e-shape solutions: Earth Observation for biodiversity and water management

14 - 15 February 2023
9.30 – 17.00 CET
The Hague - NSO Headquarter
Centre Court

Emmanuel Pajot,
EO market trends and future perspectives

e-shape

An event co-organised by

eurisy
ACTING COLLECTIVELY TO BRIDGE SPACE AND SOCIETY

Netherlands Space Office

e-shape

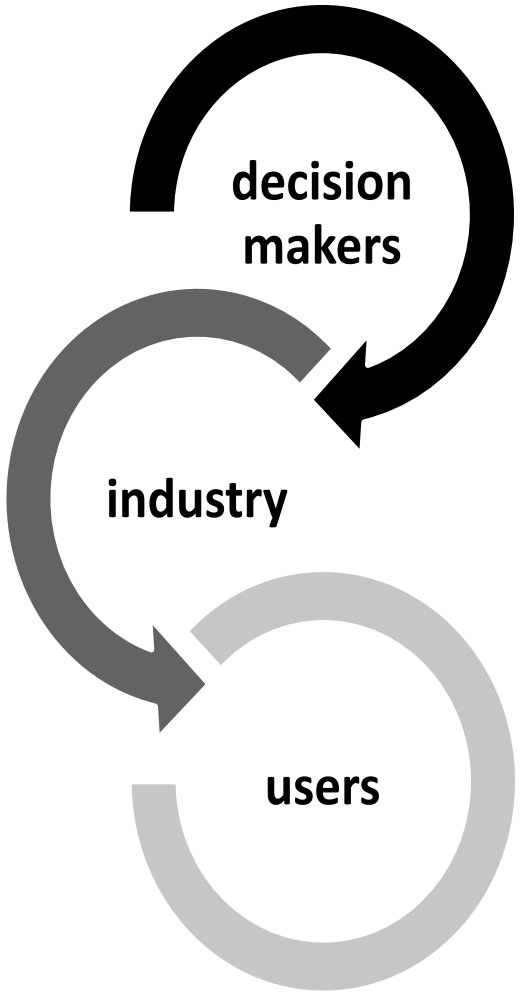
EARSC members

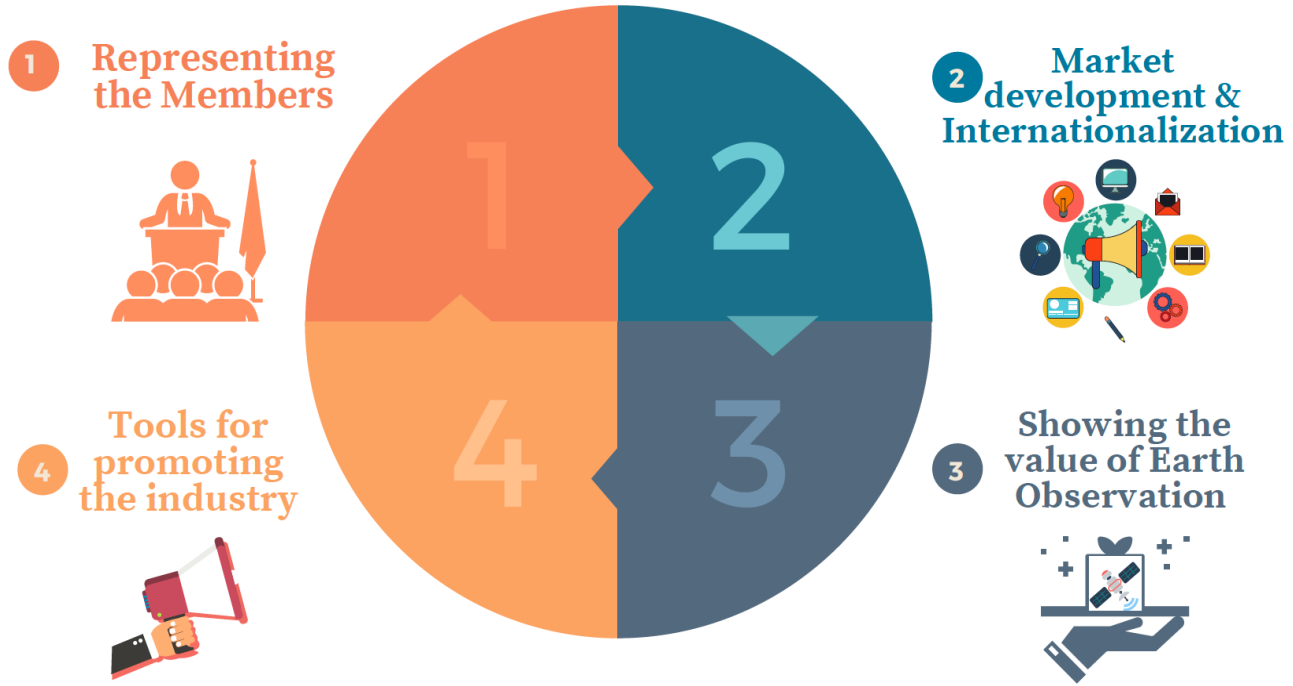
European Association of Remote Sensing Companies

130+ members from **25** countries

covering whole **Earth Observation downstream** value chain

EARSC Activities

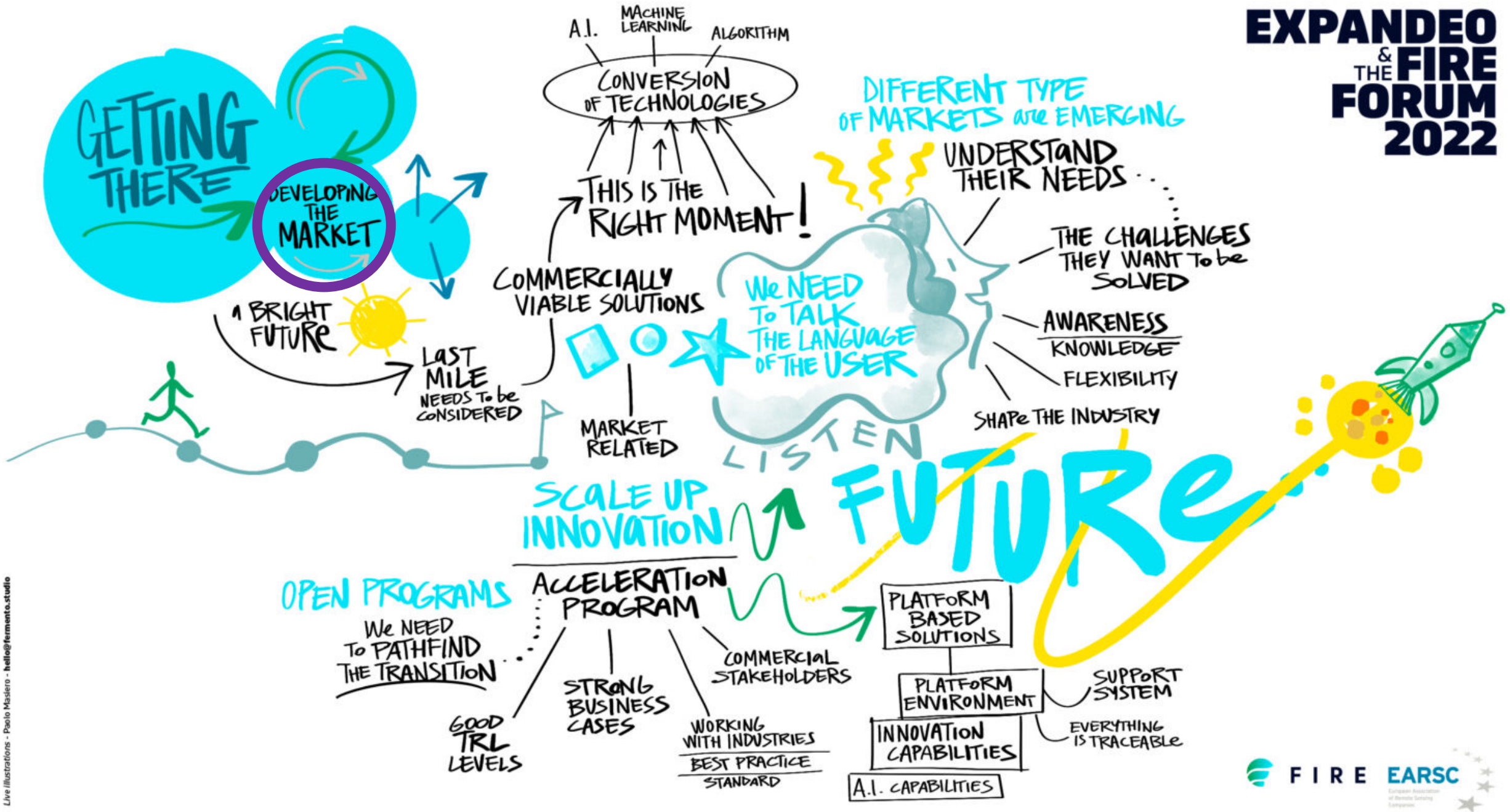




EARSC Projects

Secretariat	Uptake	Innovation	Internationalization	Consolidation
Industry Survey	SeBS	ConnectinGEO	IDE²O	eo4geo
Working Groups e.g Green Deal, Copernicus evolution, Small Companies Forum, …	e-shape	NEXTGEOSS	CONNECT EO	OpHub.AC
Advocacy; Policy observatory, Position Papers	GREAT Green Deal Data Space	PARSEC		FIRE
	SDGs-EYES	HARMONIA		
	CREDIBLE			

EXPANDEO & THE FIRE FORUM 2022



FIRE EARSC

Live illustrations - Paolo Masiero - **hello@fermente.studio**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869634

Industry Survey : Facts & Figures

746 Companies

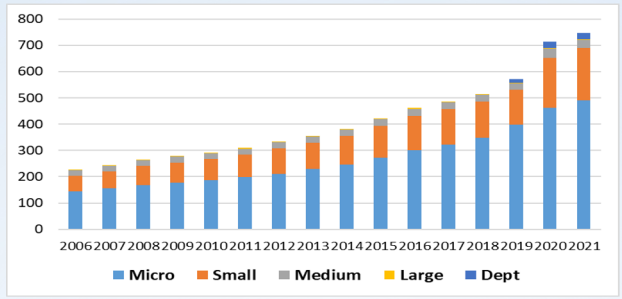
12085 Employees

€1.61 b Revenues

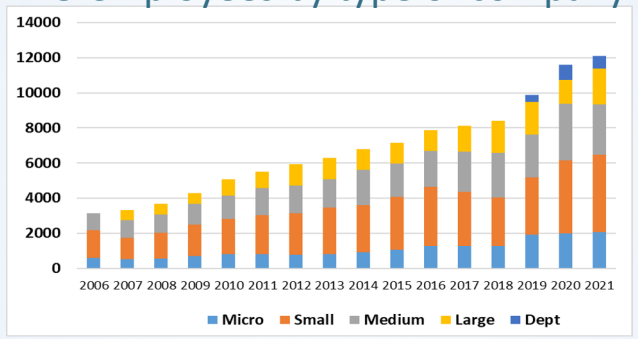
7,5% growth*

* CAGR over 5 year

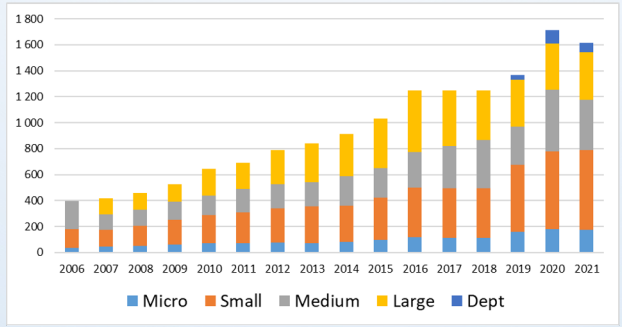
Evolution of EO service companies



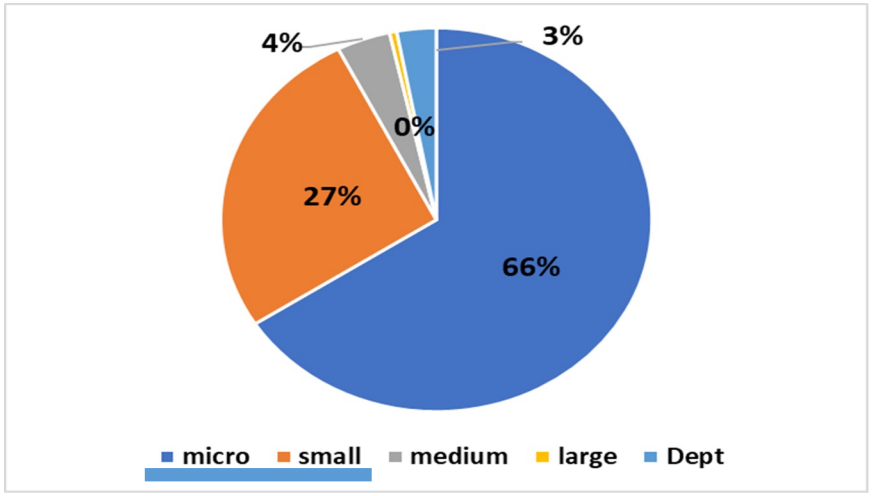
EO employees by type of company



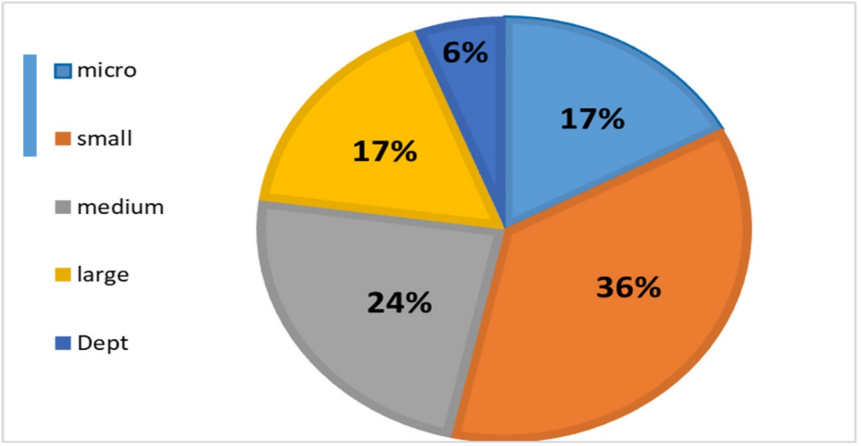
Revenues



Breakdown of companies by company class in 2021

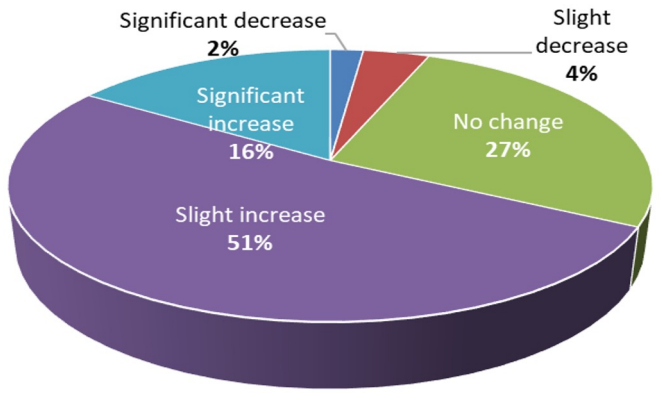


Employee breakdown by company class in 2021



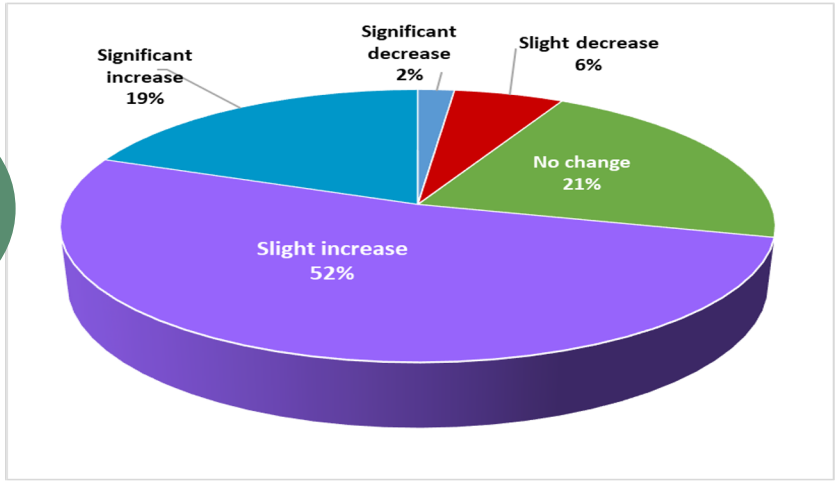
Industry Survey: Employment & Revenues

67%



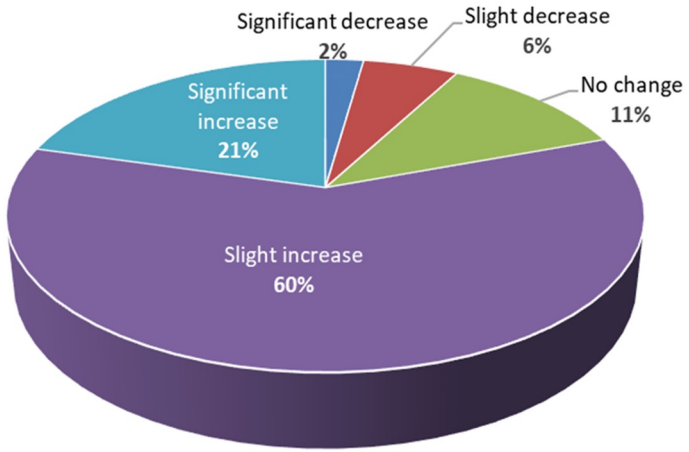
Employment outlook over the next 12 months (2020)

71%



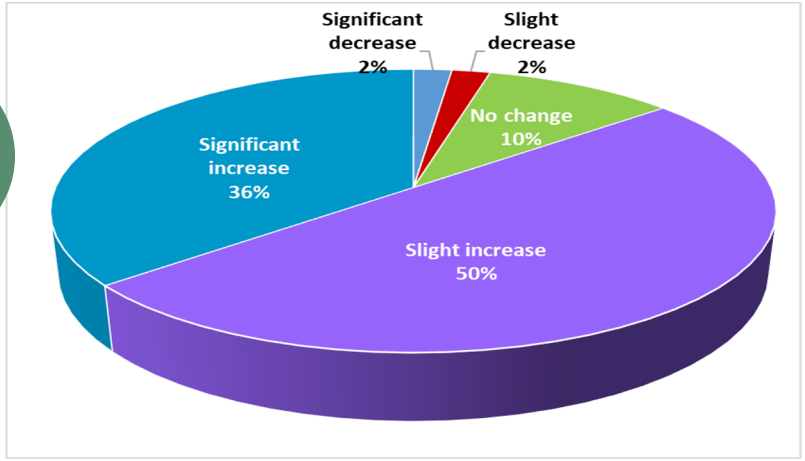
Employment outlook over the next 12 months (2021)

81%



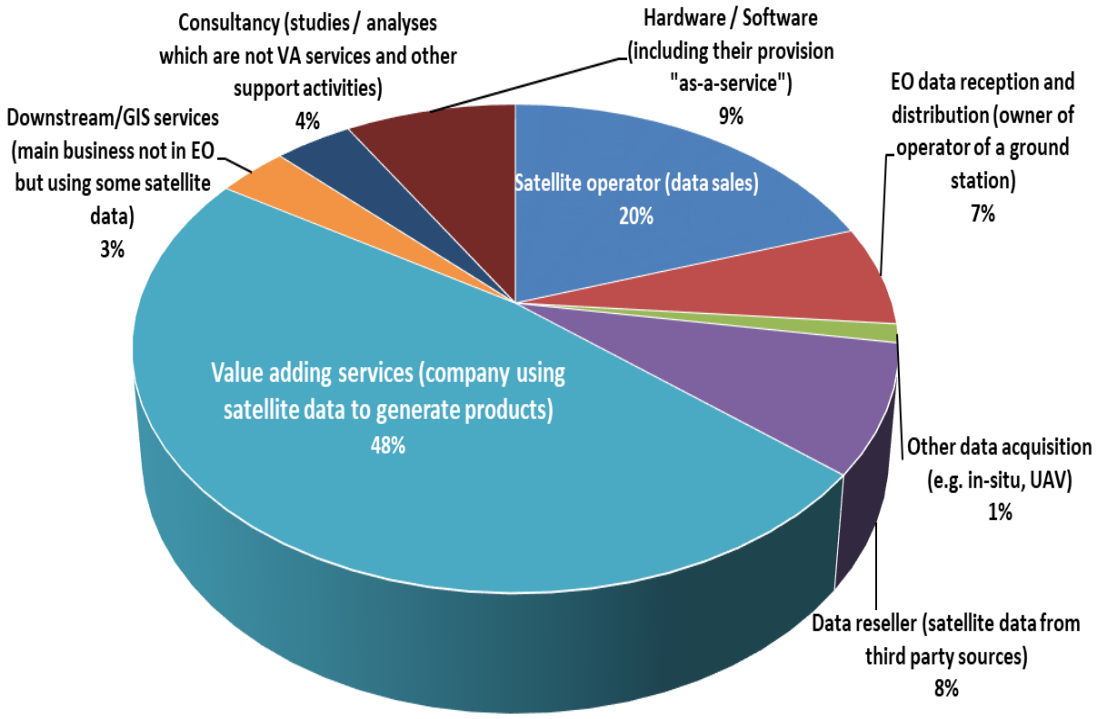
Revenue outlook in the next 12 months (2020)

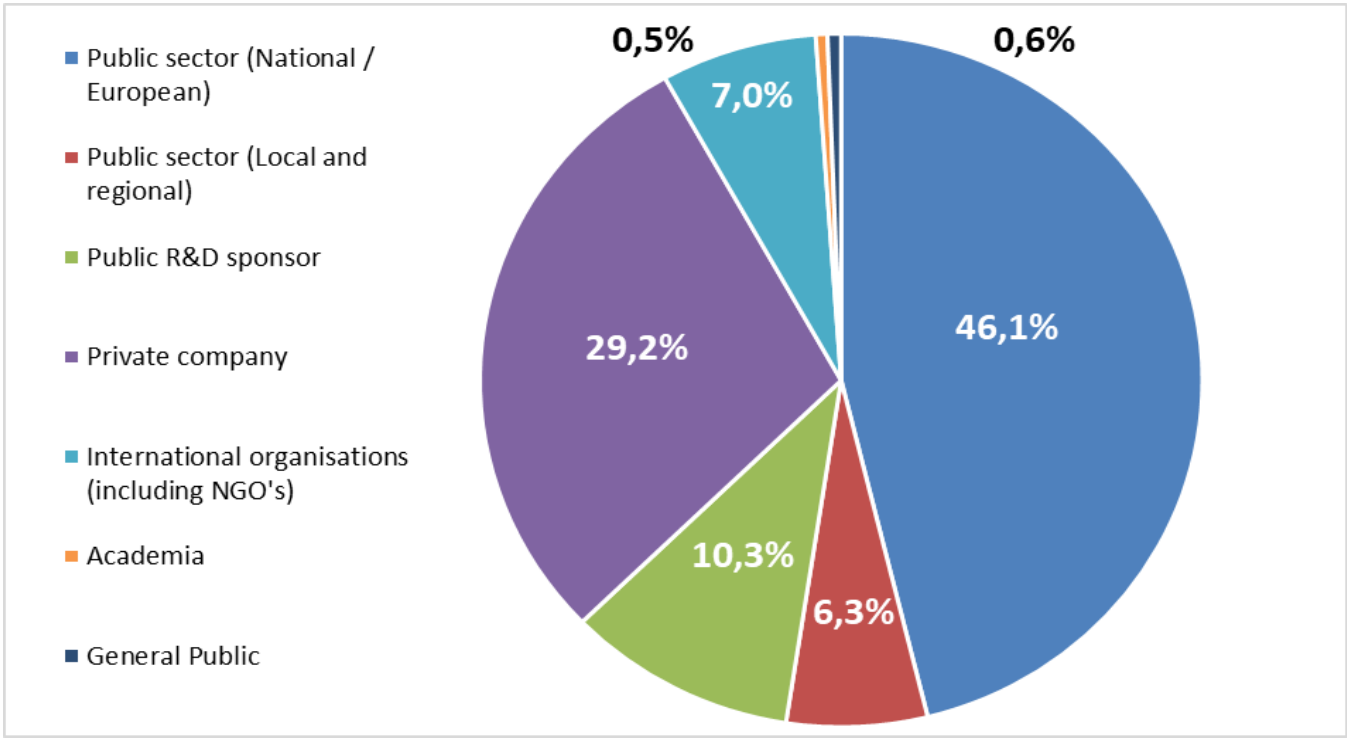
86%



Revenue outlook in the next 12 months (2021)

Industry Survey : Activities & Users

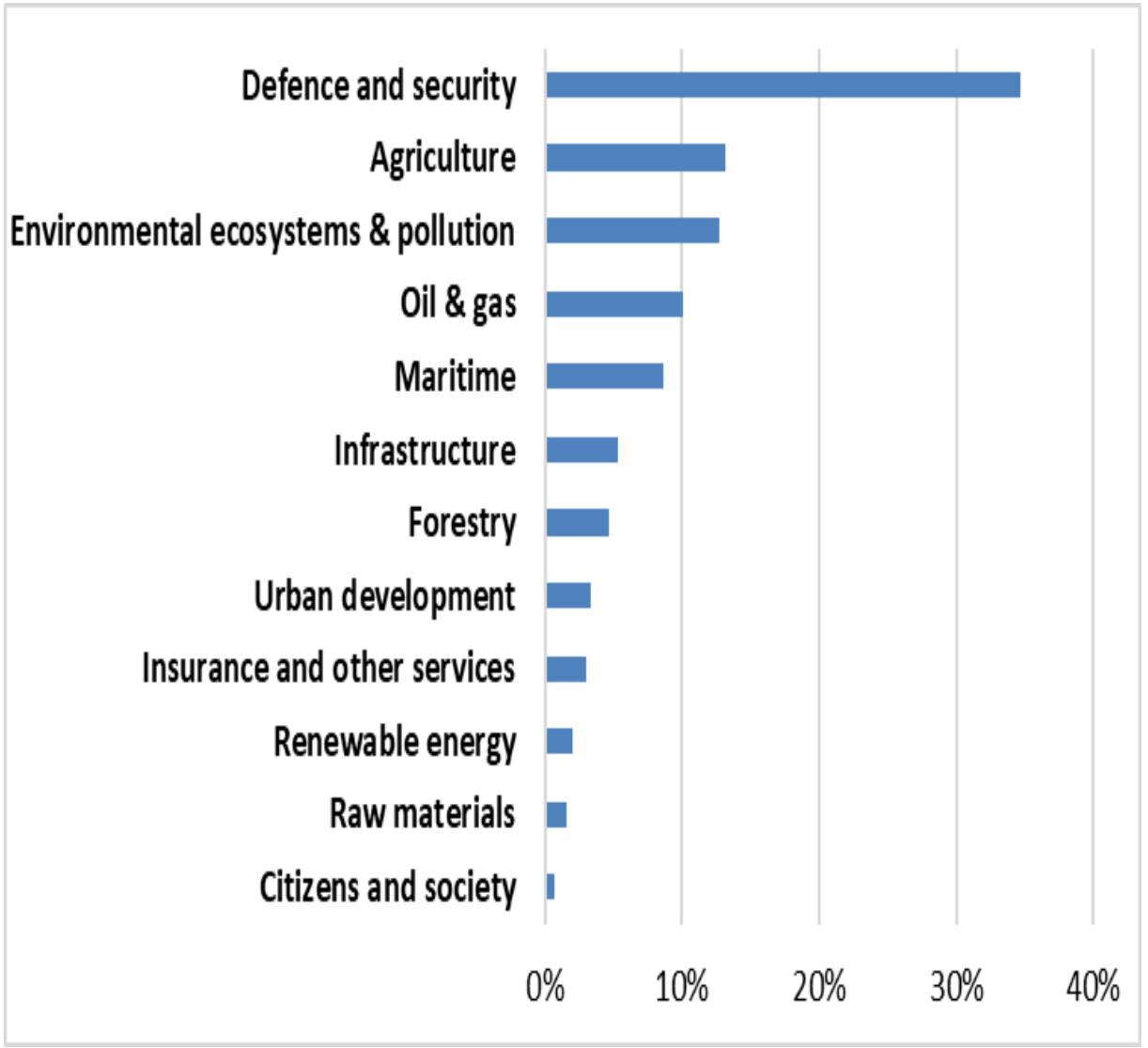


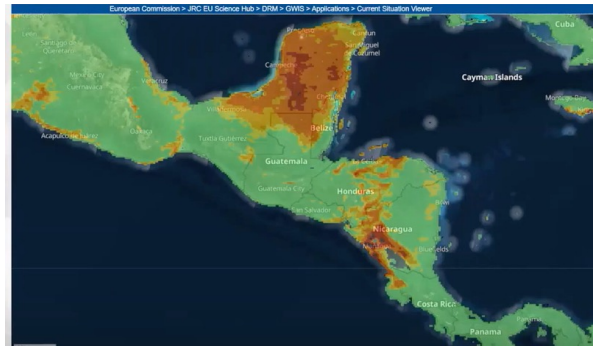


Companies using satellite data to generate products (**from 26% to 48%**)

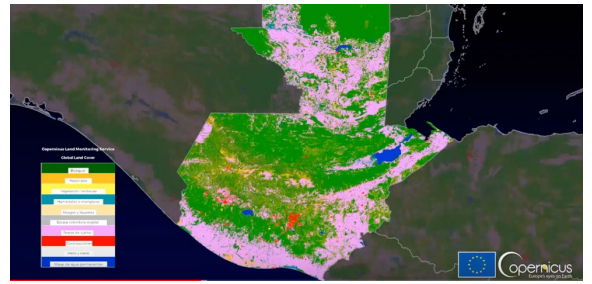
Public sector representing approx. **50%** of industry revenue

Industry survey: Market Sectors

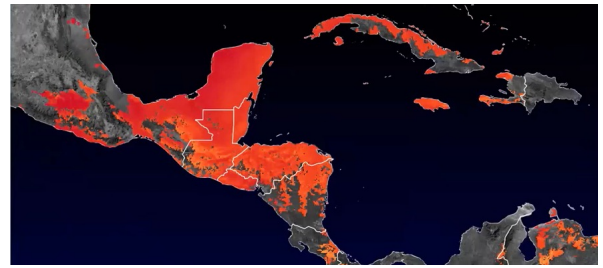




Flood Risk



Land use maps for agriculture



Surface T maps
> drought, biomass studies

EXPANDEO & THE FIRE FORUM 2022

GETTING THERE

INCORPORATION OF EO IN THE DIFFERENT STAGES OF POLICY MAKING

CHALLENGES

- HUGE DEMAND FOR RAW MATERIALS
- SLOW PERMITTING
- A COMPLEX ENVIRONMENT

ENERGY TRANSITION

- CLIMATE CHANGE
- GROWING INSTABILITY
- SUPPLY RISKS
- SHORTAGE

WE NEED TO ACT!

INTERCONNECTIONS

- ENERGY SECTOR
- AGRICULTURE SECTOR

EO HAS A BIG ROLE!

- ENVIRONMENTAL PROTECTION
- EFFICIENCY
- SECURITY
- SUSTAINABILITY

CITIES

A SYSTEMIC APPROACH

PLATFORM FOR TRANSITION

- ENGAGE THE SOCIAL ACTORS
  - ADDRESS THE DIVERSITY
  - DESIGN A CLIMATE CONTRACT

POLICIES

- INNOVATION → HELP TO PERFORM BETTER
- DIGITALIZATION → BETTER INTERPRETATION OF DATA

- SOLUTIONS
- MONITORING

OCEAN IS AT THE CENTER OF THE GREEN DEAL

WE NEED SPACE

- KNOWLEDGE
  - REGULATION
    - SERVICES DIRECTED TO THE SECTORS
  - DECISION MAKING
  - COMMUNICATION
  - INVESTMENTS
  - PROCESSES
- DIGITAL SYSTEM ASSESSMENT

SINERGIES

REINFORCE CIRCULARITY

- DEVELOP MARKETABLE APPLICATIONS

INTEGRATE DATA = INTEGRATE SECTORS

- MONITORING PROGRESS
- EVALUATE
- ADJUST

HOLISTIC APPROACH

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European Association of Remote Sensing Companies

Live illustrations - Paolo Masiero - **hello@fermento.studio**

Green Deal working group

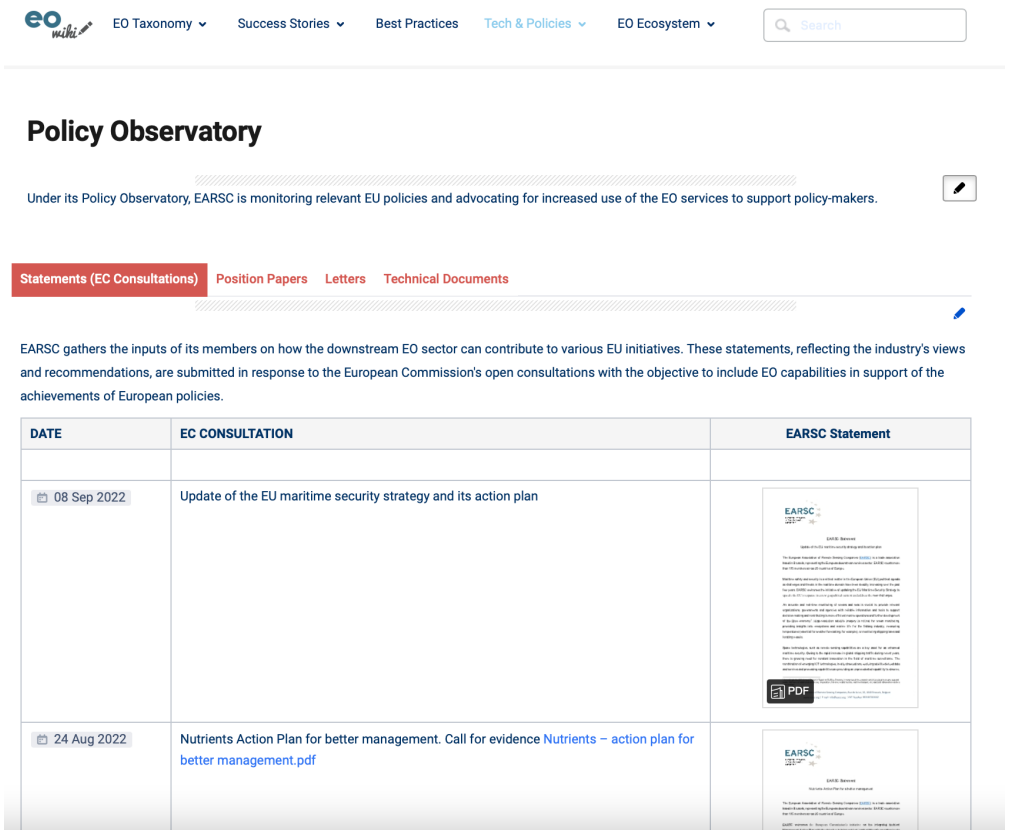
Advocate increased use of EO for the Green Deal strategy encouraging the EU to adopt EO solutions through statements, position papers, showcases, ensuring awareness of the industry contribution responding to the monitoring needs for the **Green Deal implementation**

3 subgroups:

- methane monitoring
- forest management
- carbon farming (also working on soil health)

+ other topics such **biodiversity**

Policy Observatory: Monitoring relevant policies: *https://earsc-portal.eu/display/EOwiki/Policy+Observatory*



EU Biodiversity strategy

Under the **EU Biodiversity Strategy for 2030**, part of the **European Green Deal**, the European Commission committed to put forward a proposal for legally binding EU **nature restoration targets** to restore degraded ecosystems.

Key measures announced:

- decisive role in reaching the Strategy's headline objective of putting **Europe's biodiversity on a path to recovery by 2030.**
- aims to contribute to the continuous, long-term, and **sustained recovery of EU habitats and species across land and sea.**
- implement **restoration measures** on at least 20% of the EU's territory by 2030.

Nature Restoration Regulation

Proposed EU Nature Restoration Regulation

EUROPEAN COMMISSION

Brussels, 22.6.2022
COM(2022) 304 final

2022/0195 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on nature restoration

(Text with EEA relevance)

{SEC(2022) 256 final} - {SWD(2022) 167 final} - {SWD(2022) 168 final}

The goal of nature restoration is to assist in the **recovery of ecosystems** that have been degraded or destroyed, as well as **conserving the ecosystems** that are still intact.

➔ Effective **monitoring and reporting** are needed to ensure that planned restoration measures are implemented and are delivering their expected biodiversity restoration benefits on the ground.

Progress towards the objectives will be monitored and reported by Member States and EU-wide reports will be prepared based on this

Adoption of this proposal would mark a historic turning point for EU nature conservation. There is enormous potential for **public and private** actors to work together to reverse biodiversity loss.

How EO is playing a role into the regulation?

Technical feasibility articles Regulation

Objective: effective and area-based **restoration measures in place on at least 20%** of the EU land and sea areas by 2030 (Art.1)

Tracking the state of biodiversity requires:

- **access** to data needs to be **trusted, reliable, and timestamped** to generate insights to drive action in protected areas
- **operational** monitoring systems that provide information on specific indicators

Satellite derived data is crucial for **long-term global coverage** (wide-scale), **objective, comprehensible, repeatable and timely** collecting **accurate** data regularly and at various resolutions (inc. high resolution) to support the biodiversity strategy.

Satellite-derived data is **cost-effective** (increase **efficiency, impact, transparency and accountability**) providing **globally consistent** across the entire globe offering harmonized and comparable information facilitating the reporting process.

Technical feasibility articles Regulation

Restoration of high quality nature, with **time-bound area-based** restoration targets - Art. 4, 5, 7 & 9(4)
Restoration of **terrestrial, coastal, freshwater and marine** ecosystems - Art. 4,5

EO services contributing to SDGs
Mapping mangroves

- User: National and regional authorities, NGOs
- Challenge/Needs: Mangroves are critical ecosystems
- coastal protection from storm surges, control flo
- coastlines and enhance biodiversity. Furthermore, ma
- central component of the blue carbon ecosystem. Kno
- mangrove extent, structure and dynamics is key to inf
- conservation and restoration planning and management
- Initiative: Commercial product as a result of several years
- Results: Applying supervised machine learning algorithm
- are accurately mapped and characterized using hi
- satellite data. The mangrove extent product provide
- spatial delineation of areas covered by mangrove comm
- a detailed characterization product provides added i
- species compositions and/or mangrove structures (e.g. h
- or biomass).
- Service Provider: DHI GRAS

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Reference: https://www.dhi-gras.com / http://maps.eo4sd
https://www.dhi-gras.com/projects/eo4sdg/

EO services contributing to SDGs
Sargassum detection for operational and seasonal planning

- Users: public administrations, tourism, fisheries, maritim
- transport
- Challenge: massive strandings of sargassum (Sargassum
- fluitans and Sargassum natans) in the Caribbean region
- Initiative: synergy of 8 satellite sensors: 3 wide-swath oce
- color sensors, 3 optical HR sensors, +2 SAR HR sensors. 1)
- Qualitative and quantitative monitoring by calculation of
- sargassum index> Develop specific index (NFAI (Normaliz
- Floating Algae Index) 2) Detected raft drift modeling and
- landing estimation.
- Results: Prediction of immediate landings, Coastal
- management and clean-up operations, Seasonal predicti
- Sargassum influxes for the Lesser Antilles, Expected impa
- fishing and tourism, Daily satellite detection to help sailo
- avoid Sargasso mats, maritime safety
- Service Provider: CLS

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References: https://e-shape.eu/index.php/showcases/pilot5-4

Monitoring and Detecting Harmful Algae Blooms (HABs)

- **User:** public authorities – water management
- **Challenge/Needs:** Monitoring and detecting harmful algae blooms fast and accurately is essential as they are extremely harmful to the environment and human life.
- **Initiative:** EOMAP leverages the value added of Planet's near-daily SuperDove satellites' green and yellow spectral data to monitor and detect HAB outbreaks fast with greater accuracy.
- **Results:** Integrating Planet's SuperDove data, EOMAP's HAB Indicator classifies the probability that toxic bacteria are present in water bodies to create a daily dashboard monitoring at-risk areas.
- **Service Provider:** EOMAP

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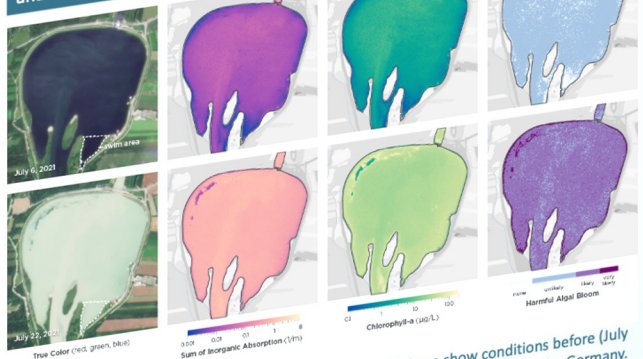
Target 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.



Derived measurements from 8-band data courtesy EOMAP. These show conditions before (July 6, 2021) and during (July 22, 2021) a harmful algal bloom in Mandichosee, Bavaria, Germany.
PLEASE DO NOT SHARE WITHOUT CONSENT.

Investments to support biodiversity

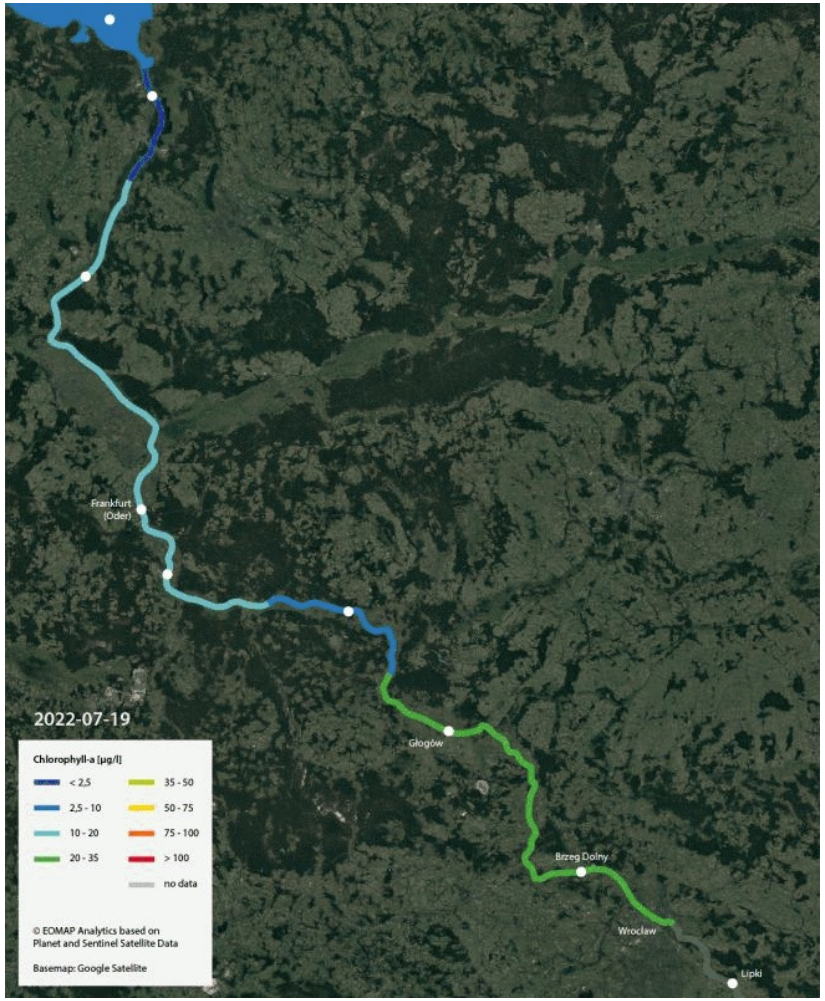
The EU Taxonomy is a classification system for sustainable economic activities. Its overall goal is to create transparency and disclose the impact of investments.

Environmental objectives established by the EU Taxonomy regulation	EO services
Climate change mitigation	e.g. identification of surface **water resources** for the mitigation of climate change risks in the agricultural sector
Climate change adaptation	e.g. EO based **soil monitoring** services to secure national CAP inventories, habitat loss fragmentation & degradation
The sustainable use and protection of water and marine resources	e.g. EO data for quantification of **suspended sediment** in rivers and water bodies in the costal watersheds as well as coastal areas.
The transition to a circular economy	e.g. EO to provide **analytics** and evidence regarding assets and the environment such waste management
Pollution prevention and control	e.g. EO to monitor and assess the status of, and **changes** in, the natural and manmade environment
The protection and restoration of biodiversity and ecosystems	e.g. improve through EO data the acquisition, coordination and delivery of biodiversity observations,… **vegetation productivity and leaf cover**…

EO services contributing to Biodiversity

Services contribution to support restoration targets such restoration of…
Water ecosystems

- **Users:** public authorities – water management
- **Challenge:** water quality monitoring is essential, in order to prevent disasters that can then take decades to restore e.g. the disaster in the Oder river in summer 2022 as well as stop, reduce or remediate pollution in the water.
- **Initiative:** With frequent and precise satellite measurement data available (PlanetScope combined with Sentinel), EOMAP works with some environmental agencies to develop and put into operation an online visualization and early warning system for water bodies.
- **Service provider:** EOMAP
- **References:** Link to analysis over the Oder river



Development of the algae bloom at several sections of the Oder River between Lipki (Poland) and Szczecin Lagoon (Germany).

EO services contributing to Biodiversity

- **Users:** public administrations, tourism, fisheries, maritime transport
- **Challenge**: massive strandings of sargassum (Sargassum fluitans and Sargassum natans) in the Caribbean region
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- **Service Provider**: CLS

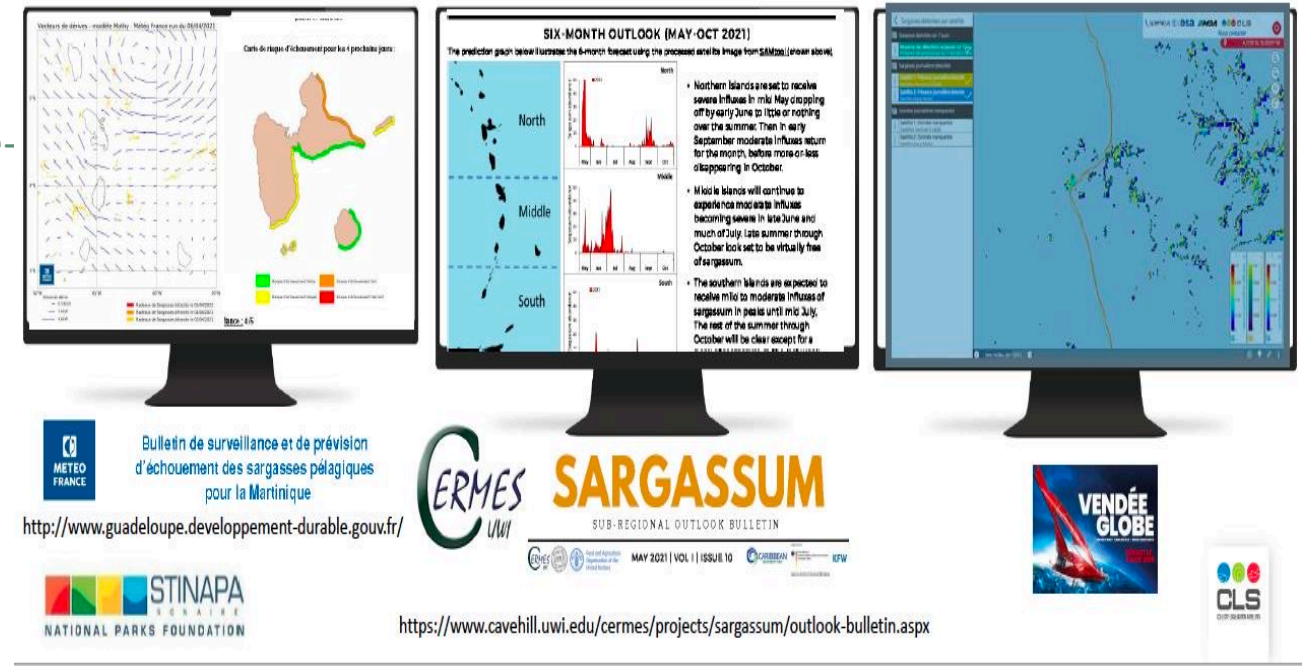
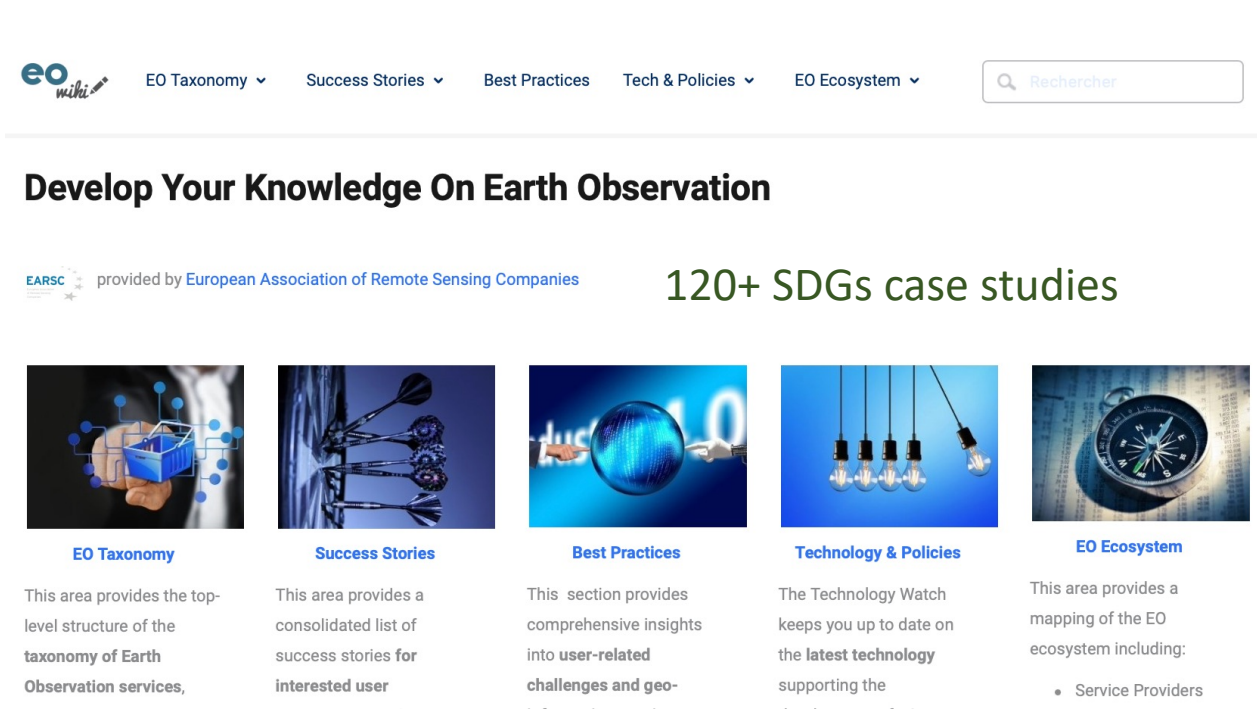


Fig. https://www.cavehill.uwi.edu/cermes/projects/sargassum/outlook- bulletin.aspx

Tools supporting the EO awareness and market uptake



What's the state of the EO industry in Europe?

Your feedback is crucial to help us identify the key issues that companies are facing today.

2022			2023		
Employees	Number of EO Companies	Revenues	Employees	Number of EO Companies	Revenues
12085	746	€1.61 B	?	?	?

FILL IN EARSC 2023 INDUSTRY SURVEY!

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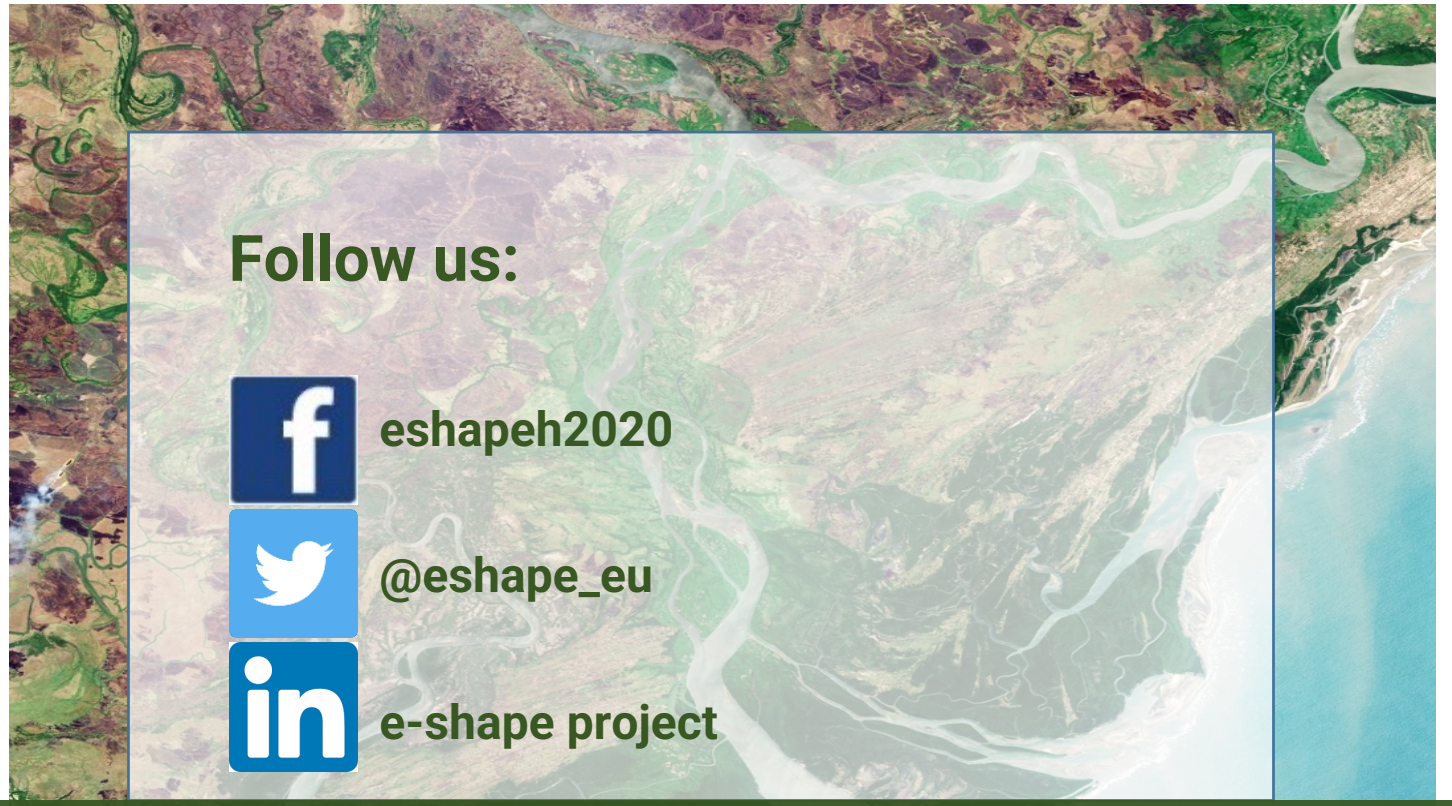
Thank you!



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