

Moving from computer-aided design into production with advanced all-in-one machines will create great new opportunities for Additive Manufacturing



The OpenHybrid project will offer unrivalled flexibility, high quality on parts produced and increased productivity for companies looking into taking advantage of its unique ability to perform both additive and subtractive manufacturing

Currently, it is not possible to undertake a wide range of processes in a seamless automated operation with a single manufacturing system. The OpenHybrid project has been designed to address the technical and commercial limitations of current hybrid manufacturing systems by developing a single manufacturing system which can achieve this goal. This new system will provide additional competitiveness to some of the most demanding and important industries in Europe, which will validate the approach through the production of industrial demonstrators. The industries will range from power generation to automotive and mining equipment sectors. Its impact can be better perceived through the expected 25% reduction in time and costs when compared with current equipment and processes, as well as the 15% increase in productivity for high-volume additive manufacturing production. Lastly, it is also expected to generate a 20% reduction in inventory and 40% on work floor space even by enlarging the working volume of the machine by scaling axes from millimetres (today) up to 20 m (at the end of the project).

Furthermore, the new system will be able to switch between powder and wire feed-stock within a single part, providing unmatched flexibility in terms of materials, a must-have for these industries as they look for optimisation on cost, weight and resources utilization, to which the ability to use several materials within the same piece is paramount. Moreover, the process can be fitted to a diverse range of platforms (with minimal machine modification being required) as well as to existing machine tools, it strongly reduces the investment needed while at the same time provides new capabilities to large and small companies.

The success of one project can be better perceived by its ability to provide for an effective technology transfer, made available through technology services at affordable costs and, as an end result, facilitating the collaborating with EU SME and large industries, and the rapid deployment and commercialisation of the new technology.

Creating the groundwork for a more widespread adoption of Additive Manufacturing

By creating new hybrid machines, equipped with both subtractive and additive manufacturing technologies, OpenHybrid will be a game changer for faster creation of new opportunities and applications for Additive Manufacturing (AM). This new solution, when implemented, will increase the level of robustness and repeatability of such industrial processes, will optimise and evaluate the increased performance of production lines in terms of productivity and cost-



effectiveness and, finally, it will assess the sustainability, functionality and performance of the produced new materials. Beyond new parts production, this new manufacturing method will also allow for a very effective repair technique.

A number of technologies will be leveraged and developed to ensure the project's long term success, creating a solid base for the future widespread adoption of Additive Manufacturing, and among them:

- Smart Laser cladding heads, incorporating temperature sensors and material feed sensing;
- Laser scanning head for heat treatment, polishing and texturing;
- Laser ultrasonic non-destructive testing inspection for defect analysis;
- Enhanced gas shielding, medium shielding through a trailing shield and high shielding through a flexible enclosure;
- Mechanical stress relieving through the development of ultrasonic needle peening head;
- Contamination control through the development of a cleaning head;
- Enhanced inspection utilizing combined thermal and optical imaging.

Project partners

The partners of this project include a relevant set of international organizations with field experience with these technologies. Partners include The Manufacturing Technology Centre Limited (United Kingdom), Siemens Aktiengesellschaft (Germany), Weir Group Plc (United Kingdom), Fraunhofer Gesellschaft Zur Forderung Der Angewandten Forschung Ev (Germany), Mikron Agie Charmiles Ag (Switzerland), Esi Group (France), Hybrid Manufacturing Technologies Limited (United Kingdom), Gudel Ag (Switzerland), Twi Limited (United Kingdom), Bct Steuerungs Und Dv-Systeme Gmbh (Germany), Centro Ricerche Fiat Scpa (Italy), Esi Software Germany Gmbh (Germany), Picasoft (France).

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About the European Federation for Welding, Joining and Cutting

EFW is a pioneer in implementing a harmonized qualification and certification system for joining professionals. Through European projects EWF has been innovating in training methodologies, and involved in the development of new technologies and uses for joining. Through its member organisations, EWF has established a firm link to the local industry, providing knowledge and training as well as participating in research initiatives that address the most pressing questions and challenges in the field of joining technologies.

