

Success Stories within Factories of the Future



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Communications Advisor

EFFRA

- Representing private side in 'Factories of the Future' PPP
- 170+ members (Large, SME, RTO etc.) from across Europe
- An experienced, engaged and motivated community
- Actively promotes Factories of the Future PPP & projects
- Collaborates closely with EC to develop strategic research agenda ('roadmap')
- Works with national & regional initiatives

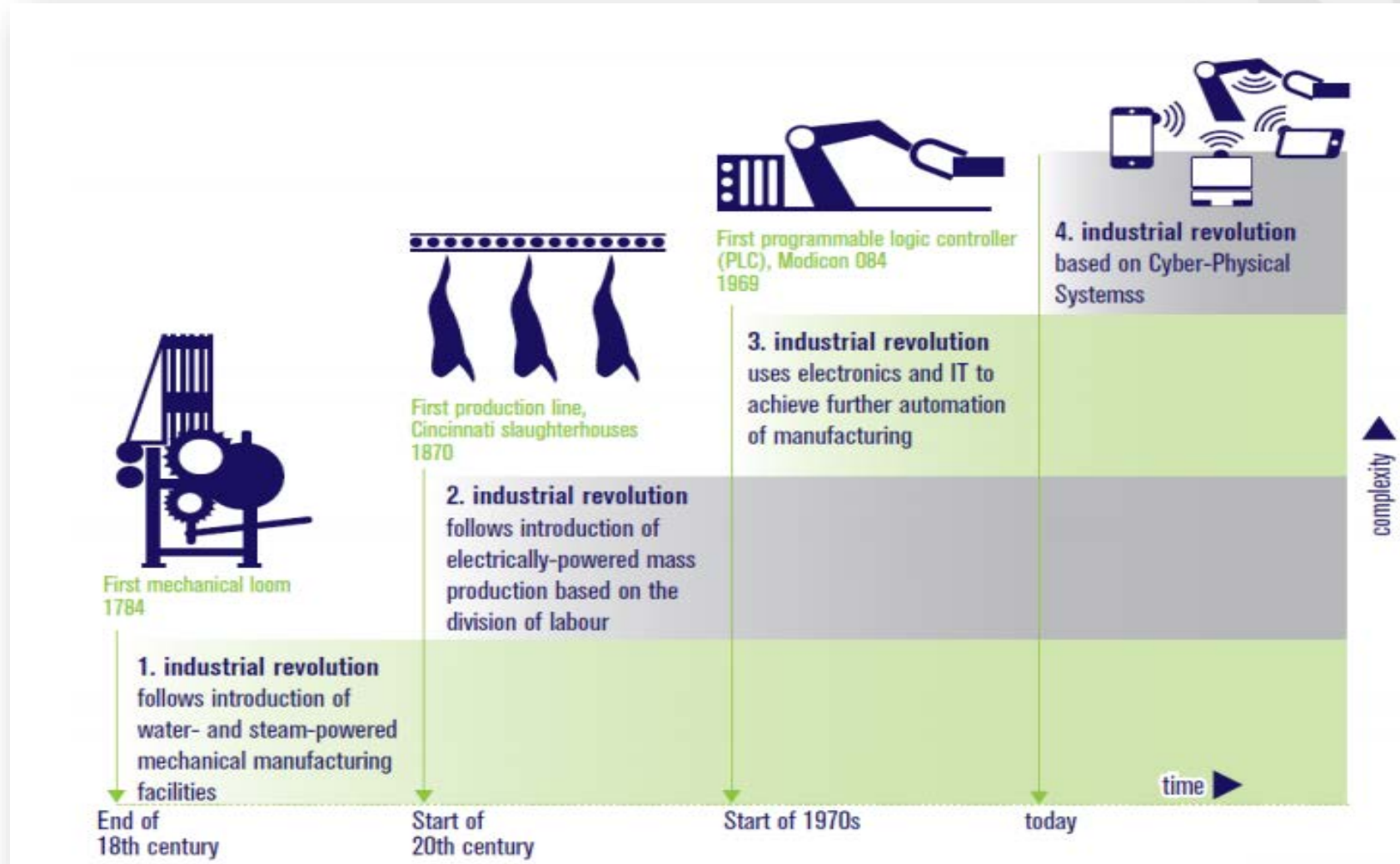


EFFRA

Industry Members



Major Changes in Manufacturing



Factories of the Future

- The European Union's pre-competitive, collaborative programme for manufacturing research & innovation
- Launched in 2010 in response to crisis
- Factories of the Future is a contractual **public-private** partnership
- The EU & industry have committed to **support** European research & innovation
- Funded through EU's **Horizon 2020** research & innovation programme
- Budget: **€1.15 billion**

Technology Readiness Level (TRL)

- Factories of the Future projects cover TRL 4 to 7 (i.e. demo activities)
- Activities beyond TRL 7 are outside of the Factories of the Future partnership – these may be supported by loans, national/regional actions etc.

Technology Readiness Level (TRL) of Manufacturing Technology								
1	2	3	4	5	6	7	8	9
Basic principles observed	Technology concept and/or application formulated	Analytical and experimental proof of concept	Technology validation in laboratory environment	Technology validation in relevant environment	System/subsystem model or prototype demonstration in a relevant environment	System prototype demonstration in an operational environment.	Actual system completed and qualified through test and demonstration	Actual system proven through successful operation.

Covered by Factories of the Future projects

Progress to Date

- 250 Projects to date.
- 3,000+ organisations participating
- High involvement of SMEs: 1,000+
- Initiative: ICT innovation for manufacturing SMEs (I4MS)
- Majority of projects feature demo activities
- 800+ results have been reported on EFFRA Innovation Portal
- Close to the market exploitation of project results
- Project results enhancing existing products



portal.effra.eu/projects

Projects Results & Beyond

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Nr of projects	Cumulative total			
FoF-2010		25 projects			post-project investments												25	25		
FoF-2011		36 projects				post-project investments											36	61		
FoF-2012			37 projects			post-project investments												37	98	
FoF-2013				53 projects				post-project investments									53	151		
FoF-2014						25 projects			post-project investments									29	180	
FoF-2015							28 projects			post-project investments									28	208

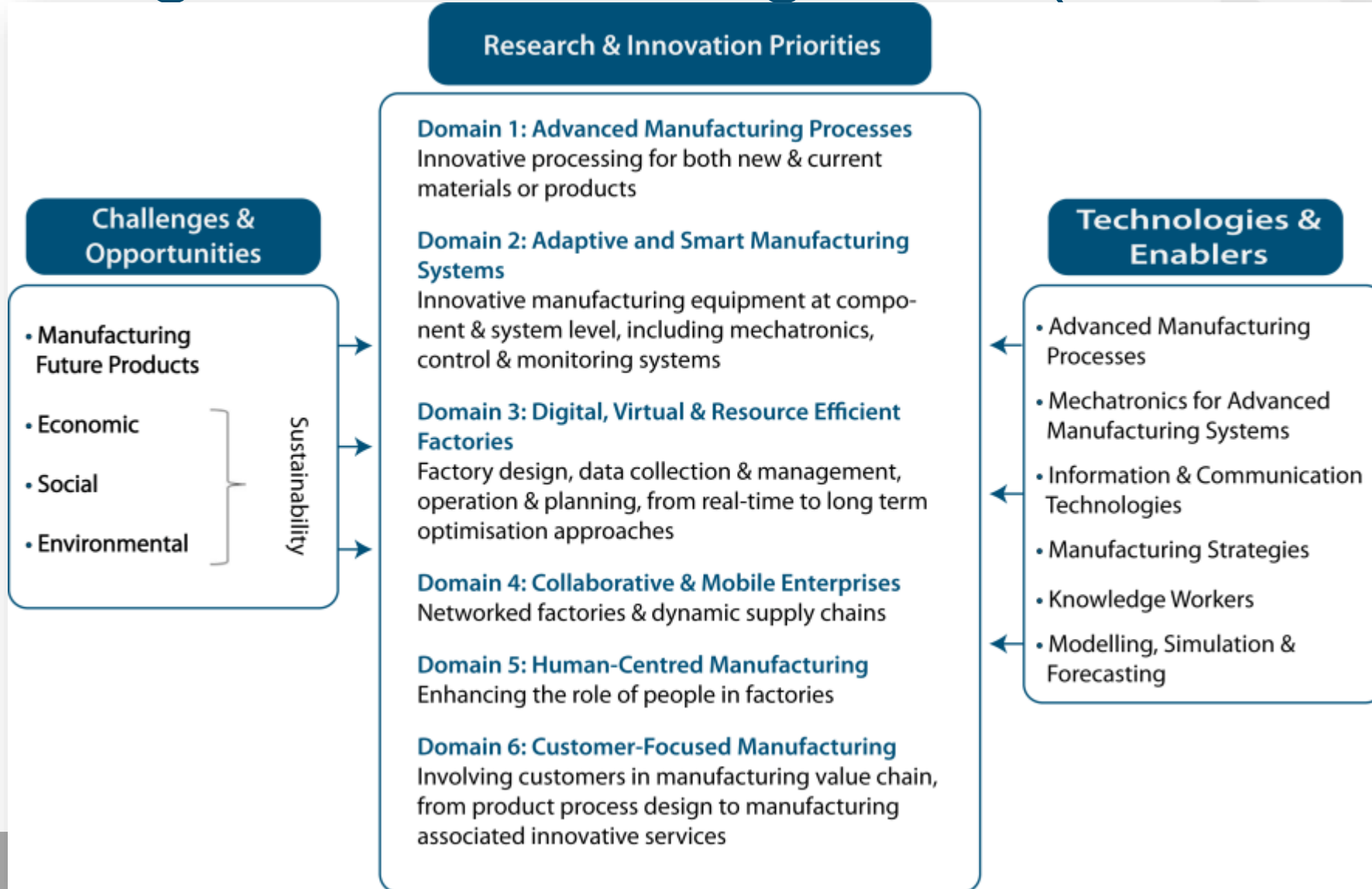
National Initiatives



Strategic Research Agenda (Roadmap)

- Covering 2014-2020.
- Developed by EFFRA & through broad public consultation.
- Identifies megatrends which drive structural changes in manufacturing sectors.
- Establishes research priorities which will allow industry to meet these challenges.
- Priorities focus on development, application & integration of enablers & technologies.
- 'Factories of the Future' call topics based upon research priorities = industry relevant.
- Not static: Evolving priorities – Factories 4.0.

Strategic Research Agenda (Roadmap)



Research & Innovation Priorities

Domain 1: Advanced Manufacturing Processes
Innovative processing for both new & current materials or products

Domain 2: Adaptive and Smart Manufacturing Systems
Innovative manufacturing equipment at component & system level, including mechanics, control & monitoring systems

Domain 3: Digital, Virtual & Resource Efficient Factories
Factory design, data collection & management, operation & planning, from real-time to long term optimisation approaches

Domain 4: Collaborative & Mobile Enterprises
Networked factories & dynamic supply chains

Domain 5: Human-Centred Manufacturing
Enhancing the role of people in factories

Domain 6: Customer-Focused Manufacturing
Involving customers in manufacturing value chain, from product process design to manufacturing associated innovative services

Calls for proposals

- FoF 1 – 2014: Process optimisation of manufacturing assets
- FoF 2 – 2014: Manufacturing processes for complex structures and geometries with efficient use of material
- FoF 3 – 2014: Global energy and other resources efficiency in manufacturing enterprises
- FoF 4 – 2014: Developing smart factories that are attractive to workers
- FoF 5 – 2014: Innovative product-service design using manufacturing intelligence
- FoF 6 – 2014: Symbiotic human-robot collaborations for safe and dynamic multimodal manufacturing systems
- FoF 7 – 2014: Support for the enhancement of the impact of FoF PPP projects
- FoF 8 – 2015: ICT-enabled modelling, simulation, analytics and forecasting technologies
- FoF 9 – 2015: ICT Innovation for Manufacturing SMEs (I4MS)
- FoF 10 – 2015: Manufacturing of custom made parts for personalised products
- FoF 11 – 2015: Flexible production systems based on integrated tools for rapid reconfiguration of machinery and robots
- FoF 12 – 2015: Industrial technologies for advanced joining and assembly processes of multi-materials
- FoF 13 – 2015: Re-use and re-manufacturing technologies and equipment for sustainable product lifecycle management
- FoF 14 – 2015: Integrated design and management of production machinery and processes
- FoF-01-2016: Novel hybrid approaches for additive and subtractive manufacturing machines
- FoF-02-2016: Machinery and robot systems in dynamic shop floor environments using novel embedded cognitive functions
- FoF-03-2016: Zero-defect strategies at system level for multi-stage manufacturing in production lines
- FoF-04-2016: Continuous adaptation of work environments with changing levels of automation in evolving production systems
- FoF-05-2016: Support for the further development of Additive Manufacturing technologies in Europe
- 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
- FoF-11-2016: Digital automation
- FoF-12-2017: ICT Innovation for Manufacturing SMEs (I4MS)
- FoF-13-2016: Photonics Laser-based production

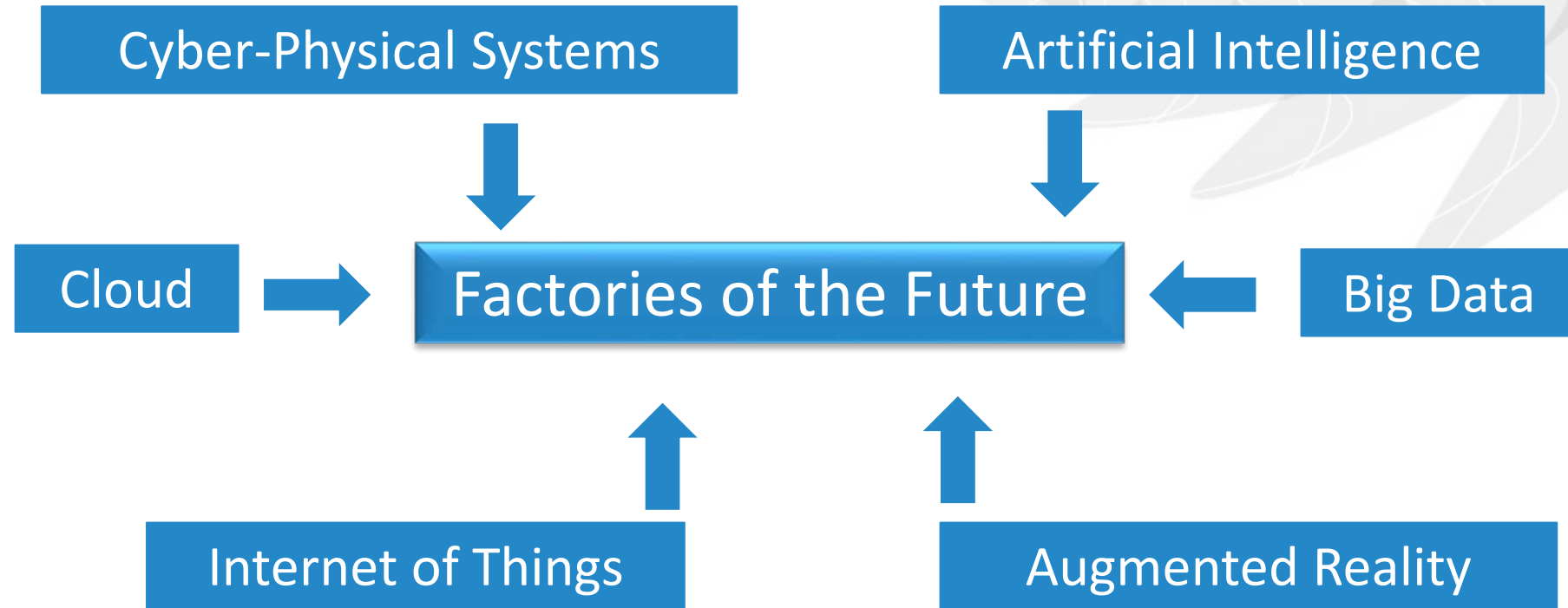
Digitisation & Manufacturing

- 'Digitisation' affects multiple aspects of manufacturing such as:
 - Process quality – monitoring and control
 - Interconnectivity of machines
 - Plant management
 - Data processing
 - Apps for workers
 - Training
- Advanced manufacturing cannot evolve without digitisation.
- Equally innovations in digitisation will be driven by the demands of advanced manufacturing.
- Manufacturing companies becoming much more involved in developing digital services & ICT-enabled tech. to meet their particular needs.

Factories of the Future

Digital Issues

- Selection of digital issues impacting on & being addressed in 'Factories of the Future'



ROBO-MATE

- Intelligent exoskeleton based on human-robot interaction for manipulation of heavy goods in Europe's factories of the future.
- Budget: €5,879,430
- Duration: 36 months
- 11 partners
- Spin-off: Robo.Mate
- Three modules:
 - Passive Parallelogram Arms
 - Active Parallelogram Arms
 - Core Trunk



www.robo-mate.eu

Factories of the Future Success Story: Human-Robot Cooperation

ROBO-MATE

The logo for Robo.Mate is displayed in a blue, sans-serif font. The word "Robo" is followed by a period, and "Mate" follows. The logo is centered within a white rectangular area that is framed by a thick black border. The background of the slide features a faint, stylized graphic of a hand or leaf on the right side.

Robo.Mate

i-Ramp

- Intelligent reconfigurable machines for smart plug & produce production
- Transformation of conventional production equipment into Network-enabled Devices (NETDEVs)
- Budget: €6,724,981 | 11 partners
- Duration: 36 months
 - Demonstrators
 - Set-up & ramp-up of a new E-Vehicle assembly line (robot cell)
 - Component exchange in E-Vehicle subassembly unit
 - Enhancing devices with re-use & predictive maintenance capabilities



www.i-ramp3.eu

VISTRA

- Virtual simulation & training of assembly & service processes in digital factories.
- Budget: € 5,336,798
- Duration: 36 months
- 12 partners
- Results
 - User Interaction Module
 - Data Import, Filter and Mapping
 - Unified Model for Virtual Assembly Training
 - Simulation of Flexible Parts
 - Knowledge Sharing Module
- Spin-off: Sentic Training system for complex assembly



www.vistra-project.eu

VISTRA

VIDEO

Door Experiment

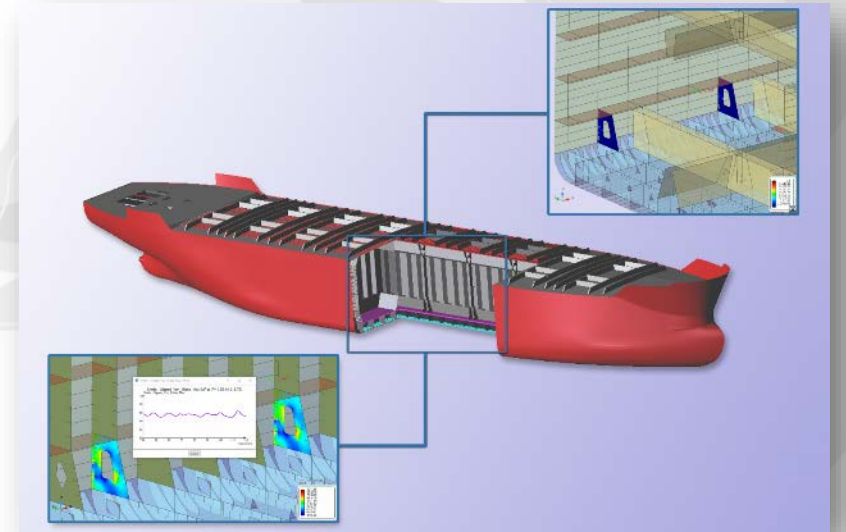
Easy Medium Expert

- INSTALL FRONT DOOR LOCK
- INSTALL LH WEATHERSTRIP ON WDO FRM FRT S/D I/S
- INSTALL LH FRONT DOOR OUTER WINDOW FRAME COVER
- INSTALL LH BRACKET HANDLE FRT S/D - LHD
- INSTALL LH HANDLE - LHD
- INSTALL LH COVER-FRT S/D LK - LHD
- INSTALL LH LINK ASM-FRT S/D CHK TO FRT S/D
- PLACE LH WDO REGULATOR IN FRT S/D
- INSTALL LH DOOR WDO TO FRT S/D
- SECURE LH WDO REGULATOR IN FRT S/D

Begin Trainingplan

Fortissimo

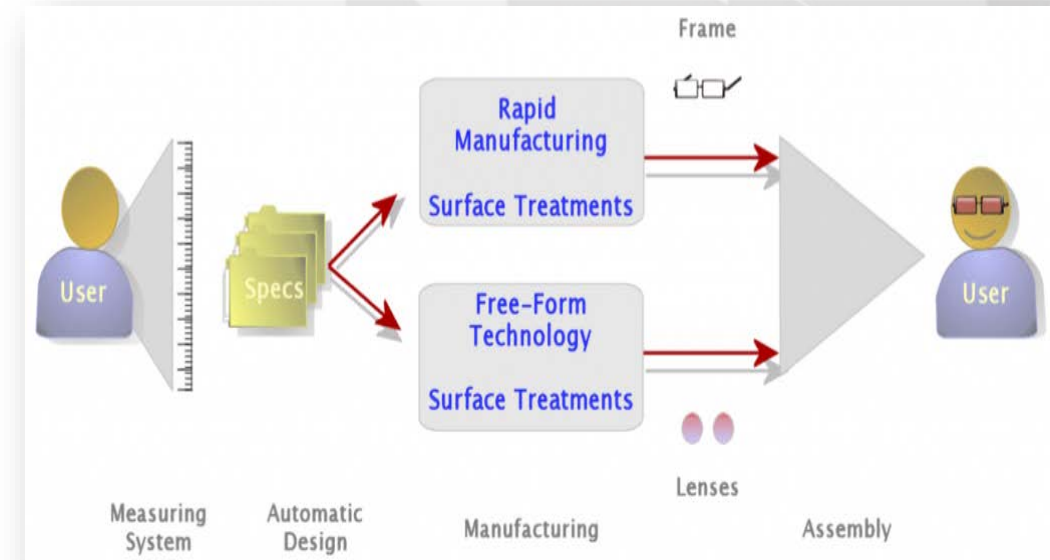
- Factories of the future resources, technology, infrastructure & services for simulation & modelling
- On-demand access to advanced simulation, modelling & data analytics resources including software, hardware & expertise.
- Participated in I4MS
- Duration: 36 months
- Budget: €21,657,380
- 44 partners
 - Demonstrators:
 - Validation experiments
 - Spin-off: Fortissimo Marketplace



www.fortissimo-project.eu

OPTICIAN2020

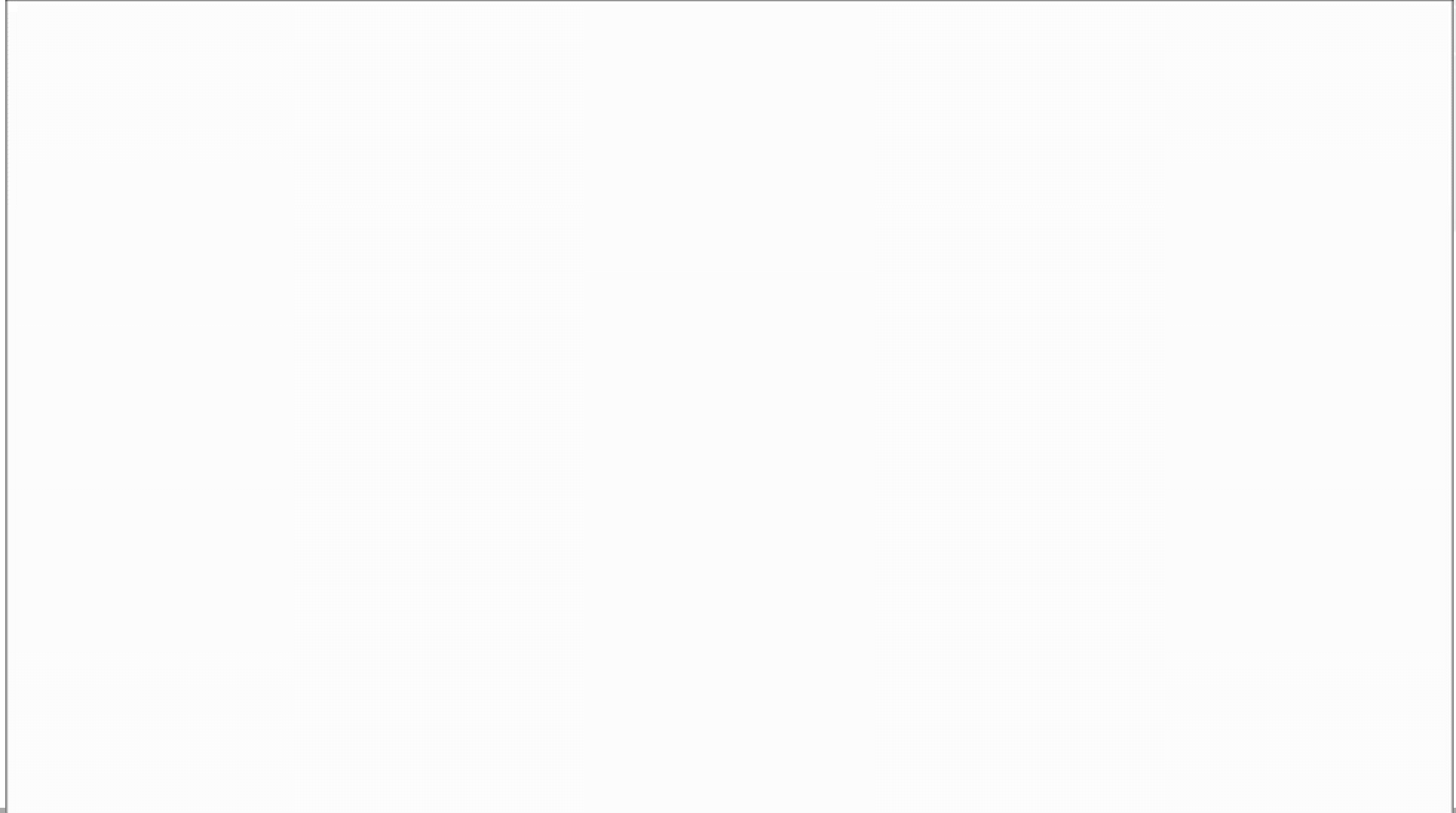
- Flexible and on-demand manufacturing of customised spectacles by close-to-optician production clusters
- Budget: €5,770,513
- Duration 36 months
- 10 partners
- Demonstrators:
 - Mini-factory validation
 - Networked mini-factories



www.optician2020.eu

Factories of the Future Success Story: On-Demand Manufacturing

OPTICIAN2020



Opening Soon!

Call Topics

- Call officially opens end of October
- Draft Topics
 - FoF-01-2018: Skills needed for new Manufacturing jobs
 - FoF-02-2018: Effective Industrial Human-Robot Collaboration
 - FoF-03-2018: Innovative manufacturing of opto-electrical parts
 - FoF-04-2018: Pilot lines for metal Additive Manufacturing
 - ICT-07-2018: Digital manufacturing platforms for connected smart factories (1)
- 2019: Draft topics also available (call opens next year)
- Find potential project partners or potential projects to join:

portal.effra.eu/projectideas
- Need advice? Contact your [national contact point](#) for Horizon 2020

Villmols merci!

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