KYKLOS4.0

An Advanced Circular and Agile Manufacturing Ecosystem based on rapid reconfigurable manufacturing process and individualized consumer preferences

Annex 1:
Open Call #1 Text

April 2021

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Terms and abbreviations

EC	European Commission
OC	Open Call
SME(s)	Small and medium-sized enterprise(s)
CPS	Cyber-physical systems
AM	Additive manufacturing
PLM	Product lifecycle management

1. Introduction

This document provides information regarding the KYKLOS4.0 Open Call #1 for project proposals. The Sub-grant Agreement template (Annex 7) must be additionally considered for the submission of a proposal.

1.1. Overview of the KYKLOS4.0 project

KYKLOS4.0 aims at providing an ecosystem that creates and supports the configurations, methodologies, production techniques, decisions and actions at all different levels and stages of the equipment manufacturing value chain to achieve the goals of:

1. Increased energy efficiency.
2. Reduction of raw material through to the second use of parts or material (including waste from manufacturing process).
3. Customer centricity.
4. On-demand manufacturing to best meet the Industry 4.0 objectives of operational excellence, where mass customization and personalization have become the norm.

KYKLOS4.0 will thus allow to increase production efficiency, reduce waste, boost competitiveness and lower costs for European manufacturers, particularly for SMEs.

The project will deliver an advanced configuration framework and state-of-the-art production paradigm, embedding key technologies into a unified platform ecosystem to manage live product innovation. This involves a set of intelligent tools for real-time analytics and prediction, and recommender systems, further integrated into the KYKLOS4.0 configuration environment.

Thus, the KYKLOS4.0 ecosystem will create favourable conditions for the rapid reconfiguration of manufacturing processes, to continuously follow a circular manufacturing framework and the individualised consumer/customised products demands.

1.2. The KYKLOS4.0 approach

In line with the evolving paradigms of manufacturing – from mass production, to mass customization and circular manufacturing and the sustainable trend to all parts of manufacturing and supply chains – the KYKLOS4.0 project aims to deliver the technological foundations needed to deliver highly relevant product specifications to circular manufacturing business models, thus delivering successful customized product design, and at the same time achieving circular and flexible manufacturing processes and accurate delivery times.

KYKLOS4.0 aims at providing a system that automatically and autonomously creates the configurations, methodologies, production techniques, autonomous decision-making processes and actions at all different levels and stages of the manufacturing value chain. KYKLOS4.0 aims to achieve the re-use and/or re-configuration of customised products and their components, while ensuring timely and successful product creation through shop-floor ready maintenance and in-process monitoring and control, associated with decentralised predictable and resilient cyber-physical systems (CPS) and advanced additive manufacturing (AM) simulation services / modules.

These optimal configurations, decisions and actions will be either provided as recommendations to the users (for manual decisions/actions) or as real-time control actions directly to the factory's controllable elements (for automatic control of adjustable parameters of the manufacturing process or of the actions of smart objects within the factory). KYKLOS4.0 framework will be based on the development of a set of innovative modules and technologies, able to support the demanding requirements of customer-centric manufacturing and sustainable production, capitalizing on the existing individual intra-factory knowledge, the interaction with customers, and the embedded mass customisation framework.

To accomplish this, KYKLOS4.0 project will create an advanced holistic production service platform ecosystem for manufacturing actors' collaboration, extraction of customer needs and after-sales information and any data deemed relevant for identified production needs, as well as the incorporation of these data to product specification and design.

Participating actors (e.g., customers, manufacturers, suppliers, software vendors, etc.) will have the ability to (semi-) automatically enter a virtual – agent based – marketplace where needs, captured by the factory (KYKLOS4.0 Orchestrator) and expressed through a shared, high level and machine understandable format, will be matched with offers, described in the same language.

The KYKLOS4.0 "Customized Open Production" system framework includes a set of production-service simulation models that consider (a) product specifications, (b) product design & materials, the suppliers, the manufacturing strategy (produce to order or make to stock), (c) the product usage (profiles of customers), (d) the product servitisation (type of maintenance services proposed), and eventually (e) product recycling/reuse.

Regarding the range of circular and flexible manufacturing aspects, the KYKLOS4.0 ecosystem will provide a set of self-organizing, data driven modules (able to work independently) that will trigger a dynamic interaction between them, and a smart orchestrator which will provide the ability to:

- exchange customized product information between involved actors (and their KYKLOS4.0 modules) in the product life cycle, from manufacturers of basic equipment components to retailers and vendors up to the final customers via "KYKLOS4.0 Symbiosis Environment", a decentralised B2B marketplace.
- dynamically handle any necessary production line changes (needs for energy and raw materials, fast reconfiguration, and re-use) given a superior proficiency to tackle the varieties of personalized products and the corresponding flexible manufacturing processes.
- deal with personalized product design issues (e.g., assembly or disassembly, re-configuration, update or reuse, new materials, number of parts) and perform quality and economical improvements focusing on the extension of Product End of Life.

Figure 1 depicts the KYKLOS 4.0 Collaboration Platform, in which the proposed projects should consider when proposing solutions to use or extend the collaboration platform.

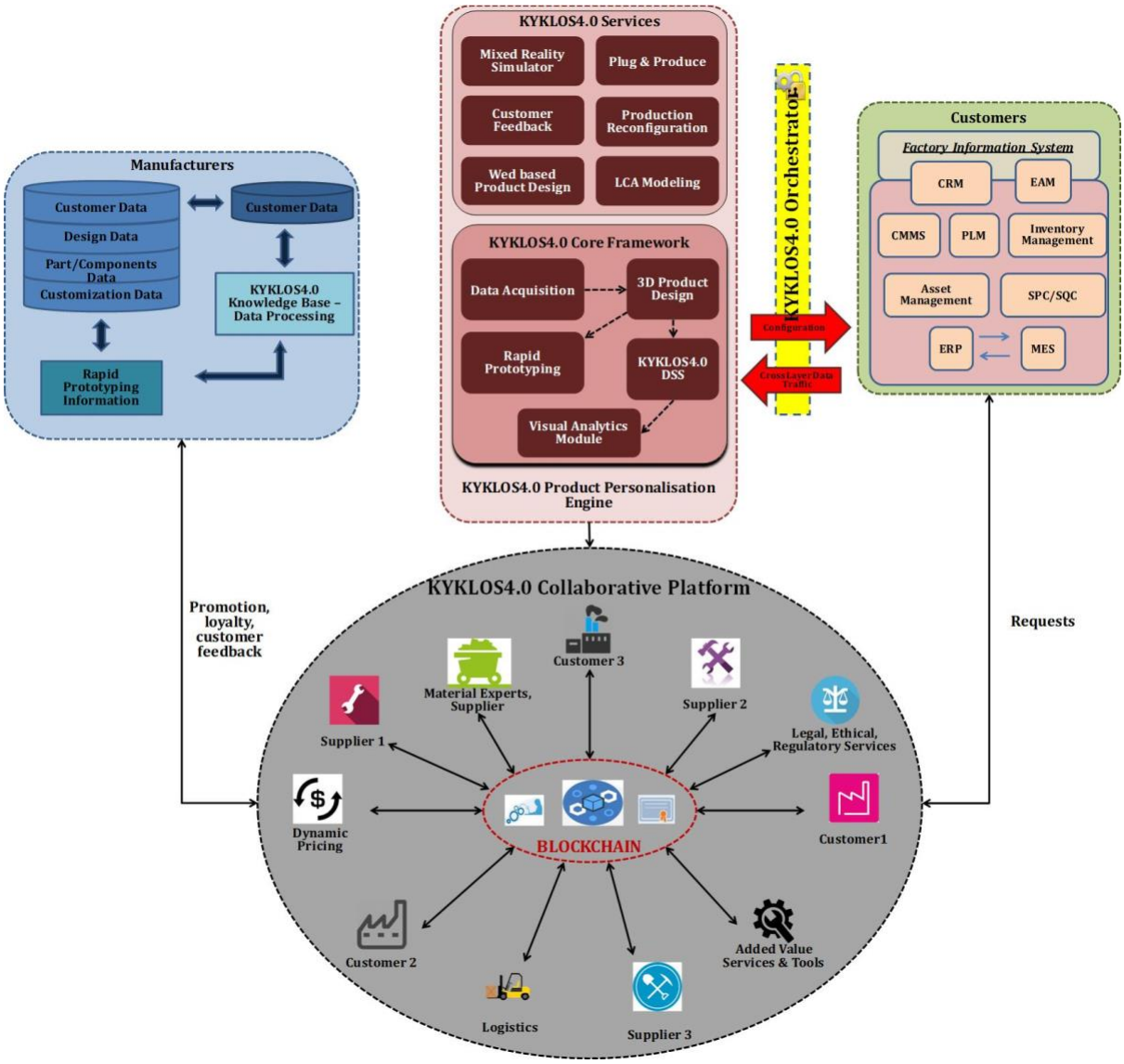

Figure 1. KYKLOS4.0 collaboration platform

The proposed personalization framework will be built around the innovative, low-cost, security by design, distributed virtual production line orchestrator, purposed with increasing efficiency and splitting work within the KYKLOS4.0 IT systems, inside smart gateway (or in the cloud in the case of small shop floors). The orchestrator, installed locally at the factory premises, will embed and provide holistic circular and flexible manufacturing services tailored to the needs of the customised shop floors, while having the capacity to collect and handle the data of the KYKLOS4.0 Ecosystem. More specifically, the orchestrator module will be responsible for communicating and exchanging information with the KYKLOS4.0 product lifecycle management (PLM) module, keeping real time information about the available resources in the plant along with up-to-date pricing.

This distributed design will help factories/plants to use the KYKLOS4.0 services and to sell their products automatically (by using the orchestrator as their automated marketing/sales department) without excluding all those that include manually their products and services to the market. Additionally, the proposed architecture will provide uniform communication interfaces between the

KYKLOS4.0 ecosystem and existing intra-factory information systems thanks to a Manufacturing Management Component to efficiently exploit the production line data with the KYKLOS4.0 components.

Finally, when the data are ready at the local level, they are forwarded to the orchestrator in the cloud to be included in a global trading marketplace, which are updated with the latest prices/products/services from each factory in real time. For example, when an end-user requests a specific material for the design of a new product through the KYKLOS4.0 marketplace, the global orchestrator provides him with the latest prices and related information (e.g., characteristics) about this material. At the same time, it requests to the related factories an update, thus providing, in a short period of time, price updates to the end-users, which can then modify their initial choice if necessary. This enables small companies to build their own production line, producing highly personalised and customised products but also minimising the time to market.

1.3. Objectives and domains of the open call

1.3.1. Objectives of the open call

The KYKLOS4.0 Open Call #1 is looking for SME-led consortia of up to three entities (more information in Section 3 of Annex 2 – Guidelines for Applicants) to submit project proposals for the development of innovative solutions to improve digital manufacturing processes. Such solutions – to be delivered though experiments – should demonstrate a high innovation potential and be ready to explore commercialisation opportunities by the end of experiment period. As part of the experiment, the solution must be validated and demonstrated in the pilot location, which should be provided by one of the applicant's consortium partners.

The proposed experiment must address the digital manufacturing domain and cover one or more sub-domains listed in section 1.3.2.

The KYKLOS4.0 Open Call #1 will prioritise the experiments that are able to demonstrate the impact of the KYKLOS 4.0 approach for a broad set of industrial users. Furthermore, experiments should clearly demonstrate the role of the circular economy within the manufacturing domain in their activities, in combination to the innovation management process.

Awarded proposals and the respective consortium will enter a negotiation with the KYKLOS4.0 consortium to formalise a contract between all parties and the full details of the sub-project to be implemented (of which the experiment is one component).

1.3.2. Domains

Considering the aforementioned project introduction and approach, the KYKLOS4.0 Open Call #1 addresses the domain of **digital manufacturing**, and specifically the following sub-domains:

- Cyber-physical systems
- Product lifecycle management
- Life cycle analysis
- Augmented reality
- Artificial intelligence
- Circular manufacturing
- Big data and data management
- Deep learning
- Decision support systems

Proposals are expected to cover one or more of the listed sub-domains in their project. The proposal must clearly justify how the sub-domain(s) is (are) will be addressed and contributions to the advancement of knowledge in the sub-domain(s).

2. Funding scheme

A total of €3,000,000 has been budgeted for the two KYKLOS4.0 Open Calls. For Open Call #1, a total of **€1 million is available**, funding up to seven (7) projects. Any budget not consumed in Open Call #1 will be made available for Open Call #2 (tentatively scheduled for June 2022).

Proposals will be eligible to receive financial support up to €150.000 (for a consortium of three entities), with a limit of €60.000 per applicant. Consortia of two partners are also eligible, but specific financial rules apply according to the type of entity (see Annex 2).

KYKLOS4.0 will financially support third-parties' activities along the project duration. This includes the following type of activities: project management, product/ service development, tests and demonstrators, business development/ internationalization activities, and project mentoring (available in each of the three implementation stages). The type of costs that may be reported include human resources, other direct costs, subcontracting (<20%) and indirect costs (25% of personnel and other direct costs).

KYKLOS4.0 will fund 70% of the project costs, with each project being eligible to receive up to €150.000 per project (limit of €60.000 per applicant in the case of two partners). The remaining costs to be covered by the awarded beneficiaries.

The financial support will be negotiated with each project after the evaluation and selection process and before the contract signature. The basis for negotiation is the amount requested by each proposal. During negotiations, the consistency of proposed activity plan and budget will be reviewed to ensure that estimated costs are reasonable and comply with the principle of sound financial management regarding economy and efficiency. **Activities that are already funded by other grants cannot be funded by KYKLOS4.0**.

The funding will be disbursed according to three stages of the project implementation: (1) Planning, (2) Implementation and (3) Commercialisation & Business Sustainability; with each stage having a specific duration and scope. With each stage, third parties will be required to submit a deliverable. With each deliverable, the projects must also present information about the resources planned and effective spent with the project. This will support the reasoning for KYKLOS4.0 to proceed with payments as contracted.

NOTE: Third parties receiving financial support from KYKLOS4.0 through the open call will not become part of the KYKLOS4.0 Grant Agreement (GA) and therefore will not need a Participant Identification Code (PIC). The KYKLOS4.0 GA will not need to be amended to include the selected beneficiaries.

3. Timeline

The KYKLOS4.0 Open Call #1 opens 1 April 2021 and closes on 30 June 2021 at 17h00 CET (Brussels time). Proposals must be submitted via the F6S platform: https://www.f6s.com/kyklos4.0opencall01.

As soon as Open Call #1 closes, the KYKLOS4.0 project will initiate the evaluation and selection phase, consisting of an internal and external evaluation. The internal evaluation will check all submitted proposals against the defined eligibility criteria (*see Section 3.1 of from Annex 2 – Guidelines for Applicants*). Any proposal not meeting the criteria will be notified and receive a rejection letter. Eligible proposals will move on to the external evaluation (*see Section 4.2 of from Annex 2 – Guidelines for Applicants*), where proposals will be reviewed by external evaluators. The top ranked proposals will be notified to enter the contract preparation and signature phase. All other proposals, including those that do not meet the threshold or are kept in a reserve list, will also be notified.

Upon completion of the contract preparation, the projects begin their implementation phase, divided into three stages:

- Planning (1 month)
- Implementation (3- 4 months)
- Commercialisation & Business Sustainability (1-2 months)

Figure 2 represents the timeline of the KYKLOS4.0 Open Call #1, including all steps and stages from submission up to the sub-project implementation.

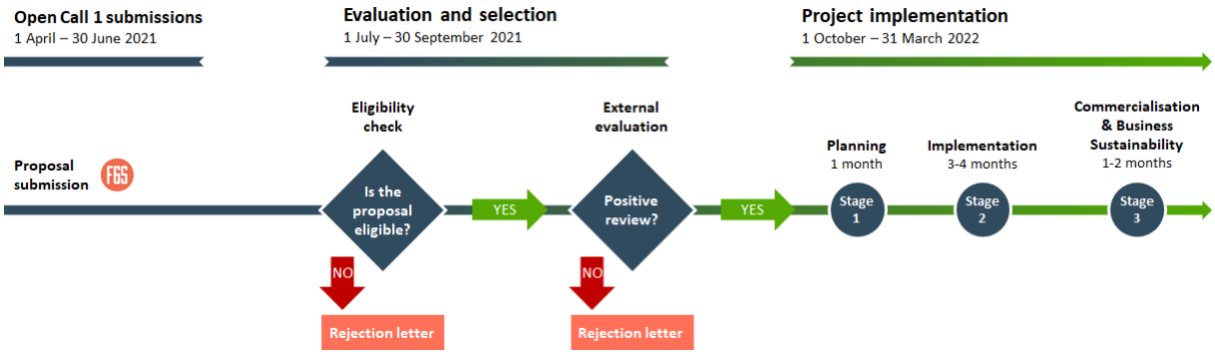

Figure 2. KYKLOS4.0 Open Call #1 timeline – from submission to implementation

4. Open call overview

Table 1 provides a summary of the KYKLOS4.0 Open Call.

Table 1. Details of the KYKLOS4.0 Open Call

Open Call item	Information
Call title:	KYKLOS4.0 – Open Call #1
Full name of the EU funded project:	An Advanced Circular and Agile Manufacturing Ecosystem based on rapid reconfigurable manufacturing process and individualized consumer preferences
Project acronym:	KYKLOS4.0
Grant agreement number:	H2020 – 872570
Call publication date:	1 April 2021
Call deadline:	30 June 2021
Expected duration of participation:	Up to six (6) months
Total EU funding available (Open Call #1):	€1.000.000
Submission & evaluation process:	The objective of the KYKLOS4.0 – Open Call #1 is to accelerate innovation in the digital manufacturing domain by facilitating the implementation of projects led by SMEs and with the participation of an industrial partner. The Open Call #1 will have a single phase where up to seven (7) proposals will be selected. The maximum amount of funding per awarded consortia of 2-3 entities is €150.000 (maximum of €60.000 per third party, with other specific rules applying for each type of entity). Submissions are available via https://www.f6s.com/kyklos4.0
Further information:	Details available at https://kyklos40project.eu/about-kyklos/open-call/

5. Checklist

1) **Does your sub-project proposal and respective planned work fit the call for proposals?**

   Check that your proposed work is aligned with the KYKLOS4.0 Open Call #1, particularly sections 1.1, 1.2, and 1.3 of Annex 2 – Guidelines for Applicants.

2) **Does your proposal address the main topic of digital manufacturing and one or more of the sub-domains?**

   Check that your proposed work does indeed address the proposed topics, as defined in Section 1.3.

3) **Is your proposal eligible?**

   Check that you meet all the eligibility criteria listed in sections 3.2 and 3.3 of Annex 2 – Guidelines for Applicants. Make sure that you satisfy the minimum participation requirements (entity from eligible countries).

4) **Is your proposal complete?**

   Have you completed all the mandatory questions? Check that all proposal form fields are filled.

5) **Does your proposal fulfil all questions requests/comments?**

   Proposals should be precise, concise and must answer to requested questions, which are designed to correspond to the applied evaluation. Omitting requested information will almost certainly lead to lower scores and possible rejection.

6) **Have you maximized your chances?**

   Expect competition in the open call. Therefore, edit your proposal tightly, strengthen or eliminate weak points.

7) **Have you submitted your proposal before the deadline?**

   It is strongly recommended not to wait until the last minute to submit the proposal. Failure of the proposal to arrive in time for any reason, including network communications delays, is not acceptable as an extenuating circumstance. The time of receipt of the message as recorded by the submission system will be definitive.

8) **Have you provided the necessary annexes?**

9) **Do you need further advice and support?**

   You are strongly advised to communicate with the KYKLOS4.0 team via the KYKLOS4.0 profile at F6S platform (www.f6s.com/kyklos4.0).

Important note: Do not forget that the applicant SME must have a valid VAT number during contract preparation.

6. Important contacts

For the proposal form and detailed guidance for applicants, please download the files available at the https://kyklos40project.eu/about-kyklos/open-calls/ website.

The KYKLOS4.0 consortium will organise webinars on the open call to provide participants with a detailed overview of the open call requirements and other relevant information. Please check the KYKLOS4.0 F6S page (www.f6s.com/kyklos4.0) and follow the project's website and social media accounts for all information related to this programme.

The KYKLOS4.0 consortium will provide information to the applicants exclusively via www.f6s.com/kyklos4.0, so that all information (questions and answers) will be accessible to all potential applicants.

No binding information will be provided via any other means (e.g., telephone or email).

- More info at: https://kyklos40project.eu/about-kyklos/open-call/
- Apply via: https://www.f6s.com/kyklos4.0opencall01/apply
- FAQ: www.f6s.com/kyklos4.0 and https://kyklos40project.eu/about-kyklos/open-call/
- Online Q&A: https://www.f6s.com/kyklos4.0opencall01/discuss
- F6S support team (for platform issues during the application): support@f6s.com
- Other support[1]: opencalls@kyklos40project.eu

[1] Information exchanged is non-binding.