



EuroGEO Showcases: Applications Powered by Europe

D5.28 - Final Analysis of governance options for e-shape



The e-shape project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 820852

ABSTRACT

This deliverable is a follow-up of the deliverable 5.9 which explored different options for the future governance of EuroGEO based on the e-shape experience. This deliverable describes the evolution of the landscape in GEO and the EO sector in Europe. It proposes an adaptation of the previous solutions to the new landscape based on the preliminary conclusions of e-shape and on the new Implementation Plan of EuroGEO.

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1 INTRODUCTION

In order to maximise the impact of EU investment in Earth Observation (EO) - and the use of the knowledge gained through flagship programmes such as Copernicus - the EuroGEO initiative was launched in October 2017 during the annual GEO plenary meeting. EuroGEO aims to ensure Europe's leading role in Earth observation and to coordinate the European contribution to the Group on Earth Observations, as well as addressing end user and citizen needs, transforming EO into reliable and usable information. One of the main challenges that EuroGEO wants to address is to shift from a data-centric to a user-driven approach – in other words guaranteeing that the data are utilised in the most efficient way. Against this backdrop, e-shape was designed to support the activities of the European partners within GEO through EuroGEO.

e-shape is a unique initiative funded under the Horizon 2020 programme, driven by the need to develop operational EO services with and for the users and to create a conducive environment whereby the strengths of Europe are exploited towards addressing societal challenges, fostering entrepreneurship and supporting sustainable development. e-shape is also a flagship project for the European Union (EU) to contribute to GEO (Group on Earth Observations) by establishing EuroGEO and by providing its experience and knowledge to the EO community.

To support the EuroGEO initiative after the end of the e-shape project, this deliverable explores the different options for an EuroGEO Secretariat, its ambitions, its positioning in order to fulfill its objectives and to take advantage of the work, the experience and key components developed within e-shape.

2 LESSONS LEARNED FROM E-SHAPE

e-shape was designed with the aim to support the development of EuroGEO activities and to fulfill its strategic objectives. It was meant as a sandbox of the EuroGEO initiative with the idea of building and testing methodologies, approaches and organizational approaches allowing to reach the EuroGEO strategic goals and to extract the strategic knowledge, the best practices, the lessons-learned and the know-how for this experience and to share it with the EO community at large. e-shape allowed to explore different aspects linked with the organization, the coordination and the animation of the EO community from the thematical but also technical point of view.

Since its inception, e-shape was built to have a deep impact in the EO community and sector. e-shape brings a new understanding of co-design for the community with the development of a fit-for-purpose methodology for co-design which has been tested among the 37 pilots developed within the project. This methodology has been disseminated and applied in other European projects, in support to GEO Secretariat on the road to post-2025 and towards the use of the proposed methodology in DestinE. e-shape also supports and links to DG RTD, DG DEFIS, EUSPA, Copernicus program, French Presidency of European Union (Copernicus Horizon 2035 Conference), GEO, ESA, ... e-shape has supported the organization of EuroGEO Workshops in 2020 and 2021. It strengthens the FAIR and GEO principles in the EO community by developing and offering to the community a dedicated self-assessment tool in support of these principles for data and services. The EO community involved around e-shape also benefits from the dissemination of the Cloud infrastructure paradigm, interoperability, standards, etc. A series of Capacity building workshops was held to reach more and more users also outside the usual circles of the EO club based on a user uptake strategy. To explore the full value chain of EO, a sustainability booster was designed with the aim of supporting the business development of the 37 pilots, through market insights, intellectual property and innovation, investment readiness support. Each pilot has developed a realistic business plan; several of the pilots have also received on-demand support by the sustainability booster to succeed in advancing their operational service roll-out and the associated business. At national and European Level, e-shape



strengthened the GEO-related coordination mechanisms by establishing a diagnosis on the maturity level of countries, opening the door to dedicated actions bringing the European countries level closer.

From this experience conducted in e-shape, we learned some lessons.

- The EO sector is currently fragmented, but with strong branding and inclusiveness, it is possible to foster an understanding and broad recognition of the EuroGEO Initiative's objectives in establishing an integrated and collaborative ecosystem of stakeholders, and a sense of community belonging and ownership, which could help to promote European interests within GEO.
- The EO sector is mainly centered on technological aspects of the domain or applications. The co-design methodology developed within e-shape is a game changer, supporting an effective transition from the technological point of view to a user-centric point of view.
- The DIAS (Data and Information Access Services) offers are quite complex to understand and to handle for the EO community. There is a need for understanding their usage and a support for negotiation of the different offers.
- The incentive approach (grants) is the most used solution to develop EO based services. This approach is adapted to the launch of activities and to ensure the interest of the community. To decrease the need of this incentive approach for EO based solutions, the community needs support to shift towards Public Private Partnerships or Pre-Commercial Procurement approaches and to learn how to leverage resources from the private sector. It can also be encouraged by a support to the first steps to venture into the real market after the end of a grant that requires serious preparation and implementation of commercialisation.
- The evolution of the different programmes (EUSPA, Cassini programme, Copernicus downstreams, etc.) oriented towards the development of business activities (mainly creation of startups) and the need to involve financing systems combining grants, private support, equity, fundraising, etc... requires an entity acting as an aggregator. In that regard the implied role of EuroGEO would be to ensure that the most advanced R&D is carried on into commercial ventures and contribute to build a sustainable EO business.
- The EO maturity of each European country involved in EuroGEO is not homogeneous. This underlines the European fragmentation from the technological, research and innovation domains and the need to fit capacity building and support services to each of them.
- e-shape was built on the legacy of previous Research and Innovation Actions, from previous research activities or from previous business developments. In the conveyor belt, identifying the different steps and support needed when developing a business activity, it clearly appears that the foundations of the future services and products must be based on research and innovation. Hence a clear need appears on the simulation of the research and innovation of the EO domain.
- During the project, e-shape acted as a common actor to stimulate the value chain of the EO based applications and services. The uniqueness of an entity supporting the different pilots during such a long time favors their successes. e-shape has implemented an on-boarding process aiming at integrating 10 new pilots during the course of the project and selected through 2 successive calls for proposals. Despite the relevance and success of the activity, the integration phase of the new partners composing the on-boarded pilots as beneficiaries of the e-shape Grant Agreement proved to be complex and time consuming. New partners were indeed integrated via two successive amendments to the contract generating administrative burden. e-shape therefore recommends opening the possibility of a simpler and faster integration mechanism which could be based on the logic of cascade funding possible via the provisions of the Article 15.1 - "Rules for providing financial support to third parties" of the Horizon 2020 Grant Agreement or the



Article 9.4 - "Recipients of financial support to third parties" of the Horizon Europe Grant Agreement. e-shape calls the EC to foresee this option in its future calls for proposals in which it would like this activity to be reproduced.

3 A LANDSCAPE IN EVOLUTION

During the last year of e-shape, the GEO Secretariat evolved and worked on the preparation of the post-2025 GEO Work programme and orientations. As it looks to the future, GEO aims to:

- Anchor Earth observation in Earth intelligence as a fundamental part of evidence-based decision making and promoting the sustainable development of societies, health and resilience of life on Earth;
- Build more integrated networks that facilitate the shift from a focus on services to a focus on equity to bridge the global information gaps;
- Build strong value chains by establishing traceability for value chains that reflect policy and decision-making needs, services necessary to support these needs, products to enable the services and the required Earth observations to sustain these products;
- Support the integration of Earth observations, models, and innovative new technologies (AI, Machine Learning, digital twins, cloud computing) on user-oriented and co-designed platforms to create Earth intelligence for societal benefits and sustainable development;
- Enhance inclusivity and adaptability in the GEO community, by leveraging expertise and resources across the scientific community, private sector, civil society and international finance institutions.

This process of evolution in GEO is still up and running. It is aligned with the work achieved in e-shape. Moreover some of the activities coming from e-shape such as the co-design methodology will support the incubators process currently in test with the two first incubators (global ecosystems atlas and the heat and health incubators).

The European Landscape also evolved a lot since the start of e-shape. Some new missions for existing organisations (EO within EUSPA) or new organisations (Copernicus Thematic Hub), new programmes (DestinE, Cassini), new infrastructures (Copernicus DataSpace Infrastructure) appeared. Even the role of the JRC Knowledge Centre for EO was now clearly defined.

This means that the future EuroGEO Secretariat should take into account all these changes and build an adaptive process to cooperate, collaborate and combine with all of them.

4 THE NEW EUROGEO IMPLEMENTATION PLAN

The implementation plan of EuroGEO was revised for the new version of the 2023-2025 GEO work programme endorsed by the GEO community at the last plenary in Accra, Ghana and will focus on the following strategic actions:

1. Engaging with a broad range of users in Europe for identifying their needs for EO based services or products, building on the wide range of European EO assets, and addressing also the inter-connections between various groups and policy areas;
2. Demonstration, incubation, upscaling, downscaling, or replication of existing EO services and products across Europe (and beyond), also through streamlining innovation instruments available at EU, national or sub-national levels and actively promote synergies;

3. Connecting European EO research communities, service providers, including the private sector, and users to allow for mutual learning and spreading of good practices and successful business models across Europe;
4. Furthering the design of a European digital ecosystem that supports access and interoperability of EO data and provides benefits to businesses, citizens, and scientists/researchers and promotes the GEO vision in Europe to realise a future where decisions and actions are informed by evidence;
5. Supporting the consolidation of national GEO management structures across Europe and ensure alignment of EuroGEO with the GEO engagement priorities.

The main spheres of activities to be conducted by the EuroGEO Initiative are as follows:

- Coordination of GEO-relevant activities undertaken in Europe to ensure a coherent European contribution to the GEO initiatives and priorities;
- Implementing a user-driven research and innovation agenda to maximise uptake and engagement of EO applications that are addressing the GEO priorities, and require further demonstration, incubation, up-scaling, or replication;
- Supporting cooperation among individual European and national programmes and user communities (e.g. Copernicus, ESA, NMHIs, European observing networks and Research infrastructures, etc.);
- Cooperation with other Regional GEOs, in particular with view to sharing data, applications and good practices globally.

5 EUROGEO SECRETARIAT: AMBITIONS AND POTENTIAL IMPLEMENTATIONS

5.1 A multifaceted role

The Implementation plan of EuroGEO defines its ambition to be the EuroGEO contribution to GEO but also to shape the EO sector and to support its expansion. e-shape supports the EuroGEO ambition and works towards the transformation of the EO sector by exploring the barriers and overcoming the challenges described in the previous section.

The support brought to the EO sector during e-shape was fully aligned with the EuroGEO ambition and dedicated to support the growth of the EO sector.

To create added-value to the EO data, e-shape acted as the entity fostering collaboration among actors in the EO value chain: (i) academia, (ii) industry, (iii) institutions, (iv) users. It also supported the innovation pipeline with focus on R&D and pre-commercialisation, then supporting the sustainable development and the user uptake of each service and application.

The contribution to innovation brought during e-shape was multifaceted: it provided an ecosystem for the development of services and application with users, it supported technical development tackling all new technological paradigms (Cloud, AI, datacubes, Agile development etc.), it involved new user communities, it built capacities of users and Pilots, it demonstrated the added value of a sustainability booster, etc. Overall, e-shape opened new growth paths for the EO sector. These innovations delivered successes but also reusable products e.g. allowing to promote and disseminate the FAIR and GEO data sharing and data management principles for all types of data including in-situ as well as methodologies and new approaches that are now offered to the EO sector.

The EU support to the EO sector is of importance. Every year a series of calls for proposals are issued focusing on the development of environmental observations and on their exploitation in different thematic areas. The coordination of EU contributions to GEO, their dissemination and the

management of the legacy of EU investments in relevant initiatives/flagships but also exporting EU approaches is key to support the European propositions and the European's interest and independence.

This multifaceted character of e-shape allowed to shape the EuroGEO initiative and to supports its ambition. This was possible by the involvement of a large EO community (68 partners) and the validation of the different innovation approaches proposed through 37 pilots in 7 thematic areas. Overall, e-shape played a crucial role in exemplifying what EuroGEO could deliver in the future, and there is a need to pursue this effort with a clear mission and a clear structure to support it.

5.2 A fit-for-purpose governance structure

From this close to four-year experience and the evolution of the EO sector and institutional landscape (creation of EUSPA, Cassini Programme, Knowledge Centre for EO, evolution of Copernicus, Destination Earth Programme, etc...), it is clear that there is a need for an inclusive coordination structure dedicated to the daily operation of EuroGEO and its guidance towards more research, more innovation, more collaboration and integration of the different actors.

The so-called EuroGEO secretariat will need to be not only this coordination body but also a lighthouse allowing the exploration of new concepts, new paradigms and new thematic areas.

The EuroGEO secretariat role will be to coordinate all actors involved in GEO and in the EO domain (HLWG, countries, GEO, Regional GEO, JRC KCEO, EUSPA, Cassini, Copernicus, Entrusted Entities, DestinE and the R&I community, industry, ministries, NGO, ...). It must embrace the decision-makers world up-to the operational one, for public and private entities, for research, academia, industries and end users actors.

The experience gained in e-shape should not be lost and must guide the EO community from inception of ideas to expansion of the applications and services. There is a need to combine the coordination aspects with practical aspects and realizations to avoid disconnection between services and applications development and the end-users. The thematic approach proposed within e-shape is echoing the Action Groups approach developed at the inception of EuroGEO. It is a high potential approach if some financial support can be brought to the new services and applications for the first steps of their development. The on-boarding approach developed in e-shape can support such a mechanism through a flexible contractual structure (e.g. cascade funding), and is complemented by a series of on-demand services for the development of and support to the pilots, stimulating a 'market-pull' effect in complement to the 'technology-push' of early Proof of Concept.

Figure 1 presents the different elements composing a potential EuroGEO secretariat.



Figure 1: Potential structure of the EuroGEO secretariat

The EuroGEO secretariat will coordinate with the EU, the High Level Working Group on the basis of their constitutional roles and responsibilities. They are the main sponsors of the EuroGEO Secretariat and will guide the evolution of the EuroGEO initiative. This group can constitute the Executive Board of the EuroGEO secretariat.

The EuroGEO implementation plan is the vehicle to structure the European GEO community and to impact on the European EO community, creating a sense of ownership and belonging to the initiative. The planning and execution, the monitoring and the regular update of the EuroGEO implementation is part of the duties of the EuroGEO Secretariat. This should be done in close collaboration with the EuroGEO Ecosystem building on stakeholder dialogue.

The interaction with the Action Groups and the numerous stakeholders of EuroGEO will offer the opportunity to collect the research and innovation needs of the community and to identify gaps that will feed the EuroGEO implementation Plan.

Within e-shape the showcases have played an equivalent role to the Action Groups. They have been the fuel for inspiring a series of solutions and activities that have been realized during the project. The EuroGEO secretariat will gather and consolidate the views of the involved actors, Action Groups and bodies to support the actions of the Secretariat towards:

- i) linking and accessing to research infrastructures, in-situ data and HPC, up scaling the EuroGEO related services and augmenting the user segment by exploiting new initiatives (e.g. DestinE);
- ii) exploring/identifying key funding sources across the EU and non-EU programmes and partnerships
- iii) reinforcing engagement and commercialization opportunities by establishing linkages with EO/non-EO sectors

- iv) setting the framework of support that the Action Groups and relevant actors can offer to the EuroGEO Secretariat.

The stakeholders that can be involved in the EuroGEO Sec are numerous.

Leveraging and connecting ongoing partnerships, networks and EU projects related to EO, with the EuroGEO Secretariat can open the door to combined actions and to consolidate the global picture in the EuroGEO initiative.

Maximizing the European EO industry presence in EuroGEO will reinforce its impact. The industry is a provider and/or a user of EuroGEO. The idea can be to develop a "collect&share" methodology to connect EuroGEO projects partners, public, private or academia, with European private actors.

Within e-shape time duration the evolution of European major infrastructures initiatives was very impressive. It will be beneficial to EuroGEO to liaise with DestinE, Copernicus, ESA Open Science Platforms, the DIASs, the Thematic Exploitation Platforms, the Earth Observation Exploitation Platforms Common Architecture, the Data Spaces including the Green Deal Data Spaces, and any new major emergent infrastructures to identify trends, opportunities or liaise as needed.

The changing landscape has made the entrusted entities and the new institutes and programmes (EUSPA, Cassini, DestinE, ...), actors that can be involved in the EuroGEO series of activities. The EuroGEO initiative can benefit from a better liaison with them and vice versa.

The observatory of research and innovation will support the sound monitoring of past and ongoing R&I in Earth Observation in Europe and beyond. This forms an important prerequisite for informed decision making including the drafting of relevant strategies (e.g. Strategic Research and Innovation Agendas), the elaboration of work programmes and the allocation of associated budgets. The observatory will allow the user to browse through numerous R&I projects and view different visualisations of the data. The outputs of the observatory will be used to compile "R&I state of play reports" as well as some cross-cutting aspects (e.g. EO and HPC, EO and AI). This will inform the work of the JRC KCEO, constitute an important intelligence source for the broader community (institutions and practitioners), and support the review of the EuroGEO implementation plan.

Last but not least, the support services will help the EO community to develop EO based applications, services and pilots, to extend them, to reach operationalization and to support their sustainability. Figure 2 presents the position of the support services already existing in e-shape (the continuous black line boxes) and the position the 3 missing elements (the dashed black line boxes), i.e. the research and innovation networks, the institutional and citizen requirements observatory and the links and interaction with EUSPA, the Cassini programme, Copernicus, and other potential investors. This latest is in Figure 1 presented outside the EuroGEO Secretariat circle, but must be tackled with attention in order to avoid duplications in activities and ambiguities on the role of each entity. All services are presented as elements of the conveyor belt, supporting the development of EO based services from their inception to their extension.

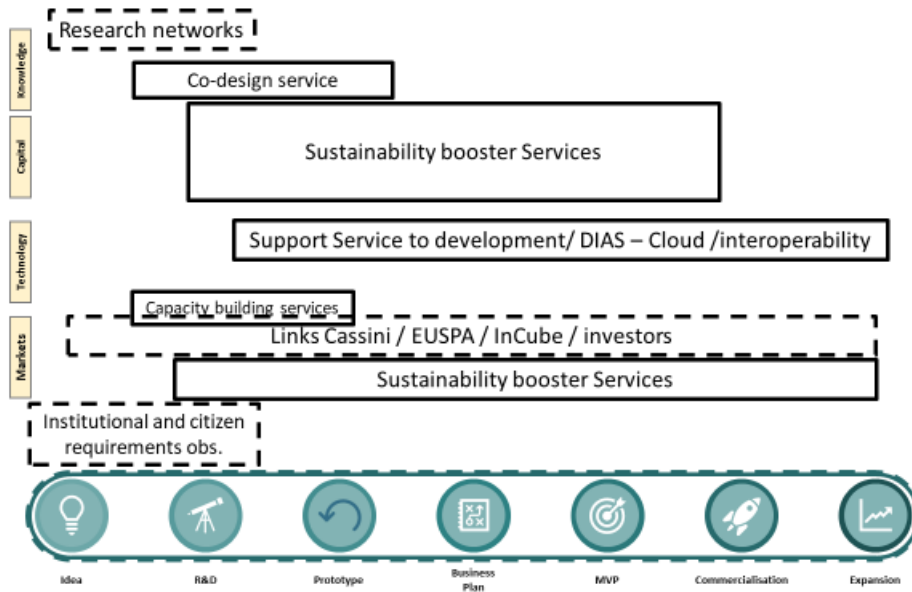


Figure 2: Support Services

5.3 Options for governance of the EuroGEO secretariat

Here we recall the proposed options from deliverable 5.9. of the e-shape project:

- **A rotating EuroGEO secretariat:** In this case, the different countries would ensure the operation of the EuroGEO secretariat on a yearly basis. It would allow each member state to be really involved in the governance of EuroGEO, but leaves open the risk of having a discontinued level of engagement and activities. It has also the potential risk of the loss of the memory, of the general direction of the Regional initiative and the dynamics of the work. Based on the discussions carried out with AmeriGEO and AfriGEO, it seems that a 3-year mandate is a good option to leave time for the development of the vision of each member state. In AfriGEO, the choice of having a sub-regional representation (group of countries in an African Region) was chosen. In AmeriGEO, the choice of a rotating secretariat supported the development of National GEO skills and organization.
- **A secondment at the GEO Secretariat dedicated to the EuroGEO secretariat:** In this case a dedicated person would be devoted to the EuroGEO secretariat in collaboration with the GEO secretariat. This would entail a regular link with the HLWG and an annual description of work. The hierarchical link with the HLWG and the GEO Secretariat should clearly be established to avoid any loss of efficiency.
- **An institute-based EuroGEO Secretariat:** In this case an institution deeply involved in GEO would be in charge of the animation of the EO community with the support of the HLWG. This institution would also be in charge of the management of the implementation plan of EuroGEO and its evolution. This can guarantee the neutrality and the fairness in the animation of the Regional initiative from the member states' point of view.
- **An externalized EuroGEO Secretariat:** In this case, the EuroGEO secretariat could be built on the model of the Copernicus Support Service. The risk is more on the difficulty for such a company to handle the different political aspects of the EuroGEO initiative. It can be a good solution if the HLWG give strong orientations for the activities.



From the previous description of the extended role of the EuroGEO Secretariat, all these options are still valid. The choice of the ad-hoc governance structure will depend on the ambition of the EuroGEO initiative and its willingness to propose an integrated EuroGEO secretariat, opening discussions on political and funding issues.

In addition to the governance structure, an operational and sustainable EuroGEO initiative could build on several potential legal instruments, which should be investigated, such as (but not limited to) European Research Infrastructure (ERIC), European Digital Infrastructure (EDIC), Joint Programming Initiative (JPI), Private Public Partnership (PPP). This panel of potential instruments should be benchmarked against the vision and mission of the EuroGEO initiative, and the most fit for purpose instruments should be shortlisted for consideration. The options would be put forward for consideration by the European Commission and the HLWG, for decision. But, no matter which legal instrument will eventually be chosen, the EC and the HLWG should secure the necessary funding to ensure continuity of the EuroGEO activities and to avoid gaps that could impede the momentum built by e-shape and potential follow-up actions