

Geospatial World Forum 2023

Space + Spatial Value Chain

ESA Earth Observation Activities

4-May-2023

Rotterdam, NL

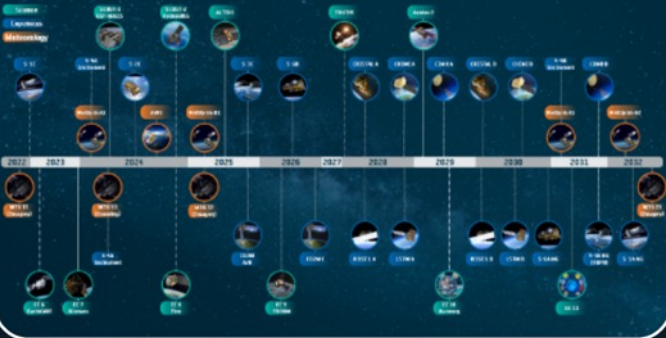
Dr. Nicolaus Hanowski ESA/ESRIN

Earth Observation Activities at ESA



Building satellites

Planned EO Satellite Launches 2022 - 2032



Managing Missions



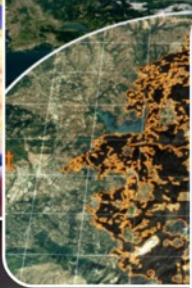
Cal/Val & Data Distribution



Earth System Science



Emergency Response



Digital Twins



Applying the Data

Climate Change



Innovation & Commercialisation

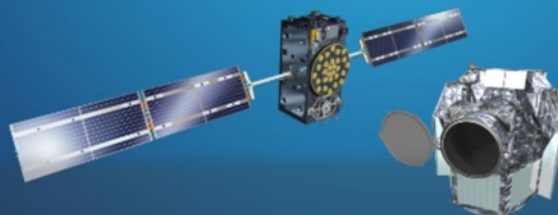
Φ-lab



What is the European Space Agency?



Make Space
for Europe



5 500+
ESA Workforce

Promoting cooperation among
European States in space research,
technology and applications, for
exclusively peaceful purposes

22
Member States

2023 Budget

€ 7.08 billion =
12 per European

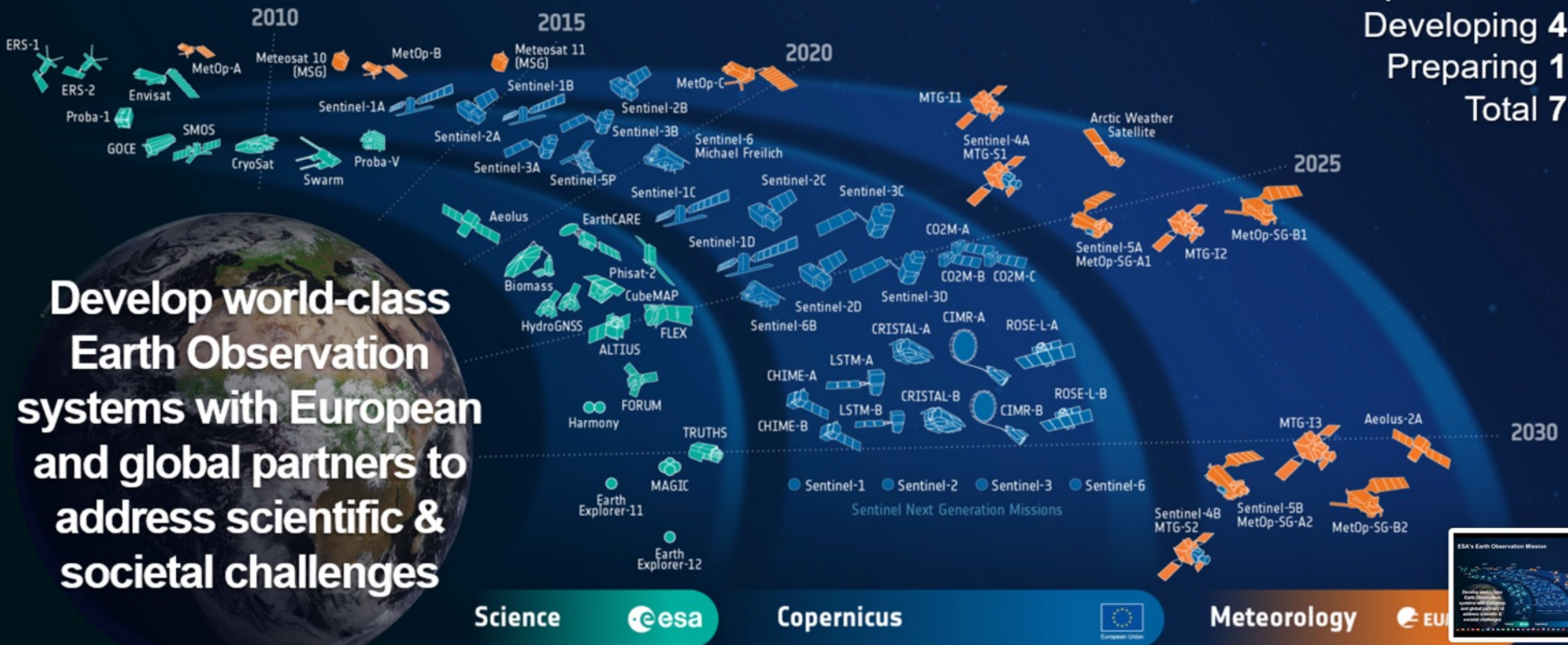


ESA's Earth Observation Mission



Satellites

Heritage **04**
 Operational **14**
 Developing **42**
 Preparing **19**
Total 79



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

Science Copernicus Meteorology



EO supports European countries & interests



Contributions to:

- Climate Action and the European Green Deal
- Earth Science
- Weather forecasting
- Agriculture & Fisheries
- Resource Management
- Air Pollution Monitoring
- Alpine & Maritime
- Security
- ...



+ industrial innovation, jobs and growth!



EO Supports Major International and European Policy Frameworks



UN SDG for 2030



Paris Agreement on Climate Change



PARIS2015
UN CLIMATE CHANGE CONFERENCE

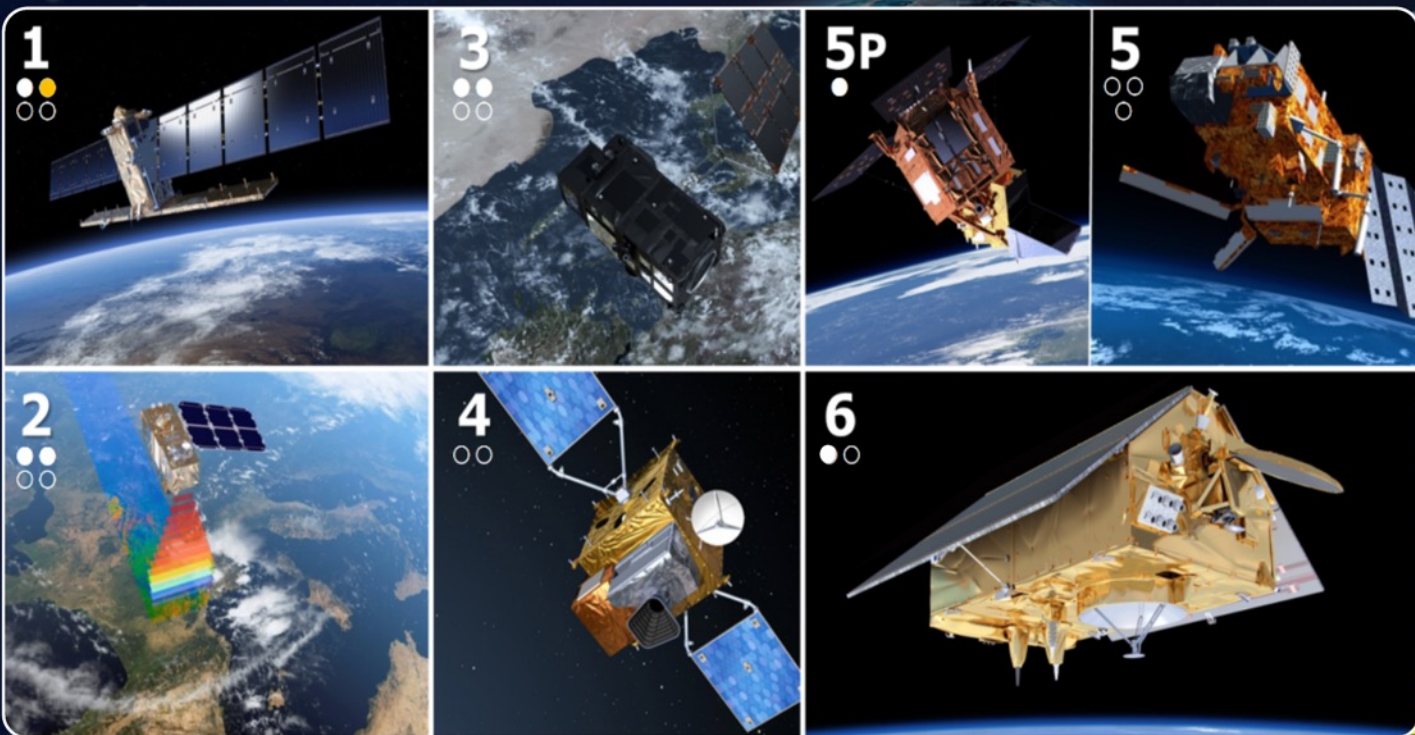
The Sendai Framework for Disaster Risk Reduction 2030

	Reduce	Increase
7 GLOBAL TARGETS	Mortality/ global population 2020-2030 Average << 2005-2015 Average	Countries with national & local DRR strategies 2020 Value >> 2015 Value
	Affected people/ global population 2020-2030 Average << 2005-2015 Average	International cooperation to developing countries 2030 Value >> 2015 Value
	Economic loss/ global GDP 2030 Ratio << 2015 Ratio	Availability and access to multi-hazard early warning systems & disaster risk information and assessments 2030 Values >> 2015 Values
	Damage to critical infrastructure & disruption of basic services 2030 Values << 2015 Values	



→ THE EUROPEAN SPACE AGENCY

The Big-Data Revolution with First Generation Sentinels



- sentinel-1**
→ RADAR VISION
- sentinel-2**
→ COLOUR VISION
- sentinel-3**
→ A BIGGER PICTURE
- sentinel-4**
→ EUROPEAN AIR MONITORING
- sentinel-5p | sentinel-5**
→ GLOBAL AIR MONITORING
- sentinel-6**
→ SURFING THE SEAS



The Big-Data Revolution with First Generation Sentinels



Copernicus is the largest producer of EO data in the world

All global landmass is observed every 5 days at 10m resolution

All data is Free, Full and Open to all*

25 TB of Daily Data Production by Sentinels

300 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

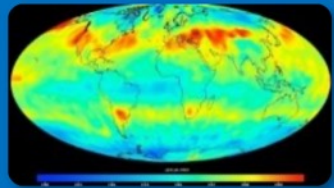
IAAS

SAAS

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

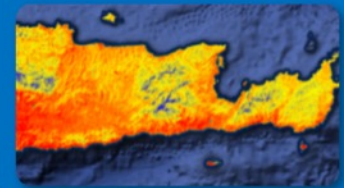
Copernicus: Sentinel Expansion Missions

CO2M - Anthropogenic CO₂ Monitoring



Causes of Climate Change

LST – Land Surface Temperature Mission



Agriculture & Urban Management

CRISTAL – Polar Ice & Snow Topography



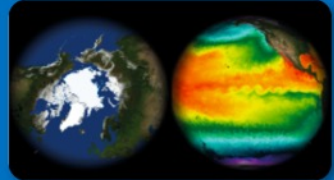
Effects of Climate Change

CHIME – Hyperspectral Imaging Mission



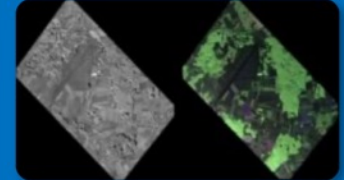
Food Security, Soil, Minerals, Biodiversity

CIMR – Passive Microwave Radiometer



Sea: Surface Temp. & Ice Concentration

ROSE-L – L-band SAR Mission



Vegetation & Ground Motion & Moisture

Digital Twin Earth (DTE)



SHAPING EUROPE'S GREEN AND DIGITAL FUTURE

Destination Earth (**DestinE**) will support the European Union's Green Deal and Digital Strategy and will enable policymakers and users to reach the next step in informed decision-making.

