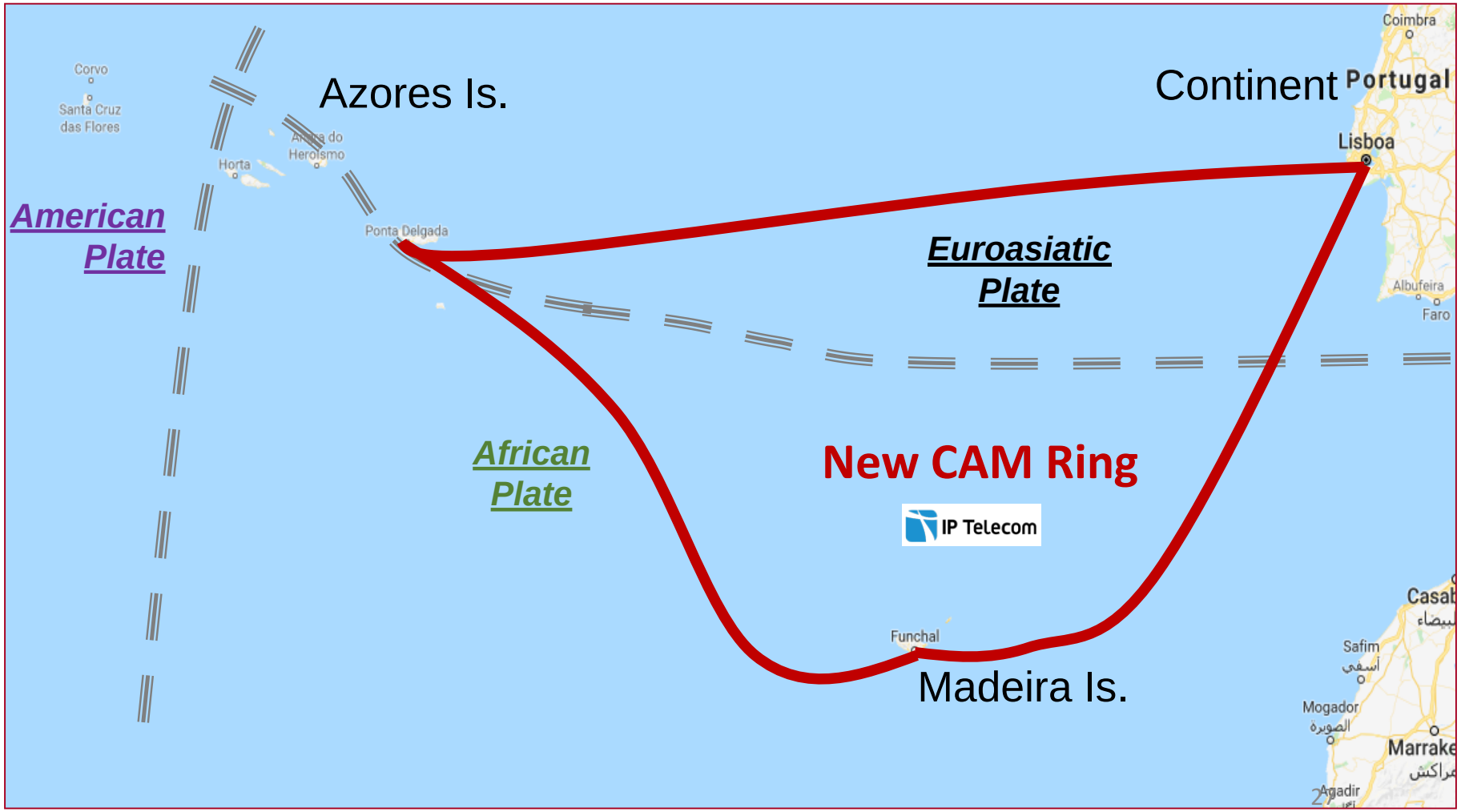
According UN SDGs, can we use telecom submarine cables for additional purposes such as to obtain data for oceanography, environmental (climate change) and geophysics studies, as well as for seismic detections (warnings and alerts of earthquakes and tsunamis) serving Portugal and beyond (Spain, Morocco, France, …)?

- Yes!

Portuguese Continental Shelf is a meeting area of <u>three</u> tectonic plates
(considerable seismic activity)



Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 3

Environment and seismic detection using telecom Sub. Cables as a contribute for the UN SDGs

LEA (***L****istening to the* ***E****arth under the* ***A****tlantic*) is a consortium with two public Institutes and one not-for-profit organization, of public interest:

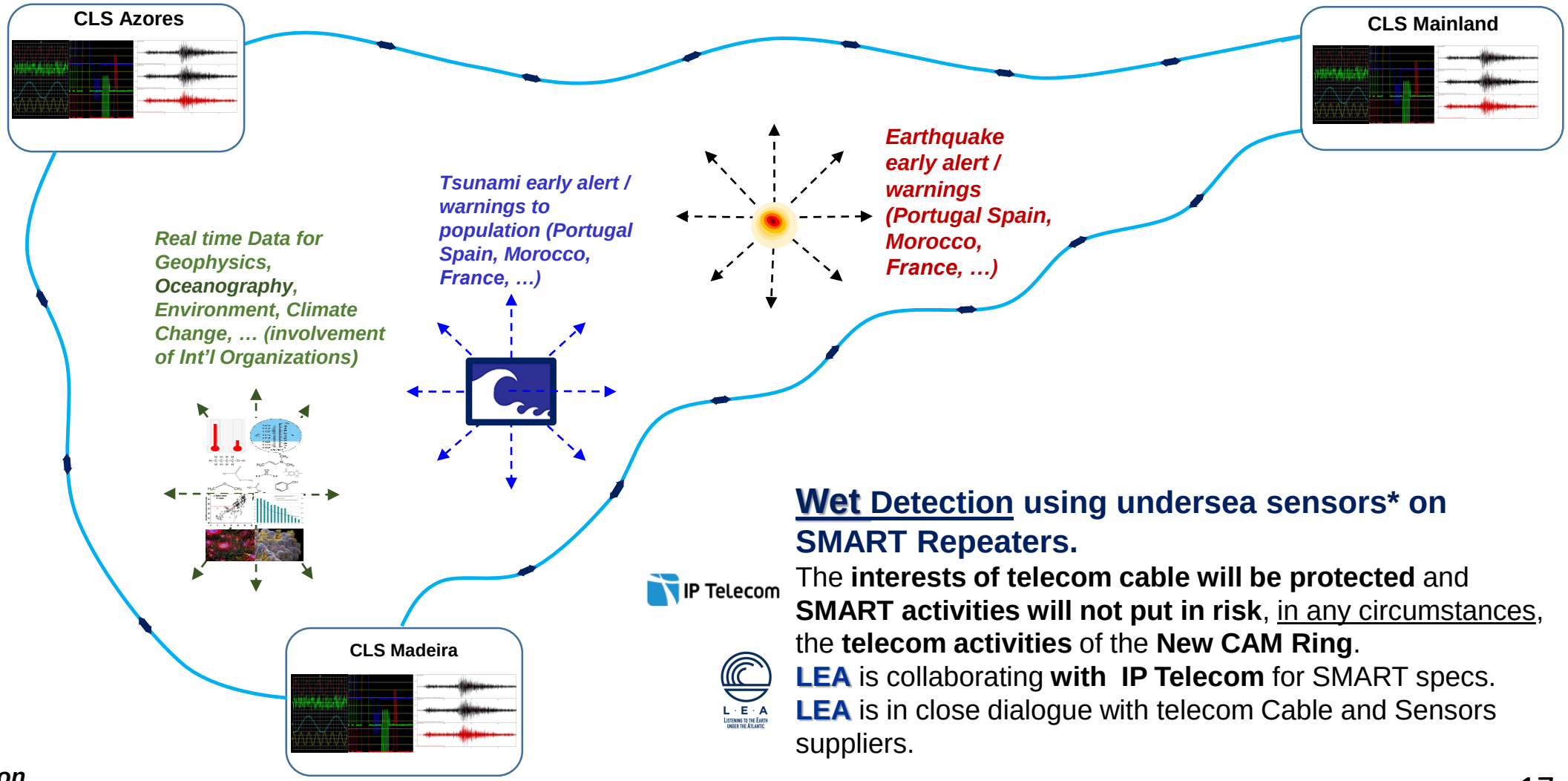
- **IPMA**, https://www.ipma.pt/en/index.html
- **IDL**, http://idl.campus.ciencias.ulisboa.pt/
- and **IT**, https://www.it.pt/

LEA partners are members of **JTF SMART Cables**, **https://www.itu.int/en/ITU-T/climatechange/task-force-sc/Pages/default.aspx**

- **LEA** is fully aware that **interests of telecom cable will be always protected** and **SMART activities will not put in risk, in any circumstances, the telecom activities of the New CAM Ring.**
- **LEA** is investigating the possibility to have the **New CAM Ring with environment and seismic detection.**
- **LEA is collaborating with IP Telecom regarding SMART specs. for the New CAM Ring.**
- **LEA** is dialoguing with **telecom Sub. Cable suppliers, Sensors suppliers** as well as **telecom operators.**
- In addition, using existing telecom submarine cables in operation (domestic and international), **LEA** is investigating **other methods of environmental and seismic detection without the utilization of wet sensors.**
- **LEA is open for collaboration and is establishing MoUs with stakeholders.**

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 3

Environmental and Seismic detection by the new CAM Ring
(public service* on real time)



Wet Detection using undersea sensors* on SMART Repeaters.

The **interests of telecom cable will be protected** and **SMART activities will not put in risk**, in any circumstances, the **telecom activities** of the **New CAM Ring**.

LEA is collaborating **with IP Telecom** for SMART specs.

LEA is in close dialogue with telecom Cable and Sensors suppliers.

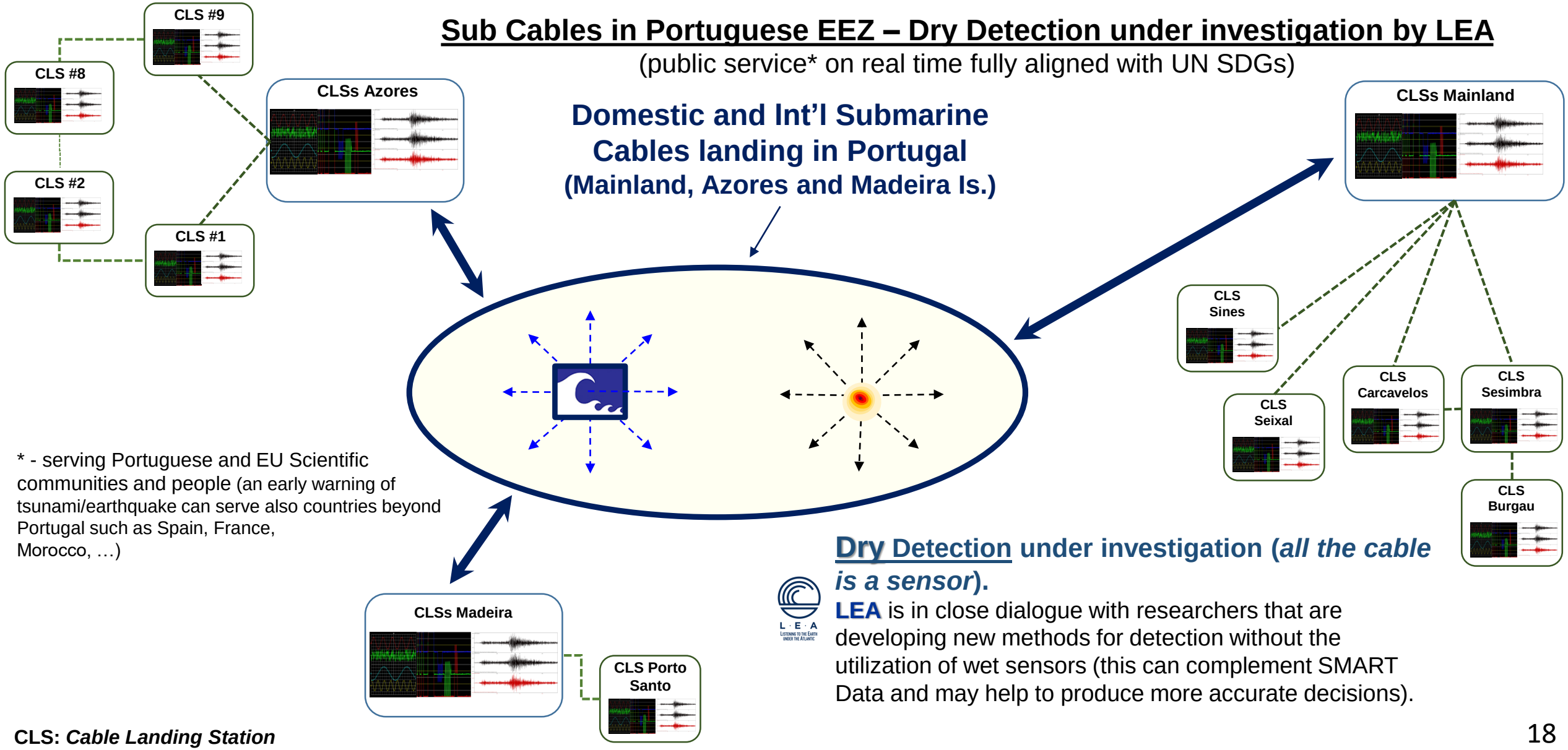
***- temperature, salinity, pressure, vibration, …**

CLS: ***Cable Landing Station***

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 3

Sub Cables in Portuguese EEZ – Dry Detection under investigation by LEA

(public service* on real time fully aligned with UN SDGs)



* - serving Portuguese and EU Scientific communities and people (an early warning of tsunami/earthquake can serve also countries beyond Portugal such as Spain, France, Morocco, …)

Dry Detection under investigation (*all the cable is a sensor*).

LEA is in close dialogue with researchers that are developing new methods for detection without the utilization of wet sensors (this can complement SMART Data and may help to produce more accurate decisions).

CLS: ***Cable Landing Station***

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 4

Beyond seismic and environmental detection, can Portugal provide other public services to the industry of submarine cables, data storage and interconnection?

- Yes!!!

- **Submarine Cables are becoming increasingly critical** in terms of electronic communications infrastructure and their interruption in terms of failures inadvertently or purposefully caused by external actors should deserve special attention too.
- **Cooperation and mutual assistance among Submarine Cables** landing in Portugal **should be encouraged** by Portuguese Administration (why not recover the old procedure of periodic restoration trial exercises?).
- **Cable ships** (installation and repair) **should deserve a particular attention** in order to facilitate their activity in Portuguese EEZ.
- **Surveillance and Protection Services of Submarine Cables** in Portuguese EEZ will be introduced.
- Will be promoted a **R&D cluster** for the **utilization of telecom and energy Submarine Cables** for **environmental and seismic detection**.
- **Easy Licensing and Permits** for **Submarine Cables.**
- **Green energy** to feed Submarine Cables, Interconnection Hubs and Data Centres, **should be** obviously **promoted**.

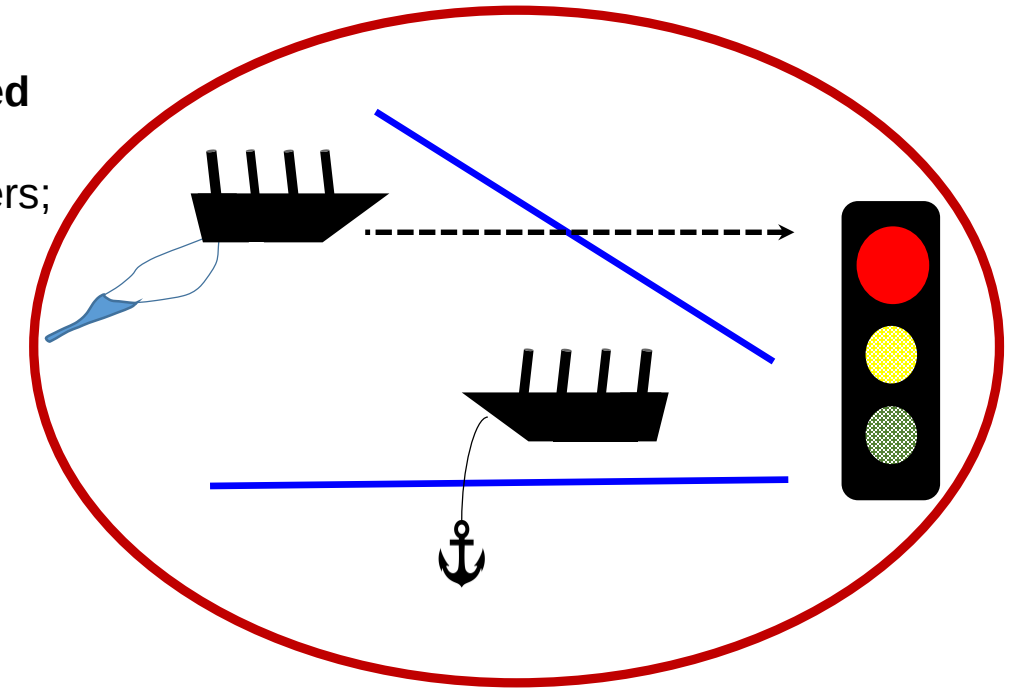
Surveillance and Protection Service of Submarine Cables in Portuguese EEZ

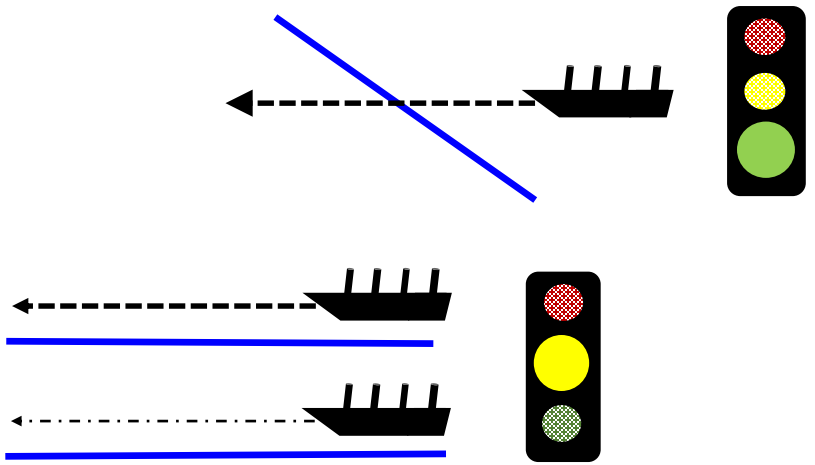
(public service 24h / day)

***Submarine Cables routes* +**
+ *AIS* + *Coastal Radars* +
+ *Wet and Dry detection*
(trawling, anchors, landslides, turbidity currents, …)

To produce **warnings and alerts to ships** nearby **Submarine Cables** routes within Portuguese EEZ, being integrated with other collected data from dry and wet detection.
By request, will be issued Reports provided by a **certified national public entity**, to:

- Operators and Cable Owners;
- Int'l Organizations;
- Authorities;
- Courts;
- Ships:
- …





: ship route (cruise speed)

: ship route (low speed)

: stationary ship

: fishing activities (trawling, …)

: Submarine Cable route

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 4

Electronic Portal* for para Easy Licensing / Permits of Submarine Cables in Portuguese EEZ
(public service)

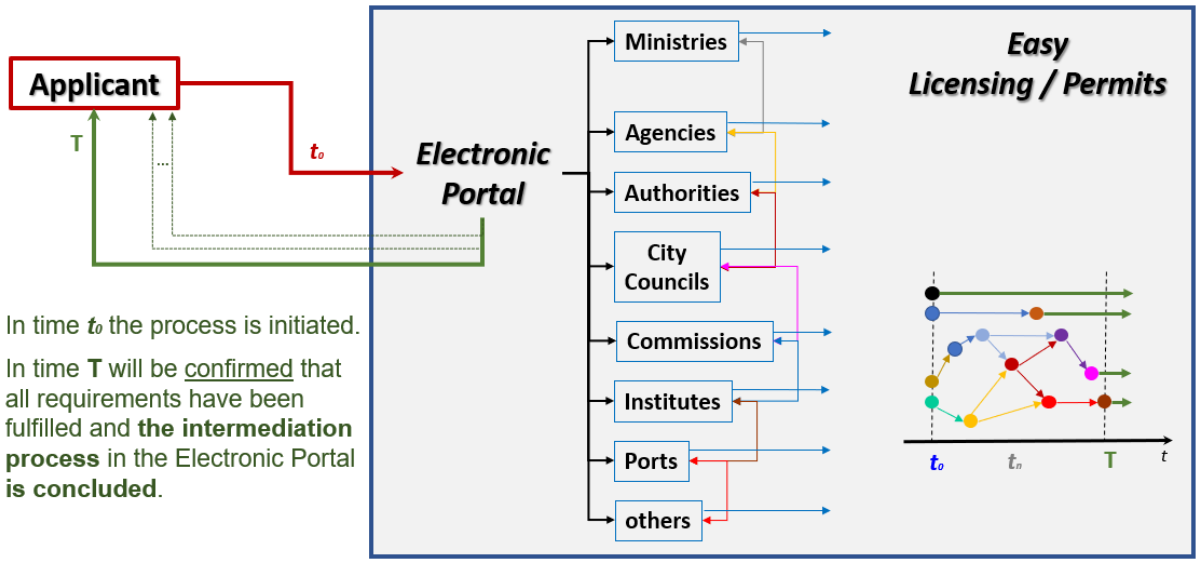
Industry

- **Operators (traditional, OTTs, others);**
- **Submarine system owners;**
- **Submarine systems manufacturers and suppliers;**
- **Oceanographic services providers;**
- **Installing, maintenance and repair of submarine systems providers;**
- **Consultors;**
- **Investors;**
- **Embassies;**
- **…**

Electronic Portal

Identification of the work to be carried out with a flow chart, "who is who" in the general process, deadlines to be met by each entity, follow up,…, including:

- **submission of requirements, communications and requests;**
- **intermediation between the applicant and public entities;**
- **transmission of notifications of decisions and remittances of titles.**



Public entities

- **Ministries** (Government);
- **Regional Governments**;
- **Public Institutes**;
- **National Agencies**;
- **Regulator Authorities;**
- **Port Authorities**;
- **Navy**;
- **City Councils;**
- **…**

*- if needed, running in parallel with Data Centres and Interconnection permits processes

Portuguese contribution to the EU Atlantic Data-Gateway Platform
Question 5

5. Will EU Atlantic Data-Gateway Platform have to respond to the needs of capacity for scientific traffic?

- Yes!

Examples of Scientific traffic:

- **Air Centre and Sta. Maria space port** (Azores Is.),
- Square Kilometre Array (**SKA**)
- Scientific traffic associated to **Environmental and Seismic detection**,
- Interconnection of research and education high-capacity networks – **Géant within EU** and **Géant-South America** and **Géant-Africa**.

All of this is under the umbrella of the *Wind Route*

With this ***Wind Route*** approach we intend:

- 1st, to solve a **problem** of **territorial cohesion** with a **New CAM Ring**;
- 2nd, to build a **Platform** for landing **int'l Submarine Cables**;
- 3rd, **associated to Submarine Cables,** to develop **Data Storage** and **Interconnection**;
- 4th, to provide **additional public services to the industry, Science and citizens**;
- 5th, to **support data transmission** for **Scientific projects**;
- 6th, to **contribute to the EU Atlantic Data-Gateway Platform** in an **innovative way**.

Portuguese contribution to the EU Atlantic Data-Gateway Platform

With this ***Wind Route*** approach, we intend to provide **additional public services to the industry, Science and Citizens, contributing** in an innovative way to the **EU Atlantic Data-Gateway Platform.**

Doing so, we will **continue to explore new routes**, according to our tradition that began 6 centuries ago with the Maritime Discoveries.

Portugal has a history of landing **Submarine Cables** for over 150 years. In the early days telegraph cables served Empires, then coaxial cables served Nations, and now digital cables serve People.
We have been serving everyone since the very beginning, and we are committed to continue to do so. This is not the end, this is only the beginning…

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Regional Innovation Forum for Europe
September 2021

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