Joining Sub-Platform

Factories of the Future Work Programme 2018-2020

Gustaf Winroth

Advanced Manufacturing Systems and Biotechnologies, European Commission

16 November 2017



Status – Factories of the Future

Horizon 2020:

- 94 projects from calls 2014-2016 (428 M€)
- 18 projects starting from 2017 call (~90 M€)

Overall*:

- ~2.3 patent applications per project
- ~7.5 new systems and techs per project
- 30% reduction in waste
- 22% reduction in material use
- 27% reduction in CO_2 emissions, 22% reduced energy use

*survey answers only

cPPP mid-term review

- One single report for nine cPPPs
- Report available online: https://publications.europa.eu/s/dPIo
- 6 recommendations:
  1. More participatory processes
  2. More transparent processes
  3. Increase links between EU instruments and the cPPPs
  4. Redesign the key performance indicators
  5. Enhance national/regional impact together with Member States
  6. Progress with the cPPPs through "missions" of societal, industrial, and scientific nature

cPPP mid-term review - FoF

- Good, mature performance
  - Important private investments
  - Good coherence with other programmes
  - Open participation, high count of SMEs and partners from newer EU member states
- Improve through the cPPP recommendations
  - Expand the stakeholder base, incl. with member states
  - Improve the reporting of the key performance indicators
  - Increase links with industrial/scientific/societal challenges



Work Programme 2018-20

- Latest version:

https://ec.europa.eu/research/participants/portal/desktop/en/funding/reference_docs.html#h2020-work-programmes-2018-20

- 12 (+3 NMBP, +ICT) FoF topics between 2018-2020
  - Ambitious
  - Large/holistic challenges
  - System-level approaches
- Showcasing the Factories of the Future

Opportunities for 2018-2019, FoF

Topic Title	Year	Type
DT-FOF-01-2018: Skills needed for new Manufacturing jobs	2018	CSA
DT-FOF-02-2018: Effective Industrial Human-Robot Collaboration	2018	RIA
DT-FOF-03-2018: Innovative manufacturing of opto-electrical parts	2018	RIA
DT-FOF-04-2018: Pilot lines for metal Additive Manufacturing	2018	IA (50%)
DT-FOF-05-2019: Open Innovation for collaborative production engineering	2019	IA
DT-FOF-06-2019: Refurbishment and re-manufacturing of large industrial equipment	2019	IA
DT-FOF-08-2019: Pilot lines for modular factories	2019	IA (50%)
DT-FOF-12-2019: Handling systems for flexible materials	2019	RIA
DT-NMBP-20-2018: A digital 'plug and produce' online equipment platform for manufacturing	2018	IA
DT-NMBP-18-2019: Materials, Manufacturing processes and devices for organic and large area electronics.	2019	IA
DT-NMBP-19-2019: Advanced materials for additive manufacturing	2019	IA
ICT Topics 2018	2018	
ICT Topics 2019	2019	

DT-FOF-03-2018: Innovative manufacturing of opto-electrical parts

Specific Challenge:

Optoelectronics and opto-electrical components involve the interactions of photons and electrons.

Application examples: lasers, photodiodes, image sensors, optical amplifiers, modulators, solar cells, embedded optics and light-emitting diodes

- However, new processes need to be introduced into production systems.
- When going into the scale-up phase, many processes need to be adjusted to fit the production of complex, often free-form components.
  - The adjustments include both component specific changes as well as standard process steps. Due to the need to produce **large varieties of parts in small batches**, process adjustments have to be **both rapid and accurate**.
- The equipment for testing, failure analysis and control equipment needs to follow a fast pace of technical advancement, and cover a range of sensors, such as electrical, optical, magnetic and thermal sensors.

DT-FOF-03-2018: Innovative manufacturing of opto-electrical parts

- **Scope:**
- /…/ a variety of new processes applicable to the production of opto-electrical components, for instance:
- material handling
- material strain engineering
- Patterning
- material deposition
- Assembly
- joining and bonding.
- Furthermore, quality needs to be ensured by reliable sensors throughout the production line. The processes need to include a level of sustainability that allows the final products to be recycled and reintroduced into the value chain.

TRL 4-6

RIA 100%

DT-FOF-03-2018: Innovative manufacturing of opto-electrical parts

TRL 4-6

RIA 100%

- **Scope:**
- Proposals need to cover all of the following areas:
- New, flexible, and innovative process chains to handle complex designs that include **opto-electrical functionalities**;
- Improved **sensor equipment for quality control** in the different processing steps as well as the final functionality of the component;
- Methodologies for improving quality through **high-precision automation** using the sensor data, including **non-destructive in-process evaluation** of material and functional component properties;
- **Re-use and requalification of key components and precious materials** within the process chain from products at their end of life.

Proposals are expected to include a variety of use-case demonstrations of typical opto-electrical components, in which the robustness of the processing, work piece handling, sensing and the automation approach can be demonstrated.

DT-FOF-04-2018: Pilot lines for metal Additive Manufacturing

IA
50%

Specific Objective:

- Costs and unpredictable defects in final parts and products are preventing **complete deployment** and **adoption** of **Additive Manufacturing** in the **metalworking industries**.

- The **industrial demonstration** in a **pilot line** will show the **full potential** of **metal AM** in **real manufacturing** conditions and it will serve as a **flagship** example for other stakeholders. **Quality** aspects to be significantly improved include **robustness**, **stability**, **repeatability**, **speed** and **right-first-time manufacturing**.

DT-FOF-04-2018: Pilot lines for metal Additive Manufacturing (IA 50%)

TRL
From 5 to 7

- **Scope:**

Multi-scale and multi-physics simulations of the process and the whole system from early design phase. Prediction and minimisation of distortion and effect on durability and expected lifetime for post processing avoiding propagation of defects to downstream stages

- In-line non-destructive testing and in-situ analysis of product
- Integration and inter-operability of AM processes into multi-stage production systems, with in-process monitoring, feedback and control
- Hybridisation of Additive Manufacturing with other processes
- Certification, regulatory and standardisation activities related to the proposed solutions and AM produced parts
- Occupational exposure in terms of health, safety and environment together with the recycling of unused materials

DT-FOF-04-2018: Pilot lines for metal Additive Manufacturing (IA 50%)

EUR from 12 to 15 millions

- **Expected impact:**

Increase in robustness of metal AM-based processes by 40% and production speeds by 25%;

- Reduction of time to market by 25% and ‘right first time’ capability by 40%;
- Reduction of uncertainties of selected material quality parameters by 50%, resulting in improving product quality by 40%;
- New certification schemes for industrial "3D-Printed" parts and products in collaboration with relevant certification stakeholders;
- New standardisation of specific categories not included in current ISO/ASTM/CEN CENELEC TCs.

Beyond Horizon 2020

- Business as usual not possible
- Rationalisation based on:
  - Outcome of the Interim evaluation of Horizon 2020: https://ec.europa.eu/research/evaluations/index_en.cfm?pg=h2020evaluation
  - Links to the Lab-Fab-App, "Lamy report": https://publications.europa.eu/s/dPIv
- Alignment to Commission priorities
  - Openness: the "three O's"
    - ***Open Science***
    - ***Open Innovation***
    - ***Open to the World***
- Citizen involvement – Sustainable development goals

Upcoming preparation

- Multiannual Financial Framework to be settled
- Stakeholder consultations
- Impact assessments

- Please support us and engage with your stakeholders
- Industry Day 22-23 February 2018

Thank you for your attention!

Find out more:

www.ec.europa.eu/research/horizon2020