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EU SPACE WEEK 2023

7 - 9 November - Sevilla, Spain

User Consultation Platform 2023
Segment overview

Climate, Environment & Biodiversity

7 November 2023

European Commission | EUSPA European Union Agency for the Space Programme

UE23 PRESIDENCIA ESPAÑOLA CONSEJO DE LA UNIÓN EUROPEA

Some 2023 headlines

Science

CAREERS | COMMENTARY | JOURNALS ∨
NEWS | CAREERS | COMMENTARY

Hurricane Otis smashed into Mexico and broke records. Why did no one see it coming?
With warming oceans, rapidly intensifying hurricanes may be on the rise, but forecasters still struggle to predict them

BBC NEWS

Sea-level rise: West Antarctic ice shelf melt 'unavoidable'

Swiss Re reveals global cost of climate impacts as losses from natural disasters top $275bn

The New York Times Magazine

The New York Times

'It's Like Our Country Exploded': Canada's Year of Fire

rfi
WEATHER
France posts record temperatures for month of September

Biodiversity loss is a risk to the global financial system

The Guardian

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Segment Overview

Biodiversity

Wildlife monitoring

Ecosystem monitoring

Climate services

Climate change mitigation & adaptation

EO based Climate modelling

GNSS based climate modelling

Climate monitoring & forecasting

Environmental monitoring

Environmental Auditing

Environmental Resources Management

Environmental impact assessment & ESG

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Multidimensional approach to climate change

We can view **climate action** through five lenses:

- **Governance:** using technical and operational mandate to address climate change issues at the policy, funding, regulatory and data level
- **Innovation:** public sector to introduce new technologies and innovations to address climate change challenges
- **Risk reduction:** prioritizing and adapting government investments in infrastructure, operations and services to address climate change and risks
- **Operational sustainability:** measuring and reducing GHG emissions
- **Climate equity:** measure the impact of improved social, employment and environmental outcomes
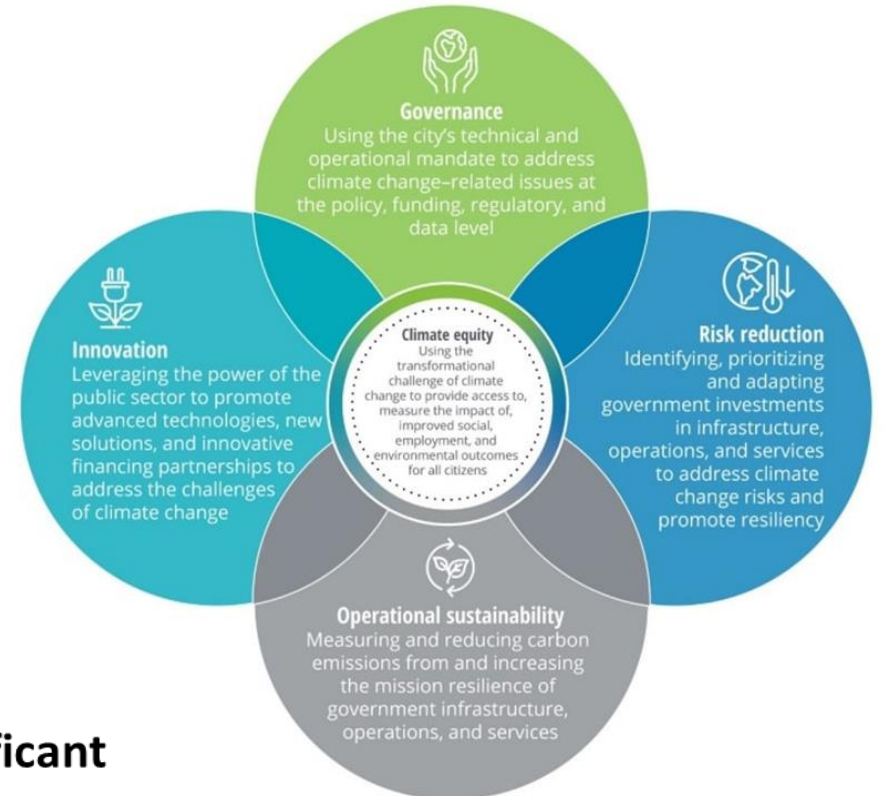
✓ **Space data has the potential to generate added value and significant advancement across the all 5 pillars.**

Governance
Using the city's technical and operational mandate to address climate change–related issues at the policy, funding, regulatory, and data level

Innovation
Leveraging the power of the public sector to promote advanced technologies, new solutions, and innovative financing partnerships to address the challenges of climate change

Climate equity
Using the transformational challenge of climate change to provide access to, measure the impact of, improved social, employment, and environmental outcomes for all citizens

Risk reduction
Identifying, prioritizing and adapting government investments in infrastructure, operations, and services to address climate change risks and promote resiliency

Operational sustainability
Measuring and reducing carbon emissions from and increasing the mission resilience of government infrastructure, operations, and services

Source: Deloitte analysis.

Deloitte Insights | deloitte.com/insights

https://www2.deloitte.com/za/en/insights/industry/public-sector/climate-resilient-cities.html

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Climate change impact on the market

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Climate change global impacts → Increased demand for:
- monitoring services & systems
- EU laws & regulations
→
- EO-based innovations
- novel applications & services
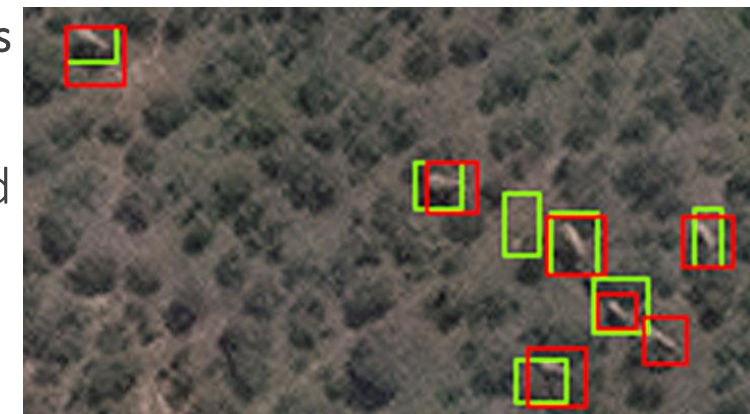
EUSPA market segments
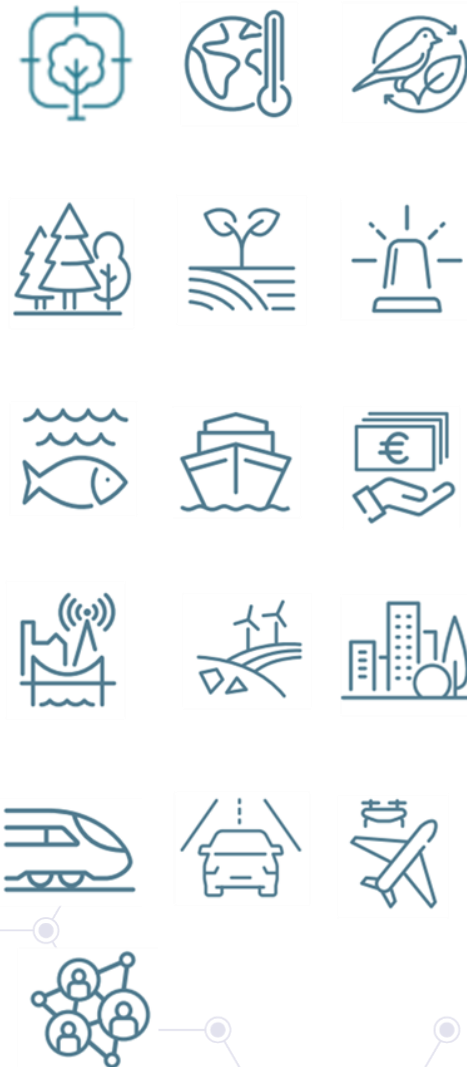
Published:
25 January 2023

EU Space for Green Transformation

https://www.euspa.europa.eu/newsroom/news/eu-space-helps-drive-green-transformation

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Users and Market data

- The user community includes:

    - Governments and Institutions

    - The research community

    - NGOs, environmental groups, parks...

    - Companies for ESG reporting, carbon footprint and environmental impact studies

- This segment represents 630M€ (EO, 2021) or 23% of the overall EO market

- The revenues will increase to 920M€ by 2031

- Data represents less than 10% of the revenues, value added services being the bulk part

- This demonstrates the role of integrators and service providers

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The role of regulations ; market trends

- Regulations play a major role in the growth of this segment:

  - The Paris agreement and the EU Green deal

  - The Corporate Sustainability Reporting Directive (CSRD)

  - The New regulation to fight deforestation (EUDR)

- Major trends include:

  - Emerging market focused on supplying data to facilitate **nature/ecosystems monitoring and carbon removal**

  - **Climate adaptation and resilience:** decision-makers require data and forecasts

The EU Green Deal

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Requirements for EO

ID	IDXXXX
Application	Animal counting
Users	Research institutions, conservation organizations
User Needs	
Operational scenario	The user needs an assessment of the population of an animal species over an area or the evolution of the population over a period of time.
Size of area of interest	Regional
Scale	Large
Frequency of information	Such assessments are performed on a yearly basis to measure the evolution of a population
Other	e.g. non-functional, data format, contextual info...
Service Provider Offer	
What the service does	The service provides an estimate of the number of animals over an area at a given point in time.
How does the service work	Satellite images are provided over the area of interest. The service provider runs its AI algorithms over the images to detect specific animal species. The given result is an estimate count of the animals on a picture which is synthesized over the area of interest.
Service Provider Satellite EO Requirements	
Spatial resolution	Spatial resolution should be sub meter
Temporal resolution	Revisit of a few days is needed to account for weather conditions and displacement of the population
Data type / Spectral range	Optical (multispectral)
Other (if applicable)	The availability of historical data is a plus to assess historical evolution
Service Inputs	
Satellite data sources	Data from commercial providers (Maxar, ADS)
Other data sources	GNSS tracking is also used to assess the whereabouts of a few animals and task the satellite over that precise area.

- Sample table from the RUR
- Your comments appreciated!

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Requirements for GNSS

	GNSS user requirements for Wildlife Tracking		
		Migration tracking	**Habitat tracking**
Accuracy	Horizontal	km-level	m-level
	Vertical	km-level	m-level
Availability	Urban canyon	No	No
	Natural canyon	No	Yes
	Canopy	Yes	Yes
	Indoor	No	No
	Better than 95%	Low	Low
	Better than 99%	Low	Low
Robustness		Low	Low
Integrity and reliability		Low	Low
Size, weight, autonomy	Relevance	Yes - critical	Yes – critical
	Time a device can run	Year range	Months range
TTFaF	In hot start	Less than a minute	Less than a minute
Service area	Geographical coverage	Global	National/Regional

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...as a conclusion...

- the emergence of **new policies** and markets, pushing further the need for data

- An increasing number of organizations will adopt EO data for environmental, social, and governance (ESG) practices monitoring

- Integration of Earth observation (EO) data with citizen science initiatives and crowdsourcing platforms enables large-scale data collection and engages the public in biodiversity monitoring.

- Collaborative approaches, like integrating EO data and citizen science, are already being used in projects focused on water resources, forest, and land use monitoring.

- The consolidation of diverse data sources into single platforms promises to enhance data quality in monitoring of diverse ecosystems.

- With advancements in technology, such as the evolution of Sentinel missions and the upcoming launch of private satellite constellations, EO data quality is expected to improve, especially in hyperspectral imaging and resolution, which are crucial for monitoring ecosystems effectively

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Requirements for EO

ID	IDXXXX	
Application	Deforestation (ESG reporting, impact studies) and coastal flood risk (risk assessment)	
Users	Large companies subject to regulations	
User Needs		
Operational scenario	The user needs an assessment of deforestation in a specific area, either for EUDR reporting or ESG reporting	The user needs to assess the coastal flood risk over an area either for an existing asset e.g. a factory or for a future site
Size of area of interest	Local	Local
Scale	Global	Global
Frequency of information	Such assessments are performed on a yearly basis for reporting purposes	For future projects, this risk is assessed once or on a yearly basis for existing assets.
Other (if applicable)		The risk index can be tailored for specific needs such as for insurance (insurable/non insurable) or for suitability (go/nogo).
Service Provider Offer		
What the service does	The service provides an estimate of the deforestation over an area year after year (in surface lost or gained)	The service provides a risk index depending on the nature of the requirement.
How does the service work	The end-user provides an area of interest and a period of time to the service provider. EO data along with AI algorithms is used to assess the change of forest cover over the years. Deforestation is provided as a number e.g. Ha per year along with images.	The end-user provides an area of interest to the service provider. EO data along with AI algorithms and climate models are used to assess the risks of floods on the area.
Service Provider Satellite EO Requirements		
Spatial resolution	Spatial resolution of 10 meters is usually sufficient	Spatial resolution of 10 meters is usually sufficient
Temporal resolution	A yearly assessment is sufficient.	A yearly assessment is sufficient.
Data type / Spectral range	Optical (multispectral) Radar (SAR) LIDAR	Optical (multispectral) Radar (SAR)
Other (if applicable)	Historical data is required to assess when deforestation happened.	Historical data is required to feed the models. Tide gauge data (GESLA) can also be used
Service Inputs		
Satellite data sources	Copernicus data is used (S1 for SAR and S2 for images) Commercial data from sources such as Planet can supplement Copernicus Nasa Gedi for Lidar	Sentinel-1 level 2 products Sentinel-2 level 2A products
Other data sources		

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