

IEEC^R

Institut d'Estudis
Espacials de Catalunya

Adoption of space-based services

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Institute of Space Studies of Catalonia (IEEC)



Established in 1996 to develop activities related to space in Catalonia in the fields of research, innovation, training and knowledge and technology transfer

- *Total members: ~300*
- *Productivity: ~450 peer-review articles per year*

Area for the Promotion of the Space Sector of Catalonia (APEC):

- Support the development of space technologies
- Adoption of space-based services

Catalonia Space 2030 strategy*

Mission 1

Catalonia, a hub of origin and connection for space economy

Mission 2

Contributing to the strengthening of Europe's space technology capabilities

Mission 3

Fostering constellations of talent with Catalan DNA

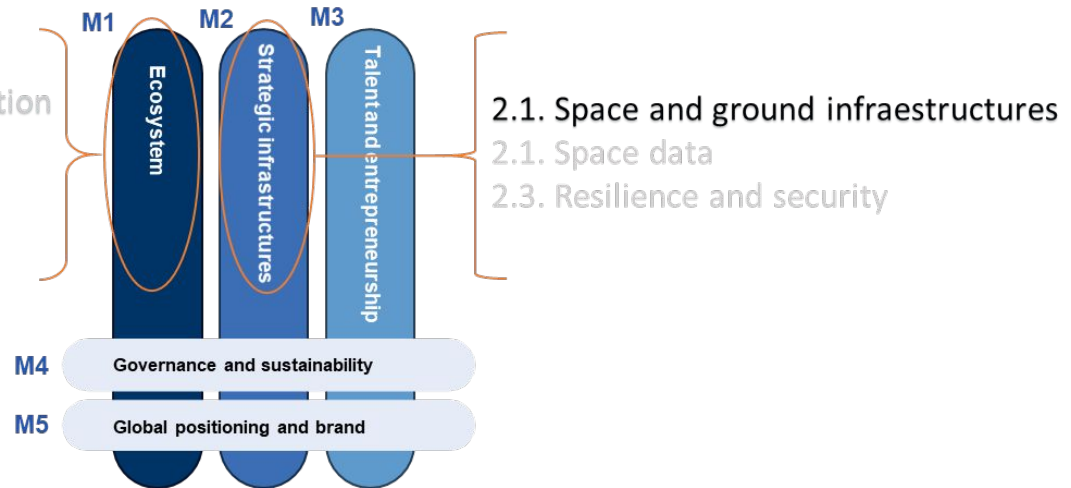
Mission 4

A solid system that drives the sector and the country forward

Mission 5

Catalonia Space 2030: a global brand, a shared pride

1.1. Ecosystem dinamization
1.2. Innovation transfer
1.3. Service adoption



*Space strategy being promoted by the Catalan Government since October 2020



Generalitat de Catalunya
Government of Catalonia

IEEC^R
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i2cat^R

ICGC
Institut
Cartogràfic i Geològic
de Catalunya

<https://politiquesdigitals.gencat.cat/ca/economia/espai/>

Infrastructures: Space Assets

New assets to increase the competitiveness of the sector in Catalonia

LEO missions:

- [IEEC] GENIOT-01/Enxaneta – IoT/5G (22 March 2021 - deorbited July 2024)
- [IEEC] **GENEO-01/Menut – EO & IOD** (3 January 2023)
- [I2CAT] GENIOT-02/Minairó – IoT/5G (15 April 2023)
- [IEEC] **GENEO-02 – EO & IOD** (launch Q2-2026)

IOD opportunities

- GENE0-01/Menut – Payload for on-board AI processing (C3SATP)
- GENE0-02 – Payload for In-orbit LISA Diagnostics Demonstrator (ILIADA)



Mission as a Service

- What is Mission as a Service?
 - IEEC designs and contracts a mission through a service provision framework
 - IEEC has exclusive satellite (or satellites) EO data over Catalonia
 - The Contractor retains the ability to commercialize the remaining satellite capacity
- Why this approach?
 - Cost efficiency: shared investment reduces the overall mission cost
 - Focused data: tailored EO data to our specific needs
 - Industry boost: enabling commercialization of data and risk sharing
- Additional advantages:
 - IEEC is involved in all aspects of the project, from definition to operations
 - Defining the platform allows IEEC to enable and In-Orbit Demonstration and Validation program for hosted payloads

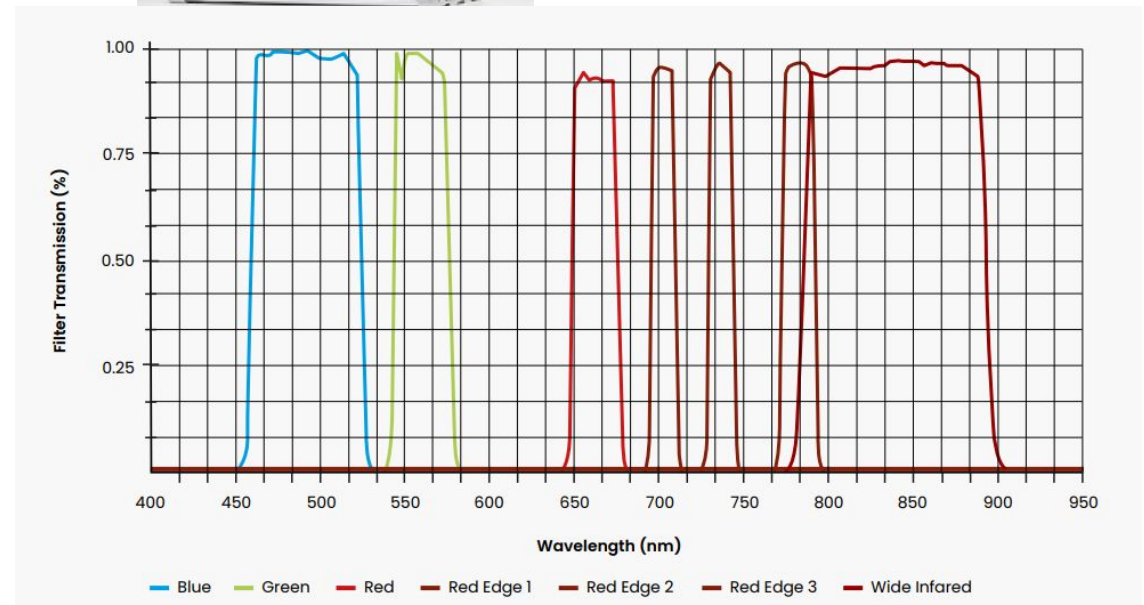
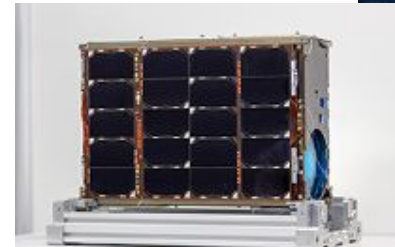


GENEO-01- Menut - Mission Overview

- **Name:** “Menut” (NORAD ID: 55010)
- **Platform:** 6U CubeSat (30 x 20 x 10 cm), mass: ~10 kg
- **Launch:** 3 January 2023
- **Orbit:** LEO SSO
- **Primary payload:** multispectral camera, 7 spectral bands 400–1000 nm (VNIR)
- **Secondary payload:** C3SatP multi-purpose high-performance computer - developed by IEEC
- **Services provision:**
 - Earth Observation (EO) data acquisition service
 - In-Orbit Demonstration (IOD) service for the C3SatP
- **Provider:** Open Cosmos Europe
- **Technical Support:** Cartographic and Geological Institute of Catalonia (ICGC)

Download Menut data from: <https://visors.icgc.cat/menut>

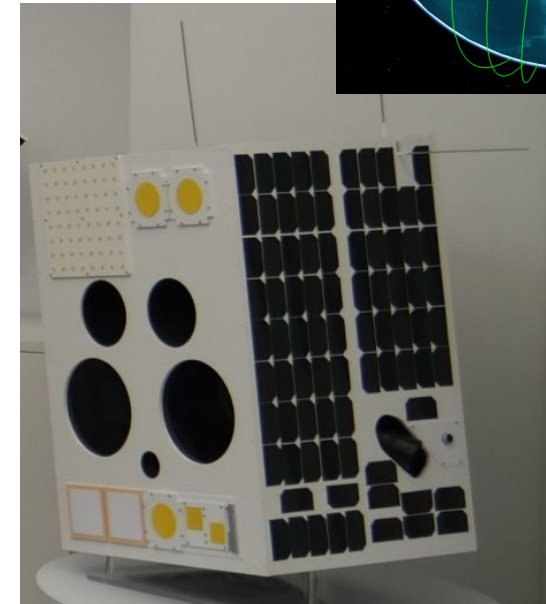
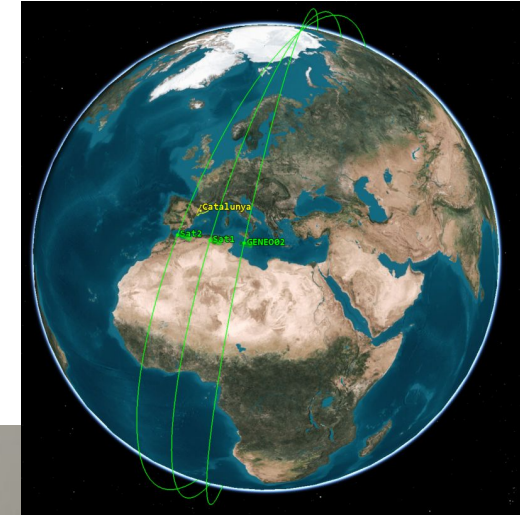
[+info](#)



GENEO-02 - Mission Overview

[+info](#)

- **Overall mission configuration:** 1 IEEC-tailored satellite + at least 2 complementary satellites to meet data recurrency targets
- **Platform:** Microsat (~50 kg)
- **Launch:** mid 2026
- **Orbit:** LEO SSO
- **Primary payload:** 2 optical payloads - VNIR 7 spectral bands 400–1000 nm + SWIR
- **Secondary payload:** IoT communications system
- **Hosted payload:** In-orbit LISA Diagnostics Demonstrator – ILIADA (~2U)
- **Services provision:**
 - Provision of recurrent high-resolution (~2.5 m GSD) EO data of Catalonia every 30–50 hours, covering the whole Catalan region in 20–30 days
 - Provision of IoT data sensed to combine it with the EO data and complement its information
 - In-Orbit Demonstration (IOD) service for the ILIADA system
- **Provider:** Open Cosmos Europe
- **Technical Support:** Cartographic and Geological Institute of Catalonia (ICGC)



Adoption of space-based services

Use cases to promote innovation from the public sector (total budget > 800k€, 2022-24)

1. Innovative public procurement (3 contracts, 200k €/contract) [+info](#)
2. Strategy use cases. Pilot projects
3. Challenges (3 prizes, 15k€/prize) [+info](#)
4. Open innovation EO services (5 prizes, 50k€/prize [+info](#)) (3 prizes 70k€/prize [+info](#))
5. DCA Open innovation IoT-5G services (2 prizes, 50k€/prize) [+info](#)

The screenshot shows the website for the 'gencat' (Government of Catalonia) European funds in Catalonia. The main navigation includes Home, Next Generation Catalonia, FEDER, ESF+, FEADER, FEMPA, and RIS3CAT. The current page is titled 'First edition of the RIS3CAT 2030 Public Innovation Procurement Program'. It features a European Union logo and the text 'Cofinançat per la Unió Europea'. A box on the right indicates 'Status of projects and tenders (PDF document)' with a 'Date of update: 30 April 2024'. The main text describes the program's goal to buy innovative technological solutions to address 20 challenges with co-financing from the 2021-2027 FEDER operational program. It mentions that solutions must be sufficiently developed, implemented in prototype or first commercial deployment phase, and have a positive impact on society. The tender amount is 200,000 euros per challenge, and it includes a preliminary market consultation process.

Innovative public procurement to promote new space applications: rail transport & GNSS, agriculture & IoT/5G, livestock & IoT/5G



I CONCURS D'IDEES DE CASOS D'ÚS D'OBSERVACIÓ DE LA TERRA PER AL SECTOR PRIVAT

> Convocatori oberta

> Data límit 04/07/2023

> Finançament fins a 50.000 €

Organitzat per: Generalitat de Catalunya, IECC^R

Amb el suport de: ICGC, i2cat^R

Open innovation service procurement to promote new space applications for the private sector

#ChallengeDCA

Concurs de projectes de casos d'ús amb comunicacions satel·litàries per al sector privat

Organitzat per: DCA

La DCA és una iniciativa de: Generalitat de Catalunya, i2cat^R



1. Innovation public procurement for public users

Funding: 3 space-based pilots awarded
200,000 euros each. [+info](#)

Challenges:

Challenge 7. Satellite positioning for railways

Challenge 12. Internet of Things applied to irrigation for water saving

Challenge 21. Satellite technology for livestock tracking in mountain areas

#gencat contact EN Q

European funds in Catalonia

Home | Next Generation Catalonia | FEDER | ESF+ | FEADER | FEMPA | RIS3CAT

Home > RIS3CAT > RIS3CAT 2030 > Public procurement program for innovation > First edition

First edition of the RIS3CAT 2030 Public Innovation Procurement Program

Cofinancat per la Unió Europea

Status of projects and tenders (PDF document)
Date of update: 30 April 2024

The Generalitat de Catalunya buys innovative technological solutions to address 20 challenges with co-financing from the 2021-2027 FEDER operational program of Catalonia. These solutions, which are implemented in a test phase, must improve processes or services and, as far as possible, must have an impact on society (people, companies and the territory).

Although the technological solutions may not be available on the market, they must be sufficiently developed to be implemented in the prototype, test or first commercial deployment phase, in the years 2023 and 2024. During the implementation phase of the projects the solutions are co-developed and adapted to the needs detected by the Administration.

The amount of the tender is 200,000 euros (VAT included) per challenge and solution. This amount is fixed, given that the functionality of the technological solutions is prioritized in the evaluation of the proposals.

As part of the preliminary market consultation, companies have submitted proposals.

The information collected in the preliminary market consultation process is key to adjusting the procurement documents to the solutions that the market can offer. It should be borne in mind, however, that the fact of participating does not generate any obligation or commitment to participate in the tenders, nor any advantage or impediment. Tender procedures will be open to all companies.

El Programa de compra pública de innovación de la RIS3CAT 2030

Contratos	Entidades implicadas en la ejecución de los contratos	Presupuesto	Cofinanciación del FEDER
18	40	3.500.000 €	1.400.000 €

Fases del proceso de compra pública de innovación (CPI)



1. Innovation public procurement for public users

Coordination and end user:  **Generalitat de Catalunya**
Government of Catalonia

Challenge 7. Satellite positioning for railways

Provider:

Technical support:

End user:



Challenge 12. Internet of Things applied to irrigation for water saving

Provider:

Technical support:

End user:



Challenge 21. Satellite technology for livestock tracking in mountain areas

Provider:

Technical support:

End user: Flora and fauna service



2. Strategy use cases of IoT-5G services for public users

2.1

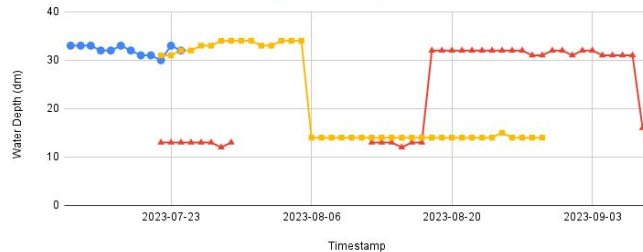
Use case: Monitoring remote water reservoirs for rapid response to mountain fires

Provider: **i2cat**[®]

End user: Fire Department  **Generalitat de Catalunya**
Government of Catalonia



● Pallars ▲ Baix Empordà ■ Alt Empordà



Objective: To access information remotely about the status of the devices in the high mountains, for action against fire.

Satellite Technologies: Enxaneta and SWARM

2.2

Use case: Real-time data collection for the prevention of forest fires.

Provider: **i2cat**[®]

End user: 
Entorn Natural · Salut · Societat



Objective: With satellite connectivity and data collection through sensors, information on humidity and other environmental variables can be obtained, allowing to take preventive action.

Satellite Technologies: SWARM and Minairó

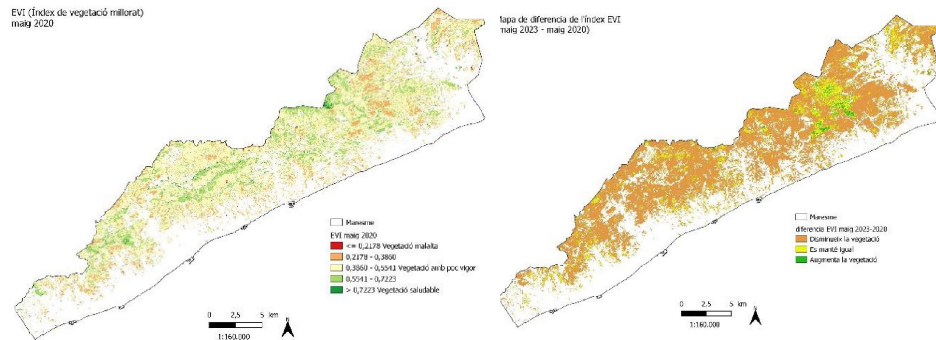
2. Strategy use cases of EO services for public users

2.3 Use case: Health monitoring of forests

Provider:



End user: Rural Agents Generalitat de Catalunya
Government of Catalonia



Objective: Looking for more proactive ways to track the decline in forest vigor and recovery, in a so diverse territory.

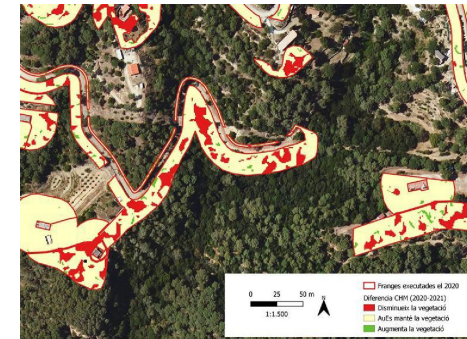
Satellite Technologies: Sentinel-2 and Menut

2.4 Use case: Monitoring of sensitive areas

Provider:



End user: Fire Department Generalitat de Catalunya
Government of Catalonia



Objective: To access information remotely about the state and morphology of vegetation near urbanizations, to establish priorities for action during the emergency and to optimize maintenance protocols.

Satellite Technologies: Sentinel-2 and Menut

2. Strategy use cases of EO services for public users

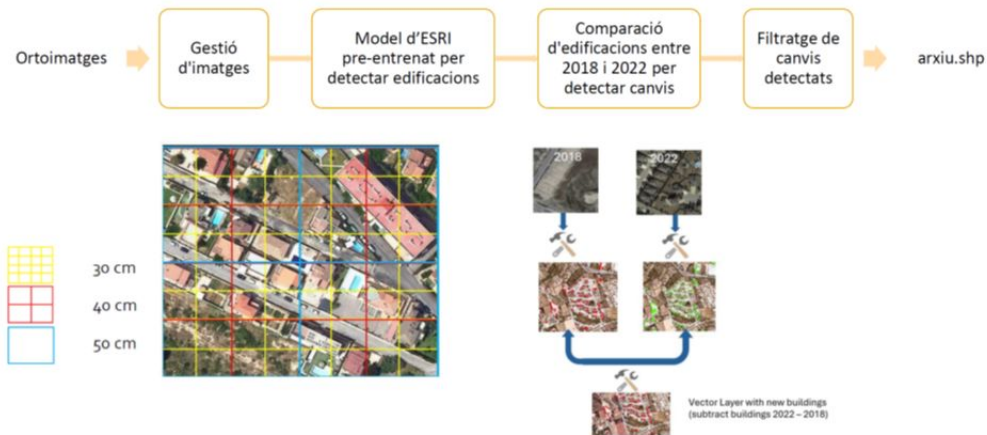
2.5

Use case: Identification of new buildings

Provider:



End user: Territory and urban area planning



Objective: Improve change detection identification by A.I. Need of very high resolution Earth Observation.

Satellite Technologies: Sentinel-2 and Planet

3. Challenges of EO services for public users

Funding: 3 use cases awarded with a financial prize of **15,000** euros each. [+info](#)

Challenges:

1. Improve the study of the Catalan coastline using Earth observation technology.
2. Evaluation and control of the impact of disasters on agricultural production through Earth observation technology.
3. Monitoring and control of drought in pastures using Earth observation technology.



ICGC
Institut
Cartogràfic i Geològic
de Catalunya

Challenge amb l'Institut Cartogràfic i Geològic de Catalunya (ICGC).

● Finalitzat el: 15/11/2022

3. Challenges of EO services for public users

Challenge 1

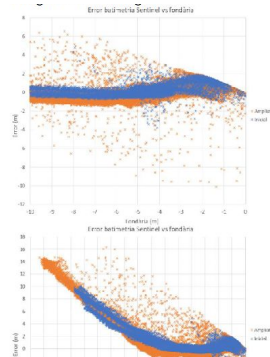
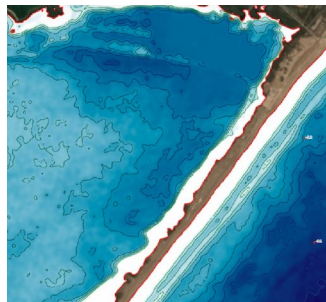
Use case: To improve the study of the Catalan coastline

Provider:

Tech. coordination and support:

End user: Coastal service

Challenge coordination:



Objective: Gather more often data to be able to take decision before/after climate events

Challenge 3

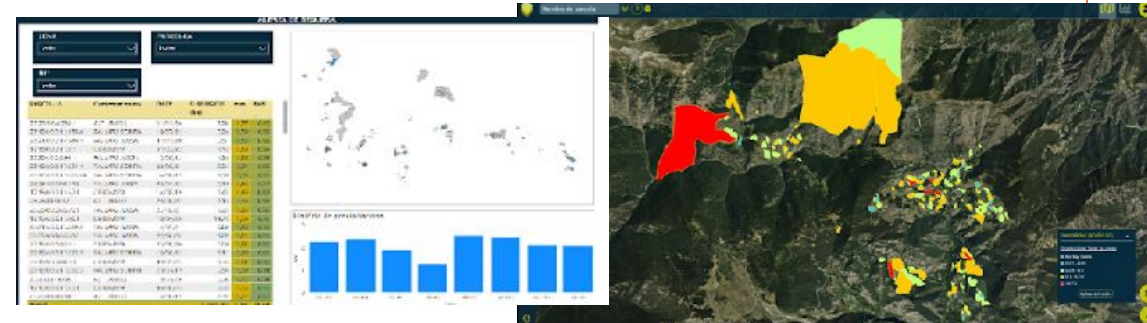
Use case: Monitoring and control of drought in pastures

Provider:

Tech. coordination and support:

End user: Rural Agenda

Challenge coordination:



Objective: Alternative ways of controlling and managing drought in pastures to optimize livestock management in the Pyrenees.

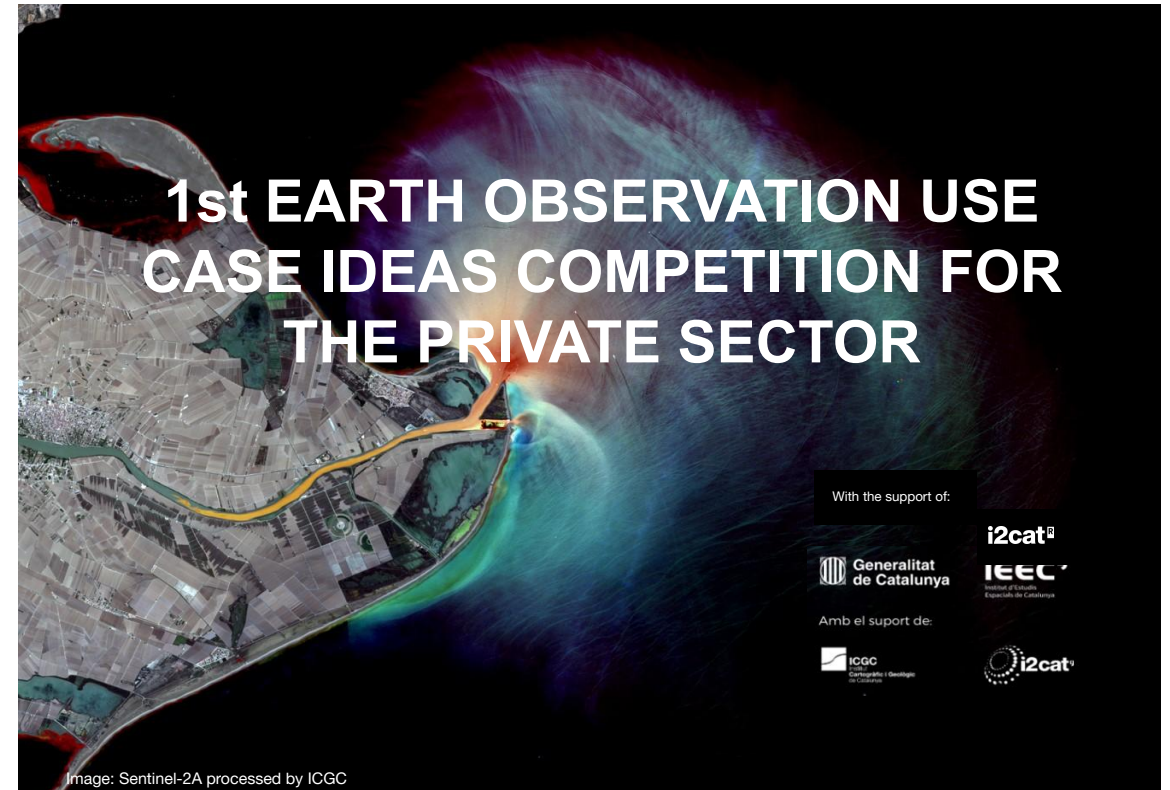
4. Open innovation challenges of EO services for private users

First Edition

Funding: 2 use cases awarded with a financial prize of 2,500 euros are eligible for a subsequent service contract of **47,500** euros each. [+info](#)

Main Participation Requirements:

- Innovation
- Based on **Earth Observation** satellite data, including data from Menut as a demonstrator of its capabilities
- Use cases targeted at the private sector
- Use cases applicable to the Catalan territory as a proof of concept
- Include active participation from the end user
- **6 months** of development



4. Open innovation challenges of EO services for private users

4.1

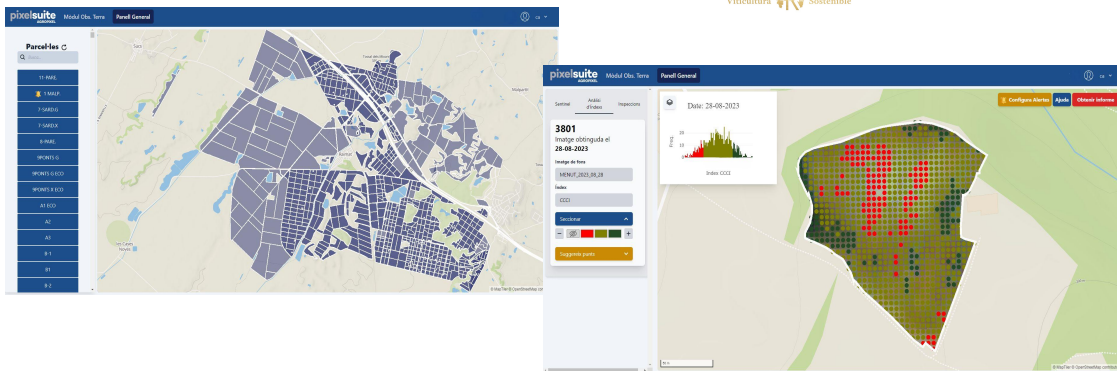
Use case: EO module for vineyard management

Provider: 

Coordination:  with the collaboration of 
Institut d'Estudis Espacials de Catalunya

End user: Technical consultancy for agricultural companies and a wine company

 
Viticultura Sostenible



Objective: To integrate satellite EO data into the platform that Agropixel uses, to improve its agronomic analysis and consultancy activities in the wine and fruit sector of Catalonia (Raimat).

[+ info](#)

Satellite Technologies: Sentinel-2 and Menut

4.2

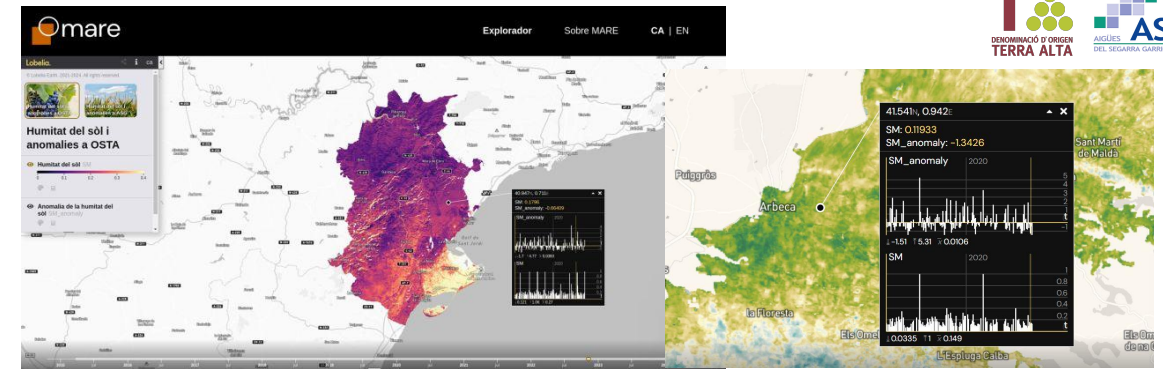
Use case: Improving drought monitoring capabilities

Provider: 

Coordination:  with the collaboration of 
Institut d'Estudis Espacials de Catalunya

End user: Irrigation communities (Aigües Segarra-Garrigues and Consell Regulador de la Denominació d'Origen Terra-Alta)



Objective: Monitor the available water in the soil and generate a drought index with a resolution of 100 m in the plots of the irrigating communities.

[+ info](#)

Satellite Technologies: LandSAT 7- 8 - 9, SMOS/SMAP, Sentinel-3 and Menut

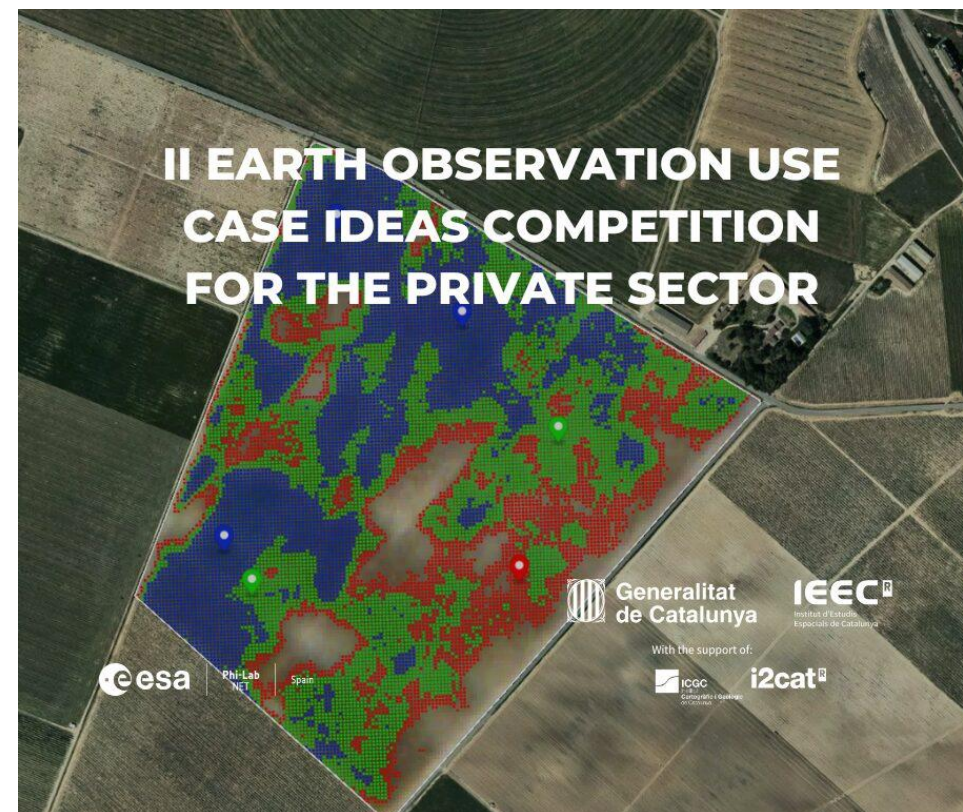
4. Open innovation challenges of EO services for private users

Second Edition

Funding: 3 use cases awarded with a financial prize of 2,500 euros are eligible for a subsequent service contract of **47,500** euros each. [+ info](#)

Main Participation Requirements:

- Innovation
- Aligned with ESA Phi-LabNET Spain's topic: Space Technology for Climate Resilience.
- Based on **Earth Observation** satellite data, including data from Menut as a demonstrator of its capabilities
- Use cases targeted at the private sector
- Use cases applicable to the Catalan territory as a proof of concept
- Include active participation from the end user
- **6 months** of development



4. Open innovation challenges of EO services for private users

4.3

Use case: Use of Earth observation technologies to optimise vineyard irrigation

Provider: 

Coordination:  with the collaboration of  Institut d'Estudis Espacials de Catalunya

End user: Technical consultancy for agricultural companies and a wine company



Objective: optimise vineyard irrigation by inferring the water stress of the plants in a scalable and automated way. This would allow irrigation to be planned according to the needs of the crop, merging data from multispectral satellite imagery, field samples and predictive models.

Satellite Technologies: Sentinel-2 and Menut

4.4

Use case: advanced fire danger indicator

Provider: Lobelia.

Coordination:  with the collaboration of  Institut d'Estudis Espacials de Catalunya

End user: energy transfer operator



Objective: The SAPIC system addresses the challenge of detecting points that could start a fire by using Earth observation technologies combined with high-resolution climate data adapted to each specific location.

Satellite Technologies: Sentinel-2, SMOS and Menut

4. Open innovation challenges of EO services for private users

Second Edition

4.5

Use case: Automated detection of water leaks in underground and open-air canals

Provider: MOAI

Coordination: IEEC^R with the collaboration of ICGC
Institut d'Estudis Espacials de Catalunya Institut Cartogràfic i Geològic de Catalunya

End user: large operators and managers of energy supply and generation infrastructures endesa



Objective: Early identification of any signs of leakage in order to prevent water losses, reduce safety risks and improve efficiency in water management.

Satellite Technologies: airborne ortophoto, Pléiades Neo and Menut

4. Open innovation challenges of EO services for private users

Third Edition

Funding: 3 use cases awarded with a financial prize of 2,500 euros are eligible for a subsequent service contract of **67,500** euros each. [+ info](#)

Main Participation Requirements:

- Innovation
- Based on **Earth Observation** and/or **GNSS** satellite data (Menut or SPGIC's as demonstrator)
- Topics: resilience, support for energy-intensive industries, fostering re-industrialisation, tourism or mobility.
- Use cases targeted at the **private sector**
- Use cases applicable to the **Catalan territory as a proof of concept**
- Include **active participation from the end user**
- **8 months** of development



Evaluation on 27 March

5. DCA Open innovation challenges of IoT-5G services for private users

Funding: 2 use cases awarded with a financial prize of 5,000 euros are eligible for a subsequent service contract of **45,000** euros each. [+ info](#)

Main Participation Requirements:

- Innovation
- Based on based on application technology in the field of **satellite communications**
- Topic: provide coverage in areas not covered by terrestrial communications or serve to improve the resilience of applications in cases of critical communications
- Use cases targeted at the **private sector**
- Use cases applicable to the **Catalan territory** as a proof of concept
- Include **active participation from the end user**
- **6 months** of development



Concurs de projectes de casos d'ús amb comunicacions satel·litàries per al sector privat

ChallengeDCA: Concurs de projectes de casos d'ús amb comunicacions satel·litàries per al sector privat

Finalitzat el: 14/06/2024

5. DCA Open innovation challenges of IoT-5G services for private users

5.1

Use case: Satellite management and traceability system for the composting industry

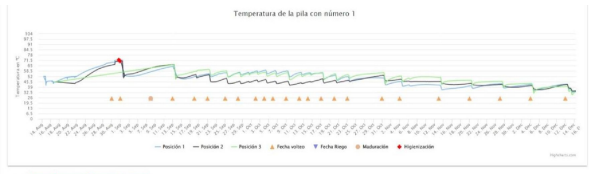
Provider:



Coordination: **i2cat**[®]

End user: Composting plant

ID	Temperatura	Humiditat	pH	Conductivitat
101-300	15.5°C	15.0%	6.5	150 µS/cm
102-300	16.0°C	15.5%	6.8	155 µS/cm
103-300	15.8°C	15.2%	6.6	152 µS/cm
104-300	16.2°C	15.8%	6.9	158 µS/cm
105-300	15.9°C	15.4%	6.7	154 µS/cm
106-300	16.1°C	15.6%	6.8	156 µS/cm
107-300	15.7°C	15.1%	6.5	151 µS/cm
108-300	16.3°C	15.9%	7.0	160 µS/cm
109-300	15.6°C	15.0%	6.4	150 µS/cm
110-300	16.4°C	16.0%	7.1	162 µS/cm



Objective: Optimitzar els processos de compostatge, millorant l'eficiència i l'eficàcia de les plantes de reciclatge industrial, integrant la tecnologia satel·litària, domòtica, IoT i l'automatització industrial.

5.2

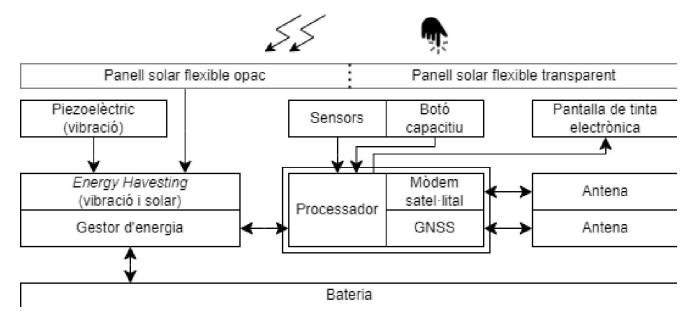
Use case: Smart tracking satellite label

Provider:



Coordination: **i2cat**[®]

End user: Private company in the logistics sector, a reference in the territory



Objective: Create a smart and sustainable label for the transport and logistics sector that incorporates satellite communications to provide global coverage.

6. Budget associated to these activities

Programme	Description / Objective	Number of activities	Budget per activity	Total budget
Innovative public procurement	Support the adoption of innovation through public procurement mechanisms	3	200k€	600k€
Challenges	Encourage innovative ideas by rewarding solutions to specific challenges.	3	15k€	45k€
Open innovation EO services	Promote innovative Earth Observation-based services through open ideas competition	5	50k€	250k€
Open innovation EO and GNSS services	Promote innovative Earth Observation and/or GNSS-based services through open ideas competition	3	70k€	210k€
Open innovation IoT-5G services	Promote innovative IoT and 5G-based services through open ideas competition	2	50k€	100k€
SPACE-BASED SERVICE ADOPTION PROGRAMMES BUDGET FROM THE CATALAN GOVERNMENT:				1.205k€

Conclusions

- **User-centric approach** is key.
- Move from dialogue to action, successful process: Engage, demonstrate and implement.
- Importance of developing new capabilities as technology evolves.
- Regional strategies provide innovative and scalable frameworks.
- Maintaining **continuous data availability** to support robust and reliable services.
- Future Earth Observation satellites (from GENE0-02 onwards) will provide higher resolution and include additional relevant spectral bands (e.g. SWIR, LWIR) enhancing the ability to assess risks for disasters, monitor agricultural production, evaluate water quality and more.

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Thank you

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