

12th December 2023

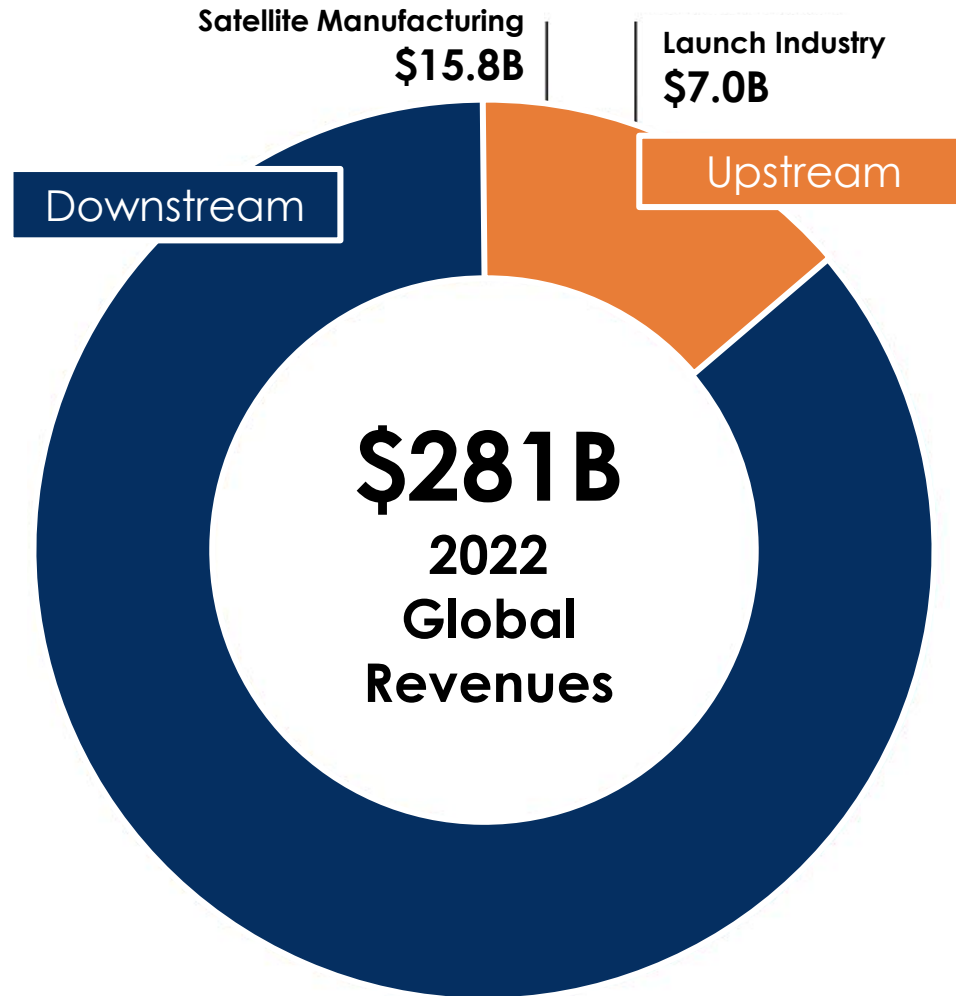
**Miguel ORTIZ (FR)**  
Deputy head of GEOLOC Lab  
ISO-TC20-SC14-WG8 convenor  
CEN-TC5-WG1 convenor

# **EURISY members' day 2023**

## **Interactive discussion on downstream standardization**

# The downstream space market is huge

2022 Top-Level Global Satellite Industry



Source: BRYCE, SIA State of Satellite Industry Report 2023. [URL here](#)

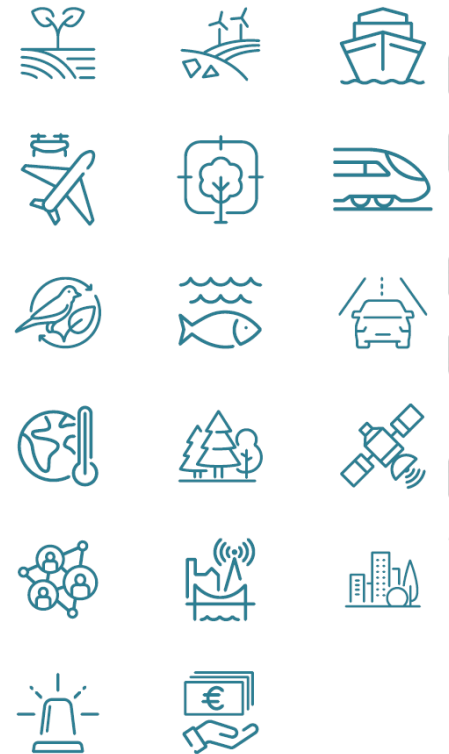
The **global GNSS downstream market revenues**, covering both device sales and service-related revenues, is expected to grow at a CAGR of 9.2% over the next decade, reaching a total of **€492 billion by 2031**.

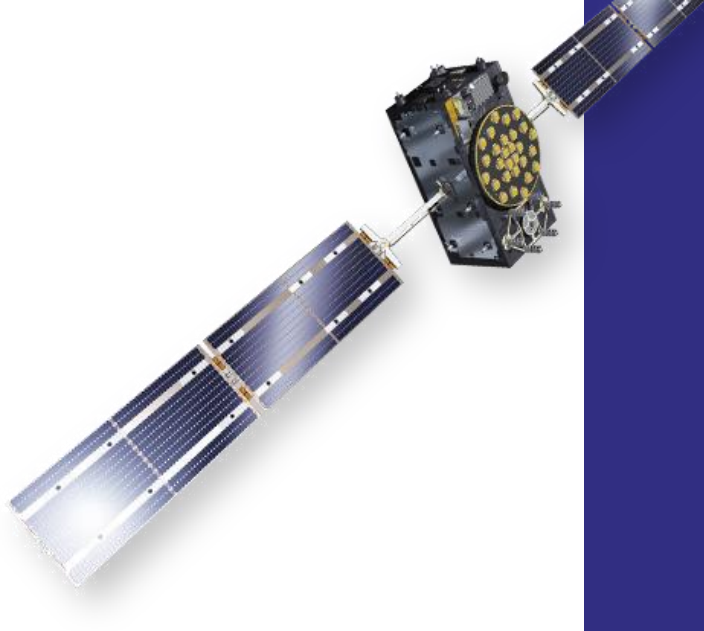


Source: EUSPA, EO & GNSS Market Report 2022  
[URL here](#)

# The downstream space standardization needs to:

- **Federate** experts, industries and operators in this domain
- Highlight and strengthen downstream activities
- Develop common international downstream standards to promote the **downstream market**
- Support large scale deployment of space services and applications, including safety and critical ones ( eg disaster management)
- Enhance **interoperability**
- Promote **fair comparison** of performances





## **EN16803: a success story for PNT-GNSS**

# Context: GNSS based positioning systems

- 4 Global Navigation Satellite Systems are operational:



Europe



USA



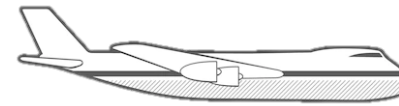
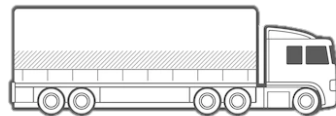
China



Russia



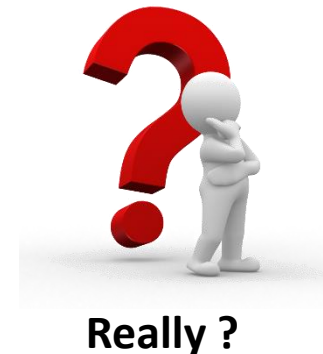
- Plus additional regional satellite systems
- From ~20,000 km altitude, they are used to locate whatever you want:



- You are here :



43°39'44.3"N 1°20'56.0"E  
43.662293, 1.348878 → 0.1 m



# Context: GNSS based positioning systems

- Not for every use cases
- Not in all environments
- Not always:  
satellites are moving, Dilution Of Precision (DOP) too !
- Not without specific corrections:  
HAS, RTK, DGPS, PPP, iono, tropo, clock correction,...



## Questions raised:

### 1- what is the “real” level of :

- Accuracy
- Continuity
- Availability
- Integrity

} of my GNSS based positioning system ?  
for its use case ?  
in its environment ?

### 2- And how to be sure of that ?

- which standards to apply ?
- what about certification / type approval of such systems ?



## Datasheets

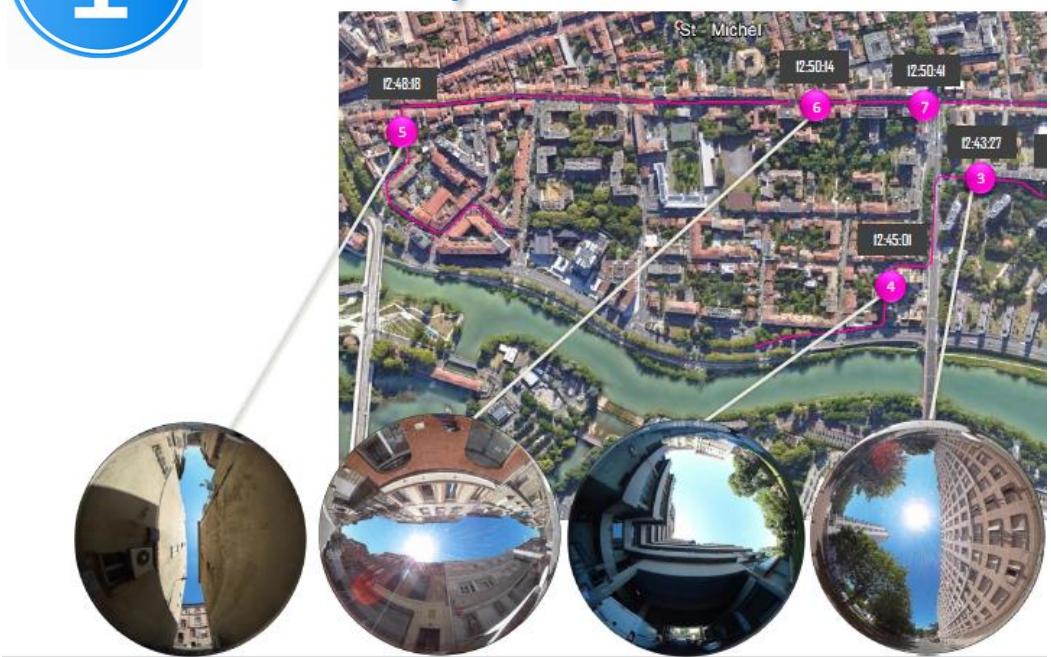
- CEP50%
- Roof top of building
- Static mode



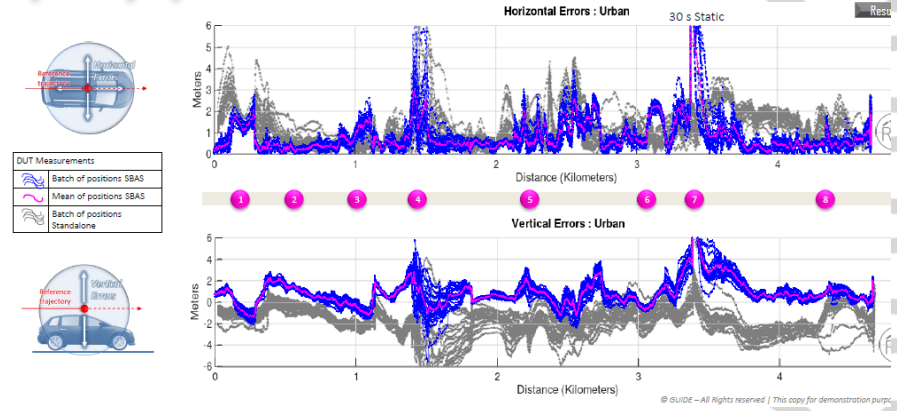
# How to assess « real » GNSS performances ?

Solution proposed by EN16803:  
Record & Replay  YouTube

## 1 Record phase



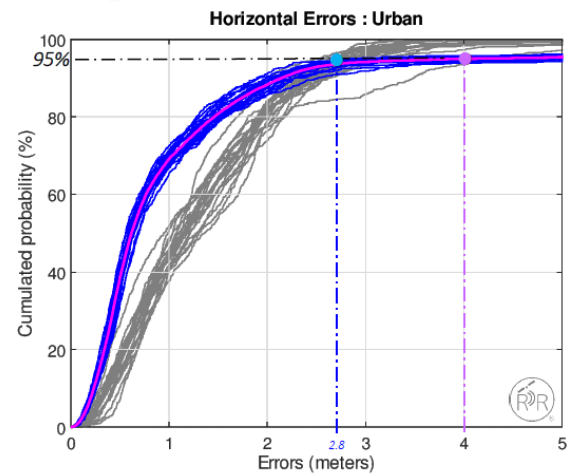
## 2 Replay phase



## 3 Analysis



EN: European Norme



| Results    |          |         |        |
|------------|----------|---------|--------|
| 50 %*      |          |         |        |
|            | Err Mean | Err Max | St Dev |
| Horizontal | 0.60 m   | 0.70 m  | 0.05 m |
| 75 %*      |          |         |        |
|            | Err Mean | Err Max | St Dev |
| Horizontal | 1.30 m   | 1.40 m  | 0.10 m |
| 95 %*      |          |         |        |
|            | Err Mean | Err max | St Dev |
| Horizontal | 4.00 m   | 6.10 m  | 0.10 m |

\*Referred to SBAS corrections active

# How to certify « real » GNSS performances ?

Solution promoted by EN16803:

## 1 Performance Criteria

- template provided by standards
- SHALL be fill in by INDUSTRY players
- shall be accepted by community
- based on refined use cases

## 2 Assessment by Record & Replay

- see previous slide
- simulation may be used for integrity

## 3 Label / Certification / Type Approval

-some potential European examples:







# **Downstream space standardization**

# European

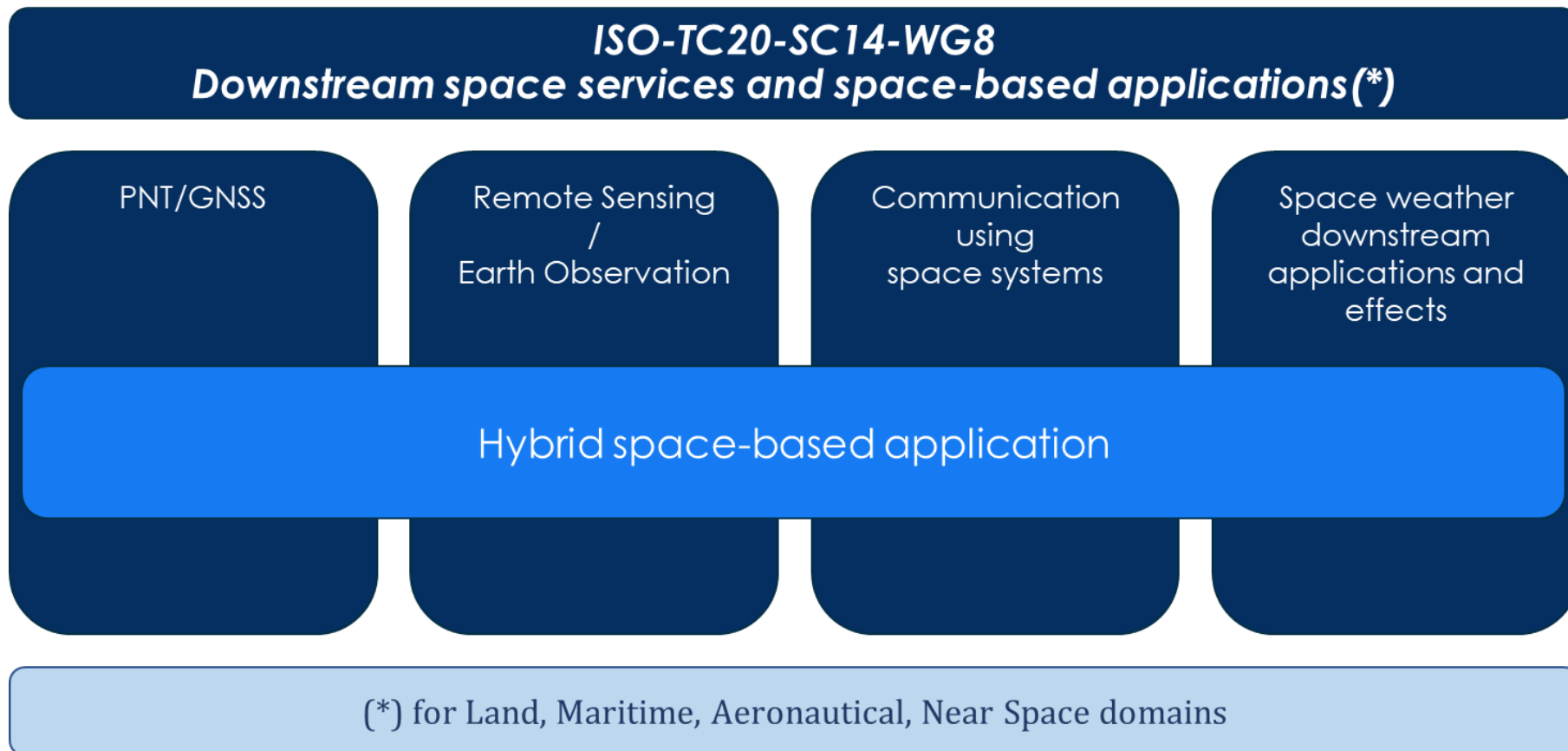
- CEN-TC5-WG1
- “Navigation and positioning receivers for road applications”
- 4 standards on going
- EN16803 series: *Space — Use of GNSS-based positioning for road Intelligent Transport Systems*
- Convenor: France (Miguel ORTIZ)

# International

- ISO-TC20-SC14-WG8
- “Downstream space services and space-based applications”
- Officially created September 2022
- 12 standards on going on PNT/GNSS and EO
- Convenor: France (Miguel ORTIZ)
- Co-convenor: Japan (Koki ASARI)



# ISO-WG8: High level architecture



TopLevel  
Document  
v1

- 38 members registered on ISO platform, 10 countries, 1 liaison\* :

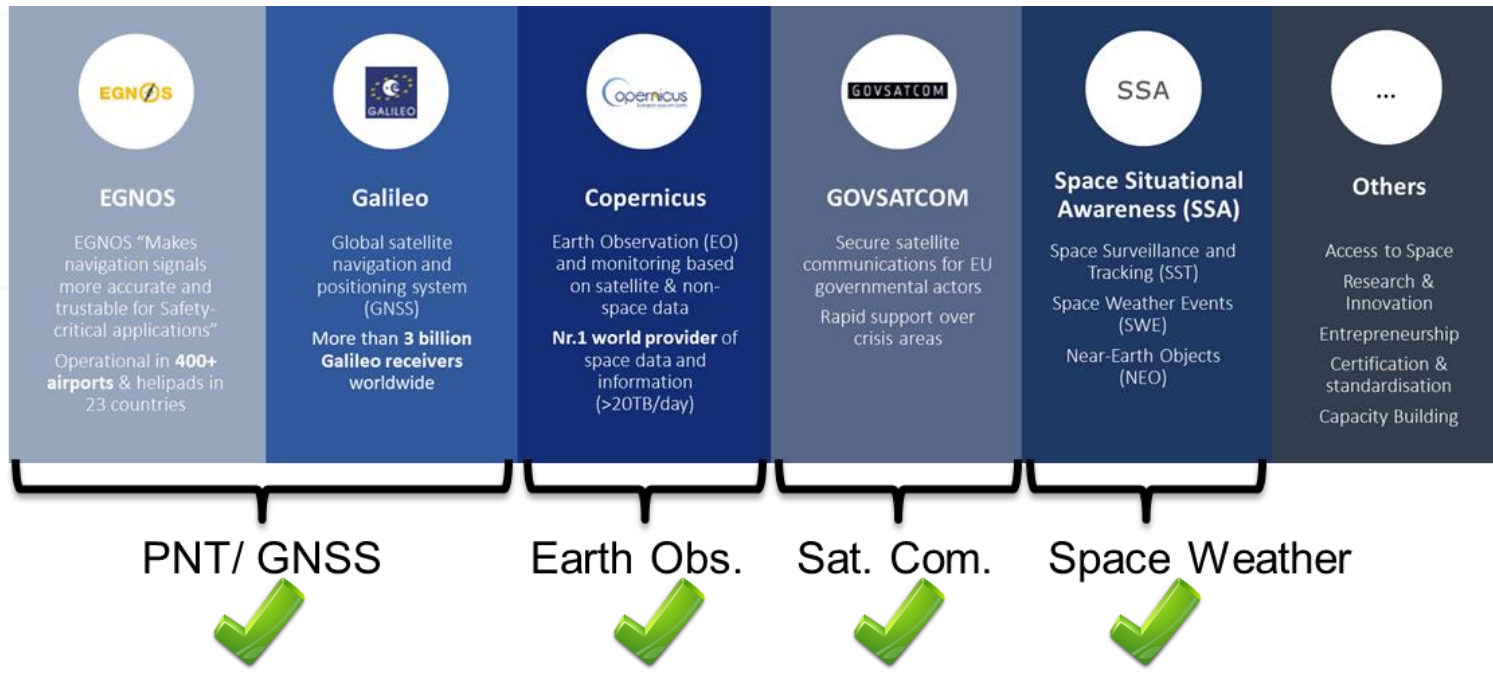
Brazil / China / France / Germany / Greece / India / Japan / Russia / United Kingdom / United States

- overview:





# ISO-WG8 : a perfect match with EUSPA



Downstream market for space services and applications

- For Galileo, EGNOS, Copernicus, GOVSATCOM



EUSPA



# ISO-WG8 : an excellent match with **eurisy**



ISO-WG8  
focused on  
**DOWNSTREAM** ✓

Source: BRYCE, SIA State of Satellite Industry Report  
2023. [URL here](#)



# ISO-WG8 : an excellent match with **eurisy**

## ISO-WG8 space services



### Earth Observation

Satellite images provide foundational context and visualisation of on-ground conditions, enabling critical decisions.



### Satellite Navigation (GNSS)

Satellite navigation provides precise location and timing services.



### Satellite Communication

Satellite telecommunication infrastructure ensures connectivity when terrestrial connections are down or inexistent.

### ISO-TC20-SC14-WG8 *Downstream space services and space-based applications (\*)*

PNT/GNSS



Remote Sensing  
/  
Earth Observation



Communication  
using  
space systems



Space weather  
downstream  
applications and  
effects

(\*) for Land, Maritime, Aeronautical, Near Space domains

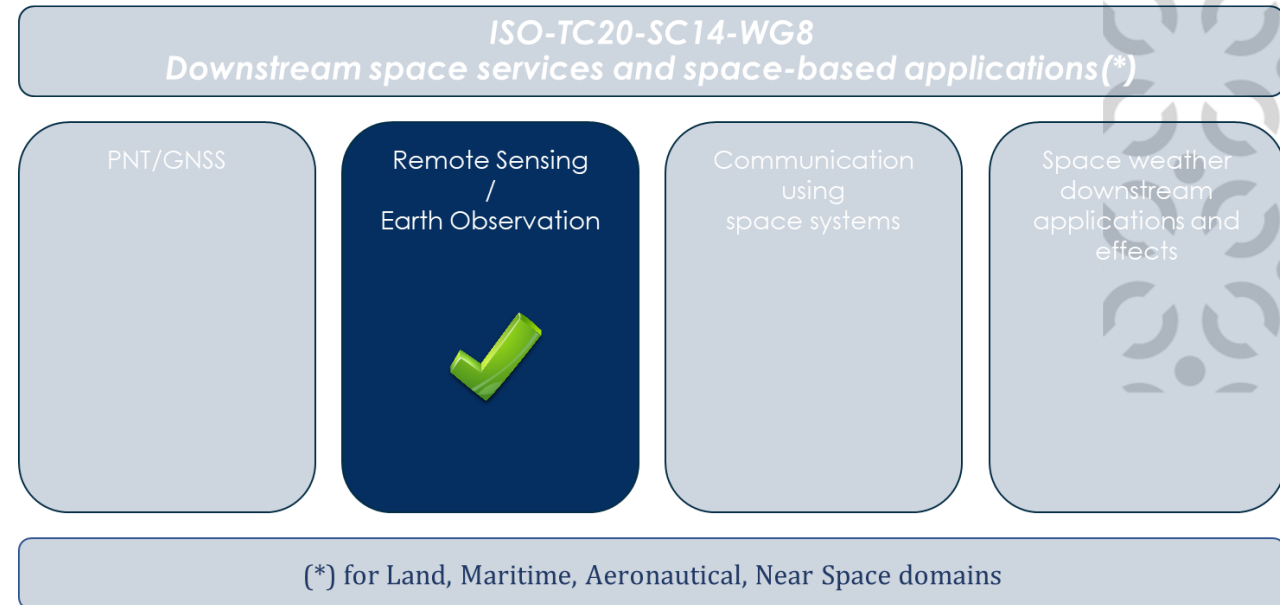


# ISO-WG8 : an excellent match with



Source: PROTECT VIDEO from website [protect-pcp.eu](http://protect-pcp.eu).  
[URL here](#)

## ISO-WG8 space services



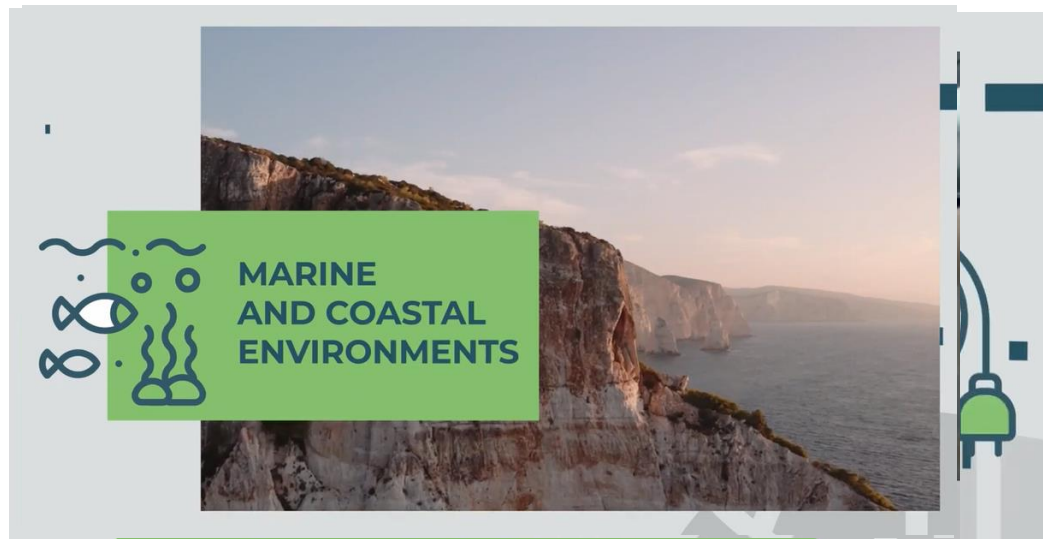




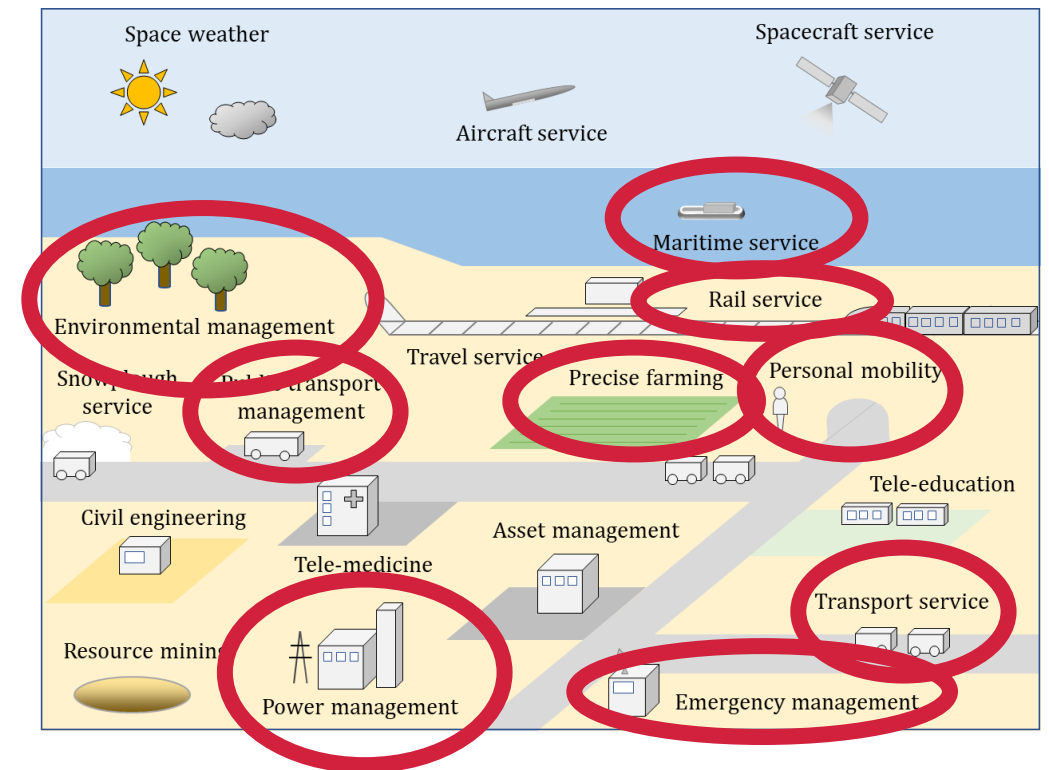
# ISO-WG8 : an excellent match with PROTECT



ISO-WG8 applications



Source: PROTECT VIDEO from website [protect-pcp.eu](http://protect-pcp.eu).  
[URL here](#)





# How to cooperate with ISO-TC20-SC14-WG8 ?

“Downstream space services and space-based applications”

1

## Ask to your National Body

-to be registered as expert to WG8

2

## Be connected

-with industrial partnerships  
-with research & innovation institutes  
-to propose New Work item (NP)

3

## Collaborate

-worldwide  
-with international experts  
-in order to publish fruitful and  
new ISO standards

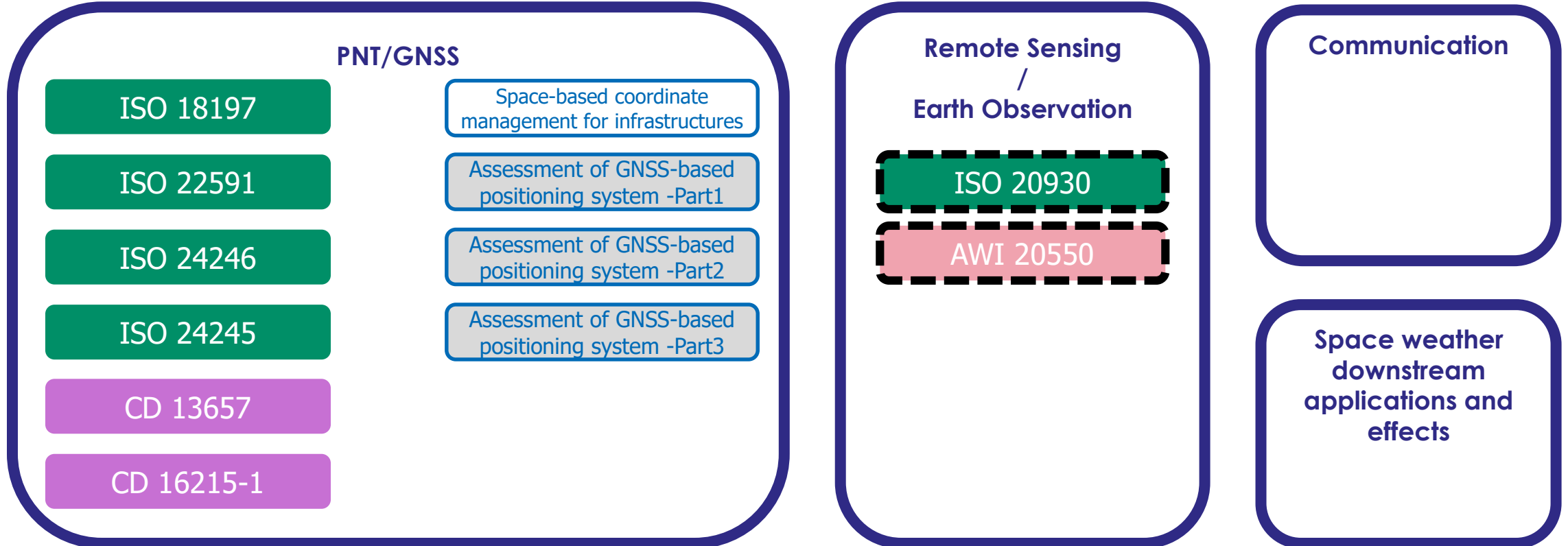




Additional backup slides

# 9 Overview of the WG8 work program

## WG8 Downstream space services and space-based applications



Publication stage (60)

Approval stage (50)

Enquiry stage (40)

will be transferred from WG1 to WG8

Committee stage (30)

Preparatory stage (20)

Proposal stage (10)

Preliminary stage

## 9 Overview of the WG8 work program

- SC 14 Work Program November 2023.xls

| Project # | Part # | Ed | Project Title  | Limit Dates                        | Project Lead      |
|-----------|--------|----|--|------------------------------------|-------------------|
| 13657     |        | 1  | Space systems — Space-based services — Positioning information exchange service                                  | DIS - 3/24/2024<br>Pub - 3/24/2025 | Asari, Koki       |
| 16215     | 1      | 1  | Space systems — Space-based positioning, navigation and timing (PNT) services — Part 1: Architectural basis      | DIS - 1/30/2024<br>Pub - 3/31/2025 | Asari, Koki       |
| 18197     |        | 1  | Space systems — Space based services requirements for centimeter class positioning                               | PUBLISHED                          | Furukawa, Toshio  |
| 22591     |        | 1  | Space systems — Space-based services for a high accuracy positioning system with safety requirements [Tech Spec] | PUBLISHED                          | Ishihara, Ryuichi |
| 24245     |        | 1  | Space systems — Global Navigation Satellite System (GNSS) receiver class codes                                   | PUBLISHED                          | Asari, Koki       |
| 24246     |        | 1  | Space systems — Requirements for Global Navigation Satellite System (GNSS) positioning augmentation centers      | PUBLISHED                          | Asari, Koki       |



- Systematic reviews:

ISO 20930 “Space systems — Calibration requirements for satellite-based passive microwave sensors”  
 “Systematic Review initiated: 20 weeks ; 15/07/2023”

# 17 Any other business

17.1. An advanced surveillance platform to improve the **EUR**ocean **M**ulti **A**uthority **bordeR** **S**ecurity efficiency and cooperation

Floor is given to :

Vasiliki (Betty) Charalampopoulou

Thomas Papakosmas

Both from : Geosystems Hellas (Greece)



This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101073985



EURMARS

@ ISO/TC 20/SC 14/WG 8 - 3rd

An advanced surveillance platform to improve the EURocean Multi Authority bordeR Security efficiency and cooperation

Vasiliki (Betty) Charalampopoulou (EXPERT— Greece)

Geosystems Hellas S.A.

09/11/2023