FIRE | European Forum for Earth Observation

D3.4 FIRE FORUM Activity Summary 2

WP3 – Market Sector Engagement Mechanisms

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Executive Summary

The second **FIRE Forum** was held on the **14th of June 2022 both physically in Brussels and online** and was the main track of the **EXPANDEO & the FIRE FORUM 2022** joint event. The FIRE Forum 2022 brought together a critical mass of actors from six key sectors **– agriculture, energy, infrastructure, marine, raw materials, and urban development** – together with Earth Observation (EO) stakeholders to discuss EO benefits and future EO capabilities needed to address sectorial challenges. The discussions built upon findings from the first and second round of FIRE Focus Group events, as well as the first FIRE Forum which took place last June 2021. This is the second year EXPANDEO and the FIRE FORUM joint forces, bringing together **483 registrants and 108 physical attendees from 350 entities and 59 countries**. All these activities are shaping the roadmap of the research and development strategy for Earth Observation in Europe, which will be delivered at the end of September 2022.

More precisely, the FIRE Forum 2022 was followed online by **307 people and attended physically by 108 people**, mainly from EO companies, research institutes/academia and user communities from all six sectors. The event was kicked off by EARSC Secretary General Emmanuel Pajot and the audience was welcomed by a video message from Thierry Breton, Commissioner for the Internal Market. Keynote speaker Isabella Poldrugo (Deputy Head of Unit, DG DEFIS) emphasized the "wide range of socioeconomic benefits for citizens around the world" brought by EO, as well as the role of Earth Observation in addressing current European challenges.

What followed was an intensive day composed of seven panels, bringing together **37 speakers and moderators** to discuss a wide range of cross-cutting topics, including **research and development trends, policy, capacity building, market development, and technological infrastructure enabling EO**.

This document gives an overview of the organization and communication of the event and the main outcomes of each of the held sessions.

FIRE Forum – online presence and identity

The second edition of the FIRE Forum brought together key representatives from user communities, EO service providers and institutional actors to discuss the "Now and Tomorrow" of Earth Observation in Europe. A series of powerful presentations and lively discussions illuminated pathways for the sector's growth. New, fresh, and lively graphical identity was created for this joint event (see Figure 1) with distinctive looks for FIRE Forum and the following day (see Figure 2).

Figure 1 Graphical identity of the EXPANDEO & FIRE Forum 2022

Figure 2 Distinctive designs for two days of the EXPANDEO & the FIRE Forum 2022

The selected designs combined elements representing the six FIRE sectors as well as the EO perspective with the satellite images used as backgrounds. It is important to emphasize that despite the hybrid format of the event, the communication materials maintained its digital focus with the creation of branded emails, social media banners, and virtual backgrounds for online speakers. The materials used in the venue (*e.g.*, name tags – see Figure 3) were printed on seed-paper, which turned a potential waste into an opportunity for a new plant.

The online format also allowed the communication campaign to focus on social media and online outreach. Based on the gathered statistics second, it can be concluded that the second FIRE Forum gained higher popularity online with more impressions and clicks on social media, resulting in increased followers' numbers for the FIRE project.

Figure 3 Seed-paper printed materials

Methodology

1.1 Hybrid Setup

Due to the post-COVID reality, the FIRE Forum 2022 was held in a hybrid format comprising both virtual and physical components. On the one hand, for the first time, the FIRE Forum was organised physically in Brussels in the International Auditorium after last year's purely online format, but at the same time, the Zoom platform with support from an Audio-Video (AV) technical team was used this time, too. This decision was taken after several discussions and benchmarking and ended up being the most reliable for blending nicely the physical and virtual discussions. This hybrid format allowed several speakers who could not join the event physically to participate successfully in the panel discussions. It also permitted the participants to join from anywhere in Europe and worldwide.

At the same time, the physical experience was very much appreciated because all the participants and speakers who came to the venue enjoyed the "traditional" conference experience. During the whole day, the main findings of different sessions were graphically recorded through live illustrations and were presented occasionally to the attendees. All the illustrations can be found below, in each respective session, as well as the recordings.

Figure 4 A photo showing the hybrid setup of the conference

1.2 Agenda of the FIRE Forum

The agenda of the FIRE Forum 2022 was divided into three components: the welcome sessions, the main FIRE sessions, and the closing session. A detailed agenda of the FIRE Forum can be found below in Table 1.

AGENDA

Time	14th of June	
08:30-9:30	*Registration & Welcome Coffee*	
09:30-9:40	Welcome to the FIRE FORUM 2022 "Unlocking the full potential of Earth Observations in Europe"	
9:40-10:00	Setting the scene Opening Remarks & Keynote Speech	
10:00-11:00	The Now & Tomorrow of Earth Observation	
11:00-11:15	*Coffee break / Networking*	
11:15-12:00	Getting There	Deep dive in the latest R&D trends & priorities
12:00-13:00		Incorporation of EO in different stages of policy making
13:00-14:00	*Lunching together /Networking*	
14:00-14:45	Getting There	Evolution of the underlying infrastructure for the exploitation of EO
14:45-15:30		Developing the necessary capacity among different stakeholders
15:30-15:45	*Coffee break / Networking*	
15:45-16:30	Getting There	Modern ways to raise awareness on key topics with the help of EO
16:30-17:15		Developing the market
17:15-17:30	Wrap Up &Closing remarks of FIRE FORUM 2022	

Table 1: FIRE Forum 2022 Agenda

In the online version of the agenda the attendees could access a short description of each session and see the involved moderators and speakers.

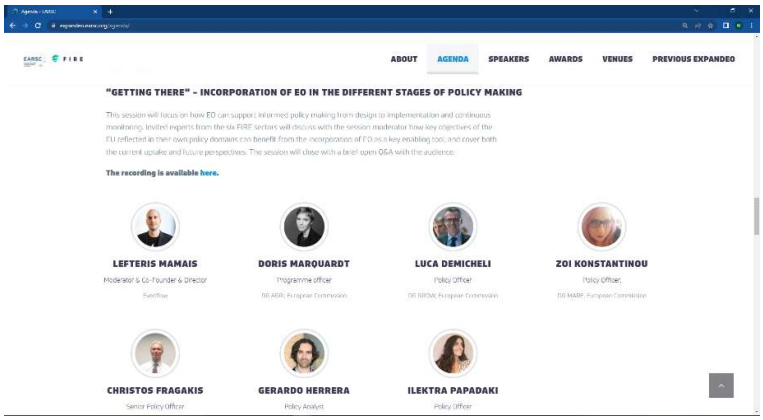

Figure 5 FIRE Forum online agenda

1.3 List of Panellists and Moderators

The FIRE Forum 2022 brought together **37 speakers and moderators** to discuss a various range of cross-cutting topics, including **research and development trends, policy, capacity building, market development, and technological infrastructure enabling EO**. Their names and affiliations can be found below in Table 2 and in the online version of the agenda (as shown in Figure 5).

Time	Location	Name of the Session	Name/Affiliation
09:30-9:40	Venue	**Opening**	Emmanuel Pajot, Secretary General, EARSC
	Video	**Statement by Commissioner**	Thierry Breton, Commissioner for Internal Market, European Commission
9:40-10:00	Venue	**Keynote Speech**	Isabella Poldrugo, Deputy Head of Unit, DG DEFIS, European Commission
10:00-11:00		**The Now & Tomorrow of Earth Observation**	
	Venue		Moderator: Benoit De Vrieze, Moderator & Open Innovation Consultant, Verhaert
	Venue		Moderator: Ornella Torres Melkebeek, Consultant DesignLab, Verhaert
	Online		Eva Haas, Marine EO Evangelist
	Online		Juan Peña, Maritime EO Evangelist
	Venue		Irene Benito, Raw Materials EO Evangelist
	Venue		Ilias Pechlivanidis, Agriculture EO Evangelist
	Online		Miriam Gonzalez, Wind Energy EO Evangelist
	Venue		Remco Timmermans, Urban Development EO Evangelist
	Venue		Lucy Kennedy, Infrastructure EO Evangelist
11:15-12:00		**Getting there: Deep dive in the latest R&D trends and priorities**	
	Venue		Moderator: Lefteris Mamais, Co-Founder & Director, Evenflow
	Venue		Evangelos Gerasopoulos, Research Director at IERSD/NOA
	Online		Regula Frauenfelder, Technical Expert, Norwegian Geotechnical Institute
	Venue		Laurent Tits, Team leader Agricultural applications, VITO
12:00-13:00		**Getting there: Incorporation of EO in the different stages of policy making**	
	Venue		Moderator: Lefteris Mamais, Co-Founder & Director, Evenflow
	online		Doris Marquardt, Programme officer, DG AGRI, European Commission
	Venue		Luca Demicheli, Policy Officer, DG GROW, European Commission
	Online		Zoi Konstantinou, Policy Officer, DG MARE, European Commission
	Venue		Christos Fragakis, Senior Policy Officer, DG RTD, European Commission
	Online		Gerardo Herrera, Policy Analyst, DG GROW, European Commission

	Online		Ilektra Papadaki, Policy Officer, DG GROW, European Commission
		Getting there: Evolution of the underlying infrastructure for the exploitation of EO	
14:00-14:45	Venue		Moderator: Phillip Harwood, Senior Consultant, Evenflow
	Online		Grega Milcinski, General Manager, Sinergise
	Venue		Stanisław Dałek, CTO, CloudFerro
	Online		Gedas Vaitkus, Director, Geomatrix
		Getting there: Developing the necessary capacity among different stakeholders	
14:45-15:30	Venue		Moderator: Phillip Harwood, Senior Consultant, Evenflow
	Venue		Peter Zeil, Senior Consultant & Co-Founder, Spatial Services
	Venue		Danny Vandenbroucke, Research Manager, Spatial Applications Division, KU Leuven
	Online		Mark Higgins, Training Manager, EUMETSAT
		Getting there: Modern ways to raise awareness on key topics with the help of EO	
15:45-16:30	Venue		Moderator: Dimitrios Papadakis, Co-Founder & Director, Evenflow (note-taker: Daire Boyle)
	Venue		Remco Timmermans, Social Media Specialist for Space
	Venue		Annalisa Donati, Moderator & Secretary General, EURISY
	Venue		Sebastian Marcu, Managing Director, DESIGN & DATA
		Getting there: Developing the market	
16:30-17:15	Venue		Moderator: Dimitrios Papadakis, Co-Founder & Director, Evenflow (note-taker: Daire Boyle)
	Venue		Eduard Escalona Zorita, Space Downstream Market Officer, EUSPA
	Venue		Stella Tkatchova, EIC Programme Manager for Space, EISMEA
	Online		Gordon Campbell, Head of Enterprise Section, EO Data Applications Division, EO Science, Applications and Climate Department, ESA
17:15-17:30	Venue	**Wrap Up &Closing remarks of FIRE FORUM 2022**	Natassa Antoniou, FIRE Project Coordinator

Table 2: Details agenda with the names of the speakers and moderators

Insights per Session

The goal of the FIRE Forum 2022 was to unlock the full potential of Earth Observation in Europe! To do so, a specific flow was used during the whole day of the event discussing different topics such as policy, infrastructure, capacity building, media, and awareness as well as market uptake. Moreover, during the coffee/lunch breaks, the participants in Brussels had the pleasure to network in the traditional way. Some of them were also interviewed for the upcoming FIRE videos and other promotional materials.

1.4 Setting the scene

The event was opened by the General Secretary of EARSC, Emmanuel Pajot. Following powerful video messages by the FIRE consortium (watch Figure 6) and Thierry Breton, Commissioner for Internal Market, European Commission.

The keynote speech was delivered by Isabella Poldrugo, Deputy Head of Unit, DG DEFIS, from the European Commission (Figure 7). Pictures in Figure 7 show the keynote speakers, whereas Figure 8 show the first created live illustration which captures the main points of the opening session. The full video recording of the opening session can be accessed either here or from Figure 9.

Figure 6: "FIRE Forum 2022: Join us as we shape the future of Earth Observation" video

Figure 7: Pictures of Commissioner Breton's powerful video message (on the left side) & Isabella Poldrugo, keynote speaker (on the right side)

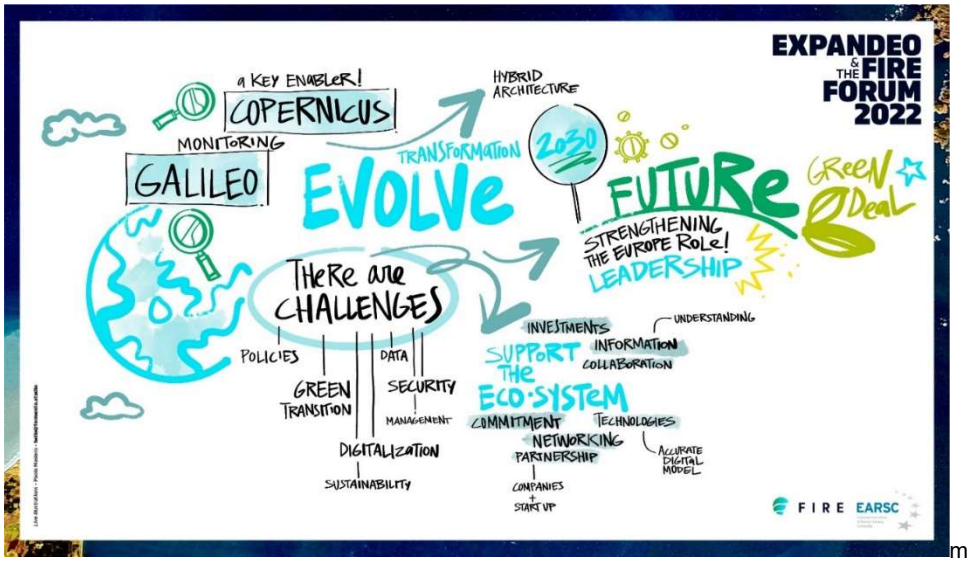

Figure 8: Graphical record of the opening session - Setting the Scene

Figure 9: Virtual recording of the opening session - Setting the Scene

1.5 The Now & Tomorrow of Earth Observation

This session highlighted where Earth Observation activities stand today and where we want them to be in the future. The content of the presentations was built on the findings in the FIRE focus groups in the sectors of Agriculture, Wind Energy, Infrastructure, Marine and Maritime, Raw Materials, and Urban Development. The key highlights were presented by the EO evangelists (see Figure 10), a group of individuals championing and advocating the use of EO in the respective sectors. In Figure 11 the created live illustration captures the main points of the discussion, while the recordings of the session can be viewed here and in Figure 12. Presentations used during the session can be accessed here.

Figure 10: Speakers of the “Now & Tomorrow of Earth Observation” Session

Figure 11: Graphical record of Session 1 – The Now & Tomorrow of Earth Observation

Figure 12: Video recording of Session 1 – The Now & Tomorrow of Earth Observation

1.6 Deep dive into the latest R&D trends & priorities

This session shed light on the hottest R&D trends that will drive the development of new EO solutions across the various sectors covered by FIRE. Three invited experts engaged in a lively discussion with the session moderator (see Figure 13). The session closed with a brief open Q&A with the audience. See the video of the session in Figure 15 or here. Table 3 summarizes the main points of the discussion, whereas Figure 14, captures them visually.

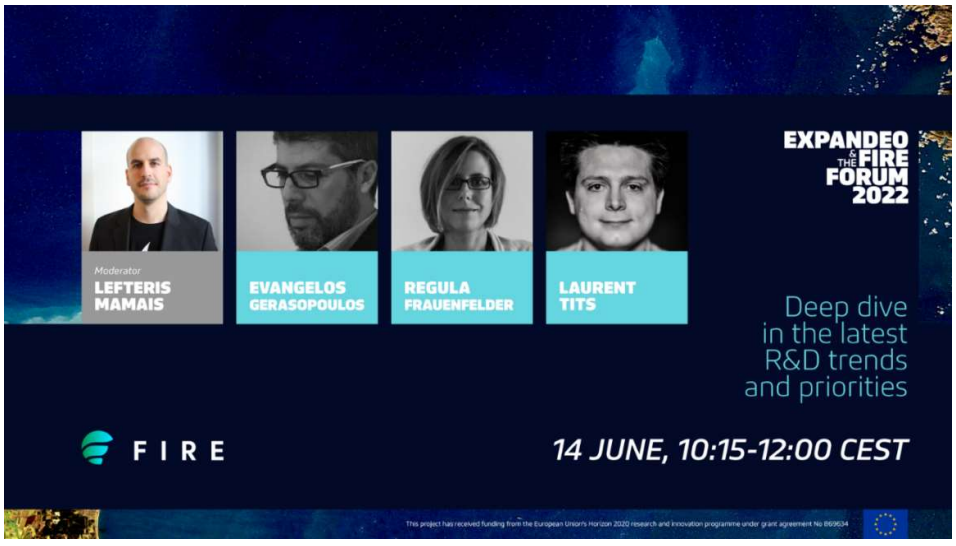

Figure 13: Speakers of the “Deep dive in the latest R&D trends & Priorities” Session

Main Points from the discussion

Who	Question	Answer
Evangelos Gerasopoulos	You have been heavily involved in FIRE as the sector lead for Urban Development and contributed to multiple R&D projects. Looking at the discussions in the FIRE Focus Groups and based on your experience, what are the key R&D trends for EO solutions in support of Urban Challenges?	Urban Atlas, high-resolution information, constantly improving, the health of buildings, thematic applications: e.g. air quality; EO4SDG initiative; immigration major challenge: in situ information at urban level crucial to resolving complex issues not seen from space; citizen science: make them aware of what they can get out and contribute to EO; integration of socio-economic information: understand implications, combine them with information, create impact; understand links between different domains; uptake of EO comes naturally; start creating a common language and build on it
Laurent Tits	We see in recent years new observational capabilities and new ways to process or visualize data that can underpin EO solutions for land applications. Which of those "trends" stand out for you?	Results need to be demonstrated at a larger scale, global level; in situ data now a small part of other data, collaboration with others needed → data repositories are a trend, data availability and EO capabilities are current trends; cloud computing: research on the cloud, again to scale; the discrepancy between university research (locally) and industry (at a different scale), for researchers going to the cloud, is a big step; trends: LSDs: but what is usable/reliable? Need to be more transparent and open about what to make available to the community so it can benefit ; Hyperspectral are important in particular for soil level
Regula Frauenfelder	With several general trends affecting infrastructure – but also energy and raw materials (such as climate change, extreme weather events, and supply chain autonomy) there is a constant need to be able to perform efficient monitoring and promote sustainable solutions. In light of this, which directions do you see R&D in these sectors taking?	Constellations, e.g. Maxar to have high revisit rates, new ESA mission (Harmony) → to address rapidly changing environments and challenges; cloud computing key for accessibility and fast results, blending local data with EO data; smart algorithms e.g. for ground motion data (hidden data in InSAR images need to be discovered); data fusion; digital twins for 3D simulation to plan and test; challenge: increasing dependence on digital services, vulnerabilities need to decrease. *"Valuable data is hidden within the measurements!! We need to harvest it!"*

all	If you were asked to design the R&D strategy for EO in your respective sectors, what would be your one absolute priority?	Regula (Infrastructure): exploitation of European ground motion monitoring service; will be an eye opener for many fields, especially Infrastructure; smart algorithms needed to harvest from the rich data Evangelos (Urban): climate adaptation, capacity development and indicators needed; tailor existing and develop new tools, make everyone understand benefits of EO, create testbeds → decision support and assessment tools incorporated and available to decision-makers Laurent (Agriculture): data mining to gain insights from all the data available; et most out of limited amount of reference (in situ) data
all	Do you have any ideas or success stories that can be used as best practices for the development of operational services coming out of R&D activities?	Evangelos: smoke event, started with local sensor to understand, density needed not covered → network of sensors created, able to give info to authorities and citizens for events of wildfires, industrial accidents, pollution: from problem do research, develop a solution, something useful Laurent: take operational context into account during the research (DIAS usually does not have coherence data!); a scalable solution with good enough accuracy developed Regula: R&D project for ESA, EO data for snow avalanche; sceptical stakeholders on resolution etc.; but taking them on the journey (making them understand how it was developed) key to then embrace products

Table 3: Main points from the discussion of session 2

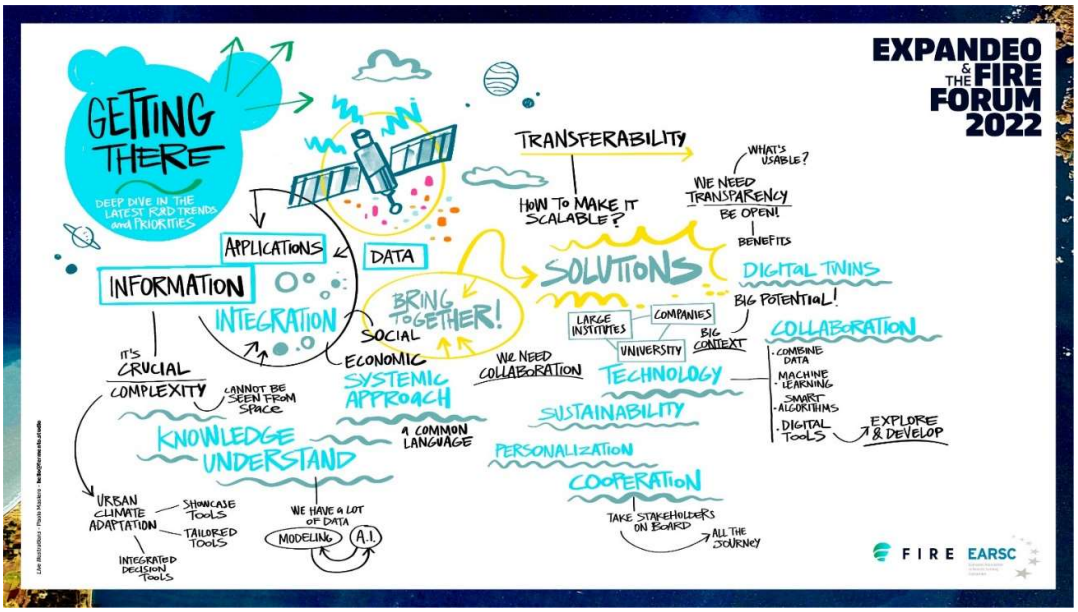

Figure 14: Graphical record of Session 2 - Deep dive into the latest R&D trends & Priorities

Figure 15: Video recording of Session 2 - Deep dive in the latest R&D trends & Priorities session

1.7 Incorporation of EO in different stages of policy making

This session focused on how EO can support informed policy making from design to implementation and continuous monitoring. Invited experts (see Figure 16) from the six FIRE sectors discussed with the session moderator how key objectives of the EU reflected in their policy domains can benefit from the incorporation of EO as a key enabling tool and covered both the current uptake and future perspectives. The session closed with a brief open Q&A with the audience. Table 4 summarises the key points of the discussion, while Figure 17 captures them visually. In figure 18 and here the video recording can be found.

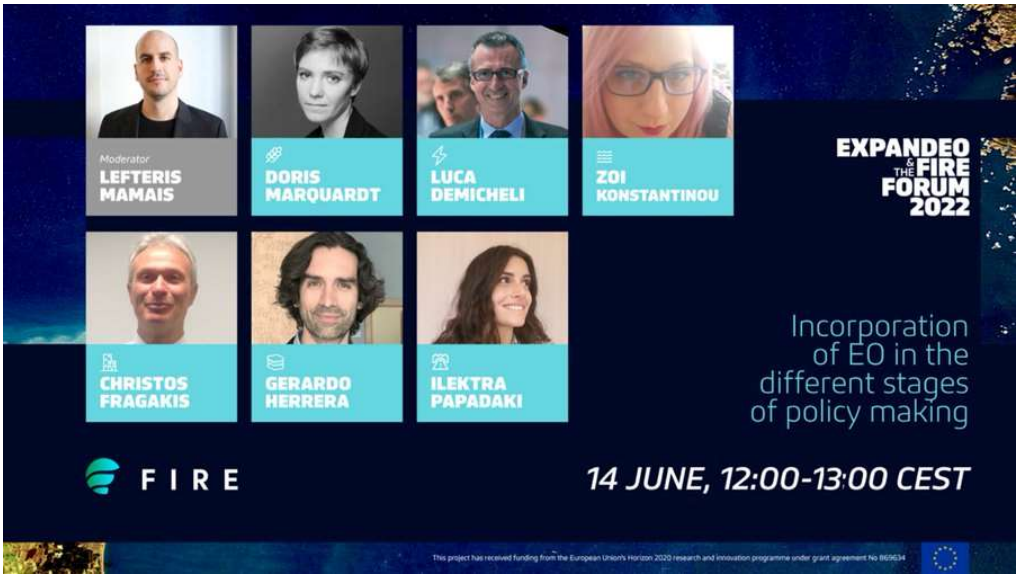

Figure 16: Speakers of the "Incorporation of EO in the different stages of policy making" Session

Figure 17: Graphical record of Session 3 - Incorporation of EO in the different stages of policy making

Main Points from the discussion

Who	Questions	Answers
all	Can you please walk us through the key policies that will drive the development of your sector over the next 10 years?	Luca (Energy, in particular, Wind and Geothermal): Repower EU, built on Fit for 55; 500 GW of wind farms built by 2030 (mostly off-shore), currently 20GW per year → will create high demand for raw materials (e.g. steel, copper, permanent magnets) and tech Gerardo (Raw Materials): energy transition, Green Deal objective of climate neutrality; greater supply risk also due to geopolitical issues; reduce the concentration of supply of

		critical raw materials, e.g through international partnerships for sustainable mining; circular economy; identify resources in EU; ensure environmental protection Doris (Agriculture): not only CAP is a key driver, but other policies as well: energy, trade, innovation, digitalisation (including EO), data policies etc play a crucial role; chip shortage may have an impact Zoi (Marine/maritime): ocean energy, fisheries; EO and marine knowledge in the centre of their work; regulation of fisheries, marine spatial planning (?); digital twin ocean for scenarios about the future of oceans Christos (Urban): cities mission: climate neutrality objective; become role models for other cities (urbanisation, energy consumption); policies and regulations in this context, e.g. green deal, zero pollution initiative, Fit for 55, etc. NetZeroCities led by Climate KIC (https://www.climate-kic.org/news/netzerocities-the-new-project-leading-european-cities-transition-to-net-zero-emissions-by-2030/); a high number of expressions of interest from cities; need a climate action plan, investment plan etc. Ilektra (Infrastructure/Construction): high demand for raw materials, creates lots of waste, requires a lot of energy; policies: renovate as much as possible, making buildings more energy-efficient, enforce circularity; more sustainable use of resources; digitalisation in construction of buildings and infrastructure, making info available and processes digital (a task for EO)
Doris Marquardt	Agriculture has been one of the earliest and most comprehensive adopters of EO solutions, with the most notable example being the CAP monitoring approach. Where do you see EO bringing the most value for Agriculture-related policies going forward?	Increase capacity of automated change detection (e.g. for CAP); generation of indicators (not to control); harvest/crop monitoring, forecasts; satellite interpretation important to assess market potential where no other data is available; precision farming/farm management input to achieve efficiency gains; interpretation crucial for policy control and private sector; Horizon Europe “Agriculture of Data” flagship
Luca Demicheli	Given recent developments, Europe will need to increase the production of wind energy. What role do you see for EO-related R&D activities in that regard?	Wind turbine towers are getting huge/high, models for monitoring wind conditions needed; impact assessment of farms; combine wind energy with ocean wave energy; produce green hydrogen might require pipeline monitoring detecting leaks
Zoi Konstantinou	Given the increasing pressure on food supply chains, fisheries but also maritime will become increasingly important in the future. What would be your plans at the policy level to incorporate EO solutions in that context?	Already used to spot illegal/unregulated fishing; in situ used for policy, the potential for EO to enhance this; fisheries is not only policies but important also for environmental protection/restoration/biodiversity; space for energy and food production needed, here EO for sustainable planning, site selection etc. important; satellite going hand in hand with in situ; also relevant for transportation

Christos Fragakis	The EU has launched several initiatives related to sustainable urban development. What role do you see for EO in these and how do you plan to promote this in practice?	100 cities selected, they have to define challenges and solutions; EO can provide info on the baseline; a vast amount of data, which to choose?; integrate data from many domains? Holistic approaches are needed; to monitor and adjust solutions with help of data
Gerardo Herrera	Strategic autonomy for various supply chains means better exploitation of raw materials. How do you see EO solutions supporting relevant EU roadmaps?	Critical raw mat action plan (10 actions to secure access), at least 3 actions could benefit from EO: deploy EO for exploration, operations, and post-closure; hyperspectral will help to map; high-resolution will help monitoring and tracking; map illegal mining, identify sources for urban mining, enhance environmental security of active mining areas
Ilektra Papadaki	On the way to a climate-neutral Europe, sustainable and digitalized construction is essential. Where do you see EO bringing value in this effort and how should R&D activities support this?	Monitoring progress of big infrastructure projects; maintenance; data for policy-making; data on buildings and infrastructure missing that could be provided through EO; adjustments such as green roofs, solar panels
all	Areas beyond Horizon Europe	Christos: Pollution, … Initiatives At the city level Doris: public administration Zoi: BlueInvest platform Gerardo: strategic international partnerships Luca: EPCEI, support EU manufacturing of wind energy components

Table 4: Main points from the discussion of Session 3

Figure 18: Video recording of Session 3 - Incorporation of EO in the different stages of policy making

1.8 Evolution of the underlying infrastructure for the exploitation of EO

This session analysed the different aspects of the underlying infrastructure (*e.g.*, data access, storage and processing) for unlocking the full potential of EO. Invited experts exchanged with the session moderator (Figure 19) on the latest technological capabilities, common challenges and future perspectives. The session closed with a brief open Q&A with the audience. Table 5 and Figure 20 summarize the main points of the discussion, while here and in Figure 21 the video recording can be accessed.

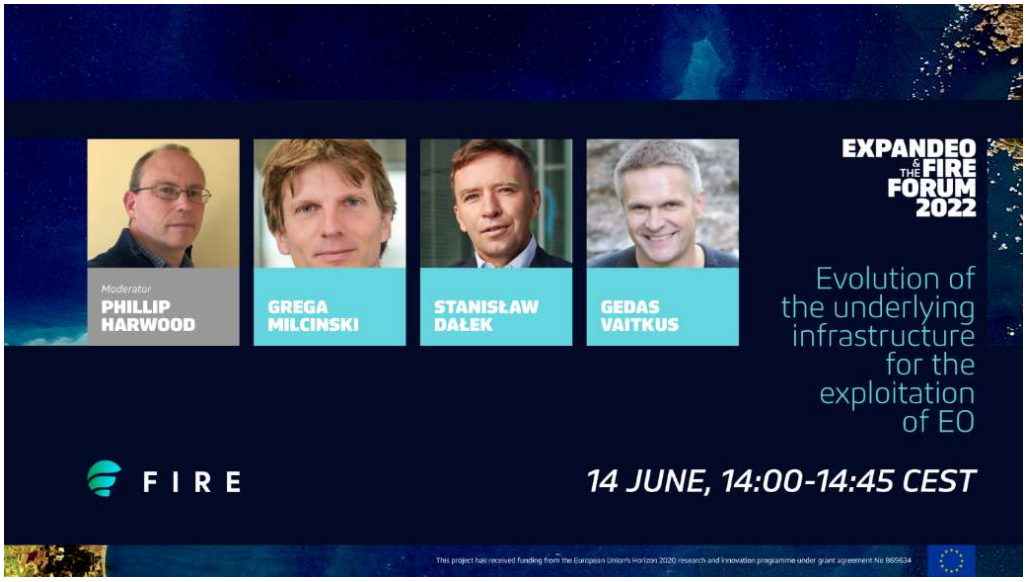

Figure 19: Speakers of the "Evolution of the underlying infrastructure for the exploitation of EO" session

Main Points from the discussion

Who	Questions	Answers
Gedas Vaitkus	As someone who builds workflows based on EO data, how do you feel the current data access arrangements work for you as a user?	Depends! We use our infrastructure. Components of infrastructure have improved massively, for an SME cost of running own infrastructure (open source) is low Taking advantage of the newest technology can deliver good results at a low cost Data still not perfectly ready, needs further processing; autonomous solution more efficient
Stanislaw Dałek	What are the lessons learned from operating CREODIAS, both from your side and feedback from users?	Crucial: data, easy access to cloud processing, homogeneity of data importance (same baseline), homogeneous queries to abstract data; have data at fingertips, scalability of data and infrastructure (pay per use) Tooling: users want a single sign-on etc., coherent and simple-to-use service

Grega Milcinski	Synergise provides tools to simplify the use of EO data. What has been the feedback from the user community?	No feedback; only if things do not work; wait time should be low; Change of baseline (e.g. Sentinel-1) breaks lots of applications From visual to data science applications: data needs to be available for at least a year, usually, several years to allow statistical back processing To run such services infrastructure required (storage) → cloud
Stanslaw Dałek	There is an ever-increasing volume of data, not just from Copernicus but other EO providers. Is there a benefit to bringing all of these sources together, and how can it best be done?	An advantage to having different datasets in the same infrastructure; immediate availability eases processing Bringing processing to big datasets has speed advantages, even at high internet speeds → boosts efficiency More users will order specific datasets not available on the platform, which requires a standardised interface for an increasing amount of satellites
Gedas Vaitkus	Analysis-ready data is a topic that keeps coming up. Do you see significant benefits to having large amounts of pre-processing done systematically? How far should this go?	Radar data is far from analysis-ready Processing different from other data Far beyond the image, rather working on a database with intelligence from optics Farmers don't want to see image/NDVI, but to know where to go ("Where should I go today"?) Thinks his USP is to be different from than competition
Grega Milcinski	Once we have access to the data, we need to help users find what they need. What tools are available for this? How can AI and other big data techniques best be used, and what infrastructure is needed to support this?	Sharpening pixels Building things on top of other things is the way to go Not all data will have the same requirements for analysis; certain decisions will make the result useful for one and useless for another user Our target is application developers Ensuring that certain levels can be used by many, e.g. allowing to build on top of it
Stanislaw Dałek	Development of the DIASes and other tools have been supported by the EC & ESA. Going forward, what role should the agencies continue to play, and where should they step back and let the market decide?	Many niches exist where added value is possible The digital market is fragmented, and many small companies; to compete with big commercial groups (hyperscalers, often anchor tenants) niches

		needed; institutions need to be anchor tenants for data part (?) to make the ecosystem flourish
Grega Milcinski	We want to bring new users into EO, who are not experts, and who want actionable information rather than data access. Do you think that the current infrastructure is sufficiently easy to use, and what can we do to improve this?	First, we need all data available Users may not understand imitations or benefits/capabilities of sat data Once they understand they may want to do it in their environment Institutions should make use of services rather than developing a new thing
Gedas Vaitkus	Linking to the next topic on capacity building, do you see the need for additional support for users and service providers to get access to data? What would you like to see happening?	Scaling across continents is reasonable only as long enough coverage of data density; Sentinel-1 only good enough for Europe DIAS is only for professionals, not for Joe Average If too simplified so anyone could use it dangerous
Q&A	Are you considering Gaia-X and/or Destination Earth infra? Links to other data initiatives	Stanislaw: other initiatives of data-centric communities in other areas exist, empower industry (IT ecosystem and industry itself)

Table 5: Main points from the discussion of Session 4

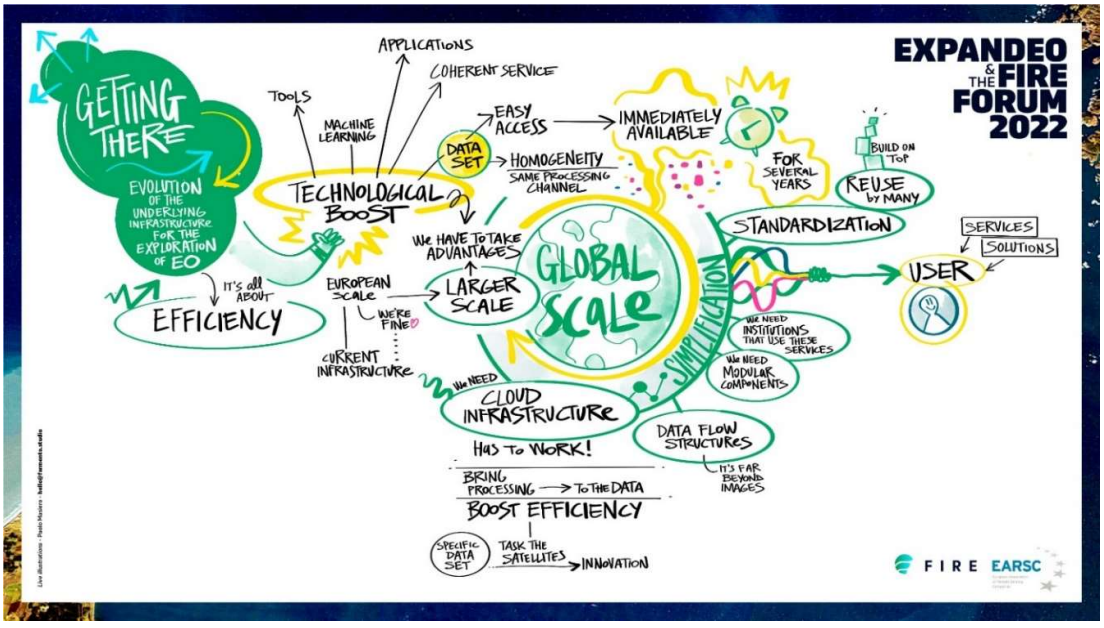

Figure 20: Graphical record of Session 4 – Evolution of the underlying infrastructure for the exploitation of EO

Figure 21: Video recording of Session 4 – Evolution of the underlying infrastructure for the exploitation of EO

1.9 Developing the necessary capacity among different stakeholders

This session highlighted the key dimensions of capacity building – an essential aspect when considering the optimal uptake of EO in the different FIRE sectors. The session moderator discussed with invited experts (see Figure 22) on topics such as institutional capacity, skills availability in the workforce and best practices from recent projects. The session closed with a brief open Q&A with the audience. Table 6 recapitulates the key points of the discussion, while Figure 23 portrays them visually. In Figure 24 and here the video recording can be found.

Figure 22: Speakers of the "Developing the necessary capacity among different stakeholders" session

Main Points from the discussion

Who	Questions	Answers
Peter Zeil	We've heard this morning about the ambitions for using EO in various sectors. Based on your experience, where do you see the likely problems when it comes to following through with these ambitions?	A lot is done to fulfil expectations: e.g. raw mat. Issues and barriers: more concrete about what capacity building means. What education? Skills development is not the same as education.
Mark Higgins	How does this fit with EUMETSAT's experience? Where do you see your users most needing help?	Make sure people get hold of data that is the right data for their purpose; select the right dataset, understand its quality, make choices → needs education If technology can help that users need fewer skills We need to hear the voices that we wouldn't usually hear.
Danny Vandenbroucke	You were the technical coordinator of the EO4GEO project, which looked at issues like these. What were the key messages and outcomes of this project?	Monitor requirements, needs, and new developments in complex ecosystems Shift from academic to applied: case-based learning, from real problems
Mark Higgins	The previous session on infrastructure discussed how we can make things easier for users, e.g. reducing the need for them to understand the details of the products. How far do you think we can push this approach, and where will there still be a need for detailed EO knowledge within the user community?	Data access mechanisms can be complex; choices need to be made to make them more accessible Listen to the right range of people to design
Danny Vandenbroucke	What processes need to be in place to monitor capacity needs within Europe, and to identify potential bottlenecks?	Infrastructure not yet in place Difficult to find your way among what is out there Skills intelligence mechanism: continuous monitoring supply/demand New ways of learning (formats) and transferring knowledge/skills
Peter Zeil	How can we link to awareness-raising activities, to encourage more interest in the field, and get key players interesting in supporting capacity development?	Try to speak the same language Address certain problems together (co-design); the technology provider understands the problem of the user, user understands the limitations of the tech

Danny Vandenbroucke	Now that EO4GEO has finished, what steps do you see as required to keep the work going?	Continue after project, DG DEFIS does not want project at last day of the project; business model in place, alliance being enlarged (bigger network, more partners, not only academic needed); results can be used and reused No magic solution to this; more training on the job needed / education closer to what companies are doing
Peter Zeil	Capacity building is a long-term process but there are short-term needs of the companies and institutions involved. What can we do to address capacity needs in the near term?	The momentum needed to attract people Europe is very attractive, can be open for people from outside to acquire skills/capacities → option to invest in people
Mark Higgins	How do you see the role of the key institutions such as EUMETSAT, ESA, and now EUSPA? Where should they lead, and where should they defer to a more industry-led perspective, e.g. through bodies such as EARSC?	Same question as above: Initiatives like eo4geo help Optimistic More broadscale education happening in fields relevant to EO Training on certain topics can be provided, but need needs to be known
Q&A	There are millions of stakeholders, and each has a different problem to resolve, so how do we manage to build the capacity for such as diversity of needs?	Danny: baseline education to be used and reused, tailor vocational training linked to occupational profiles
Danny Vandenbroucke	How to transfer eo4geo to the national level?	Challenge to find right connection point; started with Copernicus fora to do so Many requests are seen; as part of a long-term action plan

Table 6: Main points from the discussion of Session 5

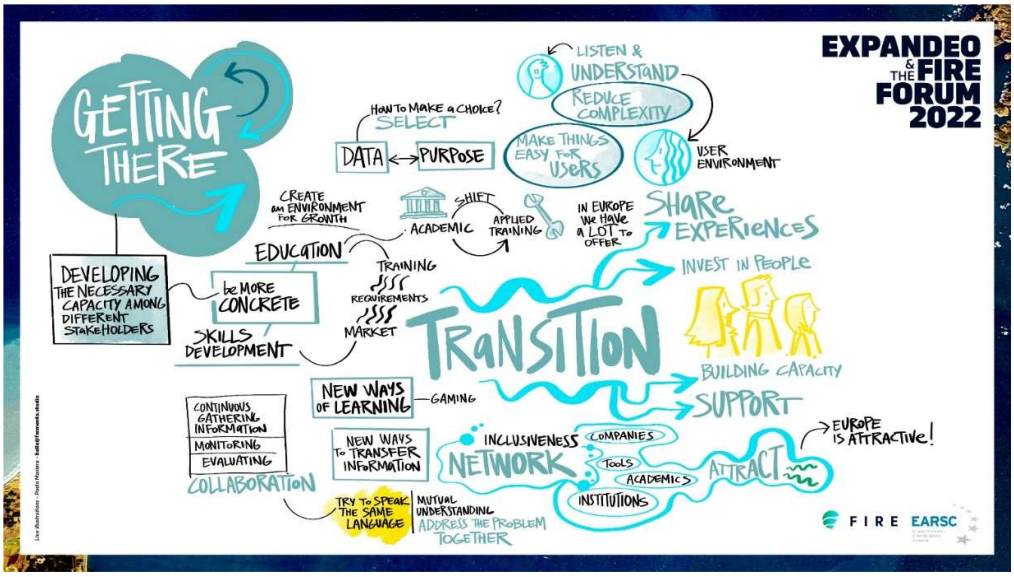

Figure 23: Graphical record of Session 5 - Developing the necessary capacity among different stakeholders

Figure 24: Video recording of Session 5 - Developing the necessary capacity among different stakeholders

1.10 Modern ways to raise awareness on key topics with the help of EO

How can EO be used to inform the public on current events of global impact? How can we raise awareness among user communities on the solutions offered by EO? What are the most impactful ways to tell “geospatial stories”? Invited experts provided their insights to answer these questions through a lively discussion with the session moderator (see involved speakers in Figure 25). The session closed with a brief open Q&A with the audience. The video recording of the session can be accessed in Figure 27 and here while the summary of the discussion is available in Table 7 and Figure 26 (live illustration).

Figure 25: Speakers of the "Modern ways to raise awareness on key topics with the help of EO" session

Main Points from the discussion

Who	Questions	Answers
Remco Timmermans	You are an EO social media specialist. What are the main ways in which you have seen EO used to raise awareness?	Not enough examples (to inspire, and stimulate the market) Stories of society: Google Maps / Earth first place for most to go to: accessible, useful Many other social media pros and hobbyists exist for EO Suez canal images, different providers showcased their imagery Ukraine: the critical element to documenting possible war crimes
Analisa Donati	Tell us about the role of EURISY in bridging the gap between space and society.	EURISY has many success stories Work on challenges of different sectors, e.g. with cities Act as platform The user on spotlight talking about application facilitates uptake (role models) Do not use technical language. Use of videos (Copernicus and me)
Sebastian Marcu	Your company develops innovative communication campaigns on science,	Printed media is fast outdated; story maps where different contents (incl. Live dates) are connected to

	space and technology. What are your views on the role of EO in this context?	create stories. Does not go out of date (shorthand: https://shorthand.com/) Data visualisations of the ozone hole weekly Tools now allow for interactive reports Lacking: interaction with EO experts to know what else can be done to visualise data Creatives can turn into EO experts
Slido	Which innovative uses of EO for awareness-raising would you like to see more of?	Policymakers interacting with EO data (Remco: storytelling aspect) Sebastian: magic happens if you combine all elements; content can be tailored to the interests of different information users See slido results
all	How can the potential of EO be better communicated to new user communities?	Annalisa: use more wow effect for engagement; address their challenges, make benefits visible, engagement follows understanding Remco: listen to user communities Sebastian: personal connection needed

Table 7: Main points from the discussion of Session 6

Figure 26: Graphical record of Session 6 - Modern ways to raise awareness on key topics with the help of EO

Figure 27: Video recording of Session 6 - Modern ways to raise awareness on key topics with the help of EO

1.11 Developing the market

This session underlined impactful ways to develop the market for EO services and products. Invited experts shared best practices, analyse common challenges and discuss with the session moderator the plans for building a thriving EO ecosystem (see involved speakers in Figure 28). The session closed with a brief open Q&A with the audience. Table 8 summarises the key points of the discussion, whereas Figure 29 captures visually those points. In Figure 30 and here the video recording can be accessed.

Figure 28: Speakers of the “Developing the market” session

Main Points from the discussion

Who	Questions	Answers
Eduard Escalona Zorita	What is EUSPA doing to help grow the EO sector? what is EUSPA bringing to the market uptake of Copernicus from the successful experience with Galileo as GSA?	In listening mode The last mile step needs to be considered to bring EO into more solutions/markets Copernicus has been exploited for policy a lot, but not so much for commercial solutions, something EUSPA wants to change Engage users, understand them from their application/perspective, their challenges FIRE inspiring, want to do the same
Stella Tkatchova	How does the EIC support the pipeline of projects from breakthrough research, through commercialization and demonstration? 5 min	Start from low TRL, pathfinder TRL 4-6, Accelerator takes them from TRL 6-9, simple 2-stage process, 5-page application, 1 month until evaluation EIC Space project: new space ecosystem and EO (downstream) show dynamics from idea to commercialisation and demonstration, different types of markets being created and emerging Markets on the rise EO should be aware of: most domains covered by FIRE, but also disaster management, AI/ML to analyse data
Gordon Campbell	ESA has been supporting the EO downstream sector through a wide variety of interventions, programmes, incentives and funding schemes. Which of your efforts have you found to be most impactful?	Looking at more technical problems the industry cannot solve itself; working with industry representative bodies standard best practice Underestimated game changers: platform-based solutions to lower fixed costs New capabilities (InSAR) and AI-based methods (current TRL hard to say, many proposals exist) Not a single platform, things need to be traceable so people get paid (IPR)
Slido	Should EIC move beyond TRL?	Stella: continue with TRL, Accelerator is also about market readiness, and potential customers; TRL required for that
all	How can the EO market best be further developed? What are the main challenges for the industry, and how can they best be addressed?	Closing statements: Gordon: lots of tech coming together, enabling business, start change how we do business, can be driven by EO users Stella: encourage the development of customer-driven products & services

	Eduard: understand the market, know who is using, acknowledge they are not EO experts, but EO can solve certain things; have to see benefits

Table 8: Main points from the discussion of Session 7

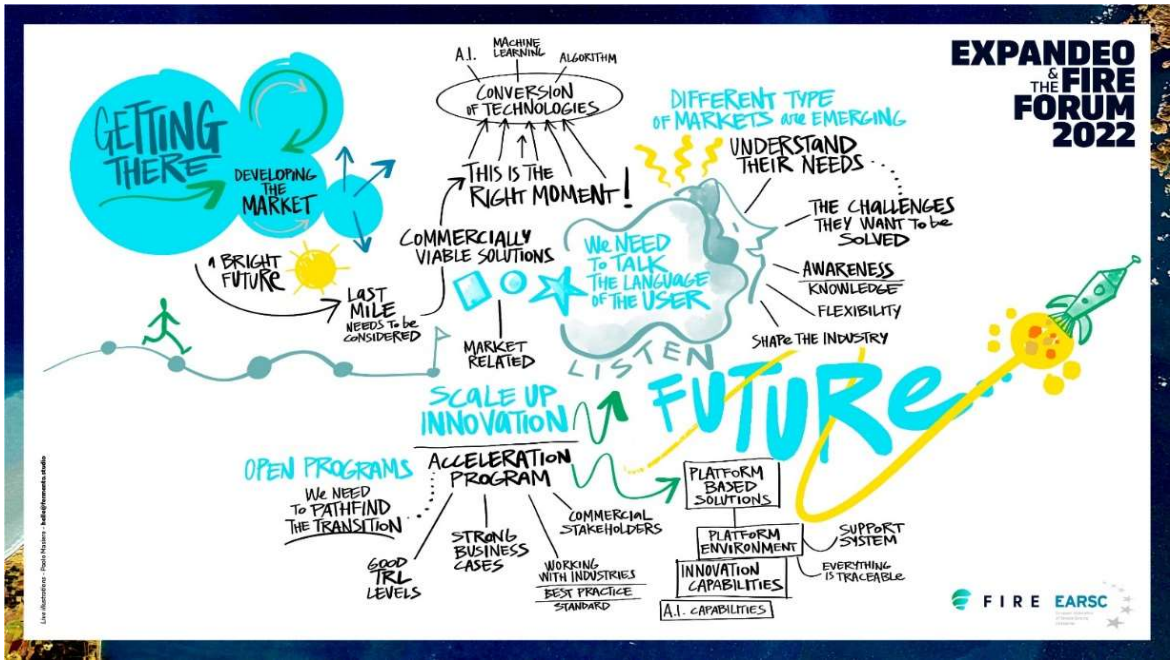

Figure 29: Graphical record of Session 7 – Developing the market

Figure 30: Video recording of Session 7 – Developing the market

1.12 Wrap Up & Closing Remarks

The FIRE Forum ended with some concluding remarks from Natassa Antoniou, the FIRE project coordinator, who recapitulated the discussion of the day and highlighted that the FIRE team has successfully achieved the objective of the FIRE project, to build a strong community and a well-defined process that captures the 'now' and shapes the 'tomorrow' of the European EO sector. She also mentioned the next steps for FIRE, mentioning particularly the FIRE roadmap, the ultimate document of the FIRE project which will be ready by the end of September 2022. All physical attendees received the FIRE postcard printed on paper seed (Figure 31) which they could take with them to turn this sustainable souvenir into a plant.

Figure 31: FIRE postcard

General Conclusion

On the 14th of June 2022, the EXPANDEO & FIRE Forum 2022 joint event took place. During that event, the Earth Observation providers and users from different sectors meet and learn about market evolution and network. The event saw 483 registrants out of which 108 physically attended the event. Attendees represented public institutions, the Earth Observation industry, and other sectors. From among 483 registrants, 136 of them identified as users of the Earth Observation or stakeholders being outside of the sector (hence the potential users and attracted external stakeholders). Among users and potential users, the most represented from the FIRE six sectors was Urban Development. There were numerous representatives of local governments, public sector, and individuals directly involved in the urban planning. The second most prevalent sector was Agriculture followed by Energy. Vast part of the user community self-classified in the registration form as representing Environmental, Biodiversity, Pollution sector. This broad domain also includes value chains' segments being a part of the FIRE sectors.
The first day of the event which was dedicated to FIRE Forum was spread across the opening remarks with two powerful videos and a keynote speech and 7 main sessions and the closing remarks with over 37 speakers. The FIRE Forum pinpointed the future of Earth Observation from seven different aspects: R&D, policy, infrastructure, capacity building, awareness, and media as well as market development. The video recordings of the sessions remain publicly available on the FIRE Forum YouTube channel to spread the messages and conclusions of the sessions to broader audience.

The following short video captures very nicely what happened during the second FIRE Forum!

Figure 32: Video with highlights of #EXPANDEO & #FIREforum 2022

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