

Welcome to the fourth edition of Impact, the newsletter from the European Factories of the Future Research Association (EFFRA) focusing on the work of projects launched under the EU’s research and innovation programme for advanced manufacturing – ‘Factories of the Future’.

This December the EFFRA co-ordinated project FoF-Impact concludes after its recent major workshop ‘Factories of the Future: Making Innovation Happen’. In this edition, we make presentations from this workshop available and report on what happens beyond the project’s conclusion.

We are pleased to introduce four projects and to report on the achievements of three projects in the areas of HPC, tooling and cloud manufacturing. This edition also highlights the new SME Instrument data hub and the 2017 edition of the Manufacturing Performance Days conference.

The aim of this newsletter is to bring news from these projects and related activities to a European audience. The newsletter is free and readers are welcome to share it with their networks.

Finally, the EFFRA team wish you the very best for the holiday season and a prosperous new year.

If you have project news you wish to share you can submit it to: info@effra.eu.

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Subscribing to Impact

Impact is available to anyone with an interest in factories of the future and is registered on the EFFRA Innovation Portal.



If you have colleagues/contacts who are interested in receiving this newsletter direct them to the EFFRA Innovation Portal and they will receive our next edition direct into their mailbox.

Access to the EFFRA Innovation Portal and subscription to this newsletter is free.

[Innovation Portal](#)

FoF-Impact Concludes: Looking Beyond the Project

This month the FoF-Impact project formally concludes after 24 months. The aim of the project has been to enhance the impact of the 'Factories of the Future' partnership through technology transfer and expanded community. The project has undertaken activities to achieve this including workshops and identification of success factors and case studies. A concluding report providing more information will be published in January.

As part of these efforts, FoF-Impact held two workshops – one focusing on manufacturing technologies for the aerospace sector and the other with a multi-sector scope. Presentations from the 'Factories of the Future: Making Innovation Happen' workshop are available via this link:

- [Factories of the Future: Making Innovation Happen](#)

These workshops have showcased the tangible outcomes, pilot actions and the experience gained through the 'Factories of the Future' partnership and enabled new connections to be made and ideas shared. Please see the articles below for more information on these workshops.

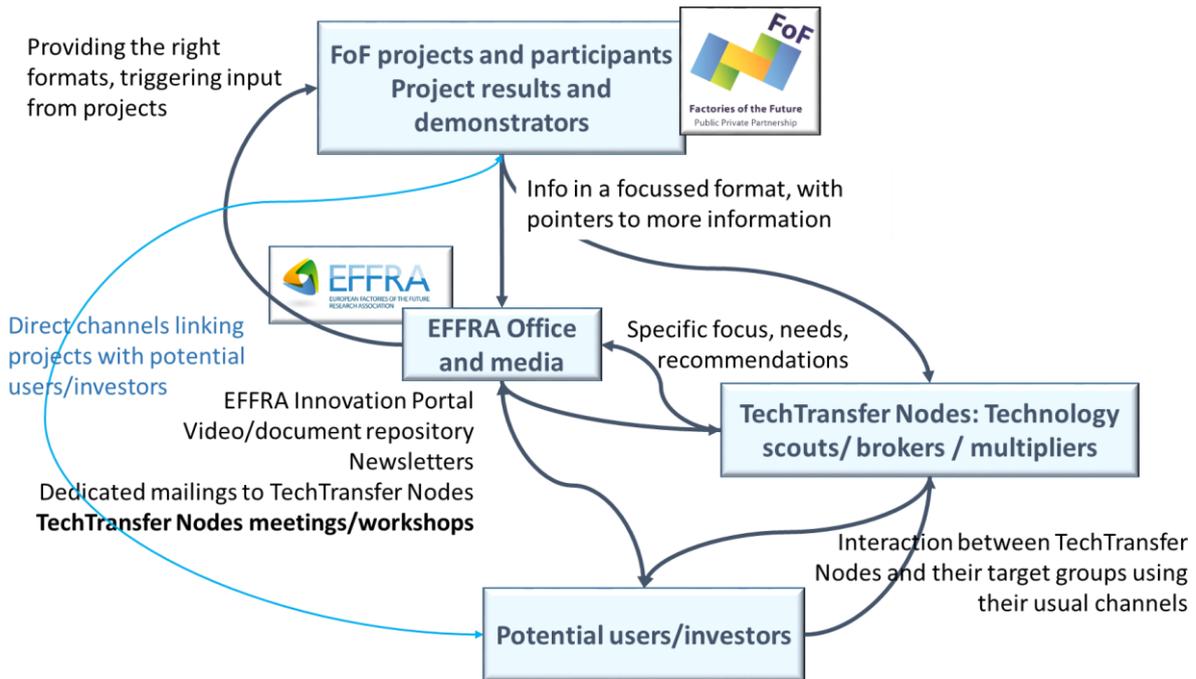
Looking beyond the conclusion of FoF-Impact, EFFRA will dedicate a lot of effort to bringing 'Factories of the Future' project results faster to more potential users beyond the project consortia.

Targeted mechanism will be put in place that considers the specific situation of the manufacturing sector, by cooperating with technology organisations active on national and regional level that guide and assist industrial companies in product and process innovation. These organisations compose a vast network of technology scouts and

brokers that can be mobilised to match FoF projects results with the needs of the companies they serve.

The post-FoF-Impact vision is to establish a European network of potential partners which should accelerate manufacturing innovation through technology transfer, brokerage and uptake of R&I-results. This network will be a win-win-situation: European projects which are looking for channels for exploiting their results will benefit by meeting appropriate innovation partners. Companies looking for inspiration, innovations, solutions or the “missing link” to realize their innovative ideas will increase the probability to find what they are looking for. Technology transfer organisations /multipliers can widen their networks and scope, find new business opportunities and new partners.

To succeed, a dynamic exchange of information will be stimulated where inquiries/opportunities are actively managed and followed up. It should neither create new entities or organisations, but build as on existing organisations, networks and expertise.



(© EFFRA)

More news about this in early 2017.

[FoF-Impact](#)

FoF-Impact Project Concludes with Final Event

FoF-Impact, the CSA project aiming to increase the impact of the ‘Factories of the Future’ partnership, concluded today with a major workshop under the theme “Factories of the Future: Making Innovation Happen”.

The workshop showcased the tangible outcomes, pilot actions and the experience gained through the FoF-Impact. Potential impact success factors including market aspects, IP management and upscaling, were discussed. Services associated to these success factors were presented, including a vision to take this further in the future.

As part of the FoF-Impact approach, twenty projects pitched their results to participants in two dedicated pitch sessions with the aim of promoting exploitable results and engaging with other projects. The format has been successfully deployed in previous impact-focused events and is expected to be a recurring feature of ‘Factories of the Future’ events.

During the workshop project consortia exhibited their results and further achievements in a dedicated exhibition.

The workshop also promoted the results of four other ‘impact and clustering’ CSAs - Co-FACTOR, EFFECTIVE, FoFAM and FOCUS.

Strong Interest in Factories of the Future at Aerospace Workshop

There was a strong interest in the 'Factories of the Future' partnership amongst participants at the recent 'Factories of the Future for Aerospace' workshop.

A first of its kind, the workshop was co-organised by EFFRA and the Aerospace Valley and gathered major aerospace companies, SMEs and research organisations from around Europe, in Bordeaux with a few to promoting the 'Factories of the Future' partnership and fostering greater collaboration between companies and organisations with a shared interest in advanced manufacturing and related areas.

Factories of the Future and other advanced manufacturing projects pitched and discussed their results in four pitch sessions. The sessions focused on the following themes:

- Product and process simulation
- Factory automation
- Advanced material processing
- Collaborative supply chain

In addition to the workshop, participants visited five major industrial sites at Dassault, Thales, Airbus Safran Launcher and Rescoll.

[FoF-Impact](#) | [Aerospace Valley](#) | [Cappadocia Project](#) | [More Information](#)

I4MS Phase Three Info Day Takes Place

The call for the third phase of the 'Factories of the Future' initiative I4MS took place in Brussels on 2 December.

Phase 3 of I4MS (FoF-12-2017) addresses the adoption of the next generation of ICT advances in the manufacturing domain. For this call the focus is on emerging innovative technologies and processes, which need to be customised, integrated, tested and validated before being released on the market. Special emphasis is placed on the strengthening European SMEs and mid-caps along the value chain by adopting new concepts linked to innovative business and/or service models, and bringing them into contact with actors that can provide access to finance and access to advanced training to reskill workers.

The Info Day also presented other ICT call topics on micro- and nanoelectronics technologies and customised and low energy computing.

Presentations will be made available by the Commission via the link below.

[More Information](#)

HPC Progress Showcased in FORTISSIMO Forum 2016

HPC for manufacturing was at the centre of the second edition of the FORTISSIMO Forum. This year's Forum addressed high-performance data analytics and the Fortissimo marketplace.

The Forum provided an in-depth introduction into the mechanisms of the Fortissimo Marketplace to service providers with different business models and functionalities presented.

Members of Fortissimo's consortium and invited speakers presented insights into high-performance data analytics to demonstrate the potential that lies in this new subject.

Fortissimo 2 is a 'Factories of the Future' I4MS project launched in 2015 with a budget of €10 million. The Fortissimo Marketplace, a result of the first Fortissimo project, offers a self-service of high performance computing resources, software applications, expertise and tools, delivered by Europe's major HPC technology providers.

[More Information](#)

Introducing the LASIMM Project

Reducing costs, improving efficiency and production flexibility are core pillars to improve Europe's industrial competitiveness. The LASIMM project (Large Additive Subtractive Integrated Modular Machine) aims to address this need through the development of large scale and flexible all-in-one hybrid machines, based on a modular architecture that is easily scalable, and ensuring that the properties of the material produced surpass those of a forged material. It will enable the production of a part/product directly from computer-aided design (CAD) models within a reduced timeframe and without the need of post-processing steps. The machine resulting from this project will be equipped with both subtractive and additive manufacturing technologies, as well as featuring additional capabilities for machining, cold-work, metrology and inspection that will provide the optimum solution for the hybrid manufacturing of large engineering parts, with cost benefits of more than 50% compared to conventional machining processes.

To produce large scale engineering structures, material needs to be deposited at a relatively high rate, with exceptional properties and excellent integrity. To achieve such result, the deposition process will be based on Wire + Arc Additive Manufacture (WAAM). Another unique feature of the machine will be the capability for parallel manufacturing, featuring either multiple deposition heads or concurrent addition and subtraction processes.

This parallel manufacturing process requires that the machine architecture is based on robotics. To ensure that the surface finish and accuracy needed for an engineering components are obtained, a parallel kinematic motion (PKM) robot is employed for the subtractive step. This robot is also used for application of cold work by rolling between passes. This ensures that material properties can be better than those of a forged material. A key part of this project is the development of the ICT infrastructure and toolboxes needed to programme and run the machine. The implementation of parallel manufacturing is extremely challenging from a software perspective and will require a strong focus within the project.

[Project](#) | [Contact](#)

Developing a Novel Hybrid AM Approach: OpenHybrid Project

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.

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.

Several 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](#) | [Contact](#)

ModuLase: Pilot-Line Validation

As industries evolve to produce better, more efficient and increasingly sophisticated products, pressure is mounting on the technologies used to produce them in order to respond to those requirements. Additive manufacturing and laser-based manufacturing illustrate this trend, since they are increasingly relevant as key modern production technologies due to their unrivalled capability for performing a wide range of materials processing applications. One caveat remains for a broader adoption, which is the fact that the flexibility of the laser source is limited by the need to change the processing head for these processes to be performed. By addressing this issue, the ModuLase project will develop a re-configurable highly flexible processing head system, capable of covering welding, cladding and cutting, compatible with existing and future fibre-delivered laser process systems. The project will deliver solutions to the aerospace, power and automotive industries.

ModuLase will encompass all stages of the process chain and provide additional flexibility, cost reduction and execution speed without compromising the overall quality, hence providing a better overall performance. By providing the groundwork for a more thorough utilization of laser-based manufacturing, ModuLase will provide a critical tool for the Factories of the Future public-private partnership which sets a vision and outlines routes on its 2014-2020 roadmap towards high added value manufacturing technologies. As result of this vision, the factories of the future will be clean, highly performing, environmental friendly and socially sustainable.

The ModuLase project will develop a re-configurable highly flexible processing head system, which will be capable of covering welding, cladding and cutting, with a changeover time of less than one minute between processes. The new head system will achieve this through the use of three modular end-effectors and, will include intelligent sensor technologies for in-process monitoring. Lastly, since linked to an intelligent system, the ModuLase system will achieve adaptive process control, quality assurance and semi-automated process parameter configuration.

Technology and knowledge transfer are one paramount issue that will also be part of the project, facilitating the collaboration with EU SMEs and large industries, and enabling the rapid deployment and commercialisation of the new technology.

The technology to be developed and validated in ModuLase consists of the following:

- A Beam Forming Unit (BFU), capable of delivering a wide-range of laser beam energy distributions, suitable for the different processes;
- Modular ‘plug and play’ end-effectors, which can be rapidly attached to the BFU to provide the additional functionality required for the different processes;
- An in-process monitoring and quality assurance system, achieved through co-axial process monitoring and algorithms to support adaptive process control;
- A software system, which allows automated re-configuration of the process head and (semi) automated process optimisation, through a user-friendly human-machine-interface.

Figure 1 shows a schematic overview of the ModuLase system:

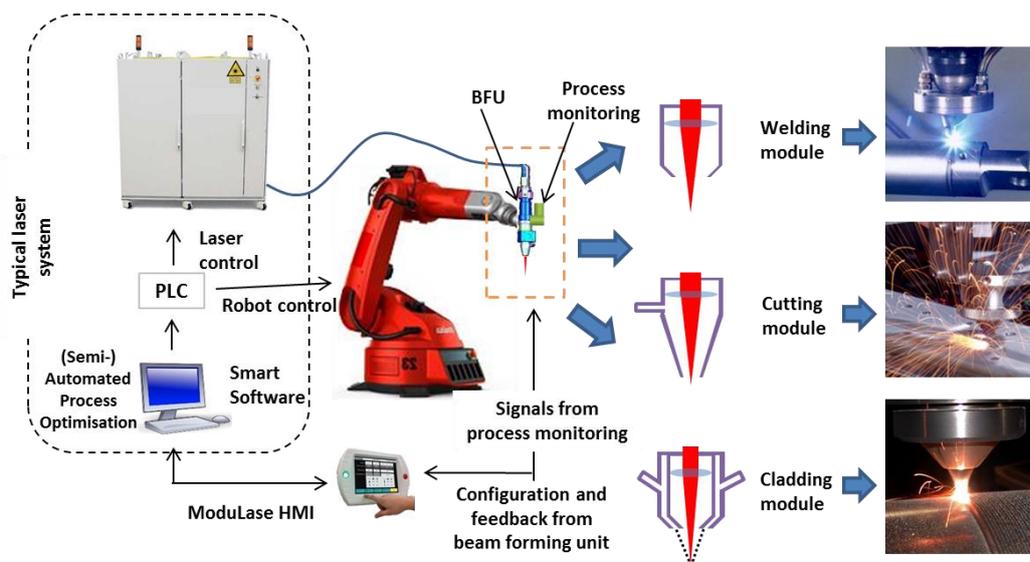


Figure 1 (© ModuLase Consortium) Schematic overview of the ModuLase system, comprising a re-configurable process head (with BFU and modular end-effectors), process monitoring sensors, and a control system for adaptive process control and (semi) automated process optimisation.

The ModuLase project will also develop welding, cladding and cutting process knowledge for the target markets. Existing laser processing knowledge will be used where possible, to supplement the additional processing knowledge developed within ModuLase. This knowledge will be embedded within a software system, which will:

- Control the positions of the optics within the BFU, allowing automated changing of the laser beam energy distributions;
- Communicate with the other ancillary equipment (laser, robot, powder feed etc.);

- Communicate with the in-process monitoring system and process control algorithms to provide process control;
- Have a human-machine-interface (HMI) to allow (semi) automated process parameter optimisation, by allowing the end user to input process requirements.

The (semi) automated selection of process parameters (including laser beam energy distributions) and adaptive process control, will result in a unique and remarkable product that will maximise the laser sources potential for material processing and facilitates non-expert industrial adoption.

[Project](#) | [More Information](#)

DIPLAT Project: Adding 'Sparkle' to Ultra-Hard Tools

'Factories of the Future' project DIPLAT has launched a pulsed pico-second laser ablation system to shape the surfaces of diamond tools in ways that can significantly improve industrial drilling, grinding and milling processes.

By applying innovative laser techniques to ultra-hard machine tool materials, such as diamonds, the DIPLAT project has shown the way to better performance. Their technology has led to the launch of a spin-off company and market-ready products that could help European industry to lower costs and improve quality.

[DIPLAT: Read the full story here](#)

C2Net Project Pilots: Videos on New YouTube Channel

C2NET (Cloud Collaborative Manufacturing Networks) has launched a new YouTube channel featuring four pilots.

C2NET aims to create cloud-enabled tools for supporting the supply network optimization of manufacturing and logistic assets based on collaborative demand, production and delivery plans. The project will provide a scalable real-time architecture, platform and software to allow the supply network partners to master complexity and data security of the supply network, to store product, process and logistic data and to optimize the manufacturing assets by the collaborative computation of production plans.

This 'Factories of the Future' project's cloud-enabled tools will also optimize logistics assets through efficient delivery plans and to render the complete set of supply chain

management information on the any digital mobile of decision makers enabling them to monitor, visualize, control, share and collaborate.

[C2NET Channel](#) | [C2NET](#)

HIPERLAM: €3.75 million for High Performance Laser Additive Manufacturing initiative

The HIPERLAM consortium has received €3.75 million as part of its Factories of the Future (FoF) partnership. The project aims to demonstrate superior cost and speed performance from laser-based additive manufacturing compared to existing processes in two key applications requiring high resolution printed conductive metallic lines, namely laser printed RFID antenna (Application 1) and laser printed Fingerprint sensors (Application 2). The promise of HIPERLAM's high resolution laser based additive manufacturing solutions is to transform the manufacturing processing speed by 10x for laser printed RFID antenna and 5x in the case of the lead-time for laser printed fingerprint sensor design. Similarly, HIPERLAM promises to reduce costs by 20x and 50% respectively for Application 1 and Application 2.

The key technologies of the project are laser printing (based upon Laser Induced Forward Transfer-LIFT technology) laser sintering and patterning which will replace existing subtractive processes. HIPERLAM will focus on novel nano-silver and nano-copper viscous inks for the printing and sintering of metallic conductive lines for electronics applications.

The HIPERLAM project was launched in November 2016 and research will be conducted over three years.

[HIPERLAM](#) (main project website will be available soon)

Manufacturing Performance Days 2017 Announced: Towards Outcome Economy

“Towards Outcome Economy” has been announced as the theme for the 2017 edition of the Manufacturing Performance Days (MPD 2017) conference.

MPD 2017 is an executive and visionary seminar for manufacturing industries, researchers and technology and service providers worldwide. From 29 to 31 May, MPD will bring together internationally recognised experts and academia to discuss and represent industrial best practices and operational excellence, novel business concepts as well as scientific and technological breakthroughs in the field.

MPIDEA

MPIDEA is a competition launched as part of MPD 2017. The objective of the competition is to advance the creation of new jobs to centenarian Finland. MPIDEA is an innovation competition for ideas regarding products, services, and processes where productivity is increased and new business is created through digital solutions. See the link below for more details.

MPD 2017 is an official conference of “Finland 100 years” marking the centenary of the Republic of Finland.

[MPD 2017](#)

SME Instrument Data Hub Launched

The Executive Agency for SMEs has launched an SME Data Hub. The hub presents SME Instrument figures and statistics in an interactive module. Using the hub, people can identify and locate SME Instrument beneficiaries in their region as well as details of each project. An overall list of projects is also available which can be browsed by country, topic, budget, date and phase.

According to the Executive Agency, the module can be embedded in company websites to encourage site visitors to use and benefit from the hub.

The data currently featured concerns projects from SME Instrument Phase 1 but this will be updated on a regular basis.

The SME Instrument is a popular EU programme aiming to support innovative SMEs through the Horizon 2020 research programme. However, due to the high volume of applications, the success rate remains low.

[Data Hub](#)

The SME Instrument is administered by the Executive Agency for SMEs, an agency of the European Commission.

More Information

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Contact

If you have suggestions, questions or comments concerning this newsletter, contact info@effra.eu.

Disclaimer

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