



Observer: Charting the future of EO – The Strategic Research and Innovation Agenda's (SRIA) role in advancing Copernicus



Prepared jointly by Directorate Generals for [Defence Industry and Space](#), [Research and Innovation](#), and the European Commission's [Joint Research Centre \(JRC\)](#), the Strategic Research and Innovation Agenda (SRIA) for Earth Observation outlines the future trajectory for Copernicus, the EU's Space Programme's Earth Observation component. By supporting key EU policy goals, driving user-centric improvements, integrating novel technologies such as AI and Digital Twins, and emphasising global collaboration, the SRIA aims to keep Copernicus at the forefront of environmental monitoring and policy support. In this week's Observer, we take a close look at the recently published strategic agenda and its implications for the future of Earth Observation.



About the SRIA

[The Strategic Research and Innovation Agenda \(SRIA\) for Earth Observation](#) outlines research priorities for the evolution of Copernicus, the Earth Observation (EO) component of the EU Space Programme. With future periodic updates, its primary purpose is to ensure that Copernicus remains at the cutting edge of technological advancements in EO while continuing to meet the evolving needs of its users and supporting EU policy objectives. This agenda is a major update of the roadmap developed back in 2020 and aims to guide the evolution of Copernicus for the remaining part of the Multiannual Financial Framework (MFF) and beyond, setting the framework for research and innovation priorities, aligning with the Horizon Europe Work Programmes and future EU Research and Innovation frameworks.

Supporting EU Policy Goals

Copernicus plays a key role in supporting several EU policy goals. By providing comprehensive and timely EO data, it enables policymakers to make informed decisions that align with the European Green Deal objectives and other environmental initiatives. This support has been increasingly recognised within the EU's current Multiannual Financial Framework (MFF) 2021-2027, marking a major shift in the extent to which Copernicus data is valuable for policymakers.

Before the current MFF, there were less than 10 explicit references to Copernicus in legislation. During the first three years of the MFF, however, this grew to over 30 references, with a notable focus on the EU Green Deal and associated legislation. These references to Copernicus span various legislative documents including Regulations, Directives, and Communications, and also cover a wide range of policy areas such as Circular Economy, Energy, Industry, Marine, Zero Pollution,

Climate, Biodiversity, Forestry, Environment, and Sustainable Development Goals, Agriculture, and Cohesion. Some notable examples include the [European Climate Law](#), [Nature Restoration Law](#), the [EU Strategy on Adaptation to Climate Change](#), the [EU Soil Strategy for 2030](#), and the [EU Forest Strategy for 2030](#), for which Copernicus data is indispensable for framing policy development, defining priorities, and setting targets.

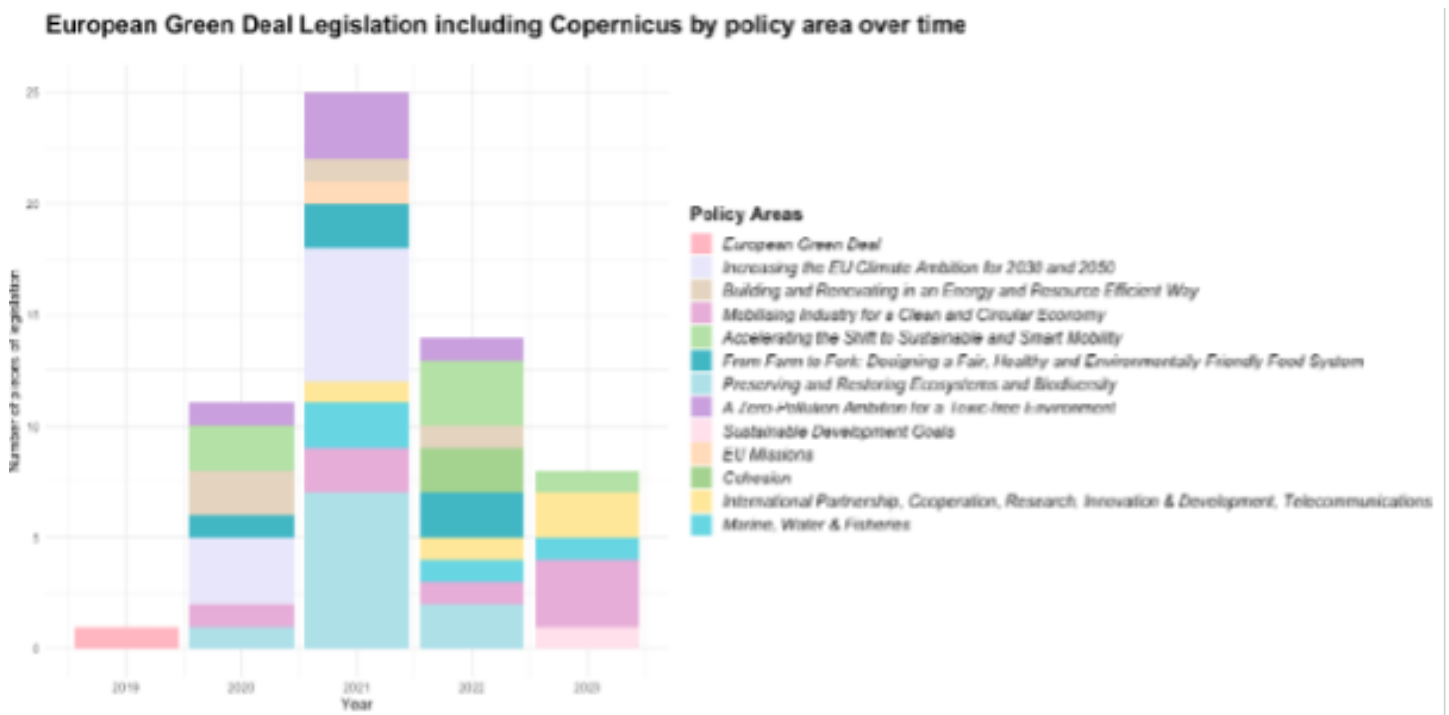


Chart from the Strategic Research and Innovation Agenda (SRIA) for Earth Observation showing over time how EU Green Deal legislation has made reference to Copernicus. Credit: European Union, Joint Research Centre

User-Driven improvements, new tech, and international collaboration

A significant aspect of the SRIA is its emphasis on user-driven incremental improvements within the Copernicus "offer" of data and information products. This approach ensures that Copernicus will continue to evolve on the basis of the actual needs and requirements of its diverse user base which ranges from public authorities to private enterprises and research institutions. By actively engaging with users and stakeholders through various user uptake activities such as the [EU Space Programme's User Consultation Platforms](#) (UCP) Copernicus has been able to adapt its services and products to provide more relevant, timely, and actionable information, enhancing its utility and effectiveness for its user base.

Building on this user-driven approach, integration of cutting-edge technologies such as Artificial Intelligence (AI), Machine Learning (ML), and Digital Twins is heavily emphasised and present in the R&D priorities for all of the core services. These technologies are set to revolutionise the way data is processed, analysed, and utilised within Copernicus. AI and ML can improve data accuracy, predict environmental changes more reliably, and positively impact decision-making processes. [Digital Twins](#), which create virtual models of physical entities, allow for sophisticated simulations and scenario testing, providing a deeper understanding of environmental dynamics, aiding in policy and planning.

In complement to its contribution to the progress in technology, Copernicus also has a significant global impact, contributing to international efforts in climate monitoring, disaster management, and environmental protection. Continued international collaboration is essential for maintaining and expanding this impact. The SRIA highlights the importance of partnerships with global organisations such as the United Nations, the Group on Earth Observations (GEO), and various national space agencies. These collaborations ensure the sharing of data, resources, and expertise, fostering a multilateral approach to tackle global environmental challenges.

Specific innovations across the core services

The SRIA also outlines in detail the service priorities within each of the six core services of Copernicus looking at their targets, expected evolution, and R&D focuses. Though each service has its own area of competence and expertise, all are aiming to leverage the latest technologies such as AI, ML, and advanced satellite data from the Sentinel Next Generation and [Expansion Missions](#) to enhance their capabilities. For instance, the [Copernicus Climate Change Service \(C3S\)](#) is integrating AI to improve data assimilation and develop hybrid models that combine conventional numerical methods with machine learning for better climate predictions. It is also focusing on [the operational update of the IPCC climate atlas](#) and developing near real-time climate attribution services to address heat stress and other urgent climate issues. Meanwhile, the [Copernicus Emergency Management Service \(CEMS\)](#) aims to bolster disaster response by integrating high-resolution data and new sensors, including optical, radar, and Internet of Things (IoT), for more accurate infrastructure assessments in the aftermath of disasters. It is also leveraging AI to enhance flood and drought risk assessments and is monitoring progress on satellite gravimetry to measure variations in the Earth's gravitational field from space, for water storage monitoring. These targeted innovations ensure that Copernicus services remain technologically relevant and satisfy the evolving needs of their diverse and growing user base.



Graphic showing some of the R&D priorities of the core Copernicus services as mentioned in the Strategic Research and Innovation Agenda (SRIA) for Earth Observation

Navigating challenges and seizing opportunities

While the SRIA sets a robust framework for the evolution of Copernicus, it outlines several challenges that need to be addressed to ensure Copernicus' long-term success. One of the foremost issues is data integration. Integrating diverse data sources into a coherent system is complex, requiring advancements in data management and processing technologies. Funding is another main point. Guaranteeing the sustainability of Copernicus also involves securing continuous funding and political support, as well as maintaining a balance between operational needs and research-driven innovation. Finally, keeping pace with rapid technological progress is crucial, especially considering

the current speed at which the use of AI and ML is propelling the sector forward. This means that ongoing investment in R&D and the adoption of agile development methodologies are needed to keep Copernicus from falling behind the technological curve.

The Strategic Research and Innovation Agenda (SRIA) for Earth Observation provides a very useful and informative roadmap for the future of Copernicus. By supporting EU policy goals, embracing user-driven improvements, integrating novel technologies, and encouraging global collaboration, Copernicus can continue to be a global leader in Earth Observation and environmental monitoring. Addressing the challenges of data integration, sustainability, and technological progress will be essential for ensuring that Copernicus remains an essential tool for policy support and decision-making. This will enable Copernicus to continue contributing to the well-being and security of our communities in Europe and beyond.

Useful Links

Download the full Strategic Research and Innovation Agenda (SRIA) [here](#)