e-shape

EuroGEO Showcases: Applications Powered by Europe

D3.5 Pilot Sprint 2 report and D3.6 Sprint 2 assessment report

e-shape

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Abstract

An important challenge for e-shape is to move from 37 individual pilots distributed over 7 thematic showcases towards a global project, identifying the right level of interaction to leverage pilots, showcases and the different work packages activities in the most efficient way. This was started by an initial assessment of the pilots which gathered information about the pilot's initial status and their target at the end of the project. This initial assessment was coordinated through all the Work Packages (WPs) to address Co-design, Implementation, Users' Uptake, Capacity Building & Liaison, Sustainability & Upscaling. WP3 initial assessment focused mainly on the three canonical user scenarios covering:

- how the users discover, access the data or run the pilot,
- the new or improved EO service scope and development needs to clarify the interactions with the EO resources (platforms and data) used as external resources,
- the publication, and dissemination of the results of the new or improved service.

This assessment has also addressed data management and data sharing principles, including interoperability, the use of Copernicus and other data, remotely sensed and in-situ data, use of open source packages, use of standards, use of infrastructure (DIAS, NextGEOSS, European Data Hub, others, …) and all technical details that the e-shape pilots could provide as a mean to reveal the value of open data, open source, open standards and more globally European Resources to build some Open Knowledge accessible to all. The recently on-boarded pilots are currently documenting such assessments to aggregate the inputs available from all pilots. Out of this assessment, several transversal threads of work have been identified to build WP3's approach.

A major challenge for the project was to identify the best way of supporting pilots which are very heterogeneous on their initial state, maturity (Technology Readiness Level – TRL- varying from 3/4 to 8), complexity, goals, resources used, architecture and at the same time driving the large number of partners for structuring their implementation approach into a process which has enough commonalities to be described into a unique high-level process. Such process demonstrated enough flexibility to allow each pilot to meet its goals and to benefit from the very large portfolio of European EO resources available.

Out of the implementation of the pilots, the project should then capture the knowledge and lessons learned into the final guide for application developers, decision-makers, and experts. At the start of Sprint 2, e-shape was rich of 32 pilots driven by 60 Partners and added 5 more pilots and 8 new partners during the sprint. This has been a wonderful panel that is likely to be representative of the European Earth Observation community for which the project will:

- Develop the e-shape Development Guide,
- Capture the issues where the project can support the pilots, and bring them value,
- Guide the pilots to benefit from them as much as possible,
- Make sure that each of the 37 pilots is accomplishing regular progress over the full e-shape implementation period,
- Capture the progress, observe the successes and the failures, and capture lessons learned into the final Best Practices document.

This Deliverable 3.5, as a follow up of Deliverable 3.1, 3.2, 3.3 and 3.4 reports captures the outcomes of the second Sprint. It is built on the same template as D3.4 to be able to compare Sprint 1 and Sprint 2.

In the grant document, this deliverable is defined as follows: "D3.5 - Pilot Sprint 2 report (M35): D 3.5 will report on the second phase of development of each pilot."

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S4	Under preparation		

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1. Introduction

A key feature of e-shape is to ensure the effective and efficient engagement of the Work Packages in support of the Pilots. At the same time, the project itself has internal objectives (recalled in Annex 1), which are framing the collaboration with the Pilots and should provide a level of trust in certain directions.

This win-win matrix forms the basis of the Sprints concept, which are organized around Challenges distributed over 2 sprints. As described in the Deliverable D3.1 “Pilots initial assessment report”, these Challenges are built upon the Key Performance Indicators (KPIs) (recalled in Annex 2) of e-shape, translated into 14 high level Challenges (See Annex 3). Within a Challenge, flexibility is given to the Pilots to define its contribution to the project, with milestones, proof of execution and outcomes which vary amongst Pilots.

In preparation of Sprints, Pilots have therefore been invited to identify out of their plans, the activities that could be mapped with these Challenges. This methodology and the Challenges definition have been described in the D3.2 “Pilots Implementation Plans and Roadmap”.

The D3.3 “Status of the ongoing Sprint 1” and “1st assessment methodology” reports described the process of work for WP3 based on the Jira-based Showcase Support Service operated by DEIMOS, in short “SSS”.

This system is designed for agile programming and organized as a ticketing system: each project’s KPI is translated into a Challenge for the Pilots and implemented through a ticket in the SSS (87 tickets in Sprint 1, 343 tickets in Sprint 2). The Jira platform provides therefore a mean to coordinate Showcase Coordinators, Work Packages Leaders, the Sprint master (WP3) and Project Management Team (PMT). It enables the creation of progress dashboards that are shared and discussed by WP3, PMT and the Showcase Coordinators.

The D3.3 deliverable also introduced first support activities developed by WP3 to assist the pilots and a first assessment of the knowledge that could be expected from the pilots to contribute to the final Best Practices that will be the foundation for the e-shape development Guide.

In addition, the showcases had regular progress meetings to support and report on the progress related to their own pilots and showcases agendas. For the Sprints assessment process, the available inputs are:

- a general description of the pilots from the grant document,
- the initial assessments,
- the Showcase Support Service SSS tickets which include the Challenges definitions, and Sprint outcomes,
- eventually, the minutes of the showcases' progress meetings.

In addition to this, the PMT has organized individual meetings with each Showcase Coordinators to collect their feedback on the Sprint 1 process. The outcomes were used to review the process itself and consolidate it before the Sprint 2.

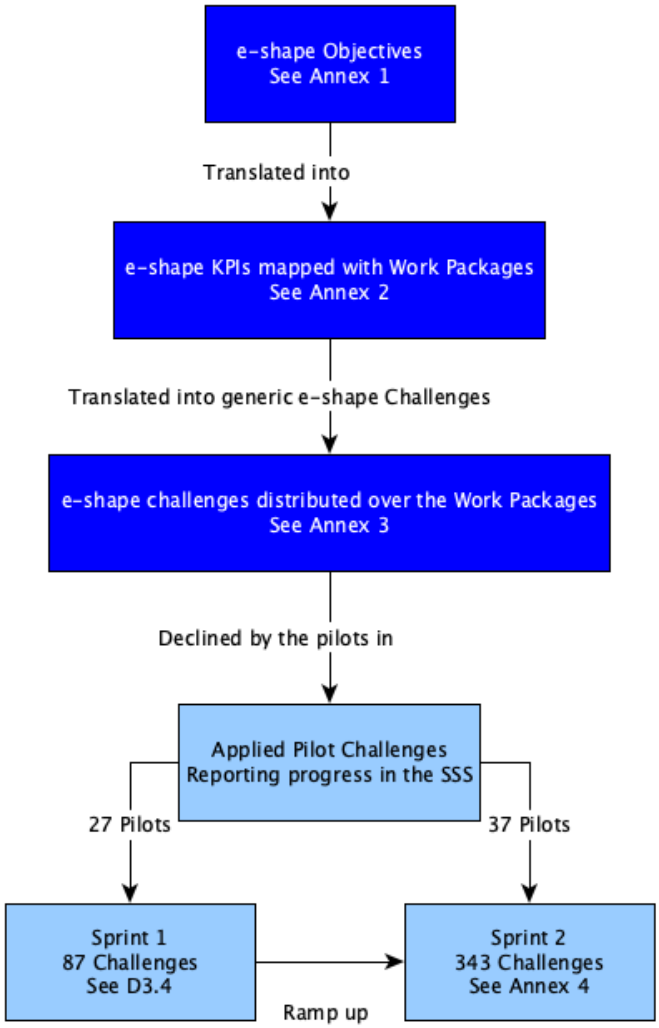

Figure 1:From Objectives to implementation challenges for each pilot over each Work Package

The target of the Sprint Assessment is to review:

- if the Challenges have been completed, and are demonstrating good progress, aligned with the e-shape KPIs,
- if the pilot has provided enough information to consolidate valuable contributions for the final Best Practices and identify some cross-cutting topics of interest,
- if the links to accessible results are up to date.

2. Consolidating the methodology from Sprint 1 for Sprint 2

The Sprint 1 methodology has been adopted and has been used for Sprint 2 with some minor changes. As at the end of Sprint 1, the method was mastered by all the partners, Sprint 2 has been more intensive, with more Challenges to support the achievement of the project's KPIs.

Two sessions have been organised to kick off the Sprint 2, provide tools to define the Challenges and to introduce the Data Management Plan as Challenge 7. The Data Management Plan (related to D1.6) was set as a mandatory Challenge (#7), assessing compliance to GEO and FAIR along the Sprints. A new Challenge related to Communication has been added and defined as mandatory to make sure that Pilots get supported into

communicating their achievements. WP3 has convened monthly Sprint coordination meetings whereby trajectories leading to Milestone's achievements was monitored and critical issues can be raised and discussed as a group.

Figure 2 reminds the configuration of the (at this point) 32 Pilots before the release of Sprint 2. Sprint 1 had invited Pilots to select only three priority Challenges to be implemented over Sprint 1. Light green and light orange colors indicate the status reached at the end of Sprint 1.In dark orange are the performance targets set by e-shape's Key Performance Indicators (Annex 2). The significant gap has led the e-shape Executive Board to adopt a Sprint 2 with a large number of Challenges, seeking for e-shape to fully comply with its objectives.

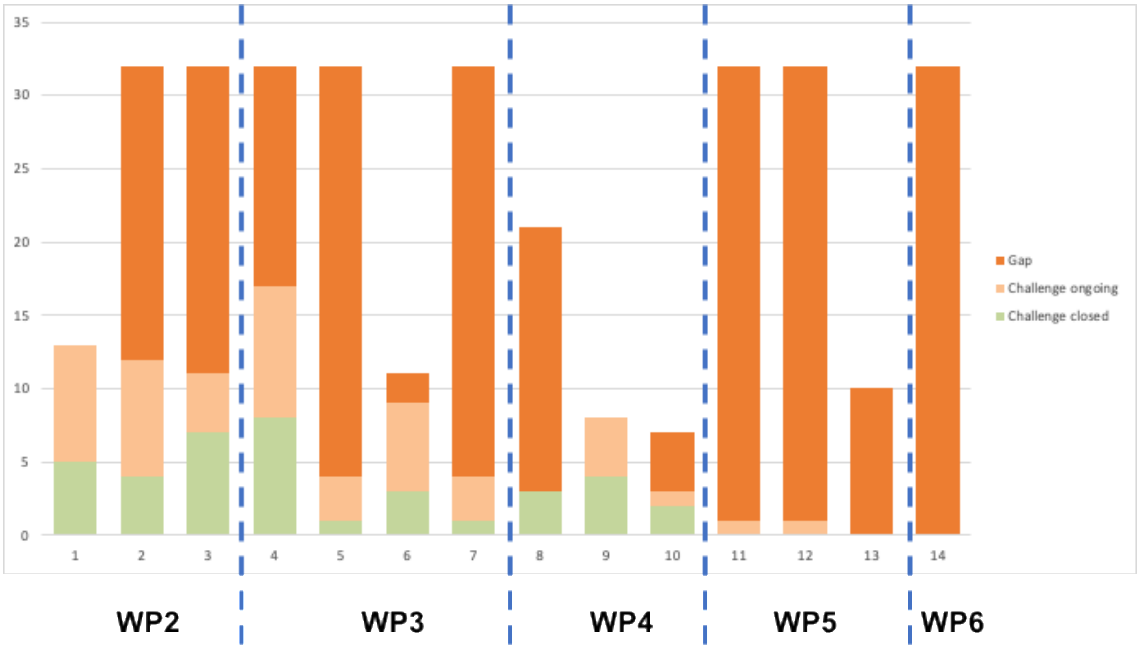

Figure 2: KPIs status assessment at the Sprint 2 kickoff meeting, before Pilots defined their Challenges

Considering the targets, some KPIs have to be addressed by all the pilots in Sprint 1 or in Sprint 2. In case the pilots did not address them in Sprint 1, the related Challenges will be mandatory in Sprint 2. This is the case for the Challenges: 2, 3, 4, 5, 7, 11, 12, 14. Some KPIs with less aggressive targets were relaxed, and the process left some flexibility to the pilots. They could for instance select between Challenge 6 and 13 and one among the Challenges 8, 9 and 10. At the start of Sprint 2, the Challenge 1 is already overachieved, so the pilots can take it if they want for the benefit of their pilot, but there is no requirement from the project.

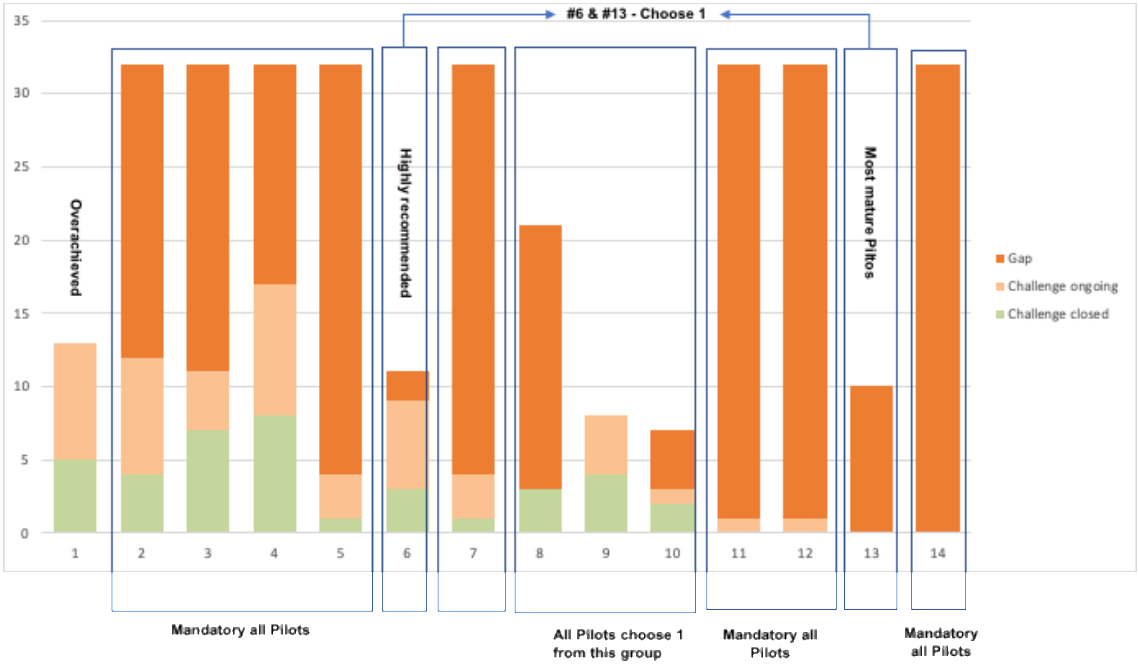

Figure 3: Challenges selection end Sprint 1 and guidance for Sprint 2

Comments on Figure 3: The figure presents for each challenge 1 to 14 on the horizontal axis, the gaps with between the previous achievements and the KPIs targets. It then offers some groupings to drive the selection of the challenges at the start of sprint 2. This approach has been presented and explained to the partners at the Sprint 2 kickoff.

The approach led to the definition of a proposal for a Pilot-specific Sprint "trajectory", recommended to the Pilots over the two sprints in order to achieve the overall project's objectives (Figure 4).

TRAJECTORIES	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
S1P1	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S1P2	SPRINT1	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S1P3	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S1P4	SPRINT1	SPRINT1	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S1P5	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S1P6	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S2P1	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S2P2	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S2P3	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S3P1	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2
S3P2	SPRINT2	SPRINT2	SPRINT1	SPRINT1	SPRINT1	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S3P3	SPRINT1	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S3P4	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S4P1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S4P2	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S4P3	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S5P1	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2
S5P2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S5P3	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S5P4	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S5P5	SPRINT1	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S5P6	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S5P7	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S6P1	SPRINT1	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S6P2	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S6P3	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S6P4	SPRINT2	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S7P1	SPRINT1	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S7P2	SPRINT2	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S7P3	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S7P4	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT1	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2
S7P5	SPRINT1	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT1	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2	SPRINT2

Figure 4: Recommended trajectories to the Pilots across Sprint 1 and Sprint 2. In line: the Pilot's unique id and in column, the challenge reference number.

Comments on Figure 4: The figure reminds each pilot with the challenge they have already addressed in Sprint 1 to help them focus on the definition of the challenges for the sprint 2 based on the guidances introduced by figure 3. The methodology supporting the selection and definition of the challenges for Sprint 2 has been explained during the kickoff with figure 2 and 3. Its goal was to guarantee the full coverage of the e-shape project KPIs out of the work of the 37 pilots by the 68 partners. The partners can focus on their sprint targets that have already been aligned with the project goals.

The proposed strategy was fruitful, as demonstrated by Figure 5. The Pilots subscribed to the proposed trajectories, and the project is in the right direction to meet its KPIs if those Challenges are implemented.

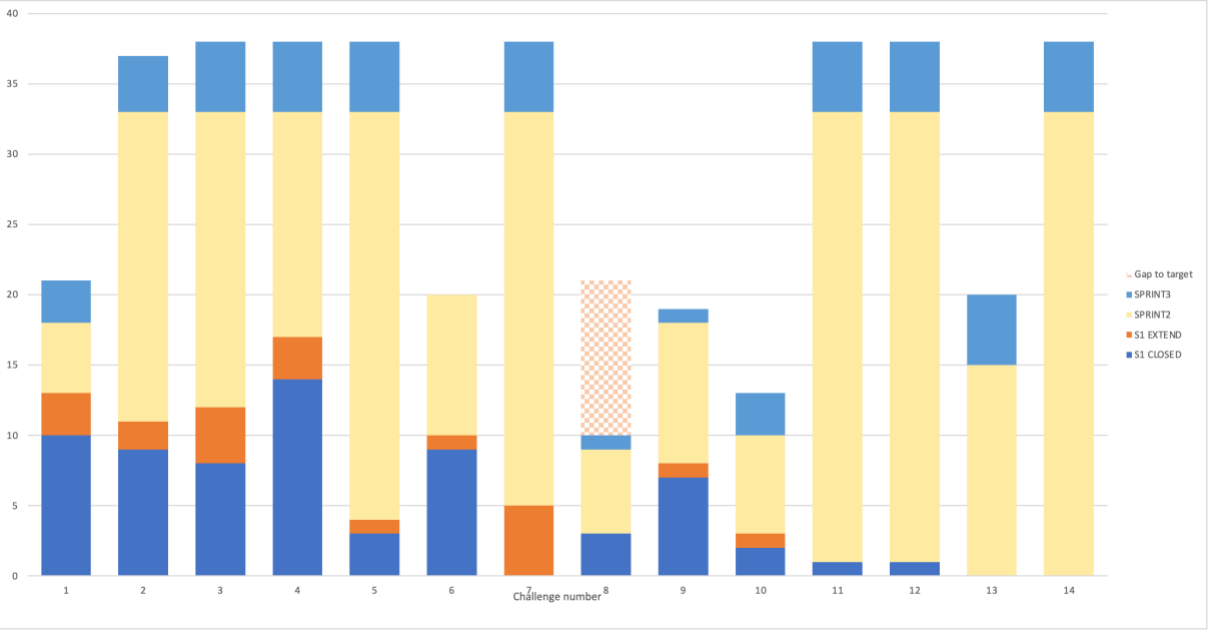

Figure 5: Number of Pilots having subscribed each Challenge in Sprint 1, Sprint 2 (and the mini Sprint for onboarding 2 - 5 Pilots)

Comments on Figure 5: The figure shows the good mitigation between the Pilots goals and the Project KPIs thanks to this Sprint 2 preparation works. The risk to address poorly a KPI is low as each KPI is supported by a collection of pilots.

Sprint 2 was divided into 2 sub-sprints (April to October 2021 and October 21 to April 22), in order to help the pilots to phase their effort over time and for monitoring to be effective. The method has been accepted by the partners and implemented through the Showcase Support Service as 343 new Challenges.

The methodology has allowed scheduling the workload of the work packages, in terms of start and end date per Challenge (Figure 6); and expected milestones (Figure 5).

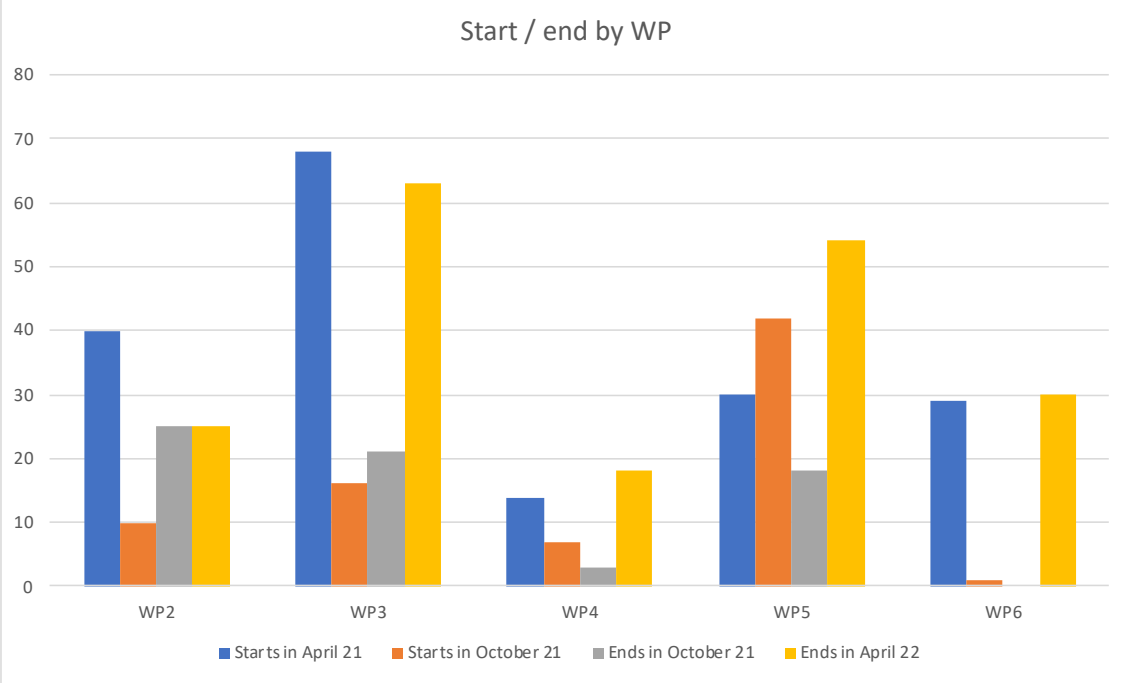

Figure 6: Expected work package workflow, according to the start and end dates per Challenge.

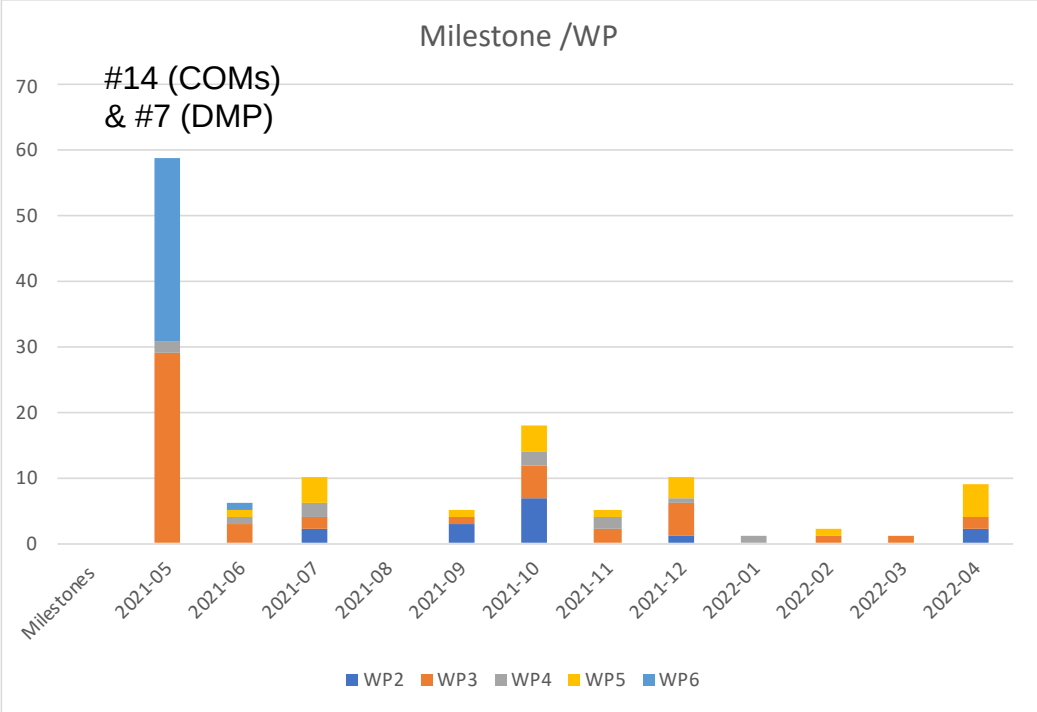

Figure 7: Expected work package workflow, according to the milestone's, achievement dates within each challenge.

Comments on Figure 7: The challenge 7 has been defined for all pilots in the same way as the documentation of the Self-assessment tool to build individual and global project Data Management Plan. The challenge 14 is a communication plan for each pilot in support to WP6. It was a new challenge for all to intensify the communication covering all activities. Both challenges had an early in May 2021.

3. Reporting

3.1 Reporting per pilot

The detail of the statuses for all challenges as declared by the pilots are provided in Annex 4. The detail of the definition, status and assessment for all challenges related to WP3 are provided in Annex 5. The platforms used by each pilots at the end of the project are detailed in Annex 6.

Noticeably, a large number of platforms have been used. It mixes Data as a Service platforms, Platforms as a Service, Portals, Generalist platforms, Thematic platforms …

They will be characterized in the final Best Practices. The platforms really used have changed during the e-shape project compared to the initial plans. Considering the PaaS Cloud Platforms, the reasons most frequently mentioned were a lack of reactivity from the support, or the data catalog. The available libraries or expert software have been mentioned as a plus, but never as a bottleneck as the Platforms allow to install additional libraries.

The e-shape project has actively supported the publication in GEOSS, EOMall and EOWiki so these portals give access to many pilots' information. The use of Copernicus data and services was one of the Pilots selection criteria so many of them use them. The use of DIAS platforms was encouraged, all the DIAS have been used or assessed by at least one pilot, sometimes many more. Some pilots have assessed the DIASs in support to the project even if they didn't really need them and were happy to have learned more deeply about them for future potential use. The following paragraphs focuses on key outcomes of the Sprint 2 process:

- a synthesis of the status of all the Challenges as declared by the pilots themselves,
- a synthesis of the assessment by WP3 of the Challenges related to WP3 (Challenges 4, 5, 6, 7),
- a review of the ongoing or potential contributions from the pilots to the Best Practices,
- a synthesis of the EO platforms used by the pilots

3.2 Status of the Challenges as declared by the pilot

The Sprint process federates the engagement of the Pilots with each work package. In this regard, the Challenges C1, C2, and C3 are related to WP2; the Challenges C4, C5, C6, and C7 are related to WP3; the Challenges C8, C9 and C10 are related to WP4; the Challenges C11, C12, and C13 are related to WP5; C14 is related to WP6

Annex 4 documents the status for each of all the Challenges as defined by the pilots themselves (updated on November, 8th 2022). The status workflow is provided below as a reminder in Figure 7.

For each Challenge, the Pilots have defined one (and up to four in rare cases) intermediate milestones, as checkpoints for the realization of the Challenge during Sprint 2 named M1 to M4. The Pilots regularly post their progress on the SSS to move to the next milestone until the Challenge is completed.

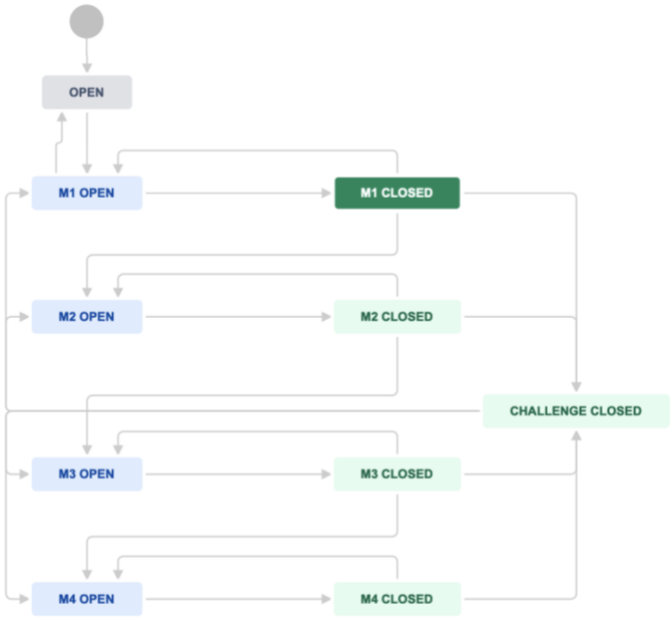

Figure 8: Challenge's status workflow

Comments on Figure 8: The challenges had been created with a status OPEN. The Pilot partners had to update it to M1_OPEN (Milestone 1 open) when starting the works. Then they could inform when the first milestone was reached moving the challenge to M1 DONE (Milestone1 done). When began the works for milestone 2, they could open the second milestone moving to M2 OPEN (Milestone 2 open) until they finish the last milestone and close it updating the status to Mi CLOSED. Then the challenge can be closed moving it to CHALLENGE CLOSED. Figure 9 shows the status as of 8th November 2022. The 38 challenges #C14 that are Communication challenges are not taken into account in this figure because they have been reopened to keep the communication ongoing until the end of the project. At that date, 74,59% of the 303 (WP1 – WP5) Challenges are completed ("Status: Challenge Closed"). 25,41% are in a status requiring further follow up by the Sprint master (WP3).

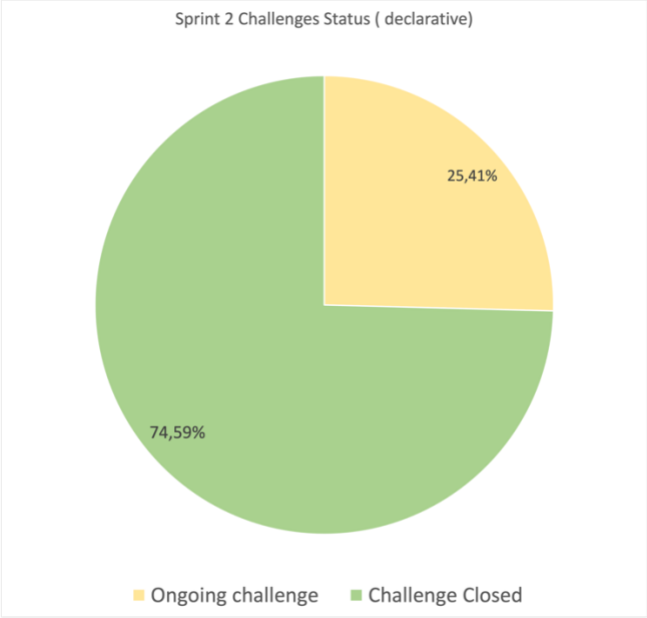

Figure 9: Sprint 2 Challenge status (declarative, according to Pilot's self-assessment).(as of November 2022)

Comments on Figure 9: At the end of 2nd sprint, the pilots had assessed 74,59% of 303 challenges as closed and 24,41% remained ongoing. This includes the challenges 1 to 13 related to the work package 2 to 5. The Challenge 14 related to WP6 Communication are not taken into account as they have been extended to keep the communication up until the end of the project. The detail of the status per challenge is provided in Annex 4.

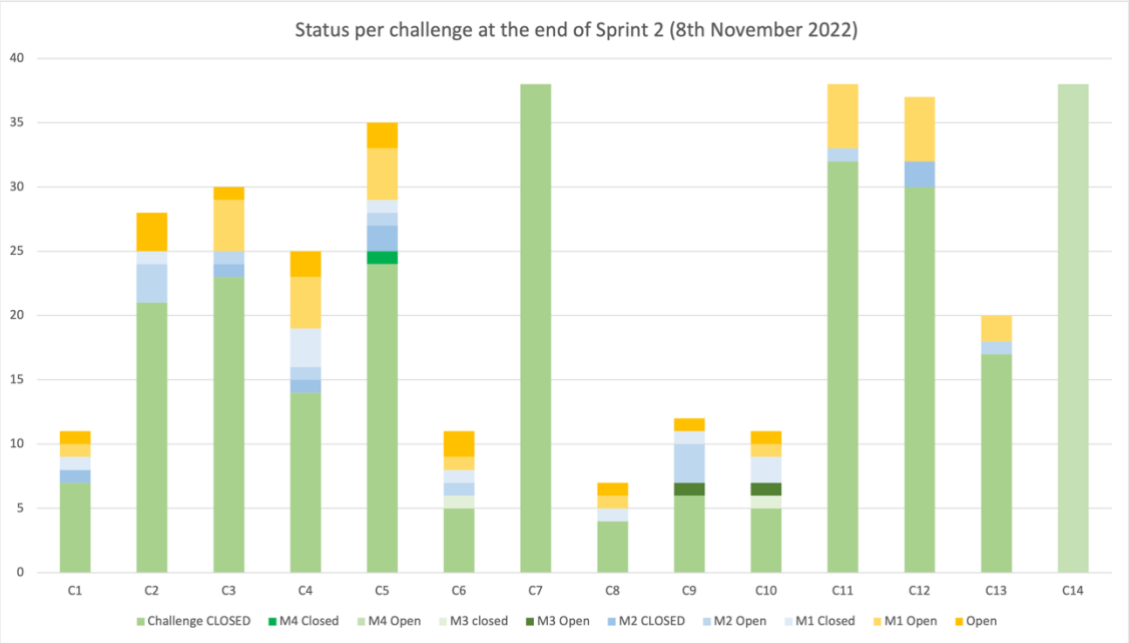

Figure 10 : End of Sprint 2 : Challenge status per Challenge type (declarative, according to Pilot's self-assessment).

Comments on Figure 10: This figure presents the status of the challenge tickets per challenge type (C1 to C14). The green color represents the challenge tickets that have been closed or are near to be closed.

The blue the challenge tickets which are progressing on the second milestone and in yellow the challenge tickets which are still working on the first milestone, in orange are the one which are still starting

Notes: The challenges are listed in "Annex 3: e-shape Challenges and distribution over the WPs ».Mi: milestones selected by the Pilot for this challenge. At the end of the Sprint all the Milestones should be documented to close the challenge.

3.3. Review of the Challenges related to WP3- Implementation (C4, C5, C6, C7)

3.3.1. How the Challenges have been reviewed

The first target of the Sprint assessment is to review if the Challenge tickets have been completed, reporting good progress aligned with the e-shape KPIs. To this end, a detailed review was conducted for each of the Challenge tickets in the scope of WP3: the definition of the Challenge tickets has been reviewed, the initial state, the final state, the means of evaluation and the final material. The alignment of the inputs from the pilots to WP3 activities has been assessed, additional questions have been asked triggering interactions for future works.

When the Challenge tickets was not completed, the reasons were reviewed to identify some possible lessons learned out of the mitigation actions, or to improve the risk assessments. The COVID-19 pandemic could not be foreseen at the beginning of the Sprint, end of 2019, neither some political troubles in Ethiopia or the war in Ukraine. These events clearly impacted some of the pilots because in-situ measurements in the fields and on-site capacity building were not possible, besides some partners were not ready for immediate intensive remote work or have met some limitation due to recent security policies. In practice, even if the Challenge tickets could not be fully completed, mitigation actions have been defined and very valuable material could be provided that will be usable in the upcoming Best Practices Guide.

Figure 11 below summarizes the Sprint 2 development and assessment process for the Challenge tickets related to WP3.

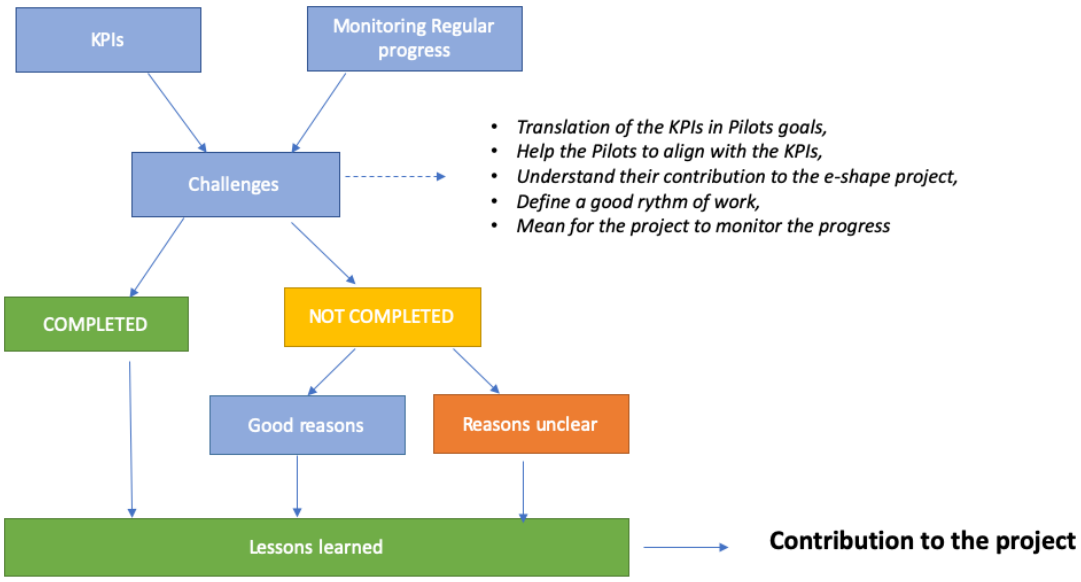

Figure 11: Sprint 2 development and assessment process

Comments on Figure 11: This figure presents the process to review and assess the Challenge tickets. The challenges cascading e-shape's KPIs into regular implementation progress and are supported by the monitoring process over the entire Sprint duration. The challenges have been used to specify implementation targets for each pilot monitored by a ticketing system . At the end of the sprint, each ticket has been reviewed to assess if targets had been completed or to document under achievements.

3.3.2. Outcomes of the Challenges C4, C5, C6, C7

Review was conducted by iterating with the Pilots, bringing clarifications on expected reporting, and conducting bilateral meetings when needed (WP3 and Pilot leader). Based on this clarification process, the assessment of the tickets could most of the time evolve towards a more positive assessment.

Figure 11 and 12 share the same color code: Green indicates that the challenge is completed as expected, Blue indicates all is not completed but the pilot could provide reasons delays, indicates all is not completed with unclear causes.

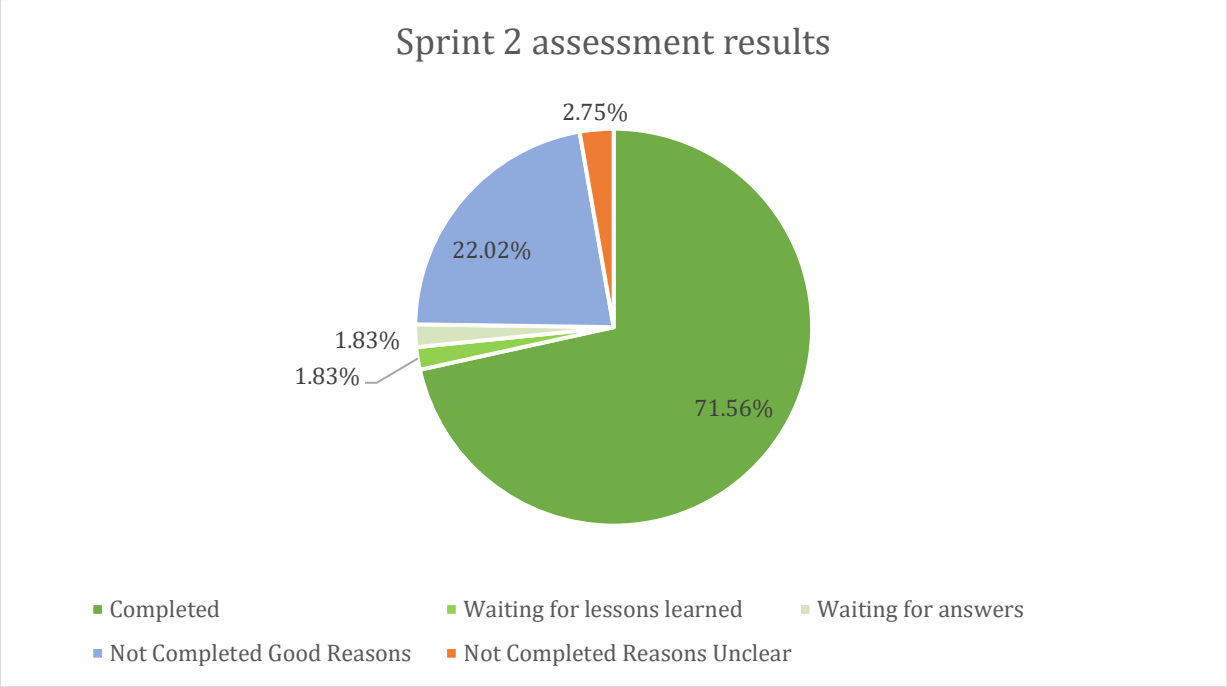

Figure 12: Sprint 2 assessment results

Figure 12 synthesizes the level of achievement for the Challenges related to Implementation (WP3based on a thorough review of the milestones and achievements by WP3's lead (Annex 4). Some challenges are still under review and some are waiting for lessons learned to be collected for e-shape's Best Practices Guidelines.

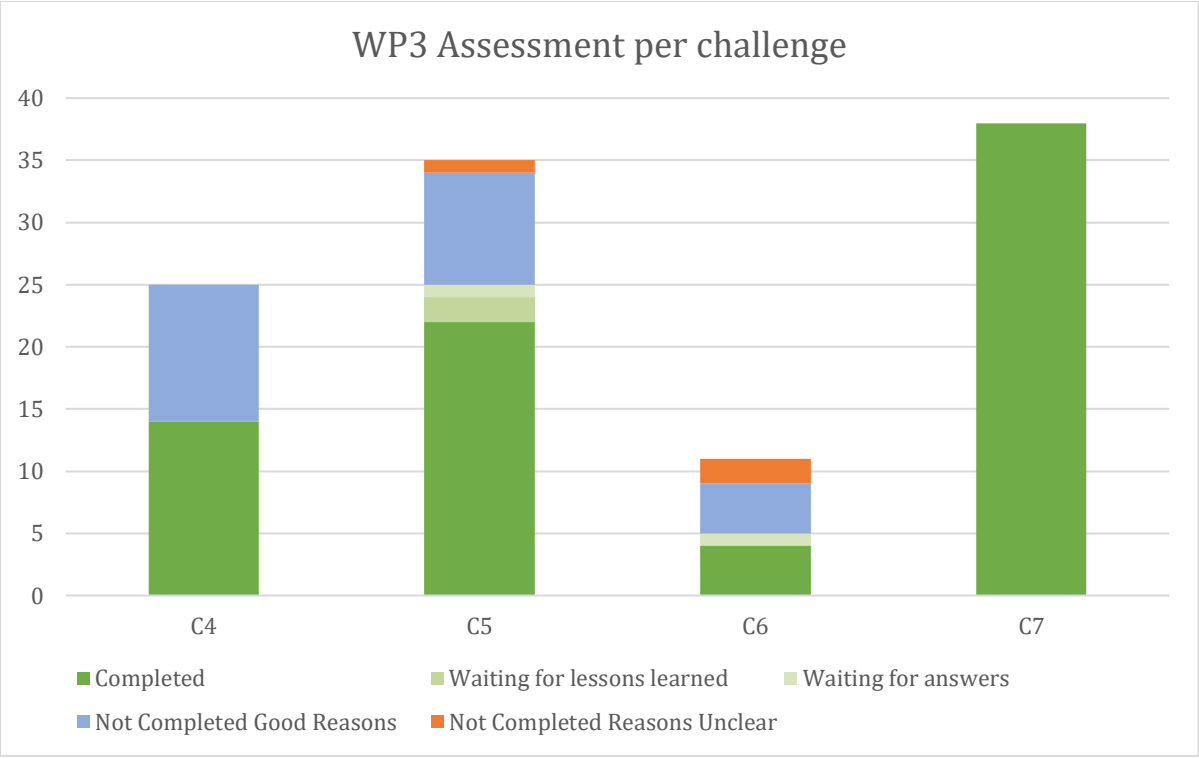

Figure 13: WP3 Assessment for Challenges 4, 5, 6 and 7 related to WP3, after review of statuses and evidence of achievement by the Sprint master (WP3).

Comments on Figure 13: Several feedback were provided via the SSS and the figure reflects the assessment on 12th November 2022. Overall, the success rate for the challenge tickets related to WP3 in the Sprint 2 is at least of 75% and could reach 98% when all the tickets will be closed.

For each pilot Annex 4 , delivers the Status as assessed by the pilot partners, the status as assessed by the Sprint WP3, a reminder of the expected final state and final material as captured, and comments on the work done.

The expected final state and final material are mentioned in italic font to emphasize that this is a reminder extracted from the SSS as declared by the pilot in the Challenge ticket definition at the beginning of the sprint.

Annex 4 shows very few discrepancies between the Pilot's self-assessment and the work package 3 lead assessment. This shows that the methodology has been understood and adopted by the partners.

4. Contribution to e-shape

The pilots contribute through successes, issues - and sometimes failure - in implementation. They also contribute to the project by building a vision of the European resources landscape, knowledge and best practices. In other words: "what resources are used, how to use them in the best way, and how to minimize or mitigate the risks."

As the methodology has been defined to drive the pilots to implement and report towards this objective, without any surprise, the results and inputs from the pilots are fully addressing the initial WP3 objectives reminders thereafter.

> As a reminder the Objective in special focus to WP3 is:
>
> SO-2. Demonstrate the benefits of the EO pilots through the coordinated downstream exploitation of EO data and the utilization of existing EO resources: The pilots will demonstrate the benefits for the different users and the iterative improvement of the services provided. To that end, it is critical to exploit the IT capabilities and the wealth of data made available through DIAS, GEOSS platform, NextGEOSS, EOSC, in-situ observatories (as organized in ENVRI plus), citizen observatories and any other existing hubs or platforms. This shall be done in full compliance to the INSPIRE directive, GEO Recommendations on interoperability and GEO Data sharing and Data management principles in WP3. Ultimately our aim is to build on top of existing EU EO resources and scale them up towards higher visibility of European actions within GEOSS Flagships and Initiatives. At the same time implementation of the pilots will support the achievement of the three engagement priorities of GEO, namely the 2030 Sustainable Development Agenda, the Paris Agreement and the Sendai Framework.

The pilots demonstrated the benefits for the different users and the iterative improvement of the services provided via many deliverables, success stories, open source, communications and publications accessible via community portals, GEOSS, EOWiki, EOmall, github and much more (see paragraph 3 and Annex 7).

The pilots have exploited the IT capabilities and the wealth of data made available through DIAS, GEOSS platform, NextGEOSS, EOSC, in-situ observatories (as organized in ENVRI plus), citizen observatories and any other existing hubs or platforms. More than 50 platforms serving Data, allowing Processing or Data or information publication have been used. The Pilots have been encouraged to use or assess the DIASs. All the DIASs have been used or assessed by at least 1 pilot, many more for WekEO and CREODIAS.

Sometimes the pilots would not foresee to rely on Cloud platforms but have assessed one DIAS and learned about Cloud technology, which might trigger the use of such technologies in the future. Sometimes a DIAS was used, but issues related to data access reliability, processing service or complexity of invoicing brought to conclusion that internal infrastructures were more adapted, awaiting for the platforms to really reach the operational level of expectations for a sustainable business. Some pilots have been delighted with the DIASs services founding the scalability and costs savings they expected. The final best practices will detail these feedbacks.

All has been done in full compliance to the INSPIRE directive, GEO Recommendations on interoperability and GEO Data sharing and Data management principles. The GEO DMP implementation tool developed by e-shape has been used by all the pilots via the Challenge 7 proving that it was usable and useful. It has been endorsed by GEO Secretariat and published in the GEO Knowledge Hub. All this is documented in D1.6.This tool will have follow ups to become more sustainable. These follow ups will be driven by ARMINES (e-shape lead who developed this tool) and OPIDOR that is a French Research department support for Data Management for research : https://opidor.fr/

EU EO resources have been scaled up towards higher visibility of European actions within GEOSS Flagships and Initiatives. Pilots from Showcase 1 are connected to GEOGLAM, pilots from Showcase 2 are connected with GOS4M, pilots from Showcase 3 are connected with GEO VENER, pilots from Showcase 4 are connected to GEO BON, …. All the pilots and work packages have communicated about the benefits of EO pilots, European EO

Resources and infrastructures in all relevant conferences and meetings. Many Youtube videos also have been published. The e-shape website has been re- designed to make this legacy more sustainable.

All the e-shape pilots support some or several of the three engagement priorities of GEO, namely the 2030 Sustainable Development Agenda, the Paris Agreement and the Sendai Framework.

The assessments of Sprints have been the opportunity to review if the Challenges were completed and, more broadly, how the activities could contribute to e-shape's body of knowledge and lessons learned. Eventually, these outcomes will be made reusable for the greater good and through the final Best Practices.

The potential Best Practices were identified during the initial assessment. Each Pilot will contributes to one or more Best Practices. At the end of Sprint 1 a Matrix had been done to identify on what topic each pilot could contribute. During the Sprint 12 assessment this has been done via the Annex 5.

This collection of knowledge could be innovative thanks to the strong user centric approach and the diversity of implementations it is built on. Some of the topics, particularly important, or challenging, or where e-shape could bring the biggest innovative impacts, have been sometimes deepen via targeted workshops or capacity development activities. This has been the case for the European Platforms Landscape and the challenges for the EO community to embrace the Cloud technologies adopting the change of paradigm required by the move from in-house resources to Cloud platforms. In the past, the scientists had predefined resources in term of computing capacities, storage and RAM available on their desk or in their computing rooms. They used to adapt their work to the resources when and where available, and resources that were apparently available "for free" (as the investment was a sunk cost from the institution). From a scientific or technical standpoint, they may have liked to work on a larger geographical area or with a better data resolution, with a better time response – but technical resources were the main constraints. Additional investments in capacity would become indirect costs borne by the institution. Such additional costs could be internalized in the framework of long-term operational services (e.g. meteorology), but earlier-stage pioneer developments would not trigger such needs.

The cloud technologies change dramatically the paradigm, as the scientists need to move away from "free"/limited resources to pay-per-use/"unlimited resources". There, a trade-off needs to be found between resources per user (cost drivers) and benefits (the scientific equivalent of the ARPU, where "Revenue" may be intangible – but real - for public services).

There the question is not anymore: "What can I do with the resources available to me?", but instead "Which resources do I need to deliver my vision in a cost-effective manner?".

In the context of e-shape and EuroGEO – potentially characterized by technology-push applications going to the market, and hence driven by background science, we can observe that when you ask the EO scientist-developers: "which technical resources do you need?" they may get puzzled.

Unfortunately, this is the first question to solve to be able to estimate the cost of the resources, to assess the different solution providers relatively to your needs or anticipate a budget requests sometimes very long in advance. Sprint 1 has provided key feedbacks to tackle this topic and hopefully consolidate findings in a valuable way for the community.

Sprint 2 has gone further in the assessment of the Usability of the European Platform as a Service and a synthesis will be presented at the EuroGEO workshop in December 2022 based on the below SWOT analysis extracted from the Draft of the final best practices (Table 1). This is just an example of the contributions from the pilots to e-shape transversal activities in support to the development and upscale of European Cloud services for EO.

A SWOT analysis is a structured review of a business, project, system or technology emphasizing:

- its Strengths, i.e. characteristics of the technology that gives it an advantage over others;
- its Weaknesses, i.e. characteristics of the technology that places it at a disadvantage relative to others;
- Its Opportunities, i.e. elements that the technology could exploit to its advantage,
- its Threads, i.e. elements that could cause trouble to the technology,

Table 1: SWOT Analysis of Cloud Technologies for Earth Observations - Theory and Practice.

Strengths

- Theory
  - Scalable IT resources: on-demand Storage, computing power and RAM. This the primary driver for Cloud technology's popularity and its fitness to EO.
  - Develop a business model as Everything as a service.
  - Cost-effectiveness: Reduced expenses based on real use of the resources and lower staff costs in infrastructure management and monitoring
  - Flexible and resilient disaster recovery.
  - Pricing Transparency by the service providers.
  - Faster provisioning of systems and applications
  - Secured infrastructure
- Return of experience from the e-shape pilots
  - Developers need to have a first idea of the resources needed as a baseline and on pics to compare prices of the different platforms. The temporary free sandbox offered by all platforms can help for this.
  - Components from the application or service architecture that can have different needs might be packaged in different containers: for instance, Jupyter Notebooks or front-ends might require more RAM to face randomly increasing users access than CPU or storage when data processing might require more CPU or storage than RAM. Having modular architecture is a general best practice and is very needed in Cloud for EO.
  - It is better to minimize the initial configuration as scalability is a native capacity than paying for unused resources
  - The price assessment tool from ESA Network of Resources can help compare the platform's offers.
  - Data as a Service has been the first popular service developed on the Cloud for EO; with the change of paradigm of bringing the process to the Data, Science as a Service or Applications as a Service development is increasing.
  - Startups will be able to afford infrastructures they cannot buy on their own but major research organizations will keep on using their in house HPCs until a real cost assessment is done, a strategy for the best use of internal/external resources is defined and eventually, a budgeting reorganization is implemented.
  - Some pilots had irregular access to the data and had to implement their own data access to secure the service because the support was not reactive enough for the level of reliability their service was demanding
  - Pricing is transparent but pricing lists are not always clear and real costs including scalability can become opaque.

Weaknesses

- Theory
  - Specific training required
  - Challenge in migrating from one Cloud service provided to another.
  - Lack of interoperability between the different cloud service providers.
  - Application & Service access is highly dependent on Network Bandwidth.
  - Data transfer bottleneck
  - Open Standard Implementation.
- Return of experience from the e-shape pilots
  - Several pilots have migrated platforms during the e-shape lifetime and did not identify this as a major source of problems. At most some delays that they could mitigate
  - No major problems were expressed related to interoperability
  - Some pilots have expressed that they were reaching the limits for Data download while others have directly implemented the new paradigm of Applications near the Data that has been designed to mitigate this issue
  - Lack of In Situ global or thematic collections push users to develop their own data hubs
  - Open standards are used by all the stakeholders from data providers to technology providers, and application developers. Their benefits are obvious including the availability of open-source integration

Opportunities

- Theory
  - Onboarding of application deployment and entry to the market is cheaper, and higher return on investment in a short time.
  - Good opportunity for SMEs to optimize upfront investments,
  - Pay-for-Use licenses,
  - Adaptive to future needs.
  - Cloud provides an excellent backbone for Mobile & Web-based applications.
  - High-tech work environment offering modern information solutions according to the last technology,
  - Easy, Quick & Low-effective mitigation of identity, privacy, security, reliability, and manageability risks in cloud-based environments.
  - The cloud computing approach speeds the deployment while preserving dynamic flexibility.
  - EO Platforms provide access to big catalogs of Open Data and Open source
  - The EO platforms often offer software packages enabling expert EO data processing.
- Return of experience from the e-shape pilots
  - the adoption of the Cloud technology is a source of complexity and requires developing new skills, involving new skills background in the team or subcontracting part of the activity introducing delays

- the higher return on investment is not clear when the Cloud platforms do not have the same level of "operationality" as the usual resources as debugging or running analysis in a distributed environment can be complex and costly.
- No problems have been reported with identity, security, and manageability risks in cloud-based environments.
- Privacy stays an issue at a different level including the use of Cloud. Reliability has been criticized by several pilots
- The cloud computing approach speeds the deployment for a newcomer but for those who already have infrastructures that they master, it is not the case
- All catalogs are not online and the process to synchronize the download of several datasets can be tricky.
- Platforms should provide more ARD. EV can be a driver to define which ones.
- Open data value can be revealed by the use of Audience Analytics tools. These data are an opportunity to optimize the catalogs. Unfortunately, the most current free tools are US and their data is not open.

Threats

- Theory
  - Data Security concerns,
  - Physical location of hardware is unidentified, therefore Governments consider the storage of their data out of their land and beyond their regulation boundaries.
  - Scalability impacts costs that can become opaque in the long run. users need to know when and how long the resources used have been "exceptional"
  - Business is highly dependent on the 3rd party Cloud service provider,
  - lack of commitment to high quality service and availability quarantees
- Return of experience from the e-shape pilots
  - No problem with security has been reported
  - Several pilots had to change platforms and could mitigate the impacts
  - It can be necessary to identify where the personal data are physically stored and this information can be difficult to get from the providers
  - Audience Data analytics are a revealer of the open data value. Currently, the free tools are US and the generated data is not public.

Synthesis on the usability of Cloud Technologies for Earth Observations - Theory and Practice Status

- Cloud technologies fit the need of Earth Observation domain.

Recommendations for all

- Companies working with EO should develop a strategy for the best use of Cloud technologies for their needs. This strategy will be highly dependent on the size of the company and existing in-house infrastructures. The real cost of the use of existing infrastructures (in particular HPCs) should be considered.
- Cloud technologies for Earth Observation require specific training, hiring new staff with these skills, subcontracting experts or getting. very good support from providers mastering Cloud and EO.

Recommendations for EO applications developers

- Developers reaching data download bottlenecks should consider pushing the Application near the Data
- The application architecture should be modular and the component should be containerized in consistent packages in relation to the Cloud resources scalability/elasticity that is needed.
- The operational SLA should be explicit to identify the level of reliability and reactivity of the support. Users should test the reliability (data access and processing) and the reactivity of the support over a reasonable period of time.
- The use of open standards as an enabler to reduce dependency should be encouraged.

Recommendations for EO Cloud Platforms providers

- Platform providers should keep on offering a free period and sandbox to develop this training on the users' specific needs to identify the technical minimum and maximum requirements.
- Alerts on extra resources activation or threshold of costs and their deactivation should be implemented.
- Dashboards to monitor real resources consumption should be accessible.
- Online catalogs should be over longer period of time, maybe on specific data and coverage to be identified.
- Audience Data analytics can be used to optimize the catalogues
- More Analysis Ready Data should be made available
- Essential Variable can be an opportunity
- In situ still driven by the communities. Can ARD on in situ be an opportunity?

5. Successful and unsuccessful challenges analysis

This analysis focuses on the challenges related to WP3 and for which the status is presented in Figure 12 above.

The criteria that have been assessed as completed were:

- To have reached the “Expected final state”
- To have delivered the “final material”
- To bring lessons learned to the collection of knowledge that will feed the e-shape Best Practices

When the “Expected final state” or the “final material” was not delivered, WP3 has systematically tried to identified lessons learned from the works that had been developed during the Sprint.

Some of the unachieved challenges have been re-planned for Sprint 2.

The pilots have met different types of unexpected obstacles.

- COVID 19 impacts:
    - In situ data could not be collected in Ethiopia Finding alternative sources of in situ data with the good access rights has required a lot of efforts.
    - Remote work had to be organized under pressure and all the partners organizations were not ready for this. This has been the cause of some delays
- International Conflicts:
    - A pilot taking place in Ukraine had to face the impacts of the international conflicts.
- Delays:
    - Beside the delays due to COVID, there has been some delays to get feedbacks to the request for quotation sent to the Platform providers. Some platform providers sometimes did not answer at all. It is not always clear if this was due to a request poorly expressed, a lack of resources from the platform provider, a bad point of contact or any other reason that can happen. Hopefully as the European landscape is rich in platforms, this could be mitigated.
    - Some partners had not planned the resources needed for the Platforms services into their budget. This can probably be explained by the change of paradigm and the need to develop new skills linked to the move to the Cloud technologies. In the past the scientists only focused on their scientific problem and the infrastructure costs were managed by the IT department. Even in some H2020 projects such as NextGEOSS, the thematic scientific partners did not pay for the Cloud resources. This budget was included in the technical partners budget. Moreover, we could observe a trend to overestimate the resources needs and costs if the new behaviors required by the Cloud scalability such as booking the resources when needed and releasing them when not needed anymore were not clearly understood and adopted. The search for grants or additional budget for these technical resources has also been the source of some delays.
- One pilot lead did not have the direct authority on the teams he had to coordinate and had some troubles to mobilize the work resources in the timing requested by the e-shape project

Some pilots, in their efforts to mitigate some difficulties or to adapt to evolutions of the EO ecosystem, have slightly evolved their initial sprint target and could not meet their final deliverable target. They have nevertheless provided a valuable contribution to the e-shape best practices. This led to some uncompleted challenges which are not directly connected to the quality of the work that has been done.

The methodology adapts and should allow the needed flexibility to coordinate and engage with the large number of partners.

Considering the high rate of successful challenge tickets, we can consider that the methodology has been successful to harness all the Work Packages and all the Pilots into a global project dynamic.

6. Where are results visible?

The Annex 7 details all the visible results from the pilots. Overarching links pointing to key informations are provided below:

- the description of the pilot published in the e-shape project's public website
    - Link: https://e-shape.eu/index.php/all-pilots
- ISO Metadata for all pilots available on the GEO Energy Community Catalogue
    - Link: https://tinyurl.com/4h7xmnsm
- link to the results published in the GEO Portal after harvest of the Catalogue by the GEO DAB
    - Link: https://bit.ly/3MbO4Xw
- link to the results published in the GEO Portal after harvest of the Catalogue by the GEO Knowledge Hub
    - https://gkhub.earthobservations.org/communities/e-shape
- Community portals, thematic platforms or dedicated ftp where the results are also published (when available),
- link to success story on EOMall (always available),
    - Link: https://eomall.eu/e-shape
- link to success story on EOWiki (always available),
    - https://earsc-portal.eu/display/EOwiki/supporting+the+awareness+of+European+EO+activities
- Other public related links (Github, videos, ...)
- other additional results that will contribute to the Best practices

Annex 1: e-shape Objectives

The EuroGEOSS Showcases project will implement a coordinated and comprehensive EO data exploitation initiative through collaboration amongst the European GEO Members and Participating Organizations in order to accelerate the users' uptake of open EO data and information for the benefit of Europe.

The general objectives are to set-up and promote a sustainable organization dedicated to users' uptake of European EO resources, building on Copernicus and GEOSS through the development of co-design pilots (i.e. application-oriented products, services or solutions) built on a user-centric approach and delivering economic, social and policy value to European citizens.

Specific Objectives

The following Specific Objectives (SOs) represent a first order decomposition of the General Objectives. These SOs are aligned with the project organization and Work Packages (WP) structure, thus providing a clear and measurable way in which they can be regularly tracked.

SO-1. Develop operational EO services with and for users active in key societal sectors: We will follow a user-centric approach in which pilots across 7 thematic areas (food security, health, renewable energy, biodiversity, water resources, disaster resilience and climate) aligned with UN sustainable development goals will be co-designed from the very beginning of the project (WP2). Building on key results from existing GEOSS actions and on the exploitation of Copernicus Services, the project will strive to bring operational EO pilots to the market. For each pilot, the teams of scientists, IT developers, user uptake specialists and business experts will work closely together with users to design and develop services that can be incorporated in their operational workflows. Thus, through this iterative co-design approach, the project will develop a suite of 26 user-driven pilots that can bring significant socio-economic and environmental benefits to the respective user communities

SO-2. Demonstrate the benefits of the EO pilots through the coordinated downstream exploitation of EO data and the utilization of existing EO resources: The pilots will demonstrate the benefits for the different users and the iterative improvement of the services provided. To that end, it is critical to exploit the IT capabilities and the wealth of data made available through DIAS, GEOSS platform, NextGEOSS, EOSC, in-situ observatories (as organized in ENVRI plus), citizen observatories and any other existing hubs or platforms. This shall be done in full compliance to the INSPIRE directive, GEO Recommendations on interoperability and GEO Data sharing and Data management principles in WP3. Ultimately our aim is to build on top of existing EU EO resources and scale them up towards higher visibility of European actions within GEOSS Flagships and Initiatives. At the same time implementation of the pilots will support the achievement of the three engagement priorities of GEO, namely the 2030 Sustainable Development Agenda, the Paris Agreement and the Sendai Framework.

SO-3. Promote the uptake of pilots at national and international scale, across vertical markets (private and public) and amongst key user communities: We will place strong emphasis in the uptake of the pilots (WP4) across three main inter-connected dimensions: Sectorial uptake, National/regional uptake, and International uptake. This will be guided by a comprehensive user uptake strategy. Our aim is to attract and involve the key organizations (UN-SDGs, GEO, Copernicus, ESA, UNFCCC), initiatives (e.g. EIPs, KICs, PRIMA, etc.) and user communities at large (e.g. COPA-COGECA, IRENA, IEA, UNISDR, ILTER, etc.). Alongside the liaison actions we will undertake a series of capacity building activities with the aim to train users in a given sector on the integration of EO-based solutions in their workflow.

SO-4. Enable the long-term sustainability of the numerous pilots, their penetration in public and private markets and support their upscaling: The sustainable uptake and exploitation of the provided pilots in different markets serving public/government and private users lies at the core of our approach (WP5). Thus, to boost the sustainability potential of the pilots we will supply all the necessary tools (business plan support, IPR advice, market intelligence, investment readiness, on-line market presence). Our aim is to establish a long-term mechanism – the "sustainability booster". It will help not only pilots developed in the project but also those "on-boarding" from the greater community in an inclusive spirit. The penetration of pilots in public and private markets will be further supported by dedicated socio-economic analyses based on an EO value tree helping to

raise awareness on the complex benefits of European GEOSS actions to policy makers, public organisations and commercial downstream markets.

SO-5. Increase uptake by raising awareness on the solutions developed through tailored and well-targeted communication, dissemination and outreach activities: The impact of large projects involving stakeholders with different backgrounds (e.g. EO-savvy vs. non-EO-conversant), thematic expertise (food, energy, environment, etc.), motivation (market success vs. policy implementation) and languages, can be significantly increased if the activities are well-communicated through targeted interactions, fit-for-purpose communication practices (e.g. social media, brochures, animations, etc.) and visually powerful media. We will thus undertake a forward-looking and innovative set of outreach activities including an help-desk (WP6) raising awareness on all its offers, providing impetus to improved policy making ignited from uptake of Copernicus and GEO in Europe and beyond and making the link between the different stakeholders and services providers.

Annex2: e-shape KPIs

e-shape's Objectives (relevant to pilots)	e-shape's Target Outcome	e-shape's Key Performance Indicators (KPIs)	e-shape's Target values	Support WP	Sprint challenge #	Sprint: Number of Pilots committed to the KPI
O1	Develop EO services with and for users	Number of user-oriented services designed (per pilot) (with various maturity level)	> 5	WP2	1	12
		Variety of users / user needs targeted by the designed services (per pilot)	> 1		2	12
		Originality of the proposed services (% of services that are out of the 'fixation', compared with a design theory- based reference that includes benchmarks inside and outside Europe) (per pilot)	> 20%			
	EO services that meet UN sustainable development goals across the 7 thematic areas	All services should be related to UN sustainable goals	100%			
	On each pilot, get an efficient organization that enable required actors to design together (scientists, IT developers, user uptake specialists, business experts, users...)	Clear collaboration procedures linking relevant actors and adapted to each specific pilot context	1 per pilot		3	11
	Scientifically validate a method of co-design adapted to	Publications in the journals and conferences of relevant scientific communities (Engineering	5			

e-shape's Objectives (relevant to pilots)	e-shape's Target Outcome	e-shape's Key Performance Indicators (KPIs)	e-shape's Target values	Support WP	Sprint challenge #	Sprint: Number of Pilots committed to the KPI
	EuroGEOSS-like contexts	design, innovation management, management science)				
O2	Exploit the IT capabilities and the wealth of data made available through DIAS, GEOSS platform, NextGEOSS, EOSC, in-situ observatories (as organized in ENVRI plus), citizen observatories and any other existing hubs or platforms.	All pilots should exploit the IT capabilities and the wealth of data made available	100%	WP3	4	17
	Pilots ready for integration into "As A Service (…AAS)" IT infrastructure such as DIAS, NextGEOSS, …	Preparedness Index (between 0 to 5) of pilot's integration towards "AAS" type of infrastructure such as DIAS, NextGEOSS, 0: Not ready, 5: fully compliant	Improvement of index for each pilot		5	4
	Usage of the DIAS	Percentage of pilots deployed in a DIAS or in NextGEOSS	>30 %		6	10
	Services shall be in full compliance to the INSPIRE directive, GEO Recommendations on interoperability and GEO Data sharing and Data management principles	All provided pilots shall be in full compliance to the INSPIRE directive, GEO Recommendations on interoperability and GEO Data sharing and Data management principles	> 80%		7	4
	To support the achievement of	All pilots aligned with at least one of the three	100%			

e-shape's Objectives (relevant to pilots)	e-shape's Target Outcome	e-shape's Key Performance Indicators (KPIs)	e-shape's Target values	Support WP	Sprint challenge #	Sprint: Number of Pilots committed to the KPI
	the three engagement priorities of GEO (the 2030 SDGs, Paris Agreement and Sendai Framework).	engagement priorities of GEO				
O3	User uptake of the pilots	No. of key organizations involved (non partners)	> 3 per showcase	WP4	8	3 (S7 only)
	User uptake of the pilots	No. of user communities involved (non partners)	> 1 per showcase		9	8 (S1,2,3,4)
	Undertake a series of capacity building activities with the aim to train users in a given sector on the integration of EO-based and in-situ data-based solutions in their workflow	No. of capacity building exercise	> 1 per showcase		10	3 (S1,3,6)
O4	Boost the sustainability potential of the pilots	Action to boost sustainability of the pilots	1 per pilot	WP5	11	1 (S3P1)
	Penetration of pilots in public and private markets	No. of entities/cases in which outputs of pilots are operationally integrated in user workflows	30-40		12	1 (S5P1)
	Sustainable uptake and exploitation of the provided pilots in different markets	No. of sustainable pilots	10 overall		13	
	Enable the on-boarding of new	Number of on-boarded new pilots as new partners	>10 overall			

e-shape's Objectives (relevant to pilots)	e-shape's Target Outcome	e-shape's Key Performance Indicators (KPIs)	e-shape's Target values	Support WP	Sprint challenge #	Sprint: Number of Pilots committed to the KPI
	pilots as new partners					
O5	Increase awareness of scientific results	No. of articles in scientific journals and conferences	> 20	WP6 (25/5/ 2020)		
		No. of webinars	7			
		No. of participations in scientific conferences and workshops	> 20			
	Target a wide range of audiences using tailored communication tools	Unique website visitors at the end of the project	> 10000			
		Printed brochures distributed to stakeholders	3.000			
		No. of communication material (printed or digital) produced during the lifetime of the project	> 50			
		Total No. of downloaded communication materials	> 100			
		Subscribers to newsletter	50 per year			
		Social media followers (Twitter, Facebook, LinkedIn)	Double audience each y.			
		No. of articles in magazines and media	> 100			
		No of video views in YouTube	> 1000			
	Establish and maintain helpdesk	No. of requests served by the Helpdesk	>100 1st y./ double every y.			
		No. of stakeholders served	>50 per y.			

Annex 3: e-shape Challenges and distribution over the WPs

Challenges definition and mapping with WPs

Work Package	Challenge
WP2	C1: Increase number of user-oriented services C2: Increase variety of users targeted by the designed service C3: Specific co-design process carried; specifying collaboration procedures; if not available so far
WP3	C4: Demonstrated improvement in exploiting the wealth of data made available through DIAS, GEOSS platform, NextGEOSS, EOSC, in-situ observatories (as organized in ENVRI plus) citizen observatories and any other existing hubs or platforms C5: Increase in preparedness index for integration into ""as a Service (...aaS)"" IT infrastructure such as DIAS, NextGEOSS C6: Based on CO-design analysis (WP2) and WP3 Initial assessment outcomes, identify and prepare for outsourcing part of processing chain to a DIAS infrastructure C7: Demonstrated compliance with inspire, GEO recommendations interoperability and geo data sharing principles (Data Management Plan)
WP4	C8: Increase number of key organizations involved C9: Increase number of user communities involved (non partners) C10: Organization of a series of capacity building activities with the aim to train users in a given sector on the integration of EO-based and in-situ data-based solutions
WP5	C11: Carry an action to boost sustainability of pilots C12: Increase no of operational integration into user workflows C13: Improvement in sustainable uptake and exploitation of pilot in different markets
WP6	C14: Communication

The C14 Communication challenge has been added at the end of Sprint 1 to encourage more communication from all the partners.

Annex 4: Sprint 2 Challenges' Status Review

The Annex provides a full overview of the Challenge's status within the Showcase Support Service, as of November 2022. (60 pp.)

It is accessible online at: https://www.dropbox.com/sh/wtp8p6wmbtylesu/AACt9WuTcTOM-gLdRHmn2MYza?dl=0

Annex 5: Sprint 2 – Detailed Review for WP3-related Challenges

This Annex provides a detailed review of the Challenges under direct supervision of WP3 (Challenge 4 to 7). (105 pp.)

It is accessible online at: https://www.dropbox.com/sh/wtp8p6wmbtylesu/AACt9WuTcTOM-gLdRHmn2MYza?dl=0

Annex 6: Platforms used by the e-shape pilot

This Annex extensively lists all the platforms used by the e-shape Pilots. The full list (14 pp.) is available at: https://www.dropbox.com/sh/wtp8p6wmbtylesu/AACt9WuTcTOM-gLdRHmn2MYza?dl=0