

European Space Policy

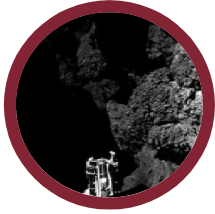
Eleni Paliouras, ESA

EuroGeographics General Assembly | 3 October 2017 | Vienna, Austria

ESA facts and figures

- Intergovernmental agency of 22 Member States
- 5.75 billion Euro budget in 2017
- 50+ years of experience
- Over 80 satellites designed, tested and operated in flight
- Eight sites/facilities in Europe, about 2300 staff





space science



human spaceflight



exploration



earth observation



telecommunications



navigation



technology



launchers



operations

European Space Policies: Why are they important?

Signal institutional intentions

- Provides a more stable environment which encourages
 - testing and adoption of new methodologies
 - decisions on business investments
- Supports formation of international partnerships
- Allows a basis on which ambitious missions can be planned
 - compelled by clear and rational study of needs

Past successes include

- European participation in the International Space Station
- European independent access to space with a European launcher family
- **Galileo and EGNOS**
- **Copernicus**

European Space Landscape - enabling provision of information about Earth from Space

Member States

National space organisations

Research institutes

Industry

EU institutions



Policy coordination:

- Since 2004 the ESA/EU Framework Agreement has been the basis for cooperation between ESA and the EU
- Article 189 of the Lisbon Treaty of 2009 gave mandate to the EU to develop a 'European' space policy, providing that it should establish appropriate relations with ESA
- ESA/EU ministerial-level meetings and related resolutions provide directions and guidelines for policy development

Joint Statement on Shared Vision and Goals for the Future of European Space

- signed October 2016 by ESA DG and the European Commission
- Specifies three core goals for the future:
 - maximise the integration of space into European society and economy
 - foster a globally competitive European space sector
 - ensure European autonomy in accessing and using space in a safe and secure environment

Cooperation between ESA and the EU



Policy coordination: EU/ESA space programmes and R&D activities: Joint Statement on Shared Vision and Goals for the Future of European Space

- Since 2004 the ESA/EU Framework Agreement has been the basis for cooperation between ESA and the EU
 - ESA is implementing two flagship programmes for the EU:
 - Galileo**
 - Copernicus**
- Article 189 of the Lisbon Treaty of 2009 gave mandate to the EU to develop a 'European' space policy, providing that it should establish appropriate relations with ESA
 - Horizon 2020** – ESA provides support to the EU in its implementation of space research and technology objectives
- ESA/EU ministerial-level meetings and related resolutions provide directions and guidelines for policy development
 - Defence and Space** – ongoing coordination between ESA, EC and EDA through different channels
 - signed October 2016 by ESA DG and the European Commission
 - Specifies three core goals for the future:
 - maximise the integration of space into European society and economy
 - foster a globally competitive European space sector
 - ensure European autonomy in accessing and using space in a safe and secure environment



Global monitoring for a safer world



Copernicus: an Earth observation programme for global monitoring for environment and security

- Led by the European Commission in partnership with ESA and the European Environment Agency
- Responds to Europe's need for geo-spatial information services by providing autonomous and independent access to information for policy-makers, particularly for environment and security issues
- ESA implements the space component: developing the **Sentinel** satellite series, its ground segment and coordinating data access
- **Free and open data policy**



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GEO EO4SDGs initiative

Realize the potential of EO and geospatial information to advance the *2030 Agenda* and enable societal benefits through achievement of the Sustainable Development Goals.

GOAL I: Demonstrate how EO and geospatial information, with socio-economic and other data contribute in novel and practical ways to support achievement of the SDGs.

GOAL II: Increase skills and capabilities in use of EO for SDG activities and their broader benefits.

GOAL III: Broaden interest and awareness of EO support to the SDGs and contribution to social, environmental, and economic benefits.



	Population distribution	Cities and infrastructure mapping	Elevation and topography	Land cover and use mapping	Oceanographic observations	Hydrological and water quality observations	Atmospheric and air quality monitoring	Biodiversity and ecosystem observations	Agricultural monitoring	Hazards, disasters and environmental impact monitoring
1 No poverty										
2 Zero hunger										
3 Good health and well-being										
4 Quality education										
5 Gender equality										
6 Clean water and sanitation										
7 Affordable and clean energy										
8 Decent work and economic growth										
9 Industry, innovation and infrastructure										
10 Reduced inequalities										
11 Sustainable cities and communities										
12 Responsible consumption and production										
13 Climate action										
14 Life below water										
15 Life on land										
16 Peace, justice and strong institutions										
17 Partnerships for the goals										



EO relevance for SDG's

Earth Observations potential contribution to the SDG Targets and Indicators



SDGs with most opportunities for Copernicus data and services

Analysis performed by the GEO EO4SDGs initiative

Target <i>Contribute to progress on the Target yet not the Indicator per se</i>							Goal	Indicator <i>Direct measure or indirect support</i>				
1.5							1 No poverty					
2.3 2.4 2.c							2 Zero hunger	2.4.1				
3.3 3.4 3.9 3.d							3 Good health and well-being	3.9.1				
							4 Quality education					
							5 Gender equality	5.9.1				
6.3 6.4 6.5 6.6 6.a 6.b							6 Clean water and sanitation	6.3.2 6.4.2 6.5.1 6.6.1				
7.2 7.3 7.a 7.b							7 Affordable and clean energy	7.1.1				
							8 Economic growth					
9.1 9.4 9.5 9.a							9 Industry, innovation and infrastructure	9.1.1				
							10 Reduced inequalities					
11.3 11.4 11.5 11.6 11.7 11.b 11.c							11 Sustainable cities and communities	11.3.1 11.6.2 11.7.1				
12.2 12.a 12.b							12 Responsible consumption and production					
13.1 13.3 13.b							13 Climate action	13.1.1				
14.1 14.2 14.3 14.4 14.6 14.7 14.a							14 Life below water	14.3.1				
15.1 15.2 15.3 15.4 15.5 15.7 15.8 15.9							15 Life on land	15.1.1 15.2.1 15.3.1 15.4.1 15.4.2				
17.6 17.7 17.9 17.16 17.17							17 Partnerships for the goals					



ESA approach to supporting SDG implementation



Global
Datasets

Methodological
Guidelines

Country
Support

Capacity
Building

EO Software
Toolboxes

Knowledge
Hub &
Platforms

Custodian Agencies

National Statistical Offices
Governments / Agencies

Key Stakeholders

- Access to global / regional datasets.
- in the absence of or to complement and enhance, national data sources.
- countries which face major difficulties in collecting national data

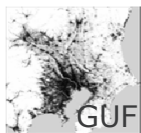
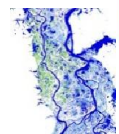
- Support custodian agencies to develop method. guidelines to countries.
- EO Best Practices.
- Scientifically sound approaches.
- Product validation.
- Show Cases.

- Targeted activities to support NSOs and governmental ministries to report on SDG indicators.
- Support country level efforts to apply EO to track, monitor and achieve SDGs.

- Build capacity to exploit EO
- Training courses
- Training material on EO best practices
- Mainly in developing and emerging economies
- Critical mass of technical centers

- Free of charge
- Open source
- Easy to use
- EO Processing Toolboxes (SNAP)
- Thematic Toolboxes (WOIS, GWA, S2Agri)

- Knowledge sharing
- Facilitate access to Sentinel data
- Access to global / regional datasets
- EO best practices
- Method. guidelines
- Visualisation and Analysis
- On-line processing
- Toolboxes (e.g Data cube)



SDG 6.6 Water-related Ecosystems

Tier 3

Tier 2

Tier 1

Global
Datasets

Methodological
Guidelines

Country
Support

Capacity
Building

Software
Toolboxes

Knowledge
Hub &
Platforms

6.6 Expert Workshop, Switzerland, Sept 2015

UNEP – Ramsar Custodians
SDG 6.6.1 Target Team

IWMI, UN WATER, CBD, UNEP WCMC,
UNEP DHI, **ESA**, IUCN

- Global Mangrove Watch (JAXA)
- Global Surface Waters (JRC)
- Global Wetland Extent (**ESA** GW Africa with GEO-Wetlands)

Step-by-Step
Monitoring
Methodology
for SDG
indicator 6.6.1

GPSDD funded
“EO support for SDG
6.6. monitoring and
reporting on
wetlands”, **Uganda**
GW Africa

- GW Africa Regional Trainings
- TIGER Capacity Building Facility (TIGER BRIDGE)
- GEO-Wetlands CB Working Group



Ramsar STRP



- Knowledge sharing Hub
- EO Best Practices
- Mapping Standards
- Monitor. Guidelines
- Benefit Showcases
- Toolboxes
- On-line processing



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Upcoming ESA project on “EO for SDGs”



Support GEO, CEOS, ESA/EC and their Member States
and the EO community to play a leading role
in the full realisation of Earth Observations in the 2030 agenda for SD

- Analyse in depth the **Metadata Repository** of all SDG indicators (169 targets, 230 indicators) and assess the **current and potential contribution of EO/Copernicus** to the SDG Global Indicator Framework.
- Review the **Tier 2 and 3 monitoring/reporting guidelines** produced by the custodian agencies for a number of key SDG indicators and propose areas of EO improvements.
- Perform a **country demonstration**, by partnering with the NSO and the relevant national governmental authorities (for the indicators selected) to support implementation of a number of SDG indicators (**at least two**)
- Study how the **GEO/CEOS/EC/ESA/MSs developed EO collaborative platforms and big data initiatives (Datacube)** can serve the EO data and information needs of the large community of SDG stakeholders (UN-GGIM, Custodian Agencies, National Statistical Offices, etc.).

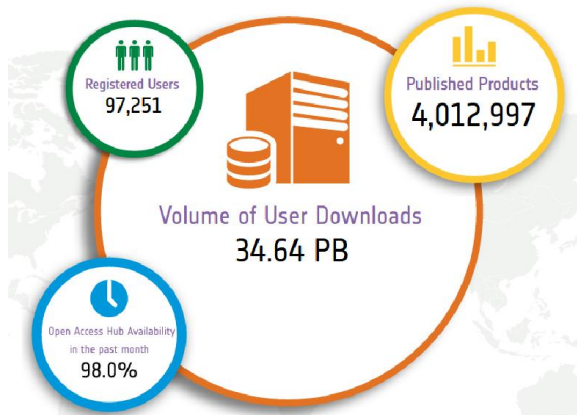
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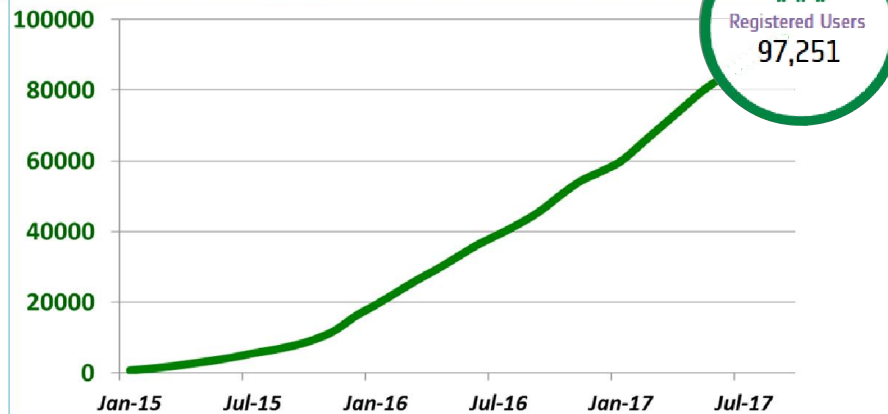
European Space Agency

Sentinel Data Access at ESA

- Statistics -

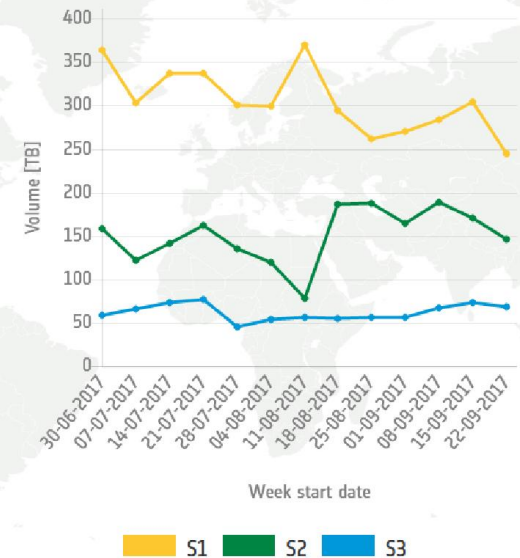


Statistics on
1st October 2017

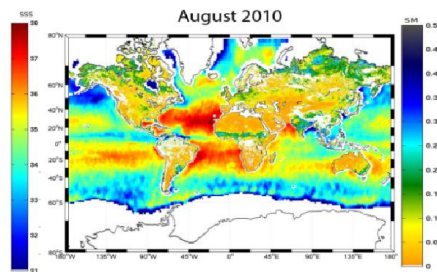


Total volume of data downloads
during last 3 months → 6.6 PBytes

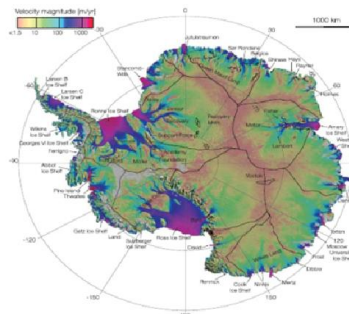
Volume of products downloaded per Sentinel



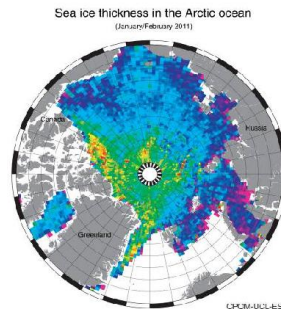
Data challenges for EO missions



volume



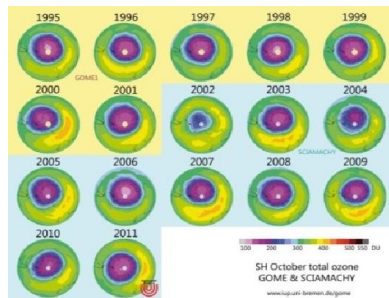
diversity



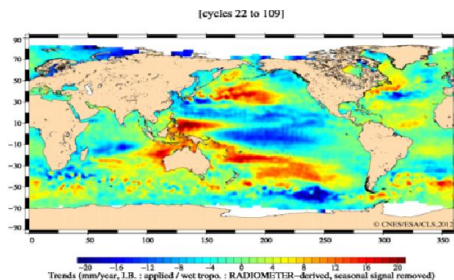
quality



Timeliness



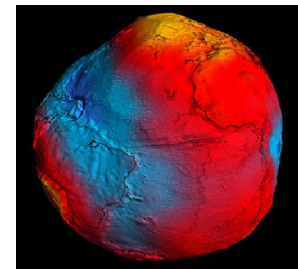
Data continuity



Synergy between
EO missions

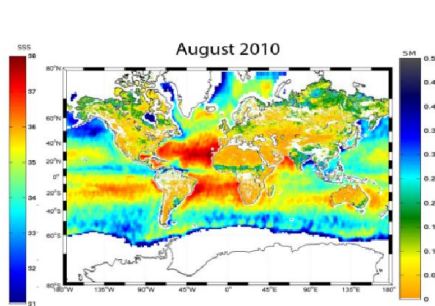


Innovation

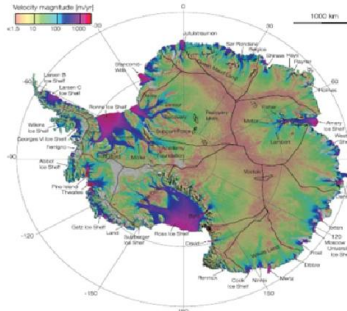


Uniqueness

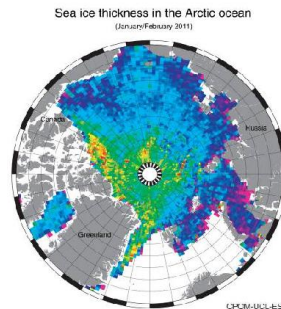
Data opportunities for EO missions



volume



diversity



quality



Timeliness

Volume

Amount of data

Variety

*Different types of data,
from EO satellites but
also earth science data,
socio-economic data*

Veracity

*Level of quality,
accuracy and
uncertainty of data
and data sources*

Velocity

*Speed at which
data are generated
and analysed*

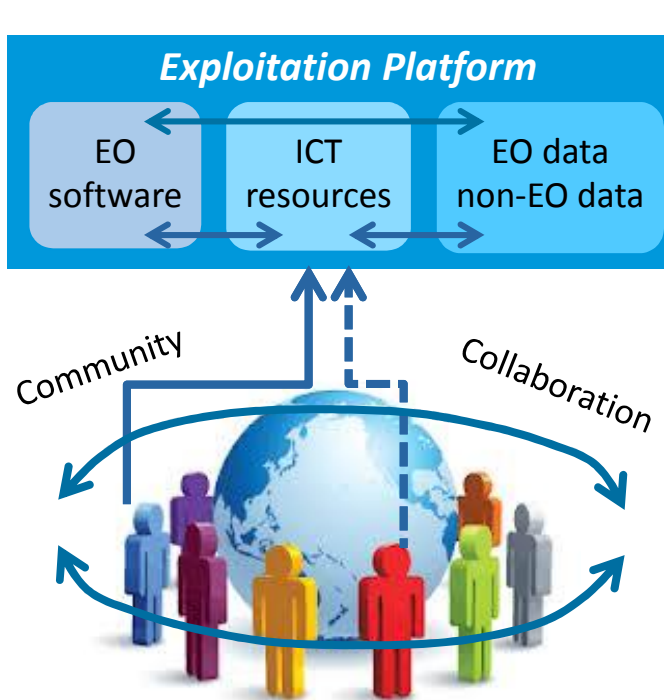
4 V's of Big Data

Value

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(EO data) Exploitation Platform

“Move User activities to the Data”



What is an Exploitation Platform

→ *virtual open and collaborative environment*

bringing together:

- data centre (EO and non-EO data)
- computing resources and hosted processing
- collaborative tools (processing tools, data mining tools, ...)
- concurrent design and test bench functions
- communication tools (social network) and documentation
- accounting tools to manage resource utilisation

3rd Conference on big data from space



- 28-30 November 2017 in Toulouse www.bigdatafromspace2017.org



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European Space Agency

Take Home messages

- Space Strategies and policies are important, especially for what they signal to communities
 - **Copernicus Programme** resulted from a series of European strategies and policies; its data policy has been a successful tool for stimulating EO business ecosystem through uptake of data
- **Earth Observation data and geographic information enhance each other** and together strengthen Europe's Spatial Data Infrastructure
 - help achieve SDG targets and monitoring indicators among other societal benefits
- As the big data challenge is mastered the value of space data will increase
 - requires close collaboration and coordination to develop the right tools including **collaborative platforms and knowledge hubs**
 - **European Open Science Cloud** will play a key role

