

# ESA Earth Observation Challenges for New Times

Poland 10th Anniversary Conference

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ESA UNCLASSIFIED – For ESA Official Use



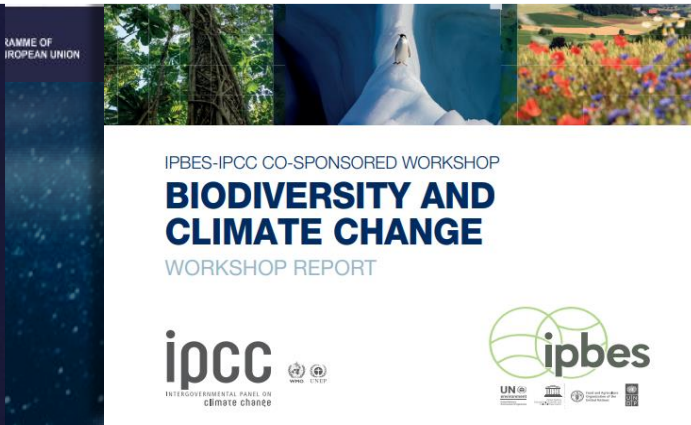
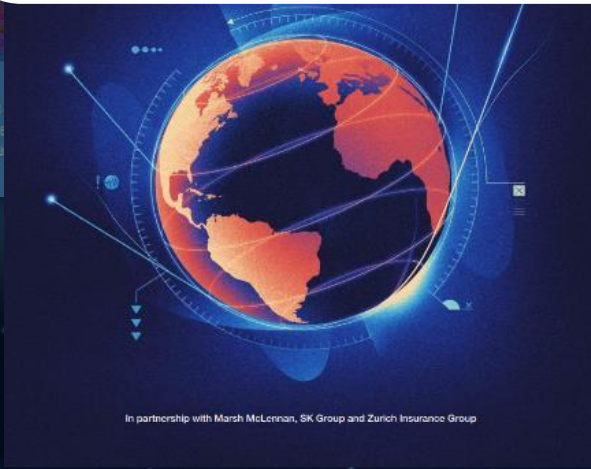
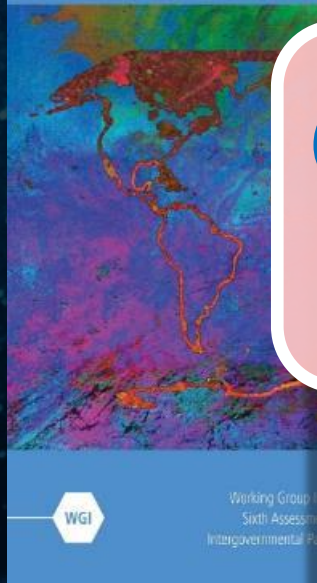
# Worldwide Urgent Priorities



## SUSTAINABLE DEVELOPMENT GOALS



**Challenges in dealing with worldwide, borderless & urgent issues**



A large, semi-transparent image of the Earth as seen from space, showing continents and clouds, centered behind the main title.

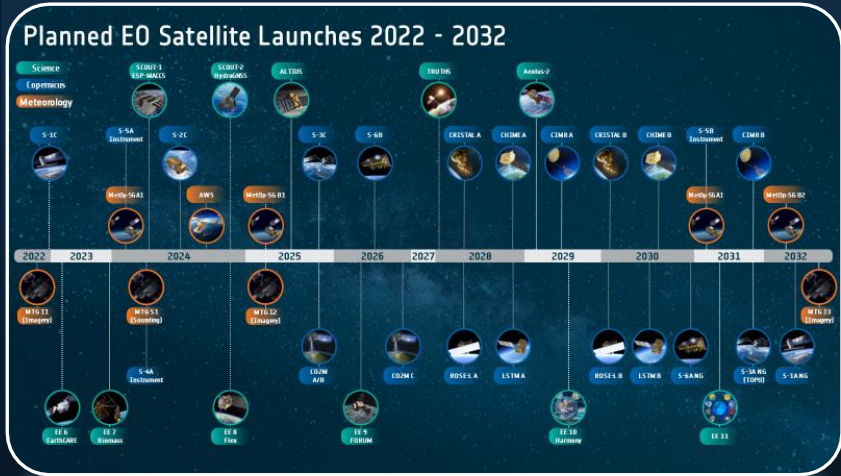
# ESA's Earth Observation Vision

## Taking the Pulse of our Planet



# Earth Observation Activities at ESA to Support the EO Vision

## Building satellites



## Managing Missions



## Cal/Val & Data Distribution



## Earth System Science

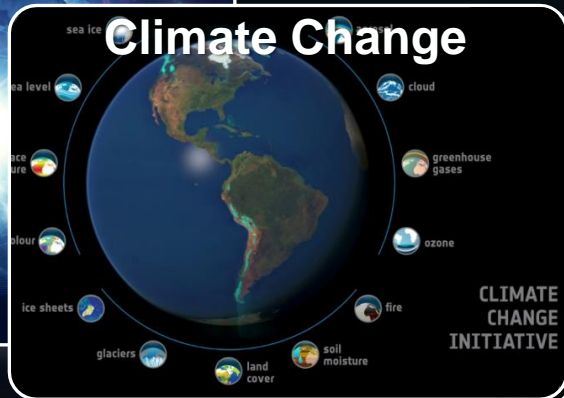
### Emergency Response



### Digital Twins

## Applying the Data

### Climate Change



## Innovation & Commercialisation

### Φ-lab

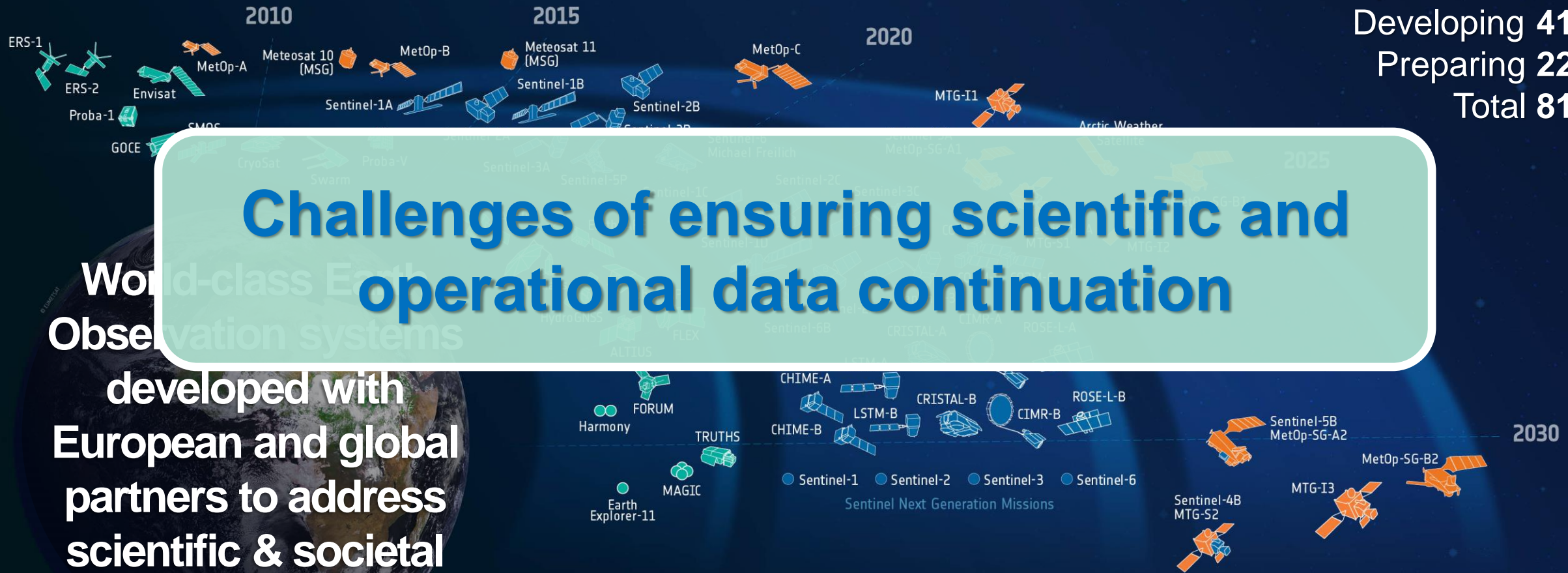


# ESA Earth Observation Missions



## Satellites

Heritage 04  
 Operational 14  
 Developing 41  
 Preparing 22  
 Total 81

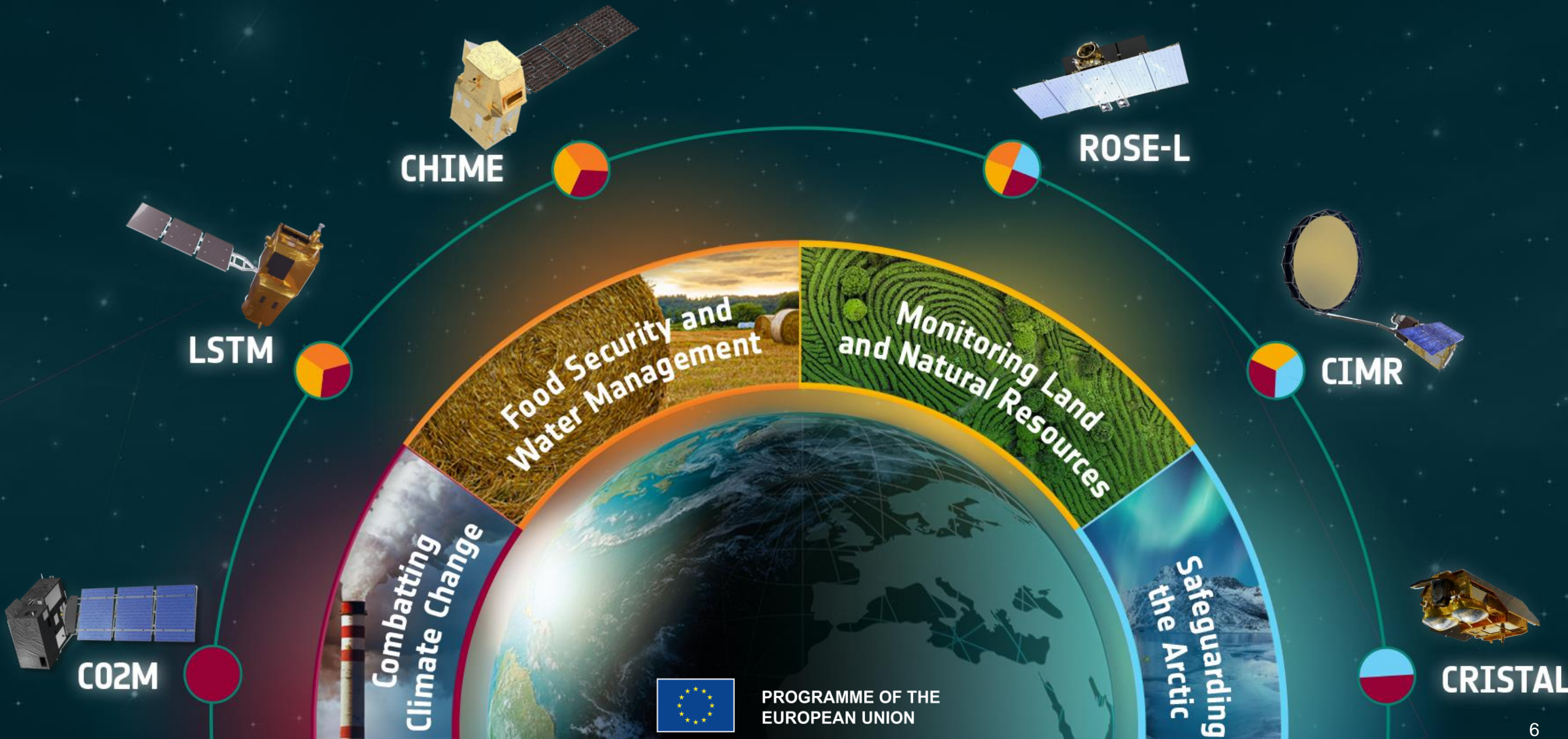


**Challenges of ensuring scientific and operational data continuation**

World-class Earth Observation systems developed with European and global partners to address scientific & societal challenges

Science Copernicus Meteorology

# Sentinel Expansion Missions to Strengthen Copernicus



## Copernicus is the largest producer of EO data in the world

All global

landmasses  
observed every  
5 days at 10m  
resolution

All data is  
Free, Full and  
Open to all\*

25 TB of Daily Data

Challenges in dealing with huge  
EO Data Dimensions

250 TB of Daily Sentinel  
Products Disseminated for  
Services to Society

Big Data Challenges

Copernicus  
2+ PB/week

Data  
Integration

Millions of  
Users

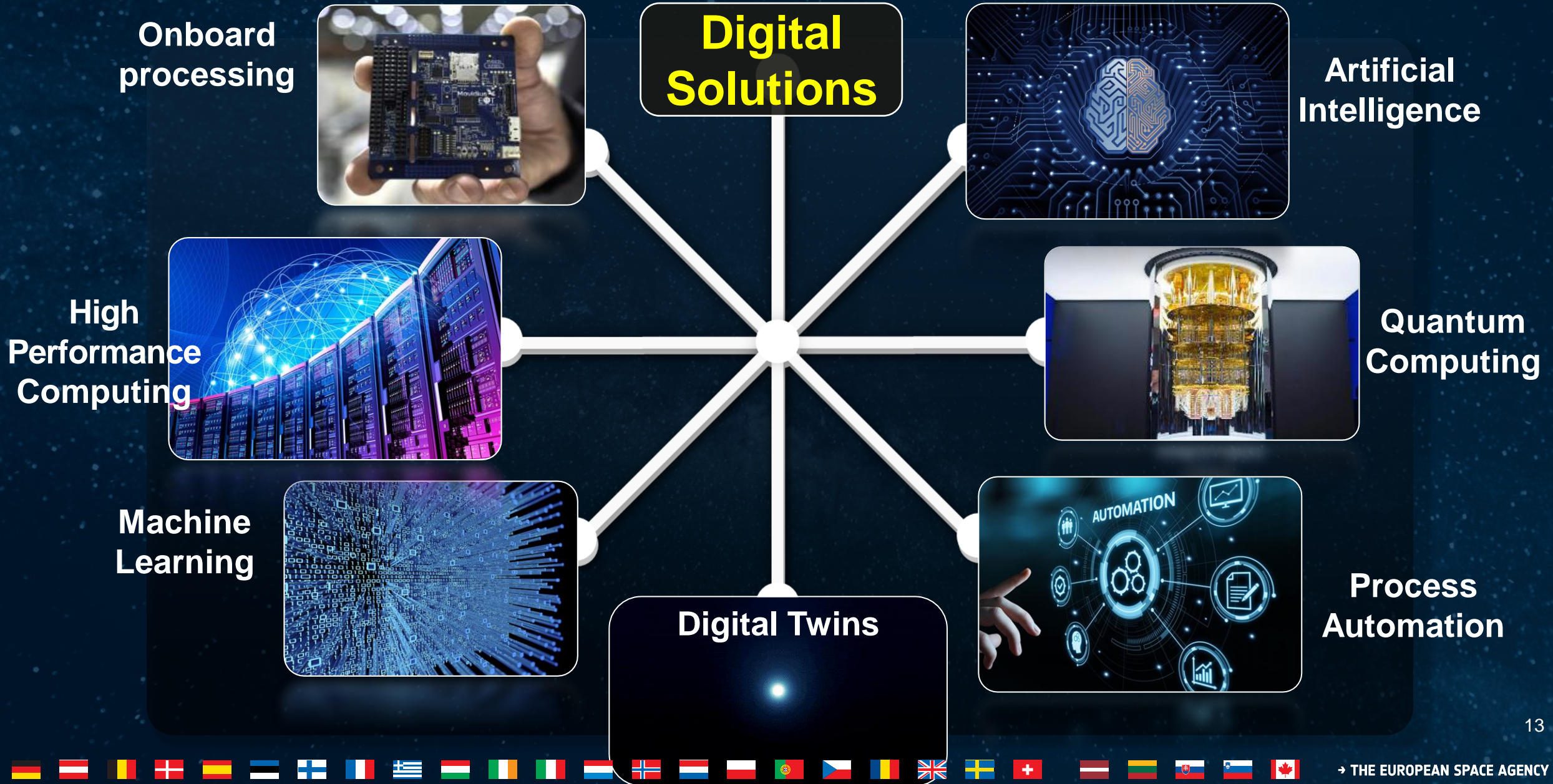
Non-  
Specialist  
Users

IAAS

SAAS

\* ESA Sentinel Data Policy (Sep 2013) and  
EU Delegated Act on Copernicus Data and Information Policy (Dec 2013)

# Digital Solutions for New Dimensions in EO Data





DTE-Hydrology



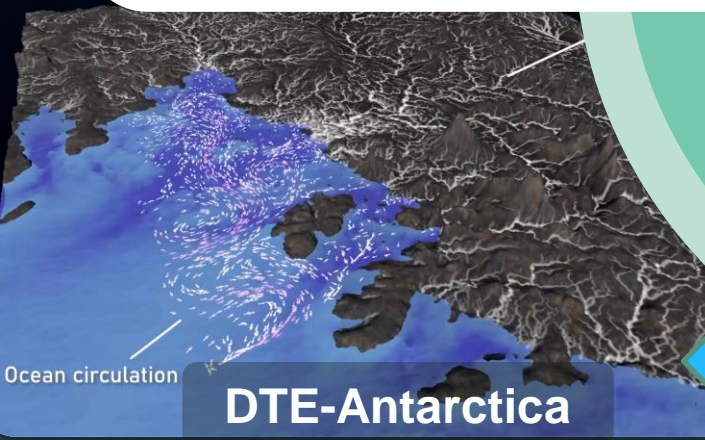
Water Cycle



## Challenges of answering Grand Science Questions with Digital Twins

operational Digital Twins valorising novel EO capabilities

products, process understanding, science & early demonstrations prototyping



Ocean circulation

DTE-Antarctica



Subglacial lakes

Open science

## ESA as Developer/Enabler

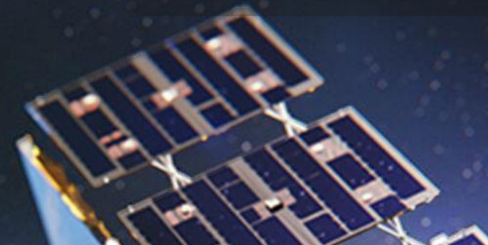
## ESA as Anchor Customer

### **InCubed**

To develop innovative/novel & commercially viable products and services related to EO data

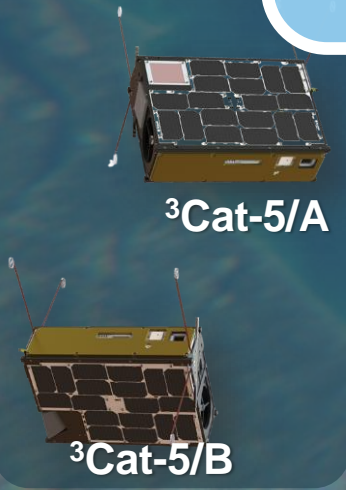
From building satellites to data platforms and all in between

Producing a minimum viable product, robust from a technical, commercial, programmatic and financial point of view



# Challenges of European New Space Development

### **φ-Sats**

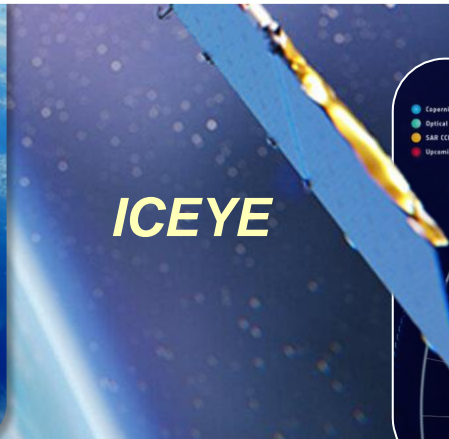


3Cat-5/A

3Cat-5/B



Scout-1 – CubeMAP  
(Expected launch in Q3 2024)



ICEYE



Copernicus Contributing Missions



# A Balanced EO Programme Proposal, Built for the Future...

ESSENTIAL

EO ENABLED

COHERENT

URGENT

COLLABORATIVE

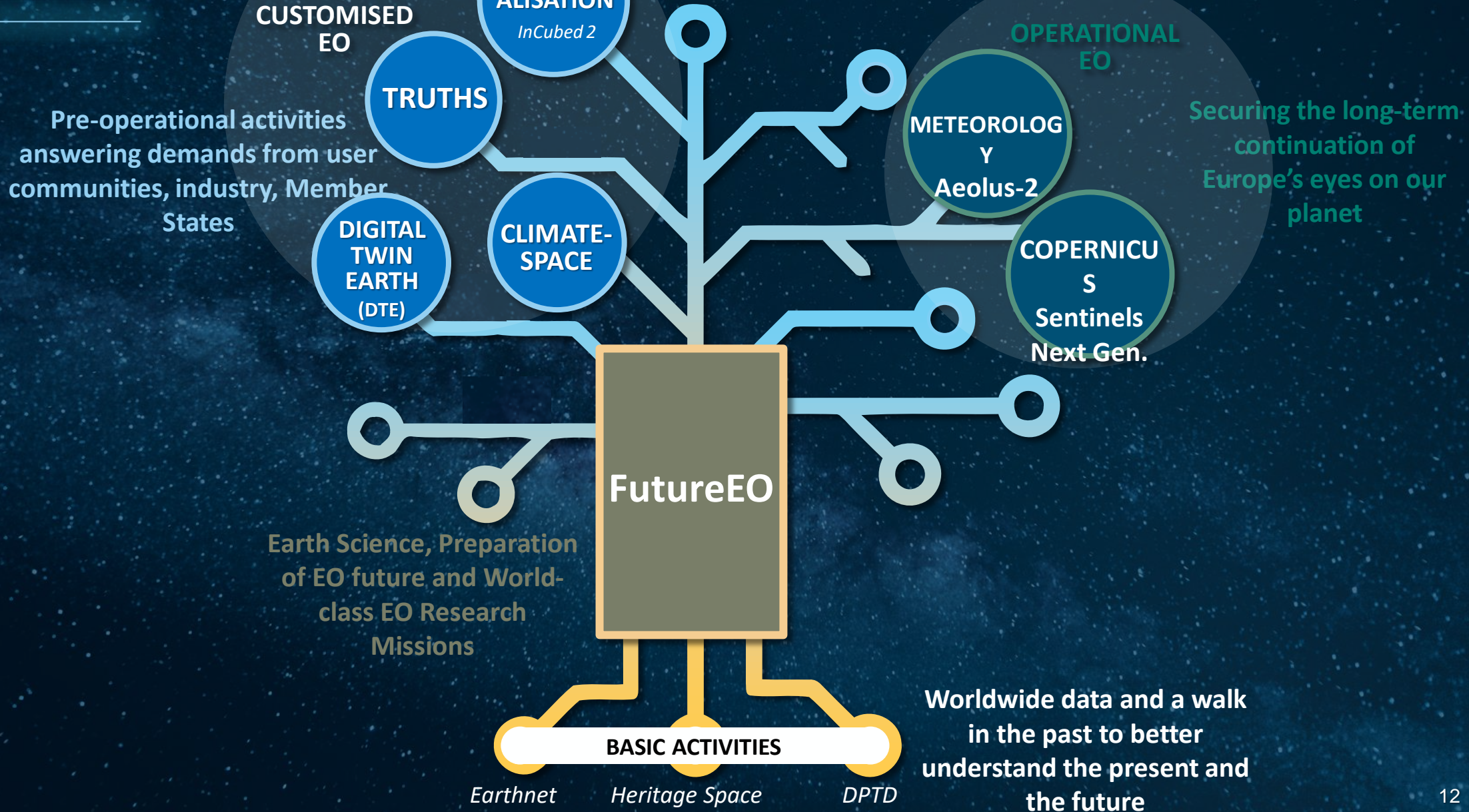
LONG TERM

## Challenges of balancing an EO Programme Proposal in a multitude of contexts

... and that critically contributes to:

- ✓ European Strategic Autonomy
- ✓ Technological Solutions for Today's Challenges
- ✓ Economic and Societal Benefits
- ✓ Science Excellence

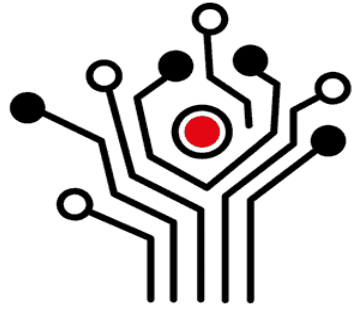
# EO at CM22...



# Polish Success Stories in Earth Observation



## EO Innovation Platform Testbed Poland



**creo TECH**

Instruments S.A.

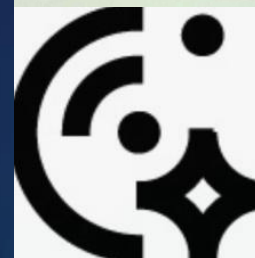
## Genesis / Intuition-1 mission



**QZ Solutions**



## CREODIAS



**KP LABS**



# COPERNICUS \_ MAKERS

EUROPEAN YOUTH CAPITAL  
LUBLIN 2023



# MAKE SPACE FOR EUROPE

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