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Update



Chris Decubber

@ Joining Platform General Assembly

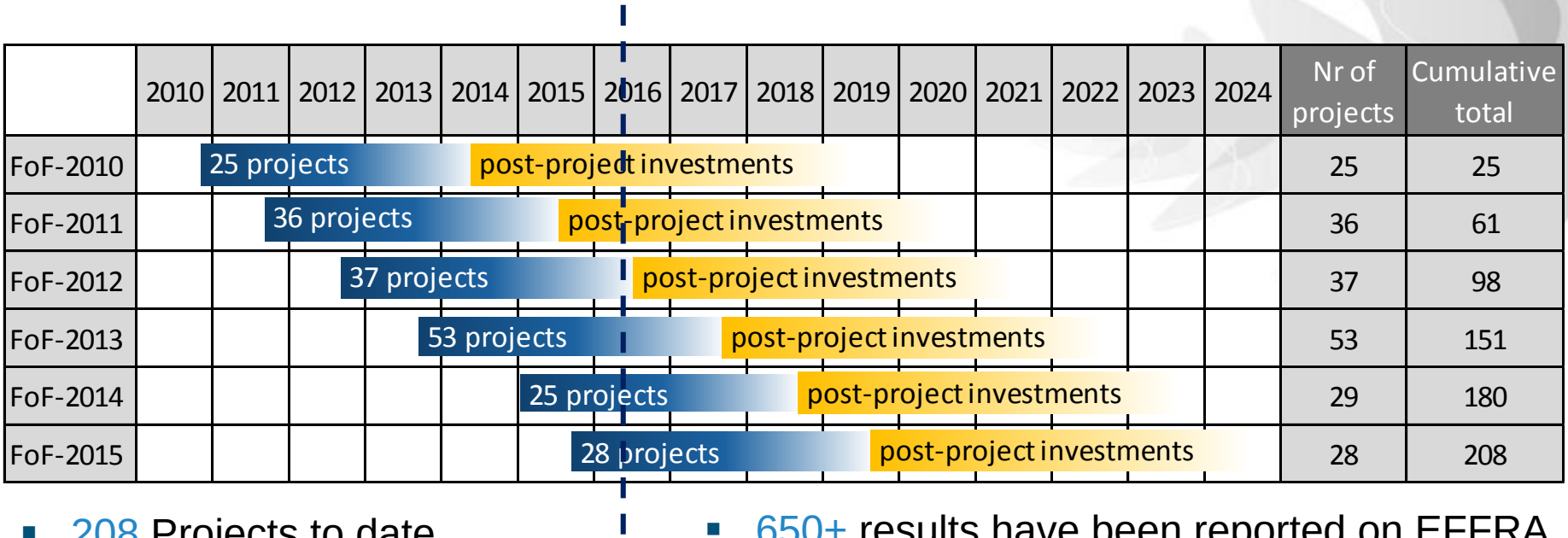
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Factories of the Future

Projects



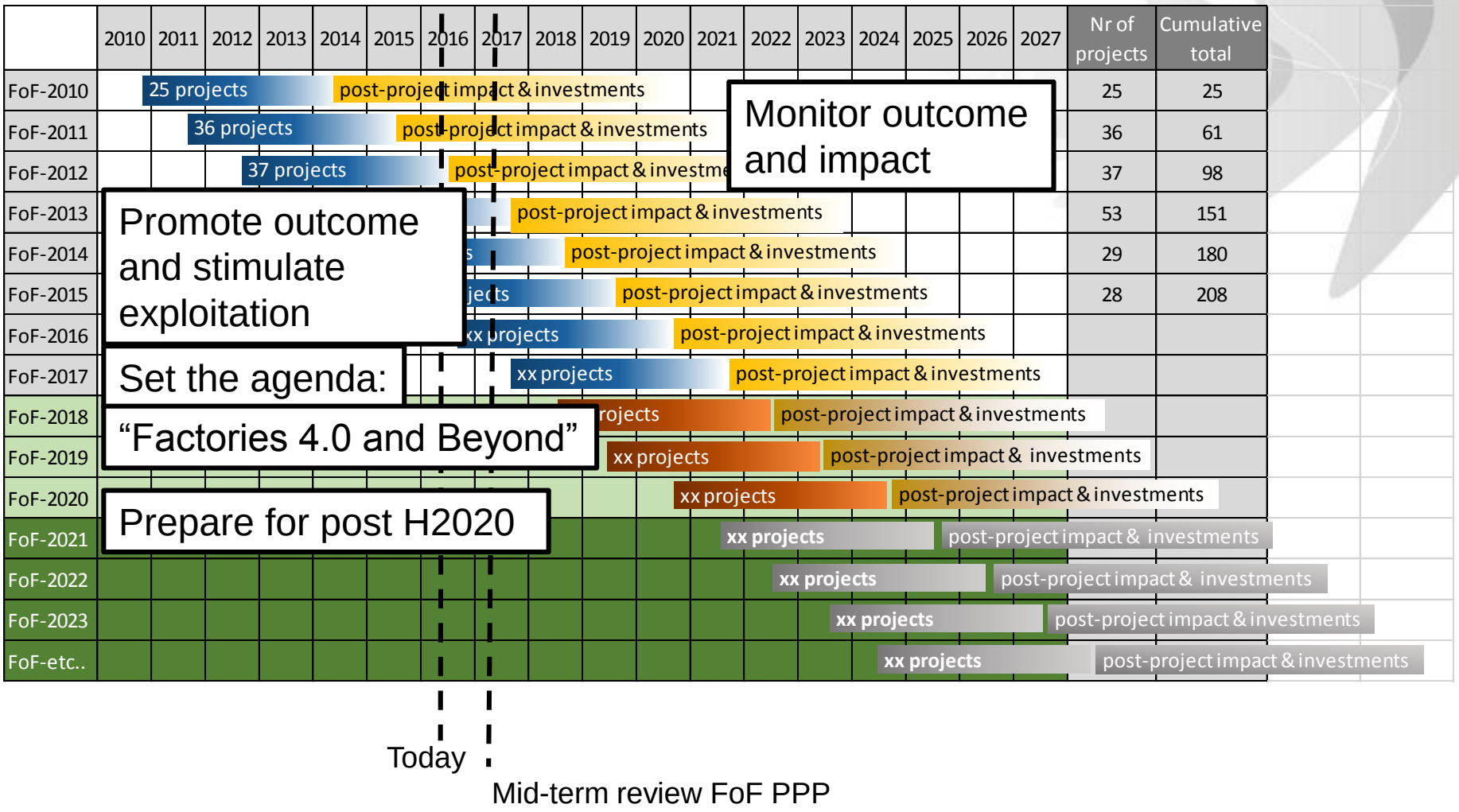
- 208 Projects to date.
- ~ 1,500 organisations participating
- High involvement of SMEs: 200+
- Majority of projects feature demo activities

- 650+ results have been reported on EFFRA Innovation Portal
- Close to the market exploitation of project results
- Project results enhancing existing products

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EFFRA General Assembly 2016

EFFRA's Priorities



April 7 2016 – opening of public consultation on FoF 18-19-20

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Consultation Document

EFFRA is preparing for its strategic discussion with the European Commission about the 'Factories of the Future' work programme 2018-19-20, covering the three last calls under Horizon 2020. In order to prepare for this discussion EFFRA has launched a public consultation.

We invite the broad manufacturing industrial and research & innovation community to participate in this consultation. Feedback should be provided through the response form that can be accessed once you are logged into the EFFRA Innovation Portal (www.effra.eu/portal). See also www.effra.eu.

Please provide us with your feedback by Wednesday, 4 May 2016 after which it will not be possible to provide a response.

EFFRA will use your input to compile a roadmap document complementing the current 'Factories of the Future 2020' roadmap, entitled 'Factories 4.0 and beyond' that will be delivered to the European Commission as a contribution to the preparation of the FoF PPP work programme 18-19-20.

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Public consultation on Headlines

Headline nr.	Headline title
1	**Manufacturing for complex and/or multi-material components**
2	**Advances in Additive manufacturing**
3	**High precision manufacturing**
4	**Material and resource efficiency in manufacturing**
5	**Energy efficiency on machine level**
6	**Energy efficiency on factory level**
7	**Zero-defect manufacturing – quality assurance – self-learning systems**
8	**Re-use of factories**
9	**Safe and ergonomic work environments**
10	**Supporting the human in the workplace – Manufacturing training/re-skilling**
11	**Human machine/robot cooperation for flexible and evolving factories**
12	**Reconfigurable cells, self-reconfigurable cells through smart sensors/devices**
13	**Distributed Intelligence Architecture and Systems on the Factory Floor**
14	**Novel production management tools for a responsive CPS-based production**
15	**On-site manufacturing technologies**
16	**Digital Factory Modelling and Simulation**
17	**Multiple Source (Big) Data Mining and Real Time Analysis**
18	**Cyber-Physical Factories**
19	**Digitisation of the Supply Chain – Manage customer-driven value networks**
20	**Collaborative, dynamic and resilient customer-driven production networks**
21	**New Approaches for the Cyberised Supply Chain**
22	**Manufacturing as a Service (MaaS) – Servitisation of autonomous and reconfigurable production systems**
23	**Collaborative Engineering**
24	**User Centric Product and Production Equipment Engineering**
25	**Standards, Platforms, Protocols and Interoperability**
26	**Security,Privacy and Liability – Cybersecurity and Industrial Safety**
27	**Lifecycle Management/PLM**
28	**European Circular Economy Open Platform**
29	**Business Models for the Digital Service Factory**
30	**New methodologies for financial & risk assessments of innovative production technologies**

Public consultation on Headlines

1. Manufacturing for complex and/or multi-material components

1.1 Addressed challenges and the link with the technologies

- Better tailoring of (local) properties of (lightweight) structures resulting from the use of more controlled and predictable innovative enabling technologies
- Including large parts
- Including new materials, composites, ceramics, multi-material and intermetallic alloys, coatings…

1.2 Specific technological (or non-technological) enablers or solutions

- Additive manufacturing for multi-material components
- Dissimilar material joining
- Advanced Forming technologies
- New and innovative cooling-lubrication methods
- Integrate Life Cycle Analysis by looking at the use phase and end of life recycling stage of the component
- Modelling and simulation (model-based prediction and control (eg. of tribological conditions) in materials processing
- Inspection methods, in-situ monitoring and the automation of the process
- Multi-scale integrated design of assembled or complex product for high tech and low weight multi-material structure
- Bionic design
- Product-process optimal design for advanced products/new materials

1.3 Expected impact

- Any particular standardisation aspects?
- Consider energy efficiency as well
- Consider productivity

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Response through Innovation Portal

Your responses | start responding or edit your responses by clicking here

Your saved responses are displayed below - you can still edit these untill the deadline of the inquiry.

1. HL01 - Manufacturing for complex and/or multi-material components - rate importance 100/100

1.1. HL01 - Comments on scope

- Include upcoming lightweight structural materials like Foams and Thermoplastic composites in combination with high strenght metallic alloys.
- The project should look for cost effective solutions compatible with automated mass production in a flexible automation environment, like transport industry (automotive, rail, ...).
- New functions integrated in single components: impact and noise absorption, corrosion resistance (eg: for maritime or high temperature enviroments), thermal management.
- The solutions should consider the possibility to integrate novel multi material processing capabilities in existing manufacturing lines, through retrofitting and reengineering.
- Coatings should not be included as multi material components.

1.2. HL01 - Comments on addressed or deployed technologies

- Net shape and single shot forming processes for multi material structures, as alternative to multi/part assembly
- Hybrid processes for simultaneous processing of the different materials.
- Quality check and inspection technology for multi material components and structures, particularly for assessment of the interface quality and status.
- Reliable surface conditioning technologies for optimal interface performance, including plasma, laser, ...

1.3. HL01 - Indication of type of action (distance to market - see guidance) 70/100

1.4. HL01 - Comments on impact

• Drastically reduce the number of steps needed to produce a complex multimaterial structure through integrated manufacturing path. (Eg: polymer overinjection in a metal forming press).
• Reduce of factory material flow complexity through integration of components.
• Improvement of quality perceived by the customer through multi material enabled extended functions: comfort, energy savings, safety, durability, ...
• Enable the adoption of advanced and new material in consumer and mass produced goods.

2. HL02 - Advances in Additive manufacturing - rate importance 100/100

2.1. HL02 - Comments on scope

• Focus on additive Micromanufacturing and high precision fabrication in single or multiple materials.
• Advance in the use of nanoreinforced and hybrid materials, like thermoplastic matrix composites.
• Surface fuctionalities through complex 3D surfaces through direct fabrication and functional gradients.
• Applications can range in medical sector (active implants, diagnostic microdevices, surgical tools), engine components with complex 3D shapes, aerospace (aeroengines, microsatellites, ...), MEMS, optical components, safety features.

2.2. HL02 - Comments on addressed or deployed technologies

• Precision AM, microwire deposition through focused energy beams. Multiwire technologies (for combination of materials and/or resolutions).
• High speed fabrication of micro/nanostructured building blocks.
• High speed photopolymerization through light projection
• Simulation of functional surfaces and engineered microstructures.
• Monitoring and control of the built structure and process, at the micro scale and in real time.

2.3. HL02 - Rating of type of action (distance to market - see guidance) 50/100

2.4. HL02 - Comments on impact

• Extend the use of additive manufacturing to high precision and high demand applications.
• Reduce or eliminate the need of post processing, through full net shape manufacturing
• Place advanced functionalities in parts through functional 3D structures at the micro/level.

3. HL03 - High precision manufacturing - rate importance 100/100

3.1. HL03 - Comments on scope

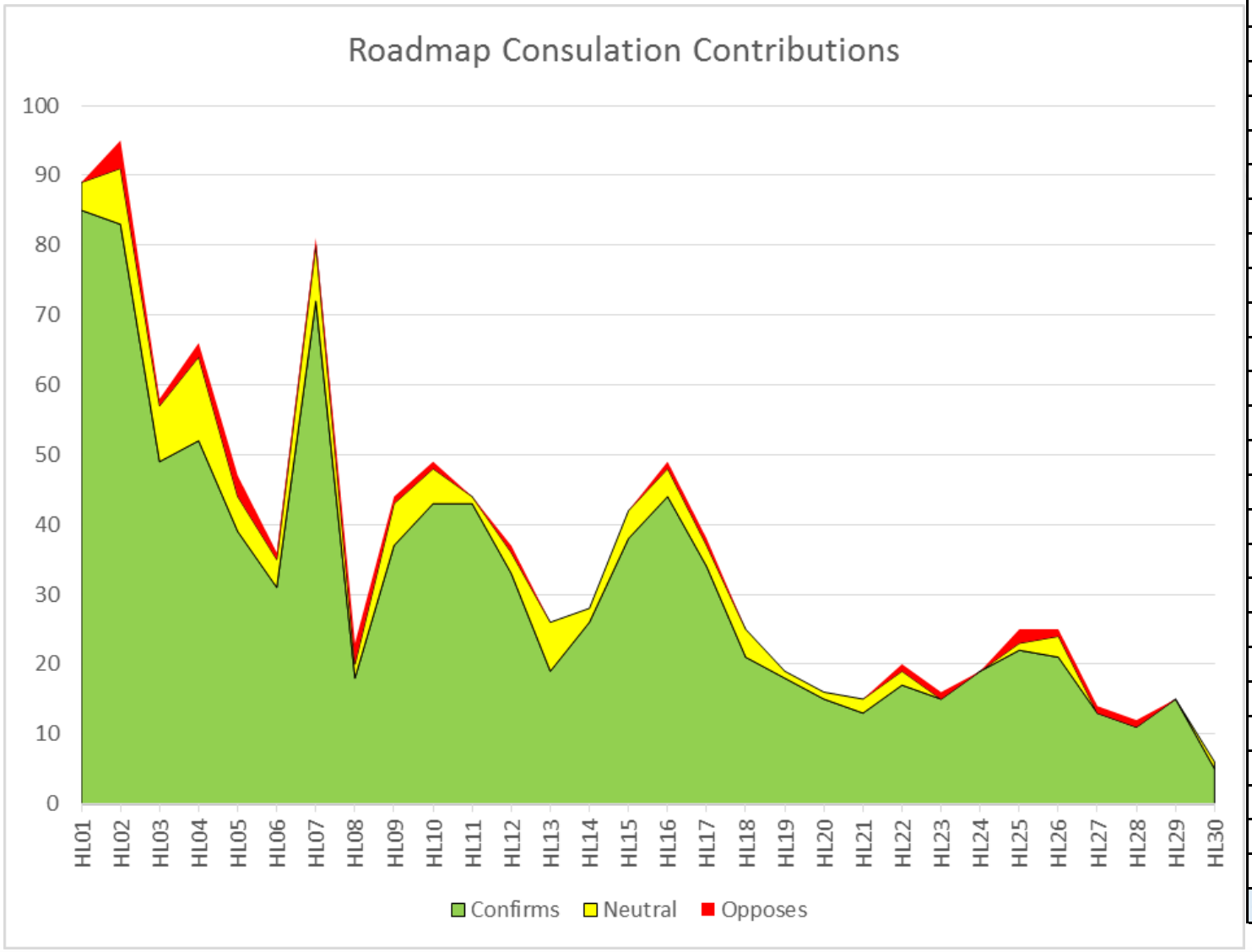
• The developed technologies should address the need for high precision processing at the micro scale on large parts. This includes high impact applications such as micro drilling on large aeronautic components, or micro machining with high global precision on square meter surfaces.

3.2. HL03 - Comments on addressed or deployed technologies

• Multilevel sensing metrology and actuation for high global resolution and accuracy of Micromanufacturing in cm scale or larger.
• Micro-assembly technologies, including microwelding.
• Advanced handling and positioning systems, servo control, vibration compensation and stabilization,
• Integration of high speed ultra precision micro machining technologies, including micro milling, laser, ultrasound, electrochemical and electron beam processes..., packaged as mechatronic devices for machine tools.

Headlines	Sum of 'Importance'	Close to market
HL01 - Manufacturing for complex and/or multi-material components - rate importance	4460	80
HL02 - Advances in Additive manufacturing - rate importance	4290	77
HL03 - High precision manufacturing - rate importance	3620	74
HL04 - Material and resource efficiency in manufacturing - rate importance	3970	76
HL05 - Energy efficiency on machine level - rate importance	3090	64
HL06 - Energy efficiency on factory level - rate importance	2960	69
HL07 - Zero-defect manufacturing – quality assurance – self-learning systems - rate importance	4620	84
HL08 - Re-use of factories - rate importance	1780	51
HL09 - Safe and ergonomic work environments - rate importance	3360	69
HL10 - Supporting the human in the workplace – Manufacturing training/re-skilling - rate importance	3320	68
HL11 - Human machine/robot cooperation for flexible and evolving factories	3410	71
HL12 - Reconfigurable cells, self-reconfigurable cells through smart sensors/devices	3480	74
HL13 - Distributed Intelligence Architecture and Systems on the Factory Floor	2500	64
HL14 - Novel production management tools for a responsive CPS-based production	2760	69
HL15 - On-site manufacturing technologies	2680	67
HL16 - Digital Factory Modelling and Simulation	3430	75
HL17 - Multiple Source (Big) Data Mining and Real Time Analysis	3360	75
HL18 - Cyber-Physical Factories	2400	63
HL19 - Digitisation of the Supply Chain – Manage complex customer-driven value networks	2490	64
HL20 - Collaborative, dynamic and resilient customer-driven production networks	2020	61
HL21 - New Approaches for the Cyberised Supply Chain	1940	59
HL22 - Manufacturing as a Service (MaaS) – Servitisation of autonomous and reconfigurable production	2250	62,5
HL23 - Collaborative Engineering	2190	63
HL24 - User Centric Product and Production Equipment Engineering	1810	57
HL25 - Standards, Platforms, Protocols and Interoperability	2520	72
HL26 - Security, Privacy and Liability – Cybersecurity and Industrial Safety	2490	71
HL27 - Lifecycle Management/PLM	1940	61
HL28 - European Circular Economy Open Platform	1890	56
HL29 - Business Models for the Digital Service Factory	1690	56
HL30 - New methodologies for financial & risk assessments of innovative production technologies	1410	54
Grand Total	**84130**	

	Total
Confirms	951
Neutral	101
Opposes	27



Headlines
HL01 - Manufacturing for complex
HL02 - Advances in Additive manu
HL03 - High precision manufacturi
HL04 - Material and resource effic
HL05 - Energy efficiency on machi
HL06 - Energy efficiency on factor
HL07 - Zero-defect manufacturing
HL08 - Re-use of factories - rate ir
HL09 - Safe and ergonomic work e
HL10 - Supporting the human in th
HL11 - Human machine/robot coo
HL12 - Reconfigurable cells, self-r
HL13 - Distributed Intelligence Ar
HL14 - Novel production manager
HL15 - On-site manufacturing tech
HL16 - Digital Factory Modelling a
HL17 - Multiple Source (Big) Data
HL18 - Cyber-Physical Factories
HL19 - Digitisation of the Supply C
HL20 - Collaborative, dynamic and
HL21 - New Approaches for the Cy
HL22 - Manufacturing as a Service
HL23 - Collaborative Engineering
HL24 - User Centric Product and P
HL25 - Standards, Platforms, Proto
HL26 - Security, Privacy and Liabil
HL27 - Lifecycle Management/PLM
HL28 - European Circular Economy
HL29 - Business Models for the Di
HL30 - New methodologies for fir
Grand Total

Factories of the Future: Key Tool

EFFRA Innovation Portal



One reference resource…

- for **progress monitoring**
- for **sharing information among projects**
- for promoting projects, results and demonstrators to the **wider community**
- for **portfolio management** and analysing coverage of FoF 2020 roadmap
- for **supporting the further roadmapping exercises**
- for **supporting online brokerage**

www.effra.eu/portal

FoF
Factories of the Future
Public Private Partnership

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Service directory



Country/region

Technologies

- **Material processing**
- **Mechatronics**
- **ICT for manufacturing**
- **Manufacturing strategies**

Organisations offering support

- **Technological/ Non-technological**
- **As project participants/ as external service**

Service directory

This page is a **draft page** in the context of the FoF-Impact Coordination Action.

Back to **Success Factors main page**.

Filters and sorting

Search string in name of organisation/initiative

Country

Success factors

2.1 IPM - Non-disclosure - basics

Technology area

Submit

Pages:: **1**

Initiatives (2)

Initiative name	Country
European IPR Helpdesk	EU
Success Factor: IPM - Non-disclosure - basics	Fact Sheets: - Non-disclosure agreement: a business tool: https://www.iprhelpdesk.eu/Fact-Sheet-Non-Disclosure-Agreement - How to manage confidential business information: https://www.iprhelpdesk.eu/Fact-Sheet-How-to-Manage-Confidential-Business-Information Case Study: - Confidentiality considerations during project preparation https://www.iprhelpdesk.eu/CS_Confidentiality_considerations_during_project_preparation Model Agreements: - One-way NDA Model https://www.iprhelpdesk.eu/node/921 - Mutual NDA Model https://www.iprhelpdesk.eu/node/921 - Model NDA (UK Intellectual Property Office) https://www.gov.uk/government/publications/non-disclosure-agreements - Lambert Toolkit – Model Consortium Agreements (by the Lambert Working Group)

FoF-Impact

Impact

Workshop at Industrial Technologies 2016

Efficient & Smart Manufacturing: Success Factors & Services in Support of Exploitation of FoF Project Results

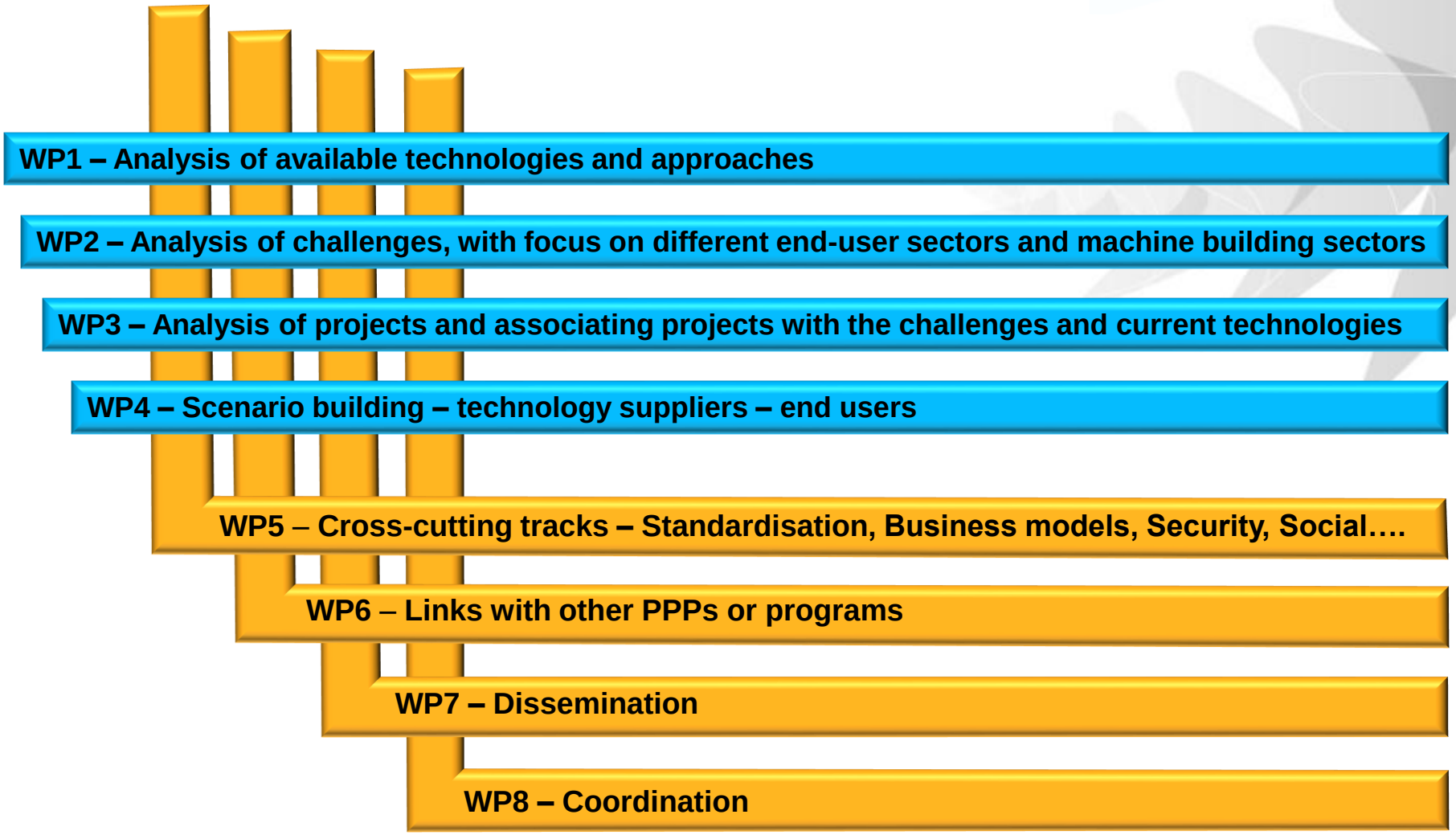
13:30 - 15:00 22 June (Conference Day One)

Room G110

On 22 June FoF-Impact will host a workshop at Industrial Technologies 2016: Efficient & Smart Manufacturing: Success Factors & Services in

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ConnectedFactories



ConnectedFactories



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The University of Nottingham

mtc
Manufacturing Technology Centre

VDMA

STEINBEIS-EUROPA-ZENTRUM

cea

tecnalia

innovalia ASSOCIATION

VTT

Teknikföretagen

TNO

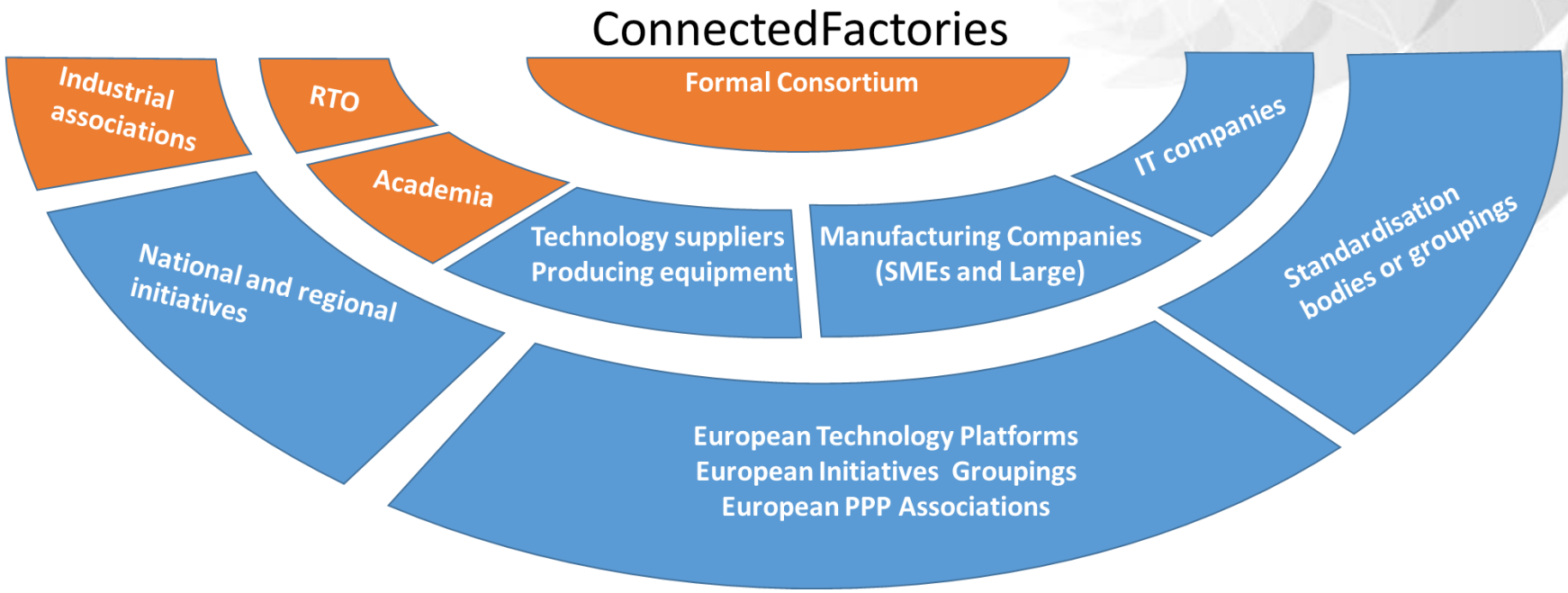
sirris
driving industry by technology

LSEC
LEADERS IN SECURITY

Fraunhofer

Fondazione Politecnico di Milano

LMS


ConnectedFactories
Formal Consortium
Industrial associations
RTO
Academia
National and regional initiatives
Technology suppliers Producing equipment
Manufacturing Companies (SMEs and Large)
IT companies
Standardisation bodies or groupings
European Technology Platforms
European Initiatives Groupings
European PPP Associations

Information / Intelligence

- **Projects – results**
  - FoF projects
  - All EU manufacturing projects (not covered yet)
  - Regional projects (not covered yet)
- **Who does what – who offers what** (technologies/services)

Reference docs Industrial state-of-the-art and outlook

- Industrial Communications in manufacturing (work recently started)
- Material processing technologies
- Simulation, data analytics, ….

Roadmap ‘Factories 4.0 and beyond

Instruments / media

EFFRA Innovation Portal

- Structured information

FoF Document repository

- All public docs and deliverables from all FoF projects

EFFRA Web site

- Project news, general news, videos

EFFRA Public Newsletter

EFFRA Hardcopy documents

EFFRA Wiki

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Research & Innovation Opportunities

Call 2017 (*Opening in 2016*)

€ 85 million for the following topics:

- FoF-06-2017: **New product functionalities through advanced surface manufacturing processes for mass production**
- FoF-07-2017: **Integration of unconventional technologies for multi-material processing into manufacturing systems**
- FoF-08-2017: **In-line measurement and control for micro-/nano-enabled high-volume manufacturing for enhanced reliability**
- FoF-09-2017: **Novel design and predictive maintenance technologies for increased operating life of production systems**
- FoF-10-2017: **New technologies and life cycle management for reconfigurable and reusable customised products**

€ 33 million for the following topic:

- FoF-12-2017: **ICT Innovation for Manufacturing SMEs (I4MS)**

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Factories of the Future Conference 2016
Materialising Factories 4.0

Share

Factories of the Future Conference 2016

On 15 and 16 September leading industrial and research experts will gather in Brussels for a major conference on the future of manufacturing in Europe - 'Factories of the Future Conference 2016: Materialising Factories 4.0'.

Factories of the Future Conference 2016: Materialising Factories 4.0 will bring together