European Commission

Space Data for Societal Challenges and Growth

3rd International Conference on Big Data for Official Statistics

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Dublin, 30 August 2016

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Space

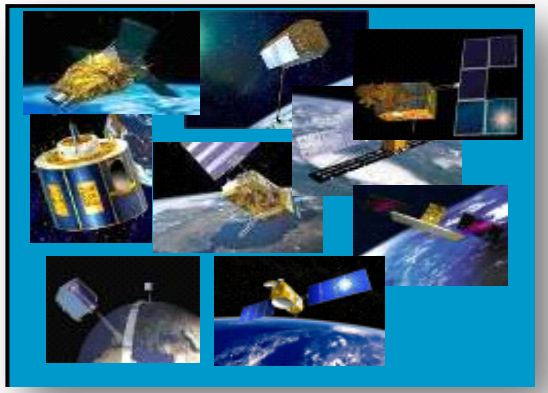
Structure of the talk

- ★ **Status**
- ★ **Challenge**
- ★ **Strategy**
- ★ **Implementation**

Architecture

European Commission

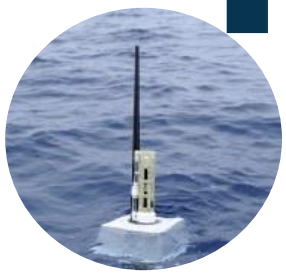
6 services
use
Earth Observation data
to deliver …



Sentinels

Contributing missions

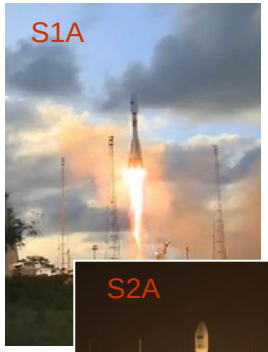
…value-added information



in-situ

Continuity

European Commission



Copernicus Constellation Deployment Schedule

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027

- Sentinel 1A — FAR
- Sentinel 1B (recurrent) — FAR
- Sentinel 1C (recurrent) — FAR
- Sentinel 1D (recurrent) — PSR; On-ground Storage
- Sentinel 2A — QAR
- Sentinel 2B (recurrent) — FAR
- Sentinel 2C (recurrent) — FAR; On-ground Storage
- Sentinel 2D (recurrent) — PSR; On-ground Storage
- Sentinel 3A — QAR
- Sentinel 3B (recurrent) — FAR
- Sentinel 3C (recurrent) — FAR; On-ground Storage
- Sentinel 3D (recurrent) — PSR; On-ground Storage
- Sentinel 4A delivery to MTG-S1 (tbc) → Integration
- Sentinel 4A (on MTG-S1) — FAR
- Sentinel 4B delivery to MTG-S2 (tbc) → Integration
- Sentinel 4B - On-ground Storage (FAR Q1/2029) — PSR (tbc)
- Sentinel 5 Precursor — FAR
- Sentinel 5A delivery to MetOp-SG → Integration
- Sentinel 5A (on MetOp-SG A) — FAR
- Sentinel 5B Acceptance Review → On-ground Storage
- Sentinel 5C Acceptance Review → On-ground Storage
- Sentinel 6A — FAR
- Sentinel 6B — PSR; On-ground Storage; FAR

Legend: ification Acceptance Review (QAR) / Flight Acceptance Review (FAR) or PreStorage Review (PSR); On-ground Storage; Tentative launch date; In-orbit Commissioning

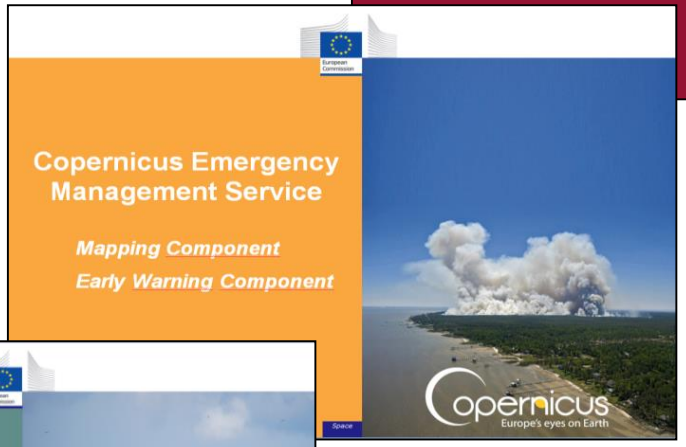
Status: 22 March 2016

Space

Copernicus | Europe's eyes on Earth

The 6 Services

Monitoring the State of the Earth System Environment …

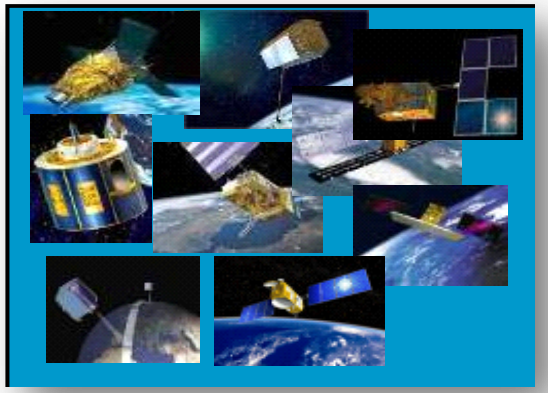


… cross-cutting Thematic Services

Copernicus | Europe's eyes on Earth

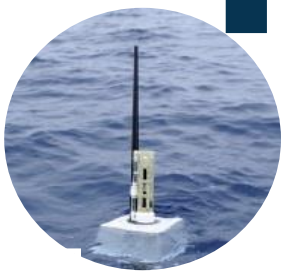
Challenge

A multitude of other users request access to Earth Observation data …



Sentinels

Contributing missions



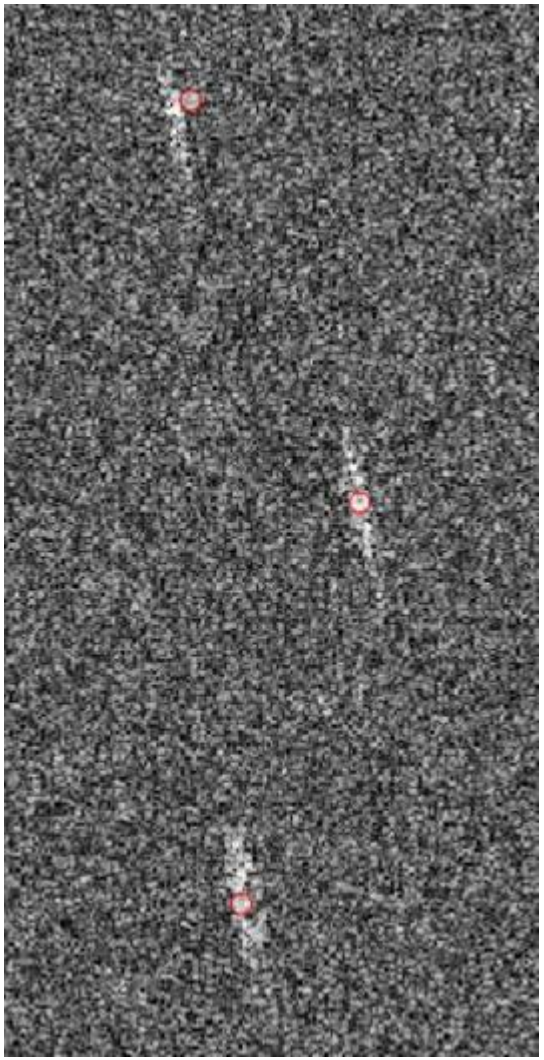
….for science, R&D and business

in-situ

Statistical information and Copernicus

Some examples out of many links

- ★ **Emergency and Security services**
  - **Statistical information on population affected by natural or man-made crisis**
  - **Maritime safety**
- ★ **LUCAS survey and Copernicus Land service**
- ★ **…**



European Commission

Copernicus land monitoring services

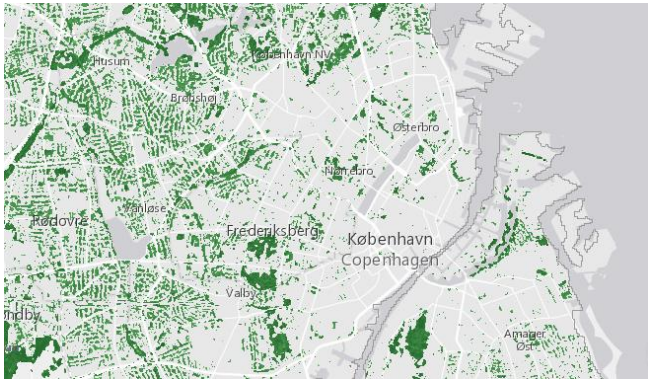
- The Copernicus land monitoring service provides **geographical information on land cover** and on variables related, for instance, to the vegetation state or the water cycle.
- Different components
  - Global component
  - **Pan-European** component
  - **Local** component.
- Based on **satellite image analysis**

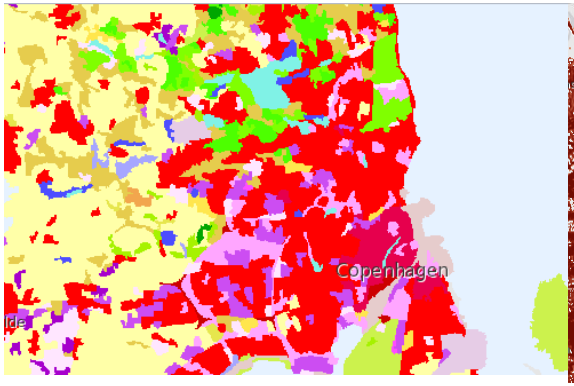
- Output
  - Wall-to-wall geographical information on **Land cover / land use** aspects of Europe / world
  - Information on specific hot spot

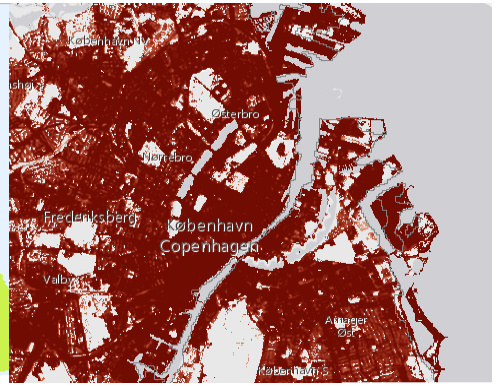
European Commission

Copernicus land monitoring services in Europe

- **CORINE LAND COVER**: 44 land cover /use (LC/LU) classes. Vector data. 25/5 ha
- **Urban Atlas**: 32 LC/LU classes, vector data, 0.25/1ha
- **Riparian Zone**: 85 LC/LU classes, 0.5 ha vector data
- **High Resolution Layer**: Raster data (20m/100m)
  - Forest
    - Tree cover density
    - Forest Type
  - Imperviousness
  - Wetland
  - Water bodies
  - Grassland



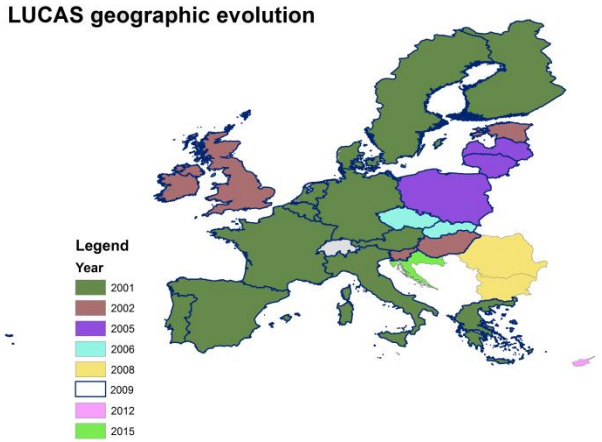




European Commission

LUCAS

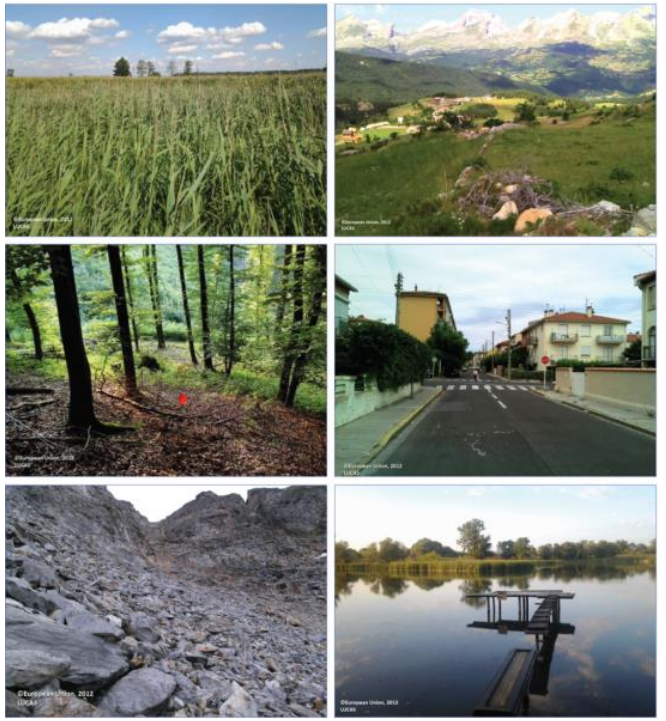
- LUCAS stands for ***l**and **u**se and land **c**over **a**rea frame statistical **s**urvey*
- **Statistical data** on land cover/land use, agro-environmental and soil data across all European Union member states.
- ***In situ* survey**, where surveyors collect data at about 275,000 individual observation points in the field.
- **Operational since 2009**, with first pilots dating back to 2000



European Commission

LUCAS

- **Output**
  - **Point information:** Land cover / land use and **metadata**
  - Point & Landscape **photos**
  - **Soil** information (for a subsample)
  - **Statistics** about land cover, land use



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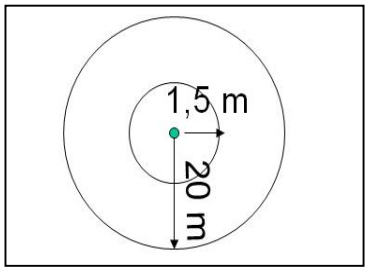
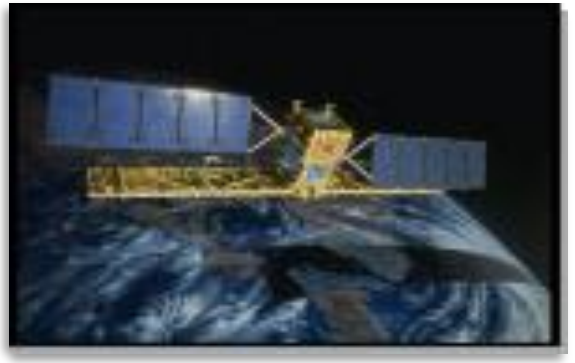


Mutual benefits

- **Temporal scale fits very well**
- Generally a **good degree of conformity** between LUCAS and Copernicus
- Classification / data model
- In situ validation
- …

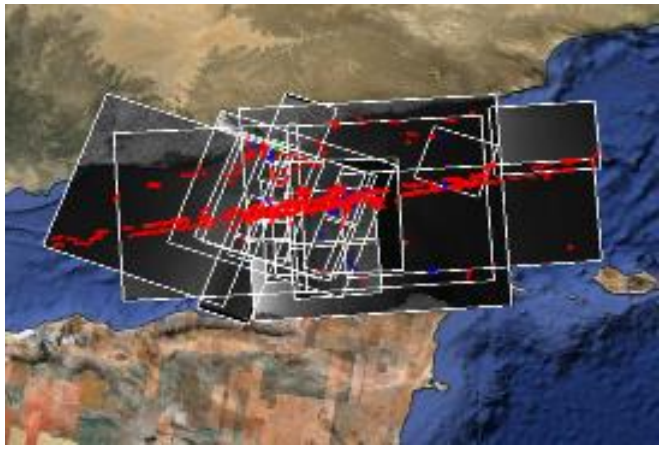
Example : Maritime Safety

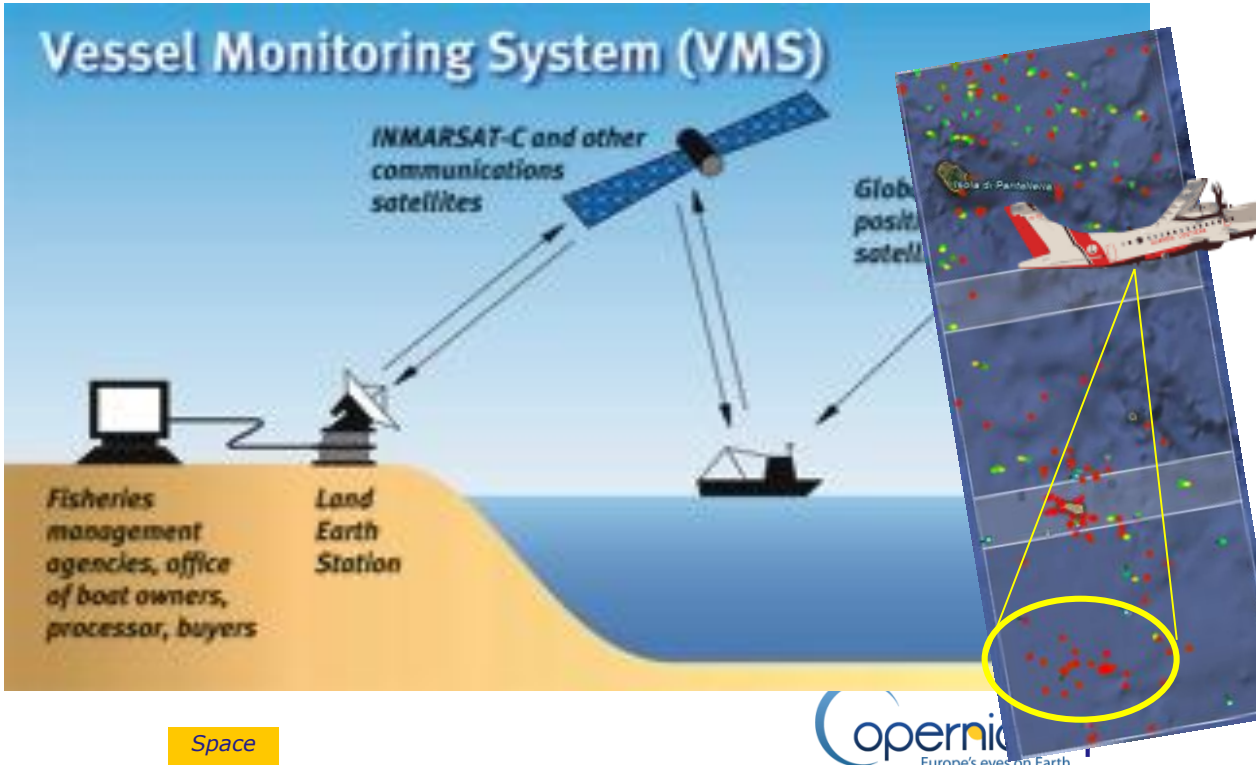


Combination of Technology / Data Fusion :

- Satellite data (radar, optical)
- Vessel reporting systems (AIS, VMS, LRIT)
- UAV surveillance

Novel sensor concepts



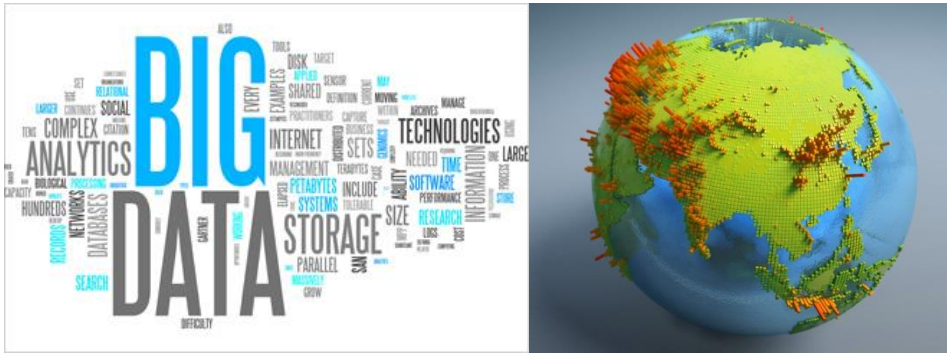


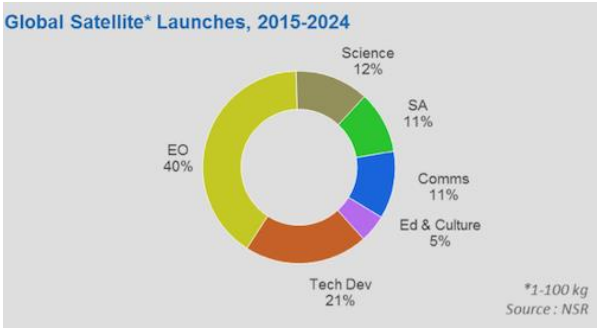
Our mission

To develop and implement activities to promote the uptake and use of space-related data and services in order to maximise their societal and economic potential.

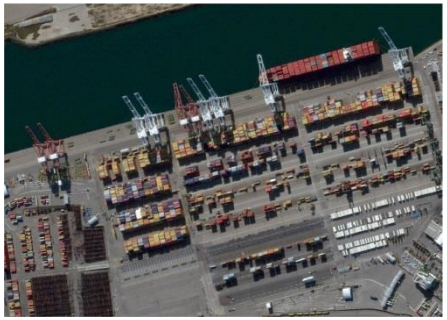
Context

European Commission





Copernicus
The European Earth Observation Programme



- ★ A programme geared towards meeting public authority needs
- ★ Copernicus full, free, open data policy – continuity
- ★ New applications built on/using Earth Observation information
- ★ The Digital Revolution – Big Data, Cloud, IoT
- ★ Commoditisation of Earth Observation data
- ★ Commercial initiatives
- ★ New and flexible value chains
- ★ International dimension

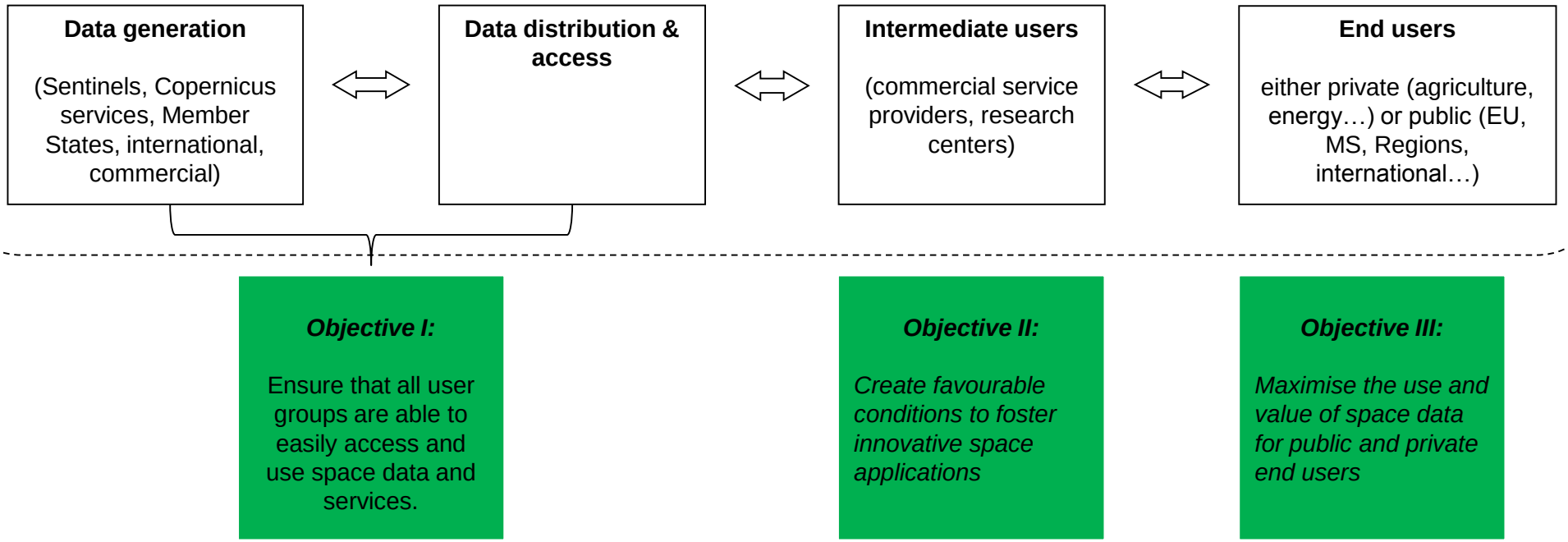
Main assumptions

- ★ **Public authorities have a central role to play**
- ★ **A significant implication of the private sector is mandatory**
- ★ **Leverage existing structures and mechanisms: a balanced and flexible distribution of roles between Member States, Regions, ESA/EUMETSAT, the Copernicus services and the Commission.**

Overall Objective:

✓ **Establish a real internal market for innovative space-based services**

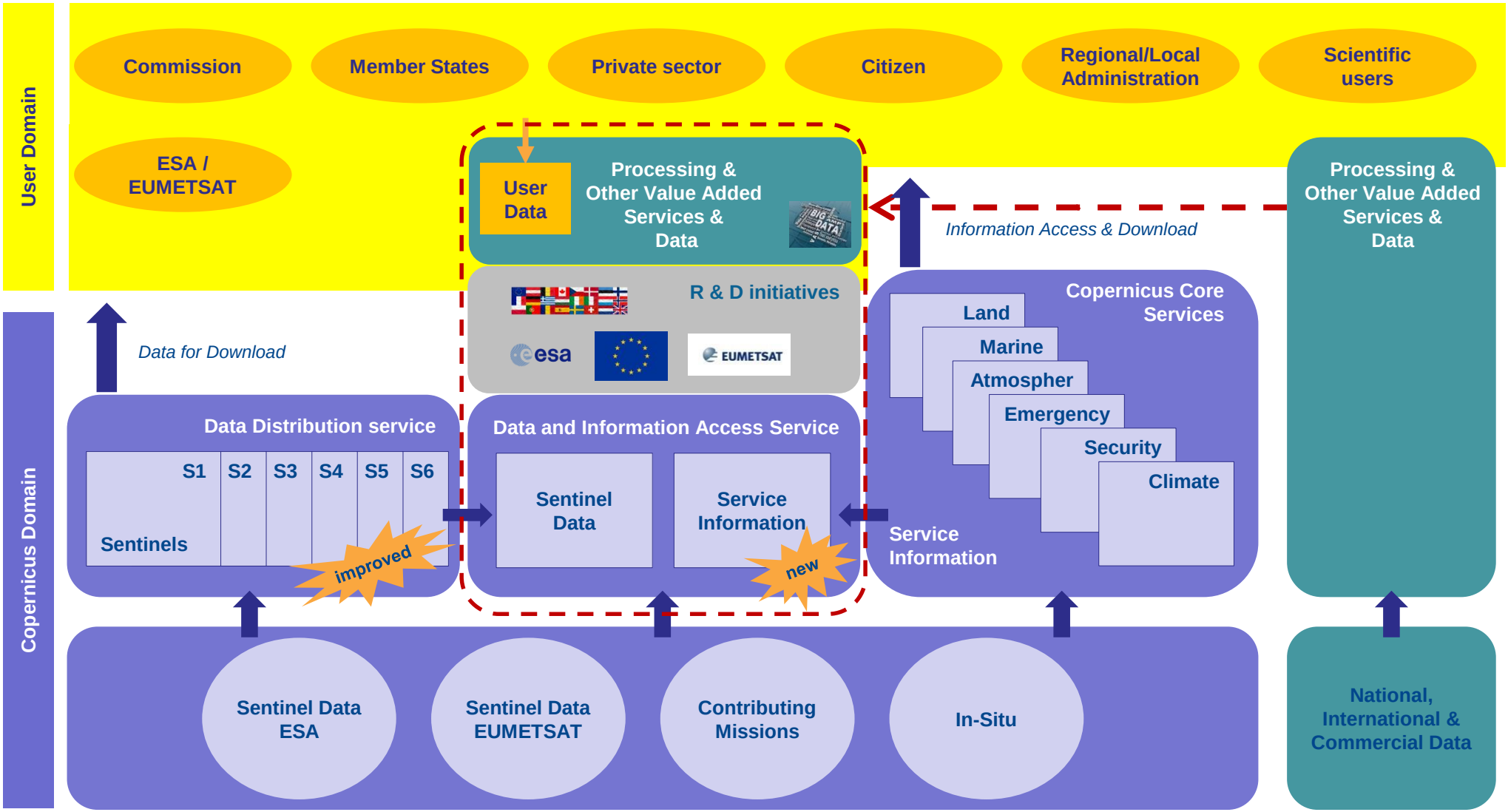
The space application value chain



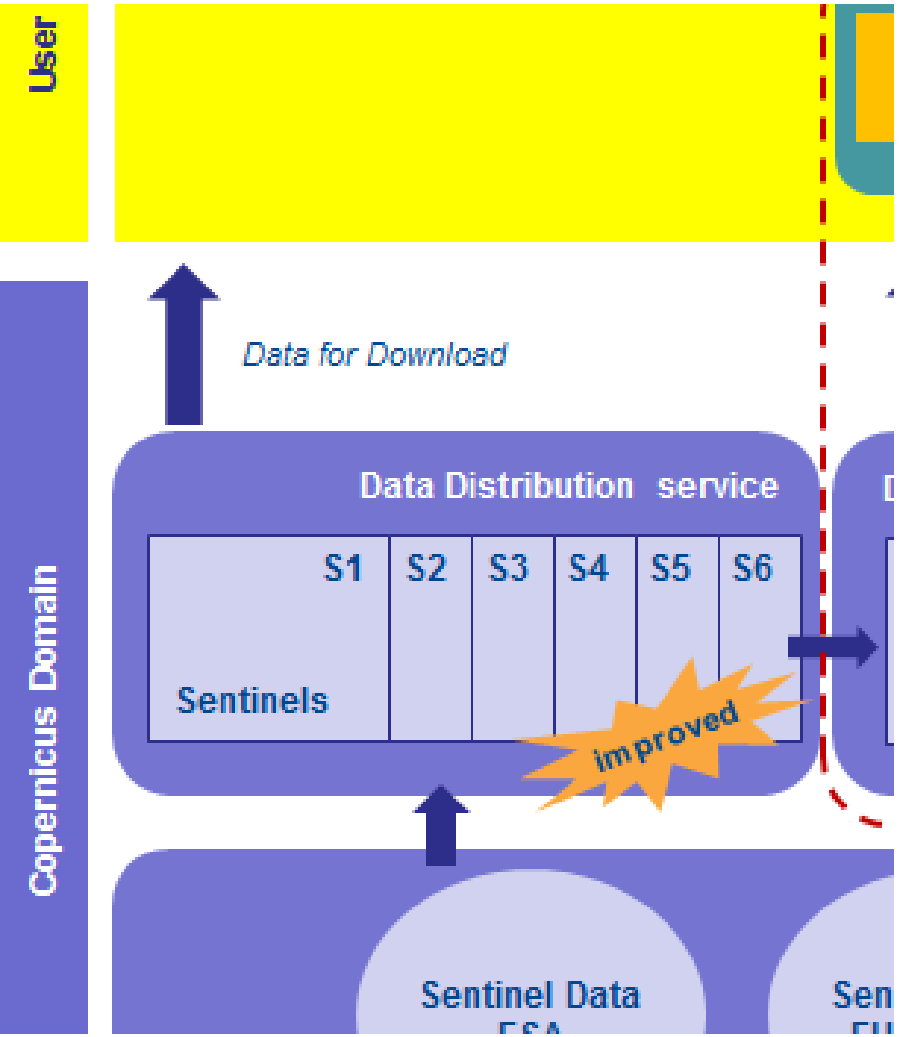
EASY ACCESS TO COPERNICUS

- ★ Improving the current data access
- ★ Bringing the users to the data
- ★ User uptake initiatives from the services
- ★ Technical assistance

Conceptual view

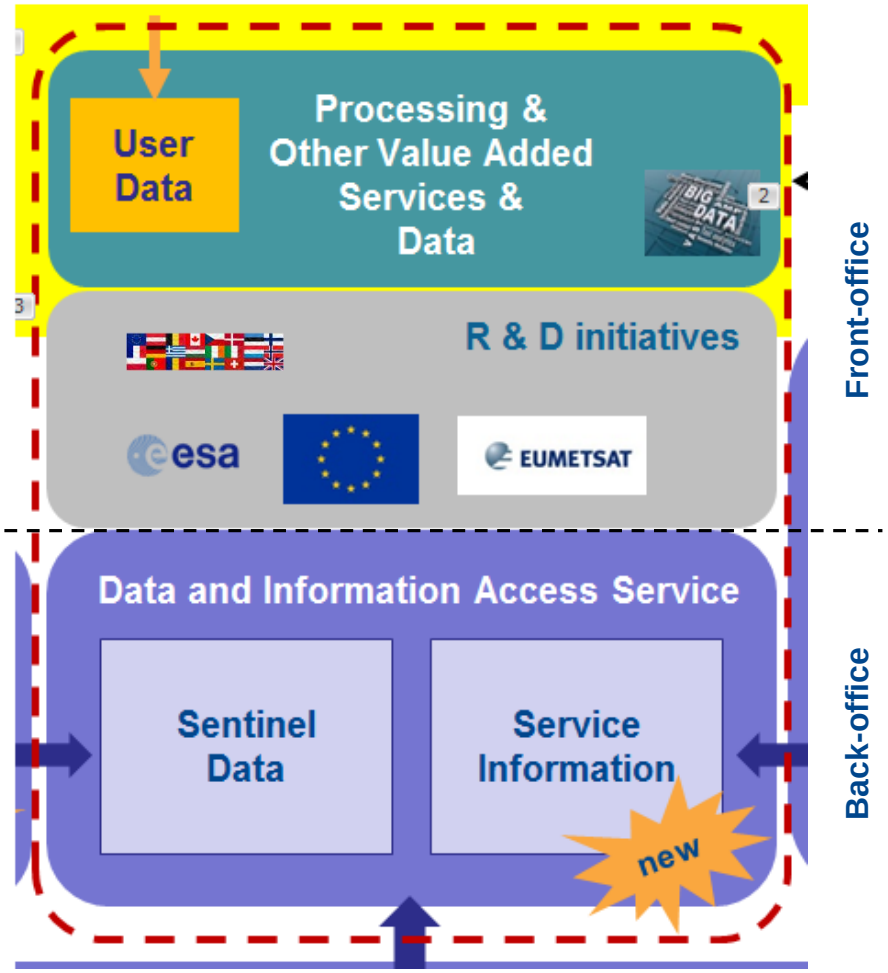


Distribution



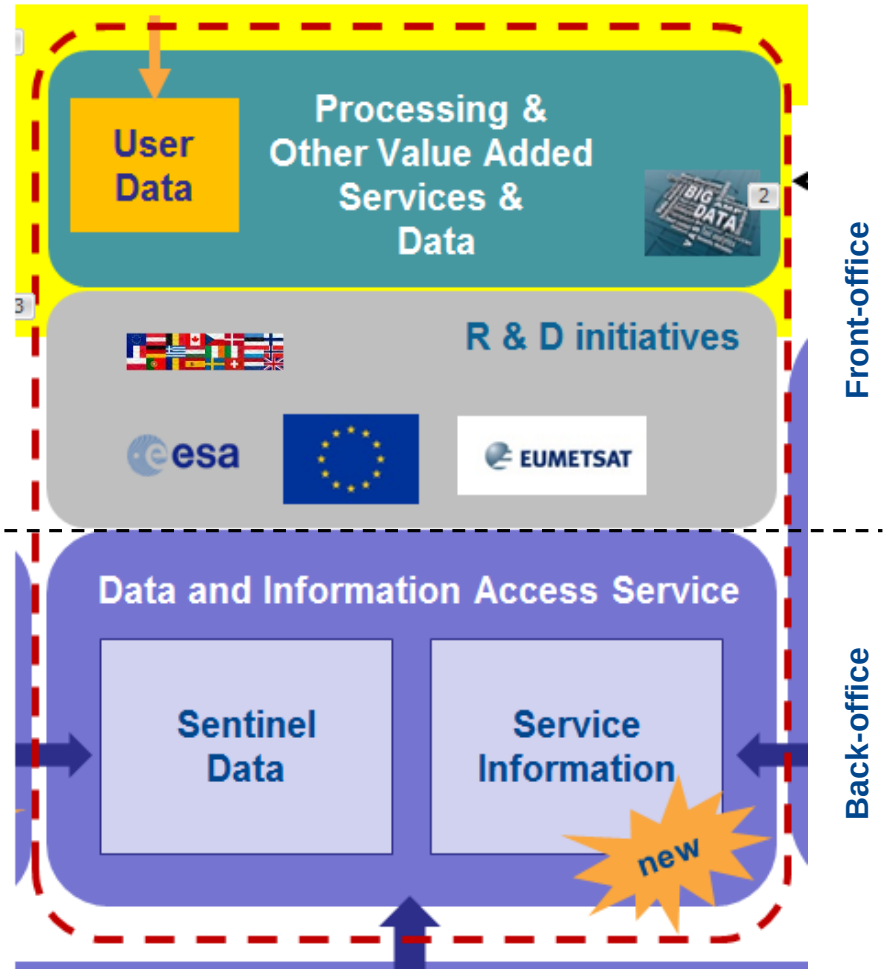
- ★ **Robust and performant distribution system overall – ESA & EUMETSAT**
- ★ **Full compliance with existing (delegation) agreements**
- ★ **Definition and monitoring of operational target performances:**
  - ★ **Timeliness**
  - ★ **Availability**
  - ★ **Continuity risk**
  - ★ **Integrity of data distributed**
- ★ **Regular reporting and annual review of targets by User Forum**
- ★ **Targets Copernicus Catalogue standard**

Access



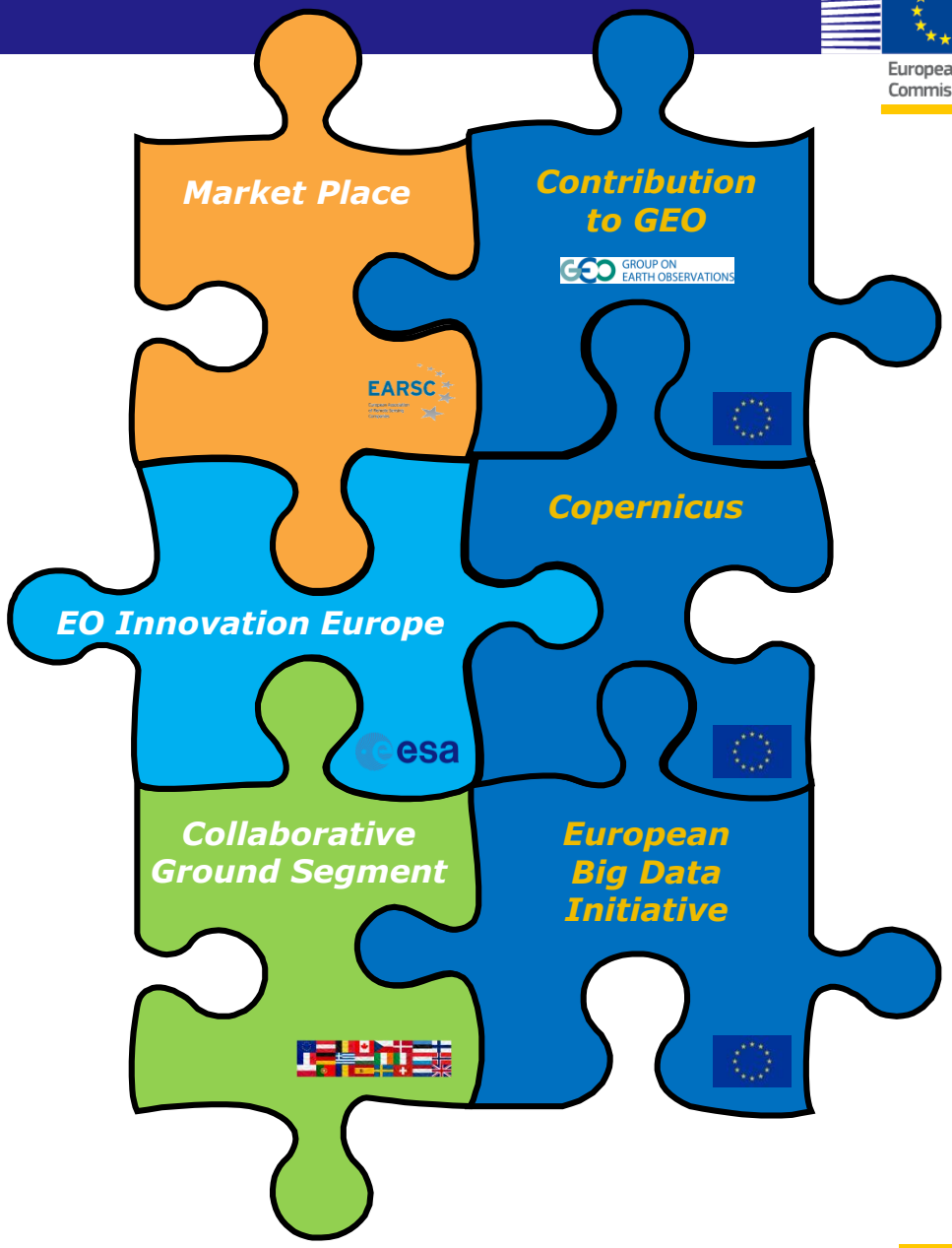
- ★ **A service approach**
- ★ **Offers access to Copernicus data and information**
- ★ **Cost mutualisation**
- ★ **Possibility for additional data**
- ★ **Combining European supply & demand to provide critical mass**
- ★ **Non-exclusive**

Access



- **Functional scope (to be refined)**
  - **Discovery**
  - **Visualisation**
  - **API or black boxes to support user online exploitation of data & information**
- **Additional offerings – free or paid for (open business models)**
  - **Processing**
  - **Access to other data**
  - **Tools**
  - **Market places**
  - **….**
- **Open & non-discriminatory**
- **Competitive, open to industrial initiatives**

Complementarity



- **The Copernicus data and information access initiative will build on and enrich other efforts within and outside the Commission.**
- **We will step up our coordination effort to target alignment of objectives and mutual support amongst actors.**

European Commission

INNOVATION IN THE DOWNSTREAM SECTOR

- ★ Boundary between the Copernicus services and the downstream sector
- ★ Copernicus start-up programme
- ★ Internationalisation of companies
- ★ H2020

INCREASING AWARENESS OF END USERS

- ★ Cooperation with Member States
- ★ Uptake inside Commission services
- ★ Cross-sectoral dimension (hybridation of data)

European Commission

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