**EUROPEAN COMMISSION**
DIRECTORATE-GENERAL FOR COMMUNICATIONS NETWORKS, CONTENT AND TECHNOLOGY

CNECT.C – Digital Excellence and Science Infrastructure
**C.1 – Open Science and Digital Modelling**

# GENERAL PROJECT REVIEW CONSOLIDATED REPORT

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| **Grant agreement (GA) number:** | 101017536 |
| **Project[1] Acronym:** | EOSC Future |
| **Project title:** | EOSC Future |
| **Type of action:** | RIA |
| **Start date of the project:** | 01/04/2021 |
| **Duration of the project:** | 30 |
| **Name of primary coordinator contact and organisation:** | Kika Kalogeropoulou (ATHENA) |
| **Period covered by the report:** | from 01/04/2021 to 09/02/2022 |
| **Periodic report/Reporting period number:** | Assessment not linked to the end of a reporting period |
| **Date of first submission of the periodic report (if applicable):** | Not applicable |
| **Amendments (latest AMD concerning description of the action)[2]** | 09/11/2021 (AMD-101017536-12) |
| **Date of meeting with consortium (if applicable):** | Not applicable |
| **Name of project officer:** | Magdalena SZWOCHERTOWSKA |
| **Name(s) of monitors:** | – IOANNIS SOLDATOS<br>   • University of York, Europe Campus<br>   • University of Glasgow<br>   • Research and Education Laboratories in Information Technologies<br>– Oxana Georgievna SMIRNOVA<br>   • Lund University<br>   • CERN<br>   • CERN<br>– Adam Franciszek SCHMIDT<br>   • TNO<br>   • Poznan University of Technology<br>   • TUM<br>– Dirk Hermann PLEITER<br>   • 999980470 |

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[1] 'Project' means the same thing as 'action'.

[2] Only amendments to the description of the action (DoA; AT21) are relevant for general project reviews since they always have to be carried out against the latest version of the DoA

# 1. Overall assessment

| 1. Overall assessment |
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| Project has achieved some of its objectives and milestones; however, corrective action will be required. |

| 2. Significant results linked to dissemination, exploitation and impact potential |
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| Project has not delivered results with significant immediate or potential impact so far.<br><br>Although some progress can be observed in terms of catching up with the accumulated delays, the project is still in the stage of defining procedures and clarifying responsibilities. While outputs of several previous projects (EOSC-Hub, EOSC-Enhance, OpenAIRE-Advance, AARC etc) has been taken care of, there is little evidence of a progress beyond those. Exploitable results cannot be identified at this stage.<br>EOSC Future could still produce results with significant impact in the coming reporting periods. As outlined in our earlier report, to produce impactful results, EOSC Future must prioritize implementation activities that will deliver and operate a scalable version of EOSC Core that integrates and supports a growing set of services from different providers and disciplines. Furthermore, the project must implement a practical interoperability framework that will enable the integration of diverse scientific resources and will foster collaboration between different communities, including communities across disciplines.<br>Moreover, the project can enhance user experience based on support for personalized EOSC services and personalized user journeys. The impact of such enhanced user experience should be reflected in the engagement of an increased number of users in the EOSC.<br>The project has advanced in the above directions, yet the pace is not as fast as mandated by the 30 months duration of the project. This puts the project's impact at risk. |

| 3. General comments |
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| The project has caught up with delays in the official deliverables. Moreover, progress has been made on individual WPs (e.g. on elicitation of requirements).<br>While the development of individual components continued, the project faces significant issues related to technical implementation and bringing the MVE into production:<br>• The target shape of the EOSC Future platform is undefined – the features to be implemented, services to be integrated and platforms to be connected to are not specified, and the scope of MVE is continuously shifting<br>• No system for planning and tracking of the development activities has been set in place so far (the consortium reported on using JIRA, but it has not been fully implemented yet). This makes it difficult to track the progress and ensure that sufficient resources are available.<br>• There are no clear plans for integration of the complete system – the system architecture is still very high level, no interfaces have been identified or defined, and no integration procedures or a project-wide code repository are in place. The required integration effort seems to be significantly underestimated<br>• The risk management does not address any aspects related to development efforts related to integration<br>• The development and integration of the EOSC system are not fully aligned with and driven by a set of use cases, which may result in missing the actual user requirements<br>All of those need to be addressed on a short notice in order to ensure that the project does not miss its targets and delivers the expected impacts. |

| 4. Recommendations concerning the period covered by the report |
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| The deliverables are tentatively accepted as is. The final assessment will be performed during the periodic review<br>Resource assessment was not performed during this review. |

| 5. Recommendations concerning future work, if applicable |
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| In order to get back on track, the project requires a number of corrective actions. We split those into those which need to be urgently implemented before the first periodic review at M12, and those corresponding to the remaining project work as a whole.<br><br>Immediate recommendations:<br>Recommendation 1 (Demonstrations for the Next Review): Provide a list of EOSC Future technical developments that will be demonstrated in the next (M12) review/checkpoint of the project ahead of the review. The results to be demonstrated must be aligned to the Actionable Roadmap. This recommendation was also given in the previous review, but not fully and timely addressed.<br>Recommendation 2 (Actionable Roadmap): The roadmap must be enhanced with interim implementation milestones |

(i.e., in the period M9-M18) such as the delivery of specific modules, the implementation of specific interfaces etc. Moreover, for each action of the roadmap, one or more responsible partners must be provided that will be accountable for the implementation, as well as the estimated effort needed. Finally, measurable indicators of success need to be defined for each of the tasks. Compound tasks (combining more than one feature) should be split, to facilitate tracking of progress.

Recommendation 3 (JIRA Visibility and Reporting): The project should provide the EC with a reporting mechanism about the implementation task, which will be directly linked to the JIRA of the project. Based on these mechanisms, reports must be provided regularly (e.g., every two months), clearly demonstrating the progress of the implementation work.

Recommendation 4 (KPI Framework): Along with the visibility in the JIRA, it is advised that the project provides to the EC and the reviewers visibility on its KPIs (e.g., in the form of an on-line spreadsheet or a dashboard).

Recommendation 5 (Architecture with Implementation Detail): The consortium must produce more detailed architecture views of the EOSC Future platform. Specifically:

• The logical view of the architecture must illustrate all the modules that must be implemented or integrated, including the interactions and interfaces between them.

• Process views for some of the main use cases must be provided (e.g., the user journeys listed in D5.2, the back-office functionalities of D4.2, the service provider on-boarding process, AAI interactions), including information flows between the main components, as well as the APIs specifications.

• Implementation and deployment views must be also provided for different parts of the platform (e.g., EOSC Core, EOSC Exchange).

Recommendation 6 (Interoperability Framework): Define specific capabilities of the Interoperability Framework that can be deployed and operated. Consultations and discussions about this must be time-boxed and they must converge soon, in line with the implementation timeline of the project.

Long-term recommendations:

Recommendation 7 (Reviewers' Recommendations): In future reviews, the consortium must provide a brief report on whether and how the recommendations of the reviewers have been addressed.

Recommendation 8 (Risk Management): The risk registry should be updated with the technical implementation and integration risks., such as delays in the delivery of specific components, lacking interoperability of components and services, and milestones.

Recommendation 9 (Management and reporting): The periodic report should contain justifications for the reported achievements when such are not documented in deliverables. For example, for every agreement made or a policy developed, a date and the title should be specified. When meetings are mentioned, date and place should be specified. When an update of a deliverable is mentioned, the updated version must be provided. When a web interface or a repository is mentioned, a URL must be provided.

Recommendation 10 (Training and Skills): As recommended following the first review, EOSC Future must develop integrated courses based on the learning paths for specific EOSC skills profiles. The project must avoid fragmentation and overlaps to individual courses and training activities already undertaken in previous or on-going EOSC projects (e.g., introductory courses to EOSC and Open Science). During the next review it is advised that the project presents the curricula that it will develop, along with relevant training materials (e.g., presentations, video, exercises) and their release timeline. The training plan should specify in detail the content to be produced, in addition to the methodologies and artifacts that have been already provided.

Recommendation 11 (User Friendliness): As discussed during the file/data transfer demo during the review, the consortium must put emphasis on the user experience i.e., cloud functionalities across communities and providers must be seamless and transparent to end users. Likewise, the personalization aspects specified in WP5/D5.2 must be developed and provided as a part of the EOSC Future implementation.

Recommendation 12 (Accountability): Since EOSC Future is a part of a larger ecosystem and integrates results of several external projects, it is important to clearly present and separate contributions coming from different sources

Recommendation 13 (End-to-end use case validation): To guide and prioritise the development, integration, deployment and operation of different components and capabilities of the EOSC MVE, as well as to show that the project brings EOSC MVE into production, the project should validate end-to-end use cases that showcase the integration of a set of EOSC MVE capabilities and are relevant for the involved science communities.

Recommendation 14 (Technical coordination): The project should establish a stronger technical coordination to ensure coherence of the development and integration efforts and to furthermore facilitate prioritization.

Recommendation 15 (Requirements handling): For each requirement, feature or enhancement request, provide a reference number and prioritisation, such that the implementation of those can be monitored and reported, similarly to the tasks in JIRA. A possibility for the reviewers to access JIRA in order to check the status would be very useful.

Recommendation 16 (Onboarding of Data and Services from the Science Clusters):
It is crucial that EOSC Future leverages the collaboration with the science cluster by demonstrating usability and readiness of the developed infrastructure capabilities through real-life usage. The datasets generated by the science

clusters should be made available via EOSC Future and their data services should be seamlessly integrated. EOSC Future needs to both prepare the technical and procedural aspects as well as to proceed with the actual onboarding. In order to facilitate progress tracking it is recommended to add additional milestones to the project marking, e.g. one milestone marking the end of the preparation phase and start of onboarding. A second milestone would be reached once the clusters' datasets and data generated via experiments is on-boarded and available via EOSC.

## 2. Objectives and workplan

| 1. Is the progress reported in line with objectives and work plan as specified in the DoA? If there are significant deviations, please comment. | Partially |
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The contractual deliverables have been submitted largely in line with the work plan as specified in the DoA, the delays reported during the previous review are not observed any more. It should be, however, noted that it is not always possible to track the progress of tasks and work packages, since means of verification beyond deliverables are not provided.

The review meeting has not been organized per WP, which is unfortunate. An assessment based on the received/submitted deliverables and the periodic report follows:

WP1 – Project Management

The WP is managing the project. During the reporting period the activities focused on:

• Revisions and improvements to the risk management methodology (including updates to the risk registry).

• Management of DIH procurement and RDA calls activities.

The progress has been satisfactory, with a clear improvement on the deliverables and other procedures. The Data Protection Officer is reported as being appointed, though no detail has been provided as to when and who that was. Deliverable D1.6 is reported as being revised, although no new version has been made available.

While elaborate management processes are in place, there is still a need for flexible technical management processes that could boost agile and pragmatic management of the software development and integration processes. Setting up the JIRA system is a positive step in this direction, yet more effort is required given that this comes after the first nine months of the project's lifetime. Furthermore, an overall technical coordination that would allow for prioritization and ensure the coherence of the technical work seems to be lacking.

Moreover, it is important to address risks related to software development and integration, which are currently overlooked, as those can put the success of the whole project at serious risk.

WP2 - Project Strategy and EOSC Alignment

During the reporting period, WP2 delivered several documents including D2.4a, D2.5a (both delayed from the previous reporting period), and D2.7a. Deliverable D2.9 is also produced in collaboration with the EC. It provides input to the planned procurement processes that will follow EOSC Future. These processes were not discussed during the review meeting, as relevant work is supervised directly by the EC .

The work package is also managing strategic level coordination with relevant initiatives and stakeholders. In the reporting period several interactions with the EOSC-SB and INFRAEOSC-07-2020 projects took place. Moreover, discussions with GAIA-X have started.

Also, WP2 has designed and implemented a dashboard for the Oobservatory.

The work package thus set the scene for the project work by identifying intended functionalities and capabilities, although prioritisation of those is lacking. It also provided a strategy for future activities.

WP3 - Architecture and Interoperability

WP3 has carried out work towards architecture and interoperability specifications including: (i) A call for Working Groups Proposals and (ii) Preparation of deliverable D3.2a, which deals with processes for building the EOSC Interoperability Framework. However, the deliverable focuses more on the governance of the IF, rather than the technical framework itself. In terms of the interoperability framework, there is a need for proceeding with a more practical approach that will lead to implementation. Likewise, in terms of architecture development, specifications that go closer to the implementation details are needed. During the review the consortium presented high level logical architectural diagrams. The latter are very good for understanding the overall functionalities of EOSC Future, yet they are not adequate to drive the implementation activities.

A collaboration with EOSC Enhance to migrate results has been reported, though it is unclear whether any development beyond what was delivered by EOSC Enhance took place so far.

WP4 - Design and Development of Portal Supply Layer

This work package has acquired some delays with regards to EOSC accounting (postponed to M18) and the EOSC helpdesk (postponed to M12). The implementation activities have focused on the implementation of the resource catalogue (EOSC Research Graph), the management of the EOSC resource catalogue data that will support the implementation of EOSC recommendation mechanisms; and the management of the EOSC data usage statistics that will be used for supporting the EOSC Open Science statistics. WP4 has also worked towards the back-end specifications, which have been supported with the architecture developments.

However, the reported work on the requirements elicitation (Deliverable D4.2) focused more on the methodology of this process rather than the actual requirements. Moreover, it is important to assess implementation of which requirements are feasible within the scope of the project – both in terms of time and available resources. Ranking of the requirements, following for example the MoSCoW approach, is advised. It is unclear how many or which of those requirements

are feasible to implement by M18. The current development status is only briefly outlined. The work package clearly inherited software from EOSC Enhance and other projects, but it is not clear what is the readiness level of this software, and what extra effort is needed in order to make it meeting the requirements.

WP5 - Design and Development of Portal Demand Layer
WP5 has continued work on EOSC Front Office Requirements and specifications, which are reflected in D5.2a that was delivered in the reporting period. A set of personas and user journeys are included in this deliverable, as a means of illustrating the target front end functionalities. It is however unclear how much of this analysis was inherited from previous projects, or what was added by EOSC Enhance. An API for the EOSC Front Office Catalogue Functionalities has been specified. In Task 5.4, extensive effort towards developing EOSC Portal User Experience enhanced by AI is reported, however, the code repository and the JIRA systems appear to be inaccessible (at least for the reviewers). Moreover, it is not clear how much of this work was inherited from EOSC Enhance.
The work package has also analysed the front -end requirements of the EOSC Knowledge Hub, in collaboration with the WP9 teams that are in charge of the Hub's development.
Similarly to WP4, the report focused on the procedures for the requirement elicitation. The analysis of the requirements in terms of priorities and feasibility should be performed as well.

WP6 - Integration of Community Services and Products into EOSC
The work has focused on producing the workflows for enhancing EOSC based on other services and communities. Emphasis has been put on the specification of the on-boarding procedure, but no efforts have been documented towards an assessment of the readiness of the various services for realising the workflows. Many meetings are reported (47). Three milestones are reported as achieved, though no means of verification have been provided.

WP7 - EOSC Service Planning and Delivery
WP7 deals with operational aspects of service planning and delivery. During the reporting period, several policies and procedures have been updated, and technical services to support the Service Management System (SMS) have been delivered. A relevant demonstration has been provided during the previous review meeting. An important achievement of delivering the Security Baseline requirements is reported, though the said requirements have not been made available for the review.

WP8 - Commercial Services
WP8 is expected to enhance EOSC (including the DIH) with commercial services. During the reporting period, the consortium continued the work of cataloguing existing commercial services, while engineering users' requirements. Deliverable D8.2, which was delayed from the last period, has been produced. While containing a usage analysis for cloud services in Europe, its relevance to EOSC is unclear.
It would be more important to properly assess the actual demand for the commercial services of the EOSC users and ensure best value-for-money results.

WP9 -Training and Skills
WP9 focuses on skills and training for the EOSC ecosystem and communities. During the review meeting, an initial training plan was presented, following also the delivery of the training catalogue (D9.1) in the previous reporting period. The work package has produced several artifacts (e.g., registration forms, feedback forms) that will support the training processes. However, no concrete curricula are yet available, and no actual training events are reported.
The fact that both the software integration and deployment milestones, as well as the training milestones, are planned for M18 creates a significant risk.

WP10 - Stakeholder Engagement, Outreach & Marketing
During the reporting period, WP10 has worked towards stakeholders' engagement based on the kick-off of the EOSC Future User Group, the publication of RDA Calls and the implementation of various dissemination activities, such as the EOSC Future Open Days. The latter was focused on public engagement.

WP11 - Ethics requirement
Ensures ethics compliance. Not assessed during the reporting period (M7-M12).

| 2. Are the objectives of the project still scientifically and /or technologically relevant? | Yes |
|---|---|

The objectives of the project in terms of the development and operation of the EOSC Core and the EOSC Exchange and the interoperable integration of additional services and communities around EOSC remain relevant and topical. Similarly, the EOSC Future objectives that aim at personalizing EOSC services for scientists and improving user experience could boost scientists' engagement with EOSC.
While the objectives remain topical and are very ambitious, the project's progress towards their implementation is quite slow considering EOSC Future 30 months duration and the little time remaining. The partners must accelerate their

technical implementation tasks. The reported work so far was of planning and preparatory nature. While it identified a very impressive set of goals, their feasibility in terms of the effort needed in order to achieve them, and availability of the necessary resources is not clear.

| 3. Are the critical implementation risks and mitigation actions described in the DoA still relevant? | Partially |
|---|---|

An updated risk management methodology and plan has been presented.  It is improved, yet it does not seem to put adequate emphasis on implementation risks (e.g., how to recover implementation/integration delays). There is a need for increased emphasis on implementation risks and related mitigation actions. Specifically, risks related to challenges with taking over, integrating and enhancing the legacy software and services, are poorly represented, and appear to be hidden inside higher-level ones. This creates a risk of those being underestimated and overlooked.

| 4. Have the pilots/case studies started to showcase innovative results as described in the DoA? | Not applicable |
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The pilots/case studies have not started yet

| 5. Have the ethics deliverables due for the current period been adequately addressed and approved? | Not applicable |
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The ethics aspects have not been assessed in this review

| 6. Have the comments and recommendations from previous project reviews been taken into account? | Partially |
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The consortium has tried to address some of the recommendations of the first review. For instance, it has delivered an implementation roadmap and revised the risk registry. However, as outlined earlier, more emphasis on the implementation actions and risks is required.
It is not clear whether the consortium has considered other recommendations, and to what extent. An overview of actions towards addressing the recommendations has not been provided.
It is advised that the management presentation of each future review and the relevant period reports starts with a brief report on whether and how the recommendations of the reviewers have been addressed.

## 3. Impact

| 1. Does the work carried out contribute to the expected impacts detailed in the DoA? | Partially |
|---|---|

During the reporting period, the project has progressed in areas that contribute to the expected impacts that are described in the DoA. Specifically, the project has advanced the integration of the EOSC services and the AAI, which is a prerequisite for seamless access to distributed resources and services across different science clusters and service providers. Similarly, the work that was carried out towards increasing engagement and providing services in the scope of the project's Digital Innovation Hub (DIH) contributes to EOSC enabled innovation. However, these are comparatively minor achievements on the overall scale of the project's ambitions, and the current pace of technical implementation is not sufficient for delivering the Minimum Viable EOSC (MVE) platform in a timely fashion that will facilitate engagement and impact creation. The latter asks for earlier deliveries of key EOSC Future elements (EOSC Core, EOSC Exchange) that can be disseminated to relevant communities towards ensuring their active engagement with the EOSC Future platform and services.

The efforts necessary for integrating existing software components together (including the need for software development efforts) and getting these deployed in an operational environment seem to be underestimated. The resulting risks are further magnified by the lack of proper task planning and monitoring necessary for an integration project of such a scale, which potentially puts the expected impacts at jeopardy.

Overall, the work is still in a preparatory phase, and, while the activities are in general line with the DoA, it is too early to conclude whether any of the impacts are materialising.

| 2. Does the work carried out follow the plan detailed in the DoA to enhance innovation capacity, create new markets opportunities, strengthen competitiveness and growth of companies, address issues related to climate change or the environment, address industrial and/or societal needs at regional level or bring other important benefits for society? Give information on the relevant innovation activities carried out (prototypes, testing activities, standards, clinical trials) and/or new product, service, reference materials, process or method (to be) launched to the market, if any. | Not applicable |
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The pilots have not started yet

| 3. Does the work carried out contribute towards European policy objectives and strategies and have an impact on policy making? | Partially |
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The project's concept, as described in the DoA, is directly contributing to the implementation of the EOSC vision and EOSC policies through improving EOSC functionalities, increasing the service supply and ultimately engaging more scientists with EOSC. The current, demonstrated progress is, however, not sufficient to provide a tangible contribution to these objectives. While the project aims at bringing the MVE into production, the target technical readiness level remains unclear and a focus on deploying MVE components into an operational environment seems to be lacking.

At a strategic level, EOSC Future is contributing to the shaping of the EOSC evolution agenda in collaboration with the EOSC Association, the European Commission and other stakeholders.

Deliverables 2.7 and 2.9 that were released during the reporting period further assist in development of the future strategic directions and the work program.

| 4. Does (or will) the work carried out have an impact on SMEs? | Yes |
|---|---|

The project will have a positive impact on SMEs based on its DIH activities. During the review meeting for this period, the project has demonstrated business pilots that took place (four in 2021) or started (five in 2022) as a part of the EOSC future Digital Innovation Hubs. Such pilots can have a positive impact on SMEs.

However, it is of utmost importance to clearly identify the added value of the EOSC services for SMEs and to define a convincing business case. In this respect, it is necessary to expedite delivery of new services that address requirements of SMEs.

| 5. Have the beneficiaries reached gender balance at all levels of personnel assigned to the action? If not, have the reasons been explained in the periodic report? | Not applicable |
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The gender balance has not been assessed in this review

## 4. Implementation

| 1. Has the project been efficiently and effectively managed? | Partially |
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The management of project remains particularly challenging. The collaboration of the partners seems improved. Moreover, some delays in the delivery of documents have been recovered.

During the reporting period, the partners have established a JIRA system to support the management of the development and integration activities. This is a positive step for the technical management, yet not sufficient to support management of virtual teams in the context of a very complex implementation project. Moreover, the current state of the project monitoring via JIRA is not fully clear.

The actionable roadmap can be a good tool to improve management. However, some activities need further elaboration, while the responsibility and accountability of specific partners must be outlined in the roadmap. It is also important to realistically assess the effort needed for delivery of individual features, to identify interdependencies between the tasks and to assign clear deadlines. Moreover, clear success checks for the individual tasks need to be defined.

An overall technical coordination that would allow for prioritization and ensure the coherence of the technical work seems to be lacking.

Lack of intermediate milestones between M6 and M18 makes it difficult to monitor efficiency, and the provided progress report does not offer sufficient means to assess effectiveness or efficiency. Interim milestones (i.e., prior to the M18 delivery) must be included in the reporting.

| 2. Is the management of the project in line with the obligations of beneficiaries (including ethics and security requirements, risk and innovation management if applicable)? | Not applicable |
|---|---|

Contributions of individual beneficiaries were not assessed during this review. There is not enough information to assess security management and ethics. There is certainly a need for improvements in risk management, as outlined above.

| 3. Is the contribution of each beneficiary in line with the work committed in the DoA? (applicable only to multibeneficiary projects) | Not applicable |
|---|---|

There is no adequate information about the role and contribution of each partner at this stage. Furthermore, the actionable roadmap that was delivered by the consortium does not list the responsibilities of the various partners in terms of the implementation of the roadmap.

| 4. Have the beneficiaries disseminated project results (foreground) in scientific publications as planned in the DoA (including the deposition of publications in open access repositories)? Do they include a reference to EU funding? | Not applicable |
|---|---|

Dissemination and communication activities were not assessed during this review. Information on dissemination and communication efforts and materials has been limited. A detailed analysis of dissemination activities and KPIs has not been provided during the reporting period. It is expected during the M12 review meeting. The outcomes must be in-line with the EOSC Future ambition and resources planned/allocated in WP10.

No evidence of publications has been presented.

The project has participated in many events. The web site of the project has been created, along with social media presence (e.g., https://twitter.com/EOSCFuture). During the reporting period, the EOSC Future Open Days have been organized.

| 5. Have the beneficiaries disseminated and communicated project activities and results by other means than scientific publications (social media, press-release, the project web site, video/film, etc) as planned in the DoA? Do they include a reference to EU funding? | Not applicable |
|---|---|

Dissemination and communication activities were not assessed during this review. Information on dissemination and communication efforts and materials has been limited. A detailed analysis of dissemination activities and KPIs has not been provided during the reporting period. It is expected during the M12 review meeting. The outcomes must be in-line with the EOSC Future ambition and resources planned/allocated in WP10.

No evidence of publications has been presented.

The project has participated in many events. The web site of the project has been created, along with social media presence (e.g., https://twitter.com/EOSCFuture). During the reporting period, the EOSC Future Open Days have been organized.

| 6. Has the plan for the exploitation and dissemination of the results (if required) been updated and implemented as described in the DoA, in particular as regards intellectual property rights? Is it appropriate? | Not applicable |
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| **7. Has the data management plan (DMP) (if required) been updated and implemented? Is it appropriate?** | Not applicable |
| | |
| **8. Have the proposed institutional changes been appropriately promoted?** | Not applicable |
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## 5. Resources

| 1. Were the resources used as described in the DoA and were they necessary to achieve its objectives? If there are deviations from planned budget, have they been satisfactorily explained? Have they been used in a manner consistent with the principle of sound financial management (in particular economy, efficiency and effectiveness)? | Not applicable |
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**Expert opinion on deliverables**

| Deliverable number | Deliverable name | Status | Comments |
|---|---|---|---|
| D1.1 | Project Handbook, Project Management and Quality Plan | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D1.4 | Data Management Plan | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D1.6 | Methodology and Platform for the Management of the Calls and Call Guidelines | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D2.1 | Mapping of EOSC Executive Board Outputs | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D2.3 | Mapping of Observatories and Classification Analysis | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D2.4 | Project Strategy Plan | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D2.5 | Inventory of Core Functions and Inclusion Criteria | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D2.9 | Co-designed architecture description | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D3.1 | Science Cases for Development of EOSC Architecture and Frameworks | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D3.2 | EOSC Architecture and Interoperability Framework | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D3.3 | Architecture and Interoperability Guidelines for Operational Services of the EOSC-Core | Not submitted | Not submitted |
| D4.1 | Back-Office design, functional and technical specifications | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D4.2 | Back-Office Requirement Analysis | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D5.1 | Front-Office Design, Functional and Technical Specifications | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D5.2 | Front-Office Requirement Analysis | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D6.1 | Registry of Connection, Integration, Validation and Auditing Processes | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D7.1 | EOSC Service Planning | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D8.1 | Overview of Available Commercial Services | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |

| Deliverable number | Deliverable name | Status | Comments |
|---|---|---|---|
| D8.2 | Overview of Usage of Commercial Services | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D8.3 | Procurement Plan for Additional Services not Available through Existing Frameworks | Not submitted | Not submitted |
| D8.4 | EOSC Digital Innovation Hub Strategy and Plans | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D9.1 | EOSC Training Catalogue and Platform specification | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D10.1 | EOSC Future Stakeholder Engagement & Communication Strategy & Plan | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D11.1 | POPD - Requirement No. 1 | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |
| D11.2 | OEI - Requirement No. 2 | Not submitted | Not submitted |
| D11.3 | H - Requirement No. 3 | Accepted | Tentatively accepted, final assessment during the periodic review at M12 |

## Expert opinion on milestones

| Milestone number | Milestone name | Achieved | Comments |
|---|---|---|---|
| MS1 | EOSC Core initial version available including the Marketplace, the Portal, the AAI, the Monitoring and Accounting, Helpdesk, Order processing, and Metrics Dashboard | Partially | The milestone is only partially achieved and the work is still in progress. Additional details should be provided for the periodic review at M12.<br><br>It is suggested that the milestone is achieved "by construction", due to the pre-existing availability of the listed components from past projects. EOSC Future has not performed any additional implementation work yet. Still, EOSC-Core specifications and the front-end design have been provided as part of D4.1 and D5.1. The components seem to not have been fully integrated yet, but rather a plan was delivered. |
| MS4 | Horizontal resources from previous projects are onboarded | Yes | 180 service providers and 311 resources already on-boarded. The on-boarding work is however in progress. |
| MS11 | Initial guidelines for EOSC Interoperability Framework available | Partially | The milestone is only partially achieved and the work is still in progress. Additional details should be provided for the periodic review at M12.<br><br>The milestone is reported as achieved and relevant work has been commenced. However, no interim document/report was provided comprising updated specifications. |
| MS12 | Consultation on results from the TFs | Yes | Initial consultation outcomes available, yet the process is in progress |
| MS15 | Collaborations Agreements with EOSC Projects established | Partially | The milestone is only partially achieved and the work is still in progress. Additional details should be provided for the periodic review at M12.<br><br>Collaboration Agreements were reported as being available, but have not been signed by the time of the review. |
| MS16 | Task Forces life cycle management | Yes | Working groups and lifecycle management processes established |
| MS17 | EOSC Data Sources and Services Registry populated with the relevant components (180 Resource providers / 300 resources in the Exchange). | Yes | 180 providers and 300 resources in EOSC Exchange; Linked to MS02 as well |
| MS18 | SP integration requirements and plans | Yes | Integration requirements outlined (EOSC Future GA, D3.1) |
| MS19 | Prepare Large-sized Science Projects | Yes | Service Provider Templates developed; consultation meetings with scientific and technical coordinators from the proposing science clusters and e-Infrastructures conducted |
| MS25 | Researchers can see services and reach thematic and regional portals from the EOSC Portal | Yes | Relevant marketplace discovery and access mechanisms in place, although the service is largely inherited from the pre-existing one. |

| Milestone number | Milestone name | Achieved | Comments |
|---|---|---|---|
| MS32 | EOSC training roadmap and Rules of Participation for Onboarding EOSC Training Resources | Yes | Documented in D9.1 |
| MS33 | Co-create EOSC programme launched & user base of co-designers & testers in place | Yes | User group/community with >200 users established and mobilized |