Crafting the European Earth Observation Ecosystem 2040+
Wrap-up and next steps

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Feedback overview

- Overwhelming participation and intensive “thinking out of the box.”
  - Where are we?
  - Where are we going?
  - What do you need?

- However, we need to consult the broader stakeholder community and further think out of the box.
  - Next generation
  - Non-space related actors
  - ….

➔ Otherwise, we might not be able to capture the full picture, all the current trends and the long-term future aspects

- EO Ecosystem 2040+ plans / architecture shall work hand-in-hand with the EO Science Strategy (and others) to achieve a balanced and attractive long-term plan for European EO in a global and competitive context

Feedback overview – Policy dimension

- Todays and past challenges (Kyoto – to – Kyiv) – cause a major disruption / shifts, we need to deal with the reality
- Climate adaptation – from monitoring to action – still remains a key driver, still gaps in the ECV
- Climate impacts expect to be a major challenge (2.7C) – drives the need for a stable EO system
- There is an interdependency between the different system components – EO can't be seen in a silo
- Verticalisation – is one of the bigger picture questions which will be very relevant for 2040, needs to start now
- Competitiveness and scaling is needed to be effective (to leverage the R&D costs)
- As multilateral cooperation is ceasing, crucial to stop competing within Europe

Feedback overview – User perspective

- Constellations offer the opportunity to deliver high temporal / spatial resolution / mix of different geometries, which could help revelling new insides into the Earth System and **Human behaviour**
- We are still not measuring at the appropriate time and space resolution of the processes we observe
- Demand Global – European scale, more and more also local scale (e.g. heat islands)
- How to handle the challenging differences between Defence / Civil systems?
- Security / resilience are pressing topics and might drive the users' needs in the future (and the need for constellations).
- Policy-dimension and what EO can offer (currently and potentially in the future) needs some further thinking

Feedback overview – Future users needs (science)

- Earth Observation data are the core and fundamental intelligence baseline, especially for understanding processes - interactions on the global basis
- Focus on processes, ways of addressing the deeper understanding, getting different communities to work together.
- We see policies becoming a stronger corner stone of what we are doing – Earth Action
- Uptake in society, global uptake

- We need to preserve blue sky research missions in the overall architecture
- Frontier science and discovery relying on new critical technologies to fill knowledge gaps
- Frontier Science needed also for the competitiveness of Europe – potentially more ambitious Earth Explorers needed – also to fill the current info gaps.

Feedback overview – Commercial perspective

- Without science you can't build commercial business cases.
- Multi-dimensional users need and also multi-dimensional infrastructure need
  Floating ideas for potential commercial applications:
  - Carbon Emissions / Green house gas leaks (ships) / Methane / Defence / Security / Natural Disaster monitoring / extremes / Tripple crises (three intersecting global environmental crises of pollution, climate crisis, biodiversity loss and/or ecological crises) have lots of opportunities for EO, all of them will exponentially grow / "heat monitoring – cities" / Human movements….
- Autonomous tasking – combination of different missions
- Constellations acting as a service – it is an overarching system of system

Some technical aspects / needs discussed

- Infrastructure developments needed for downlinking of data needed (NRT demand) also for crisis situations (if funded by public it need to serve an added value for the public)
- HAPS could also be considered in the Ecosystem – offering long-term, NRT monitoring – yes or no?
- AI on-board to reduce data volume, ocean colour,…
- Fully data-driven / Ai-based NWP / less physical modelling in the future?
- Various data sources, also question of how many/much do we actually need?
- Protect “our” EO RFI
- How to take benefits of all new technologies / New Space / AI/ML in the short term
- Interoperabile long-term time series and reference missions → which reference missions do we need to preserve
- Preparing technology to unlock frontier science discoveries in areas such as : operational NRT gravimetry, geosynchronous SAR (Hydroterra+), HR thermal imaging, formation flying for SAR....

System architecture aspects / needs discussed

- Good integration of the user dimension.
- System federation and interoperability – need of accepted standards, cross domains, not only for the space segment.
- Data driven approach in a general sense, specific missions and the value added has to be seen on the overall context.
- Keep system sustainability in mind, there will be a growing competition between different areas of priority.
- We need to maintain economic viability, thinking about diverse data policies and inclusive governance.
- Maintain a core system providing the backbone observations as a high priority.
- Reach out for global cooperation but keep European resilience and independence as top priority.
- We have no crystal ball, assess different scenarios for the future and identify the ones significantly changing the overall requirements.

Feedback overview – “ESA role”

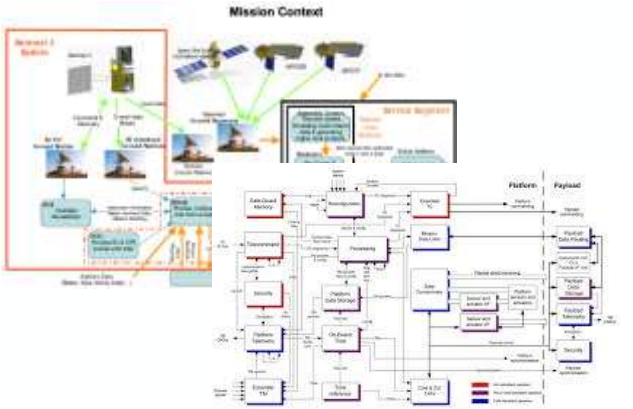
- ESA needs to look at the whole Earth Observation Ecosystem (and beyond).
  - User-drive is the core
  - Non-EO experts need to get better involved and supported

- Federate the user needs to create a common market of services
- Fragmentation of the offer ➔ federation of the demand to allow the market to grow fast

- ESA can give a “a quality proof stamp” helping commercial actors to get the business up-and-running.
- ESA can help in the initial developments, testing on satellite level and data quality ➔ ESA technical support
- Harmonisation of e.g. platforms and development of roadmaps also to enable large scale manufacturing
- **Supporting with demonstrators for space and ground aspects**
- De-risking through financial support
- Help with the last mile

What do we want from you today and tomorrow?

- **Your vision for the European EO Ecosystem in 2040+:**
  - What constitutes the EO Ecosystem?
  - What are your “red-line” requirements for the EO Ecosystem?
  - What are the essential EO Ecosystem elements?
  - What are the challenges to overcome – technical, scientific, system…
  - Which systems must be linked across the EO landscape to create an Ecosystem?
  - How can institutional missions best enable commercial space?
- **Your feedback captured as Future Vision Scenarios that can be evaluated**
- **What do you need to make the Blueprint a useful compass for you? How will you leverage its content?**
- We have setup an EO system architect mail address: EO-System-Architect@esa.int
  - **For this meeting we will capture inputs until 28th February**
  - **But YOUR VISION AND INPUT IS WELCOME ANYTIME!**



Where are we? Where are we going? What do you need?

Stages of an Er odels, published By Rob Evans and Matt Taylor.

Our Future European Earth Observation Ecosystem **is in your hands** for the next two days!

Send your requirements, user needs, policy drivers, vision, comments, feedback, and any other contributions to:

EO-System-Architect@esa.int

Crafting the EO blueprint - European Earth Observation System 20

M-IND Workshop
20-March @ ESTEC
Josep.Rosello@esa.int

EO 2nd Science Strategy Workshop:
Linking the Blueprint to the EO Science Strategy

ESA-wide consultation

LPS 2025

01.2024
05.2024
10.2024
02.2025
06.2025
2025 - 2026

Programmatics

Architecture studies

Technical development roadmaps

Applications / Science developments

Mission Management synergies

Re-check and potential update in 1-2 years