

A satellite night view of Europe, showing the continent illuminated by city lights against the dark background of the night sky and the blue glow of the atmosphere. The lights are concentrated in major urban centers and along coastlines.

# Unlock the power of earth observation data with Terrascope and EOplaza

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# CONTENT

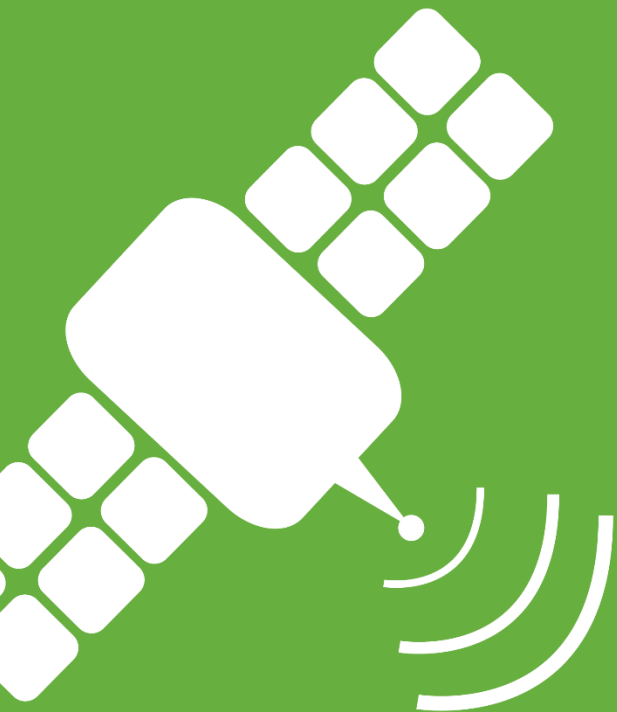
VITO REMOTE SENSING  
TERRASCOPE PLATFORM  
EOPLAZA  
EO CATALOGUE



# VITO REMOTE SENSING

LOCATED IN BELGIUM (MOL)





# TERRASCOPE

BELGIAN COLLABORATIVE  
GROUND SEGMENT FOR  
SENTINEL MISSIONS



# What is Terrascope?

## Belgian Collaborative Ground Segment for Sentinel missions

Platform released from March 2018 onwards

Build on technologies explored in ESA PROBAV-MEP

Onboarded in Network of Resources in 2020

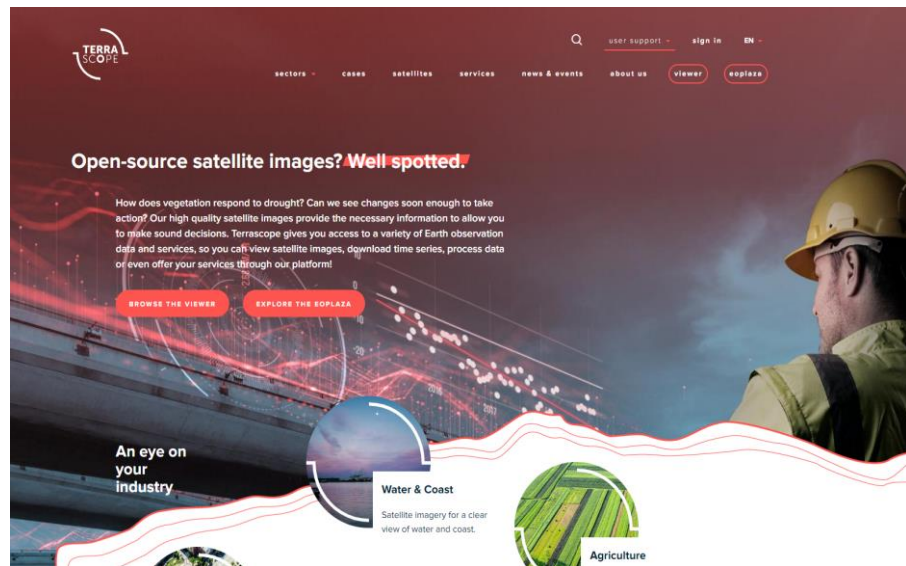
### Highlights

Focus on Analysis Ready Data (ARD)

Unique long term global vegetation datasets

Strong BE user focus

Federated node in EU infrastructure

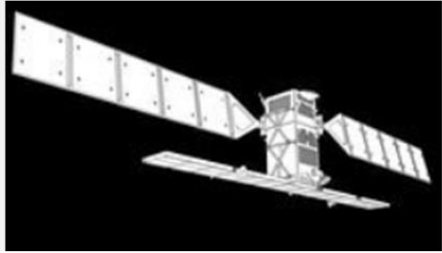


<https://terrascope.be>



# Available datasets

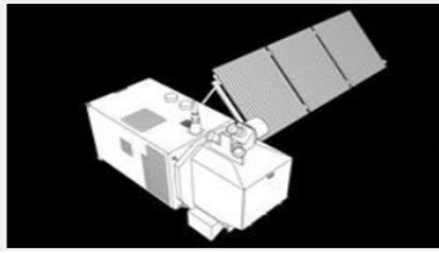
## Native datasets (COG FORMAT)



### Sentinel-1

#### Benelux area

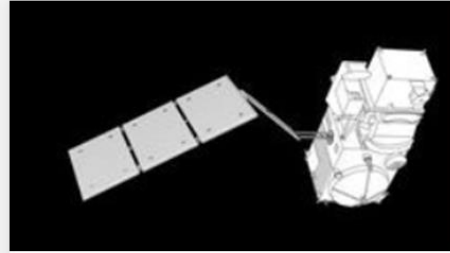
- Full archive
  - GRD; GRD-0
  - SLC; Coherence



### Sentinel-2

#### Europe/selected regions

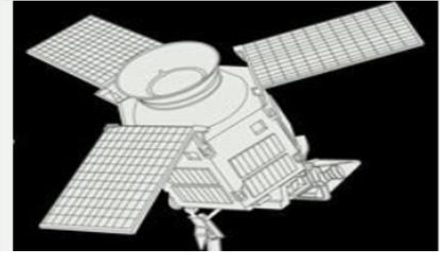
- Full archive for Benelux
- 2Y rolling archive for EU
  - L2A TOC
  - Vegetation indices
  - Water indices



### Sentinel-3

#### Global

- Full archive
  - SYN-VGT



### Sentinel-5p

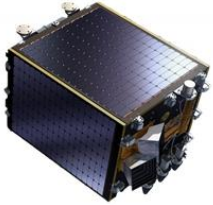
#### Global

- 2018 - present
  - NO<sub>2</sub>
  - CO
  - (HCHO)
  - (CH<sub>4</sub>)



# Available datasets

## Native datasets



### PROBA-V

Global

- Full archive



### SPOT VEGETATION

Global

- Full archive



### Copernicus Services

Global

- Full archive
  - ▶ LAI
  - ▶ FAPAR
- DEM
  - ▶ 30m
  - ▶ 90m



### ESA World Cover

Global

- ▶ 2020
- ▶ 2021 (October 2022)





# Terrascope interfaces



## Terraviewer

### Novice users

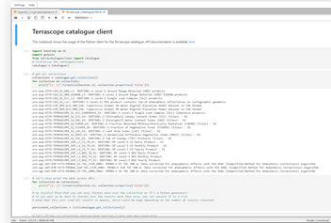
- Viewing
- Comparing
- Time lapses
- Downloads
- Time series analysis



## Virtual Machines

### Expert users

- NFS File access
- Wide Open-source toolset
- Access to HPC



## Jupyter Lab

### Expert users

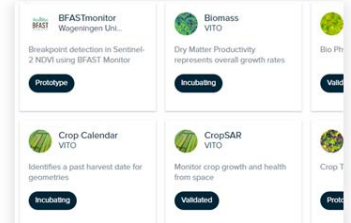
- Use Python/R/Scala
- Access to HPC



## Web Services

### Expert users

- WMS/WMTS/WCS
- OpenSearch Catalogue
- (STAC Catalogue)
- OpenEO API



## EOplaza

### Expert users

- On demand algorithm execution
- Orchestration on OpenEO or ASB
- 3rd party service publication possible
- Credit system

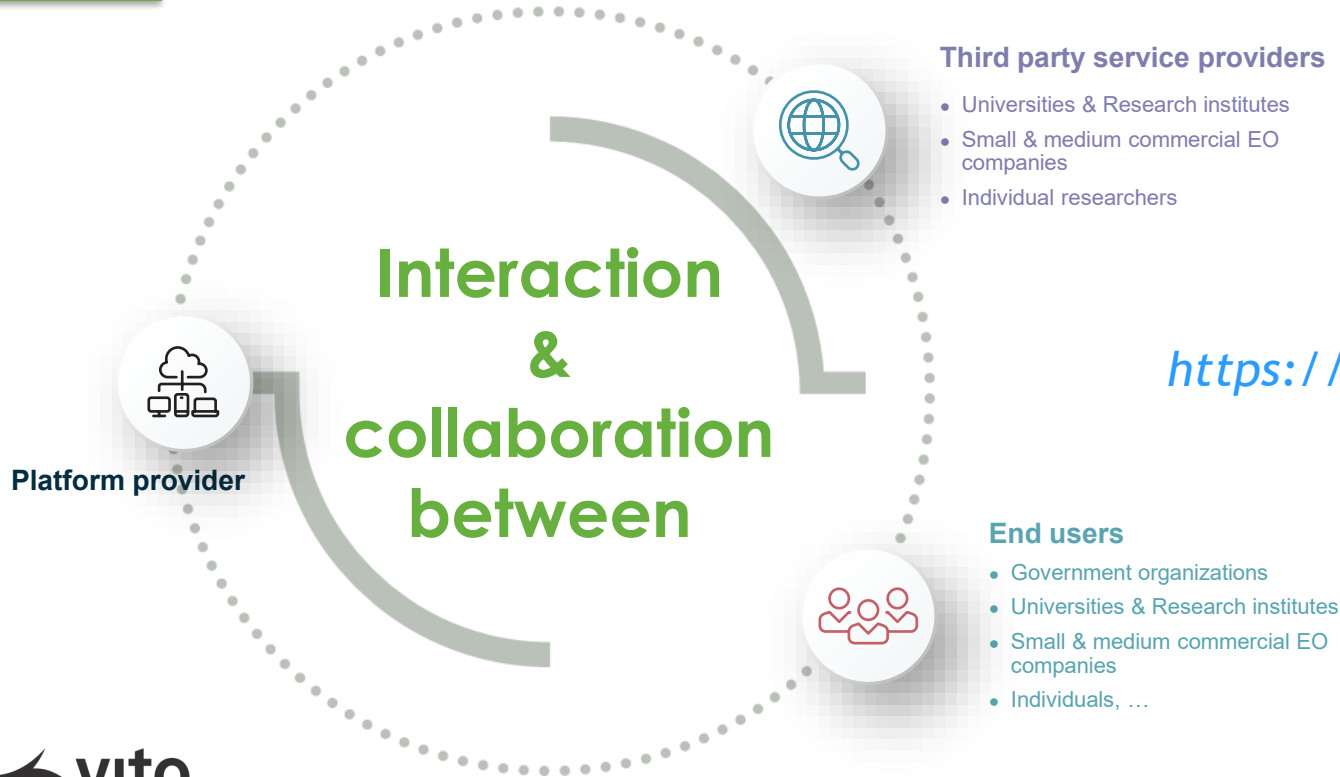


# EOPLAZA

## MARKETPLACE



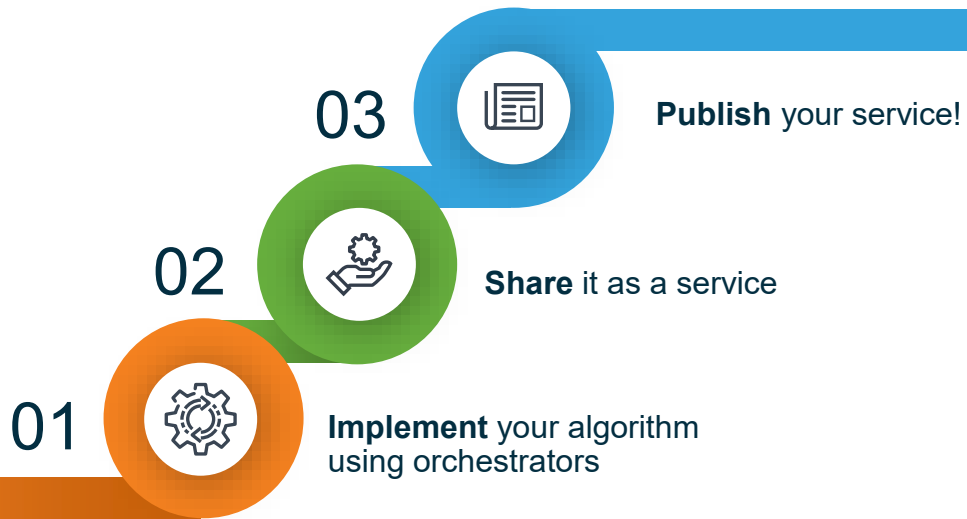
# EOplaza



<https://portal.terrascope.be/>



# Third party service provider





# Benefits of onboarding services



## Avoid high investments in

- IT & e-commerce infrastructure
- deep IT knowledge (develop, deploy and operate systems)
- EO domain knowledge (meaningful algorithms)



## You can focus on

- development of your algorithm
- users & user needs

## & easily scale up ...

- prototypes → operational services



## Generate revenue

- depending on the service level
- to be able to continuously improving your service



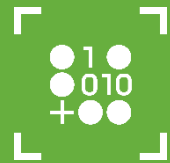
## Reach out to our large network

- Terrascope & Proba V Mep community of 2500 + users
- ...

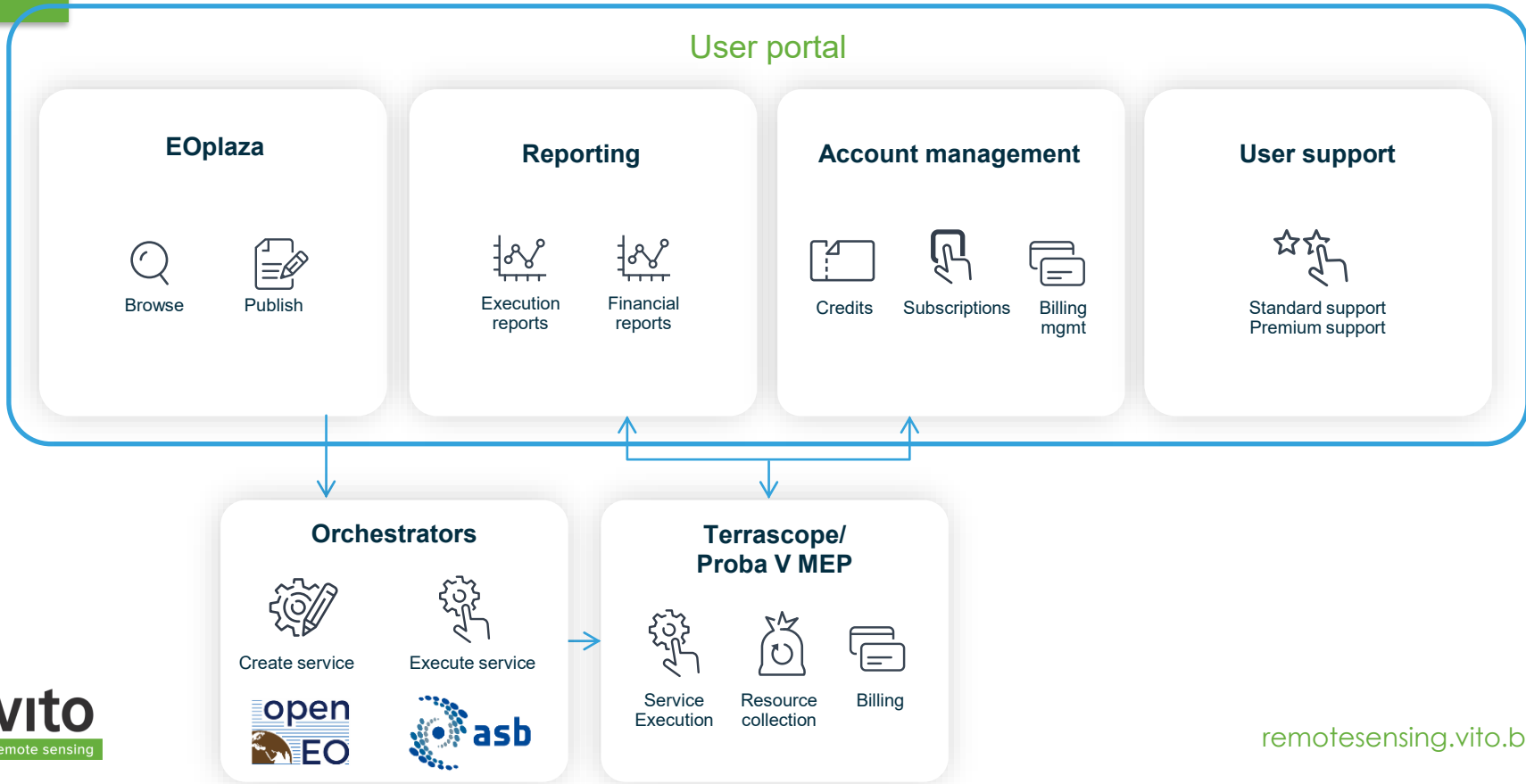


## User experience and fair pricing structure

- operational support from multidisciplinary team
- easily create services through orchestrators
- multiple options for executing services
- API's available for integrating into your own applications



# Eoplaza building blocks





# EOplaza

## Service catalogue

## Explore the EOplaza



Sort by:

- Service name
- Service provider name
- Last updated

Filter by:

- Labels
- Service providers

### 16 Services available

<p><b>Anomaly Det...</b> VITO</p> <p>Regional Benchmarking using CropSAR</p> <p>Incubating</p>	<p><b>BFASTmonitor</b> Wageningen U...</p> <p>Breakpoint detection in Sentinel-2 NDVI using BFAST Monitor</p> <p>Prototype</p>	<p><b>Biomass</b> VITO</p> <p>Dry Matter Productivity represents overall growth rates</p> <p>Incubating</p>
<p><b>BIOPAR</b> VITO</p> <p>Bio Physical Parameters</p> <p>Validated</p>	<p><b>Crop Calendar</b> VITO</p> <p>Identifies a past harvest date for geometries</p> <p>Incubating</p>	<p><b>CropSAR</b> VITO</p> <p>Monitor crop growth and health from space</p> <p>Validated</p>
<p><b>Crop Type Cl...</b> VITO</p> <p>Crop Type prediction model</p> <p>Prototype</p>	<p><b>MSI</b> VITO</p> <p>Moisture Stress Index</p> <p>Validated</p>	<p><b>NBR</b> VITO</p> <p>Normalized Burn Ratio(NBR) that identifies burned areas.</p> <p>Prototype</p>

< 1 2 >

### Are you a Developer?

Publish and market your own services on the EOplaza through our developer portal!

[GO TO PORTAL](#)



# EO CATALOGUE

OPENSEARCH - GEOJSON - STAC





# EO – Catalogue

Exploitation platforms and virtual research environments find their **origin** in providing **easy access to exponentially growing Earth Observation datasets**.

They serve the paradigm of **'bringing the users and their algorithms and services to the data'** and no longer **'bringing the data to the users'**.

The **real core** of these services remains **the data** and the **success of the platforms** is highly dependent on **the easiness of finding and accessing the data**.

# Standard based catalogue



EO Collection metadata GeoJSON  
(OGC-17-084)



EO Product metadata GeoJSON  
(OGC-17-003)



## OGC OpenSearch API

- **OGC-10-032** OGC OpenSearch Geo and Time Extensions
- **OGC-13-026** OGC OpenSearch Extensions for Earth Observation
- **OGC-17-047** OpenSearch-EO GeoJSON-LD Response Encoding Standard

STAC API  
(limited functionality)

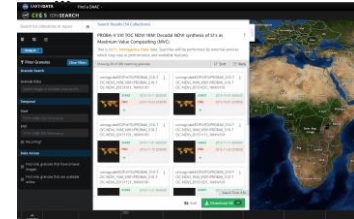


Terrascope Viewer

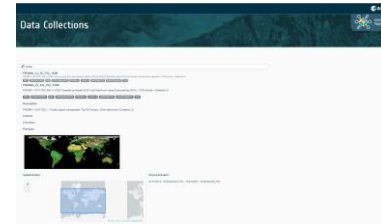


Third Party Catalogues:

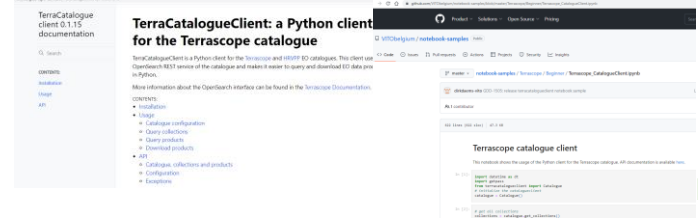
- ESA FedEO / EO-CAT
- NASA CEOS-IDN / EARTHDATA



openEO Platform



Python Client / Jupyter notebook sample





# EO Catalogue – future proof

The catalogue is designed using microservices and doesn't rely on a relational database system anymore which ensures **simple maintenance** and **scalability** and facilitates straightforward deployment in cloud environments.

A **modern** and **standard-based** catalogue with the aim to serve as a metadata catalogue **independently on where the data and applications are deployed**, in a private, public or hybrid cloud environment.

The **real core** of EO exploitation platforms and marketplaces remains **the data** and the **success of the platforms** is highly dependent on **the easiness of finding and accessing the data**.

Extremely important to **preserve and maintain valuable data** sets and this requires an never-ending effort in multiple disciplines:

- Storage Technology: Online – Off-line
- Data and metadata file formats
- Data accessibility: search and download (FAIR)
- Standards in all the domains
- ....



# Terrascope in a federated EU ecosystem





# Copernicus Data Space Ecosystem



Scientific Users



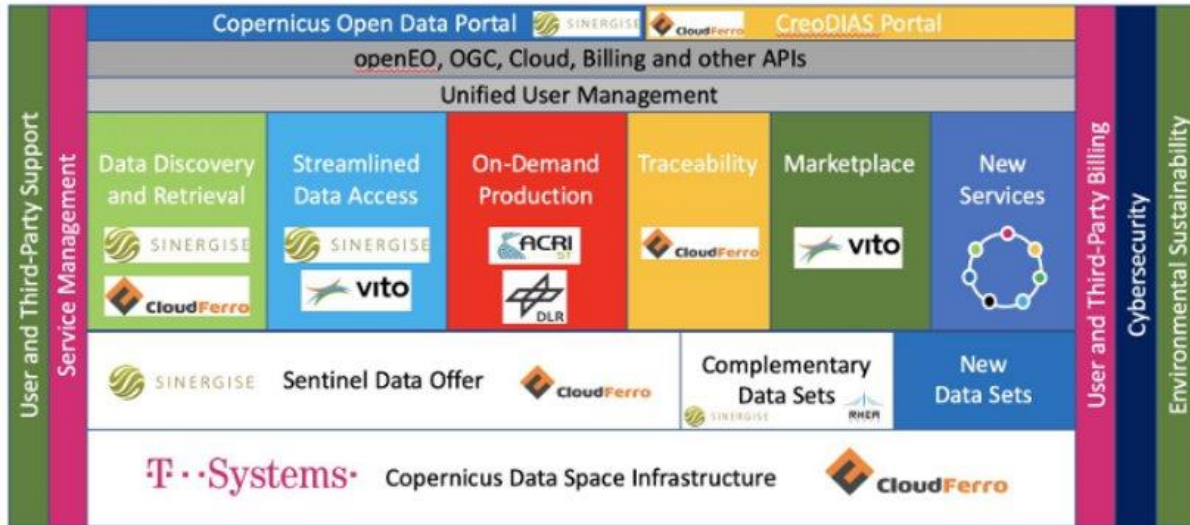
EU/National Entities



Industry



Start-Ups / Others



- Complete L1-2 Sentinel 1-2-3-5p collections
- Access to CCM – commercial data
- Long term commitment: 6 years
- Large number of interfaces



<https://dataspace.copernicus.eu/>

The screenshot shows the homepage of the Copernicus Data Space Ecosystem. The header includes the European Union logo, the Copernicus logo, and the ESA logo. Navigation links for 'EXPLORE DATA', 'ANALYSE DATA', and 'ECOSYSTEM' are present, along with 'SUPPORT' and 'LOGIN' buttons. The main content area features the heading 'Explore the Copernicus Data Space Ecosystem' and a welcome message. A large satellite image of a river delta is displayed on the right side, with a decorative graphic of three overlapping bars (orange, green, white) at the bottom. The footer contains three small white dots.

News Events About

PROGRAMME OF THE EUROPEAN UNION Copernicus satellite services on land esa

EXPLORE DATA ANALYSE DATA ECOSYSTEM

SUPPORT LOGIN

## Explore the Copernicus Data Space Ecosystem

Welcome to the Copernicus Data Space Ecosystem, an open ecosystem that provides free instant access to a wide range of data and services from the Copernicus Sentinel missions and more on our planet's land, oceans and atmosphere

ACCESS EO DATA

• • •



# Future Challenges

## Improving accessibility and affordability of using remote sensing data

Remote sensing and Earth observation data **can be expensive** to acquire and process, which limits its accessibility to researchers, businesses, and governments.

## Ensuring data accuracy and reliability

Remote sensing and Earth observation data are used for a **wide range of applications**, from **environmental monitoring** to **national security**. Ensuring the accuracy and reliability of the data is essential to its usefulness and credibility.

## Staying up-to-date with the latest developments in Artificial Intelligence

for advanced data processing capabilities, including the integration of multiple data sources through techniques such as data fusion. By exploring new possibilities of the data, we can **unlock valuable insights and opportunities for innovation**.

# THANK YOU

remotesensing.vito.be

## Useful links:

Terrascope website: <https://terrascope.be/en>

Terrascope viewer: <https://viewer.terrascope.be/>

EOplaza: <https://portal.terrascope.be/>

Terrascope documentation: <https://docs.terrascope.be/#/>

Terrascope use cases: <https://terrascope.be/en/cases>

Copernicus data space ecosystem: <https://dataspace.copernicus.eu/>





SEE  
THE  
BIGGER  
PICTURE



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