KYKLOS 4.0 newsletter

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

The project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 872570

Contents

KYKLOS 4.0 **Technology**

KYKLOS 4.0 technology involves a set of **intelligent tools for real-time analytics & prediction, and recommendation systems**, further integrated into the KYKLOS 4.0 configuration environment. The KYKLOS 4.0 "Customized Open Production" system framework includes a set of production – service simulation models considering the 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 servitization (a type of maintenance services proposed), and eventually, e) product recycling/reuse.

Rapid Reconfigurable Manufacturing Process: The KYKLOS 4.0 Ecosystem adopts a life cycle management approach to devise and enable a set of product strategies for reconfigurable and reusable products across diverse sectors. **Pilots are expected to demonstrate drastic reductions in the required time and effort for reconfigurable and reusable customized products**.

Individualization of Consumer Preferences: The KYKLOS 4.0 solution allows manufacturing enterprises and global supply chains to devise and deploy operational strategies that meet fast changing customer demands and ride the wave of **mass customization and personalization**.

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KYKLOS 4.0 **Consortium**

The KYKLOS 4.0 consortium is a well-balanced group of European organizations including research institutes, universities, SMEs, and large enterprises, with complementary expertise. The partners bring together a **unique combination of technical-business skills** and expertise necessary to form an effective and compact consortium.

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KYKLOS 4.0 **Pilots** (1/4)

"7 Smart and Circular Manufacturing Pilot use cases will be developed during the project."

KYKLOS 4.0 will demonstrate, in a realistic, measurable, and replicable way the transformative effects that **Circular Production System (CPS)**, **Product Life Management (PLM)**, **Life Cycle Analysis (LCA)**, **Augmented Reality (AR)** and **Artificial Intelligence (AI)** technologies and methodologies will have to the Circular Manufacturing framework.

The following **7 Smart and Circular Manufacturing Pilot use cases** will be developed during the project to demonstrate the matching and applicability of KYKLOS 4.0 technologies and solutions to major categories of businesses and manufacturing processes:

1. Aerospace

2. Electronic Devices/Equipment

3. Medical

4. Automotive

5. Shipyard

6. Food Industry

7. Electronic Equipment

Through sharing its developments in pilot manufacturing as well as through complementary communication and dissemination activities based on the strategy developed, KYKLOS 4.0 aims at reaching interested parties and stakeholders from industry and academia and deliver them the technological advances, challenges, opportunities, and solutions that the KYKLOS 4.0 piloting platform provides.

In addition, participants engaged through the Open Calls, that will be announced during 2021, can get a deeper understanding of how KYKLOS 4.0 capabilities are applied to real-world use cases.

More information about pilot use cases follows.

KYKLOS 4.0 Pilots

"Within KYKLOS 4.0 Aerospace Pilot (KANFIT3D), an important part of the AM design and manufacturing process will be addressed."

"Electronic Devices/Equipment Pilot (VESTEL) aims to help mold technicians with version changing operation on metal stamping factory by using AR technology integrated with plant's Manufacturing Execution System."

"In the Medical Pilot (PRO MEDICARE), the whole process, that starts from the quote request by the side of the dealer to the delivery of the device, will be addressed."

KYKLOS 4.0 **Pilots** (2/4)

1. Aerospace Pilot - KANFIT3D

Image by 2427999 from Pixabay.

KANFIT3D offers the latest in Metal Additive Manufacturing (AM) and hybrid manufacturing (combining AM with CNC), using advanced equipment and the latest manufacturing technologies to achieve accuracy and precision, to meet the top-most international standards. Most of KANFIT3D's manufacturing is for aerospace (various high-precision parts) and medical (patient-specific implant) customers.

In the KYKLOS 4.0 Aerospace Pilot, an important part of the AM design and manufacturing process will be addressed, which is not sufficiently handled by available off-the-shelf software: the design of support structures and the selection of process to remove these structures after printing. Support structures are necessary to enable the additive manufacturing of complex components, but they need to be removed from the part to form the final component, wasting materials and cost.

2. Electronic Devices/Equipment Pilot – VESTEL

Photo by Remy Gieling on Unsplash.

The Electronic Devices/Equipment Pilot by VESTEL aims to help mold technicians with version changing operation on metal stamping factory by using augmented reality technology integrated with the plant's Manufacturing Execution System.

VESTEL is one of the top 3 global TV producers. Other than a final assembly factory, there are four other sub factories that produce parts for a final products. One of them is a metal press factory, where the pilot will take place.

With this pilot, when the mold is brought to the moldshop for version changing, mold technicians will see arrows on the parts that needs to be changed on the mold by using an AR Glass or a tablet computer. They will also see a workflow about what to do for each step. The aim is to establish control over version changing.

3. Medical Pilot - PRO MEDICARE

Photo by NCI on Unsplash.

PRO MEDICARE s.r.l. develops and manufactures postural systems for wheelchair users. PRO MEDICARE'S customers are qualified dealers (orthopaedic workshops) who provide specific inputs for the manufacturing of the parts. The customization is performed by reshaping the basic design of the wheelchair and the postural system developed by PRO MEDICARE, according to the dealer inputs, the reference standard, and the design constraints.

In the Medical Pilot, the KYKLOS 4.0 capability to simplify the whole process, that starts from the quote request by the side of the dealer to the delivery of the device, will be applied.

"In the Automotive Pilot, DIGRO aims to produce the net shape windshield cowl cover using the AM technology developed in KYKLOS 4.0, using the best fitting material."

"Shipyard Pilot (ASTANDER) aims to monitor the state of life of the cranes."

"In the Food Industry Pilot (PINDOS) the KYKLOS 4.0 capability to monitor the production resources such as water, hot water, steam, air compressors, etc. will be applied."

KYKLOS 4.0 **Pilots** (3/4)

4. Automotive Pilot – DIGRO

Photo by carlos aranda on Unsplash.

DIGRO (short name for DIAD Group) is a leading company in optimizing customized processes for automotive and aeronautic sector, with a strong partnership all over the world.

DIGRO aims to produce the net shape windshield cowl cover using the AM technology developed in KYKLOS 4.0 using the best fitting material. The use case also includes the conduction of simulation processes for the wind shield cowl cover component and the use of biomaterials to demonstrate the sustainability of materials in the project.

5. Shipyard Pilot – ASTANDER

Photo by Jens Peter Olesen on Unsplash.

Astilleros de Santander S.A.U. (ASTANDER) is providing all the technical and human capacity needed to carry out all kinds of conversion and ship repair projects under the most demanding quality standards in the sector.

The Shipyard Pilot use case aims to know the state of life of the cranes by monitoring them. In case of evacuations on the ship, the crane operators can have information about the status of the crane (structural analysis, load cycle, network analysis).

This pilot will also help operators in the handling of the crane by using AR manuals and remote assistance, including repairs, also with AR. Real-time information from sensors will be visualized in AR to support the rest of the situations.

6. Food Industry Pilot – PINDOS

Image by Michael Gaida from Pixabay.

PINDOS is the largest first-degree agricultural cooperative and one of the 5 largest food companies in Greece.

In the Food Industry Pilot, the KYKLOS 4.0 capability to monitor the production resources such as water, hot water, steam, and air compressors, will be applied. Sensors/PLC will be installed on the engines (pumps, flowmeter, energy meter, etc.) to monitor their proper operation and to prevent damage and malicious intervention by human error or external factors. The goal is the optimization of the process and the control of the variables that ensure the quality of the production and the final product, with minimum energy consumption.

7. Electronic Equipment Industry Pilot - CONTINENTAL

Image by Magnascan from Pixabay.

CONTINENTAL develops pioneering technologies and services for sustainable and connected mobility of people

KYKLOS 4.0 **Pilots** (4/4)

"The CONTINENTAL Pilot use case aims to improve the maintenance process."

and their goods. The technology company offers safe, efficient, intelligent, and affordable solutions for vehicles, machines, traffic, and transportation. CONTINENTAL has central electronic plants in 30 locations in 16 countries all over the world.

The Timisoara Plant produces electronic components (interior and design components like central displays, instrument clusters, head-up displays, etc., and safety components like airbag control units, control units for switchable suspension, electronic parking brake, etc.) for the automotive industry, with customers throughout Europe.

The CONTINENTAL Pilot use case aims to improve the maintenance process. It is desired to support maintenance operators in their work, providing them with dashboards, improved manuals, work instructions, technical drawings of the equipment using digitalization and AR.

Furthermore, another objective is to reduce maintenance cost in terms of head count time used for preventive, corrective, and predictive maintenance in the Final Assembly Line.

Finally, in the CONTINENTAL Pilot, the KYKLOS 4.0 capabilities to implement 3D printing technology / CAD data visualization for maintenance interventions will be applied to reduce reaction time on maintenance. Automatic monitor, trigger and forecast the spare parts order and spare parts cost is also an objective.

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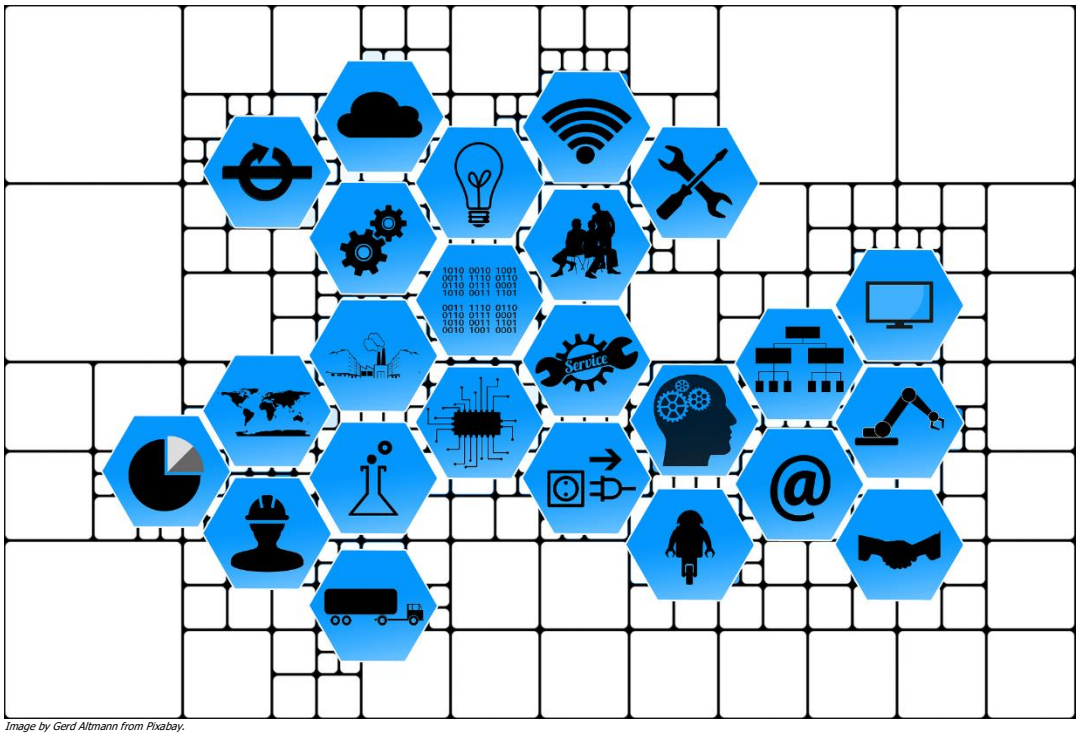


Image by Gerd Altmann from Pixabay.

KYKLOS 4.0 Open **Calls**

KYKLOS 4.0 will organize two Open Calls during the project with the objective of engaging European SMEs in the design and implementation of highly innovative experiments/prototypes using research infrastructure available within the framework of the project.

The Open Calls will be published and run from the F6S platform (https://www.f6s.com/kyklos4.0), with communication and promotion activities focused on channeling potential applicants to the platform. Following the events that took place during 2020 (e.g. participation in the Funding for Innovation Webinar, organized by partner F6S in the framework of the EOSC DIH of the EOSC-hub project, participation in the Accelerator and Tech Parks Webinar) in which details about the KYKLOS 4.0 Open Calls were provided to participants, several other events, including online webinars and local face-to-face events across Europe are expected to be implemented within the framework of the two Open Calls before the launch of the Open Calls.

Funding will be provided to projects led by small consortia (third parties) and targeting innovative concepts. Each project is expected to define their own project objectives while adhering to the larger objectives and vision of the KYKLOS 4.0 project. KYKLOS 4.0 will support the third parties' activities along the project duration, including those related to project management, product/ service development, tests and demonstrators, business development/ internationalization activities. A total of €3M has been budgeted for the KYKLOS 4.0 Open Calls. In principle, €1M will be allocated to the 1st and €2M to the 2nd Open Call. Awarded projects may receive up to €150,000, with each third party receiving a maximum of €60,000.

It is worth to mention that the Open Calls page in KYKLOS 4.0 website is one of the top viewed pages by the users. This indicates the attention that the audience/stakeholders give to initiatives and best practices like this, and that the interaction through the Open Calls can contribute to reach more SMEs, innovators, and industrial partners with the KYKLOS 4.0 technologies and solutions.

KYKLOS 4.0 will also launch a call for expressions of interest (EoI) for external evaluators. Selected experts will participate in the evaluation of the applications submitted to the two KYKLOS 4.0 Open Calls. The call for EoI will be open to all experts with knowledge in the digital manufacturing domain, as well as one or more sub-domains, including cyber-physical systems, product lifecycle management, life cycle analysis, augmented reality, artificial intelligence, circular manufacturing, big data and data management, deep learning, and decision support systems, among others. The call for EoI will be launched in January 2021.

More information about the 1st Open Call and the call for EoI can be found on the KYKLOS 4.0 **WEBSITE**.

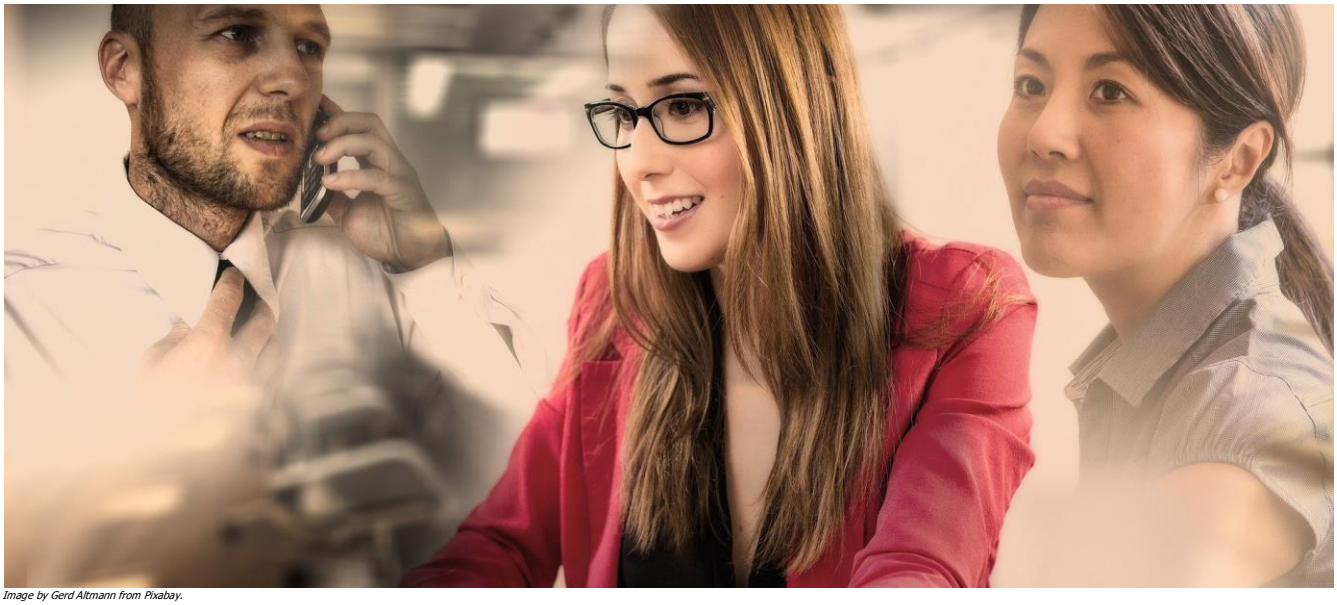


Image by Gerd Altmann from Pixabay.

KYKLOS 4.0 at **Events**

"The project consortium partners participated in key conferences, workshops, and exhibitions (mostly online due to COVID-19 pandemic) to promote its technologies and solutions, and exchange knowledge with the research community and stakeholders."

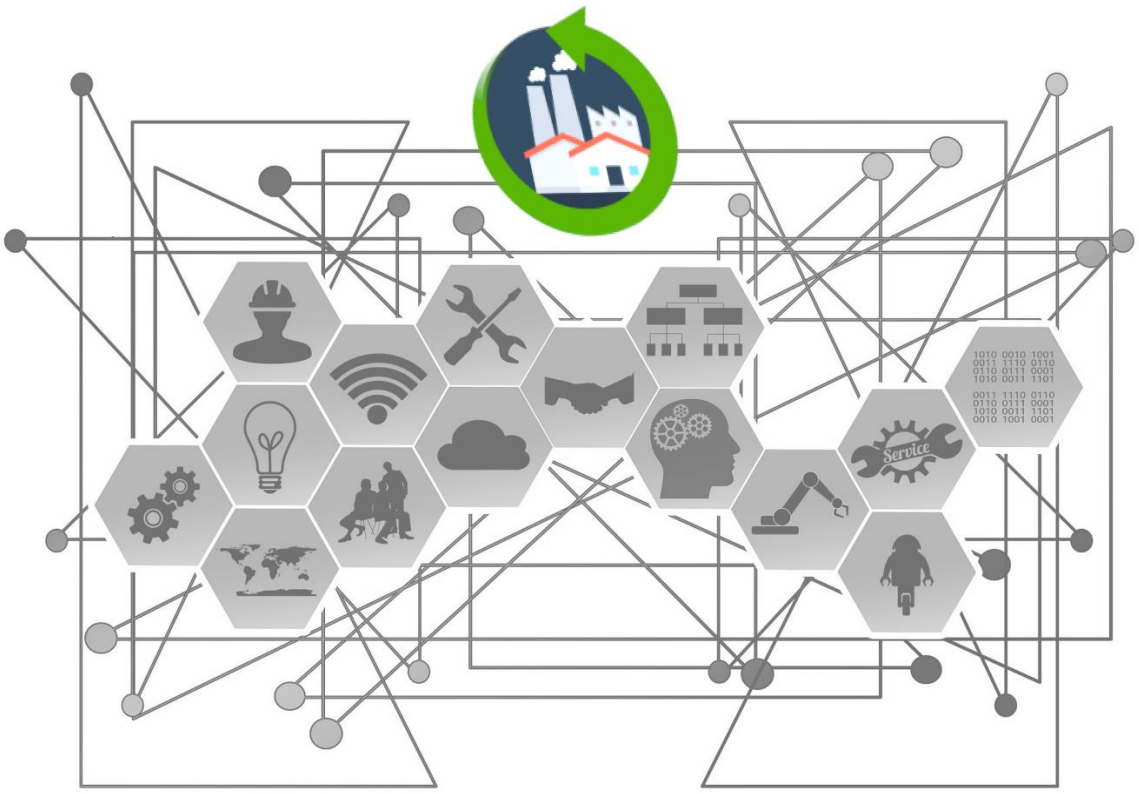
The KYKLOS 4.0 consortium partners participated in major forums and exhibition shows during 2020, offered mainly online due to COVID-19 implications, in the fields of manufacturing, industrial automation, and related technologies. Furthermore, online meetings/ teleconferences were organized to foster collaboration with external industrial partners and stakeholders. During the meetings, KYKLOS 4.0 partners presented the project's planned and ongoing technical activities and discussed about possible cooperation on topics such as design, customization, process optimization and components development.

Considering the conferences and events, partners provided the interested parties with information about the objectives and technology of KYKLOS 4.0 and discussed potential collaborations in research and/or industrial level. Indicatively, during the Virtual Brokerage Event on the European Green Deal Call, partners disseminated the overall scope of KYKLOS 4.0 and informed participants about technical aspects of the project. In addition, during the DIGITAL SME General Assembly 2020, the KYKLOS 4.0 project was introduced to all the members of DIGITAL SME alliance including 30 national and regional SME associations throughout Europe. In the framework of the EOSC DIH Funding for Innovation Webinar, organized by partner F6S, the presentation and discussions were mainly focused on the KYKLOS 4.0 Open Calls. The Open Calls were also presented on the pitch event Accelerator and Tech Parks Webinar.

Furthermore, during the Standards for Digital Manufacturing Webinar, KYKLOS 4.0 partner Jotne participated in the organization of the webinar and presented KYKLOS 4.0 to participants with emphasis on the standardization tasks of the project. KYKLOS 4.0 also participated in the European Forum for Electronic Components and Systems (EFECS) 2020. The project participated with a virtual booth where participants had the chance to visit the booth, interact with KYKLOS 4.0 representatives, and get insights on KYKLOS 4.0 technologies and solutions.

More information about KYKLOS 4.0 news and developments can be found on KYKLOS 4.0 **WEBSITE**.

KYKLOS 4.0 booth at EFECS 2020



Download KYKLOS 4.0 presentation, leaflet, and posters

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