EuroGEOSec – CS#5: Supporting the implementation of demonstrators

Contents

List of Acronyms

Acronym	Description
CAMS	Copernicus Atmosphere Monitoring Service
CS	Case Study
EO	Earth Observation
EU	European Union
EuroGEOSec	European GEO Services in Support of EU Policies
EUSPA	European Union Agency for the Space Programme
GIS	Geographic Information System
PoCs	Proofs of Concept
PV	Photovoltaic

1. Executive Summary

This case study documents the design, execution, and outcomes of five short Earth Observation (EO) demonstrator projects (or "proof-of-concepts") implemented under a EU Agency for the Space Programme (EUSPA) service contract, with the objective of **facilitating the uptake of Copernicus data in the energy sector**. The demonstrators addressed concrete operational challenges faced by major energy stakeholders, including infrastructure monitoring, grid balancing, climate risk assessment, and renewable energy finance.

Rather than pursuing technology-driven pilots or research-oriented activities, the demonstrators followed a **user-driven approach**, starting from **clearly articulated operational needs** and validating whether Copernicus data could provide actionable, decision-relevant insights within realistic time and organisational constraints. Across the five Proofs-of-Concept (PoCs), the **solutions delivered** demonstrated tangible value for users, while also revealing important **limitations** related to **data resolution**, **integration** requirements, and **organisational** readiness.

Overall, the case study confirms that short, well-governed EO demonstrators are an **effective mechanism** to lower entry barriers, build user confidence, and accelerate the transition from awareness of Copernicus capabilities to operational and commercial uptake.

2. Purpose

The purpose of this case study is to assess how short, user-driven EO demonstrators can support the effective adoption of Copernicus data and services in operational contexts. Despite the maturity and availability of Copernicus products, many potential users (particularly large corporate actors) struggle to translate EO capabilities into concrete business or operational value. This gap is often due to a lack of internal EO expertise, uncertainty about data suitability, and perceived risks associated with integrating new data sources into established workflows.

Within this context, EUSPA and Evenflow played a facilitating role between policy objectives, EO service providers, and end users. The demonstrators analysed here were designed to test whether this intermediary role, combined with a structured and time-bound PoC model, can bridge the gap between EO potential and real-world application. The focus was explicitly on **validating existing Copernicus capabilities against real operational needs**, rather than developing new datasets or experimental methodologies.

The energy sector was selected due to its strategic importance for the **green transition**, its exposure to climate-related risks, and its increasing reliance on spatially explicit and scalable data. The case study aims to evaluate whether demonstrators can (i) translate user needs into EO service requirements efficiently, (ii) deliver actionable insights using Copernicus data, and (iii) act as catalysts for longer-term uptake and commercial engagement.

3. Methodology

Overall Approach

The methodology followed a demand-driven approach, placing user needs at the centre of the demonstrator lifecycle. Initial activities focused on **identifying emerging application areas** within the energy sector where EO data could plausibly add value. A multi-criteria analysis was used to **prioritise application areas** based on factors such as EO data-powered services maturity and Copernicus value-add.

Based on this analysis, **targeted outreach** was conducted to engage prospective users and assess their willingness to participate. Importantly, participation required a commitment of **time and expertise** rather than financial investment, significantly lowering barriers to engagement and encouraging organisations to explore EO solutions without upfront risk.

User Engagement and Buy-in

User engagement was a critical **success factor** throughout the process. For each PoC, workshops and bilateral discussions were organised to describe the operational problem, document existing workflows, and identify decision points where EO-derived information could add value. This phase helped translate user language and operational constraints into EO-relevant requirements.

A key **lesson learned** was the importance of involving the correct technical and operational experts from the outset. In some cases, additional stakeholders were introduced during execution, leading to evolving requirements and the need for flexibility from service providers. While this introduced some inefficiencies, it also reflected real-world organisational dynamics and reinforced the importance of adaptable governance structures.

PoC Design and Procurement

Once **user needs** were clearly defined, they were **translated** into **concrete service requirements** forming the basis of **public calls for tenders**. This ensured transparency, competition, and access to a diverse pool of EO service providers. **Proposals** were **evaluated** based on technical quality, relevance to the user context, feasibility within the timeframe, and effective use of Copernicus data.

Each PoC was designed with a duration of approximately **four months**. This short timeframe encouraged focus on feasibility and value demonstration, rather than full system development, and helped maintain user engagement throughout execution.

Governance and Execution

The execution of each PoC followed a common governance structure, including a kick-off meeting, a mid-term review, and a final review. This structure enabled regular validation of progress, early identification of issues, and alignment with user expectations. EUSPA acted as the contracting authority, Evenflow provided coordination and facilitation, EO service providers delivered the solutions, and users evaluated the outputs against their operational needs.

4. Results

Demonstrator Outcomes

Each of the five demonstrators delivered concrete, application-specific results. The Iberdrola demonstrator demonstrated the **feasibility of detecting illegal constructions near powerlines using Sentinel-2 data**, producing actionable alerts that could be integrated into existing Geographic Information System (GIS) workflows. The demonstration confirmed the reliability of the EO-based approach, supporting its potential operational adoption.

The Gruner Stucky demonstrator explored flood risk assessments for hydropower infrastructure using Copernicus data. While limitations were identified, particularly related to digital elevation model resolution and extreme event return periods, the exercise showed **that Copernicus products are well suited for preliminary assessments and feasibility studies**, especially in data-scarce regions.

For ENEL, the demonstrator combined various Sentinel and Copernicus Services data to produce wildfire and flood risk maps for electricity infrastructure. The results highlighted the **value of integrating Copernicus data with local datasets to generate scalable vulnerability assessments**, strengthening grid resilience and climate risk preparedness.

The RTE demonstrator focused on forecasting rooftop solar photovoltaic production in relation to grid balancing activities. By leveraging CAMS radiation data, the **EO-based approach outperformed** existing in-house methods, particularly under complex shading conditions. This improvement has direct implications for **grid balancing and operational planning**.

Finally, the Raiffeisen Bank demonstrator developed a Copernicus-enabled web tool to assess the financial viability of solar PV investments. By integrating EO-derived solar radiation data with financial models, the tool provided **project-level return-on-investment estimates**, opening new opportunities for EO use in the finance sector.

Cross-cutting Results

Across all demonstrators, several common outcomes emerged. Users consistently confirmed the operational relevance of the solutions, noting that the demonstrators **addressed real decision-making needs** rather than purely experimental objectives. In most cases, discussions on follow-up activities and commercialisation were initiated, indicating **market traction**.

The demonstrators also validated **Copernicus data as a reliable source of first-order information**. While users acknowledged limitations in spatial resolution or temporal depth for certain applications, they recognised Copernicus as a cost-effective and scalable foundation that can be complemented by higher-resolution local data when needed.

5. Analysis

Beyond the technical performance of individual PoCs, this analysis highlights several cross-cutting factors that influenced outcomes and uptake potential. One of the most decisive elements was **organisational readiness on the user side**. Users with existing geospatial capabilities, established data integration workflows, or prior exposure to EO were able to assess results more rapidly and engage in concrete discussions on operationalisation. In contrast, organisations with limited internal capacity still recognised the value of the insights but faced greater challenges in translating demonstrator outputs into sustained operational use. In this sense, the PoCs functioned not only as technology validations but also as diagnostics of organisational absorptive capacity.

A second key insight relates to the **complementary role of Copernicus data within operational systems**. Across the PoCs, Copernicus consistently proved most effective as a source of scalable, first-order information that can frame decisions, prioritise areas of interest, and reduce uncertainty **early in the decision-making process**. However, full operationalisation often required the integration of higher-resolution, local, or proprietary datasets. The demonstrators therefore validated **hybrid data approaches** rather than Copernicus-only pipelines, reinforcing the importance of positioning Copernicus as a foundational layer within broader information ecosystems.

The short duration of the PoCs also shaped outcomes in important ways. By design, the demonstrators **prioritised time-to-value over technical completeness**, focusing on delivering actionable insights within a limited timeframe. This approach helped maintain user engagement, avoided over-engineering, and allowed users to rapidly judge relevance against their operational constraints. The results suggest that, for many users, timely and sufficiently accurate information is more valuable than highly optimised solutions that require longer development cycles.

Finally, the analysis highlights **risk reduction** as a central component of the value proposition delivered by the demonstrators. Whether addressing infrastructure exposure, grid balancing uncertainty, climate-related hazards, or financial viability of investments, the PoCs consistently contributed to narrowing uncertainty and improving decision confidence. Even in cases where immediate operational uptake did not follow, the demonstrators reduced informational and organisational risk, thereby lowering the threshold for future adoption. Collectively, these findings confirm that EO demonstrators can play a strategic role not only in showcasing data capabilities, but also in shaping user expectations, reducing adoption risk, and supporting market development.

6. Conclusions and Next Steps

This case study demonstrates that **short, well-structured, user-driven EO demonstrators are an effective instrument to accelerate the uptake of Copernicus data in operational energy-sector contexts**. Across five diverse Proofs-of-Concept, the demonstrators successfully showcased EO-enabled solutions for clearly articulated user needs that delivered tangible, decision-relevant insights within a limited timeframe. This confirms the relevance of demonstrators as a practical bridge between Copernicus' (and EO in general) strategic ambitions and real-world application.

A central conclusion is that the **value of EO demonstrators extends beyond technical validation**. The PoCs functioned as learning mechanisms for users, service providers, and programme managers alike. For users, they clarified where Copernicus data can meaningfully support operational decisions, and where complementary datasets or additional investments are required. For service providers, they provided opportunities to refine market-ready offerings and engage directly with end users under realistic constraints.

At programme level, the demonstrators generated evidence on which application areas, user profiles, and governance models are most conducive to uptake.

The findings also underline the importance of **positioning Copernicus-powered solutions appropriately within operational workflows**. Rather than acting as a stand-alone solution, solutions consistently proved most valuable as a scalable, reliable source of first-order information that reduces uncertainty, scopes subsequent analysis, and lowers overall system costs. Acknowledging this role explicitly helps manage user expectations while strengthening EO powered solutions' credibility and long-term relevance.

Finally, the case study highlights the **strategic role of intermediary enablers such as EUSPA**. By facilitating user engagement, translating operational needs into EO service requirements, and managing the demonstrator lifecycle, technical and organisational risks associated with EO adoption are reduced. This intermediary function is critical for scaling EO uptake across sectors, particularly among users with limited prior exposure to EO. Taken together, the results confirm that EO demonstrators are not only effective tools for showcasing capabilities, but also **essential building blocks for sustainable market development and long-term Copernicus uptake**.