European Roadmap for Industrial Process Automation
Agenda

• Background
• Introduction – purpose, objective and needs
• Methodology
• 10 R&D areas
• 9 Game changers
• Relevant new and emerging business models
• Summary
Background

• Increasing global competition for process industries
  • Process industries needs to increase efficiency and productivity
    – industrial process automation

• Roadmaps from other initiatives surveyed – to position the ProcessIT.EU roadmap in the area
Introduction – purpose, objective and needs

Purpose
• To provide guidance and input for process industry companies, providers of industrial process IT-and automation solutions, researchers as well as policy makers and bodies/initiatives that craft calls for RDI-projects
• To provide an insight into what may need to be considered on strategic and tactical levels, in terms of objectives, R&D areas, game changers and business modelling, to keep and develop the competitive edge and initiative

Main objective
• European process industry to stay competitive, profitable and sustainable

Three top level needs
• Sustainable production
• Competence management
• Trust, security, safety and privacy
Methodology

State-of-the-art

Other initiatives and roadmaps

Trends

R&D areas

Game changers

Stepping stones

Short- and long-term objectives

TODAY

TOMORROW

Goals and visions
<table>
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<tr>
<th>Sustainable production</th>
<th>Competence management</th>
<th>Trust, security, safety and privacy</th>
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<td>Productivity, efficiency, scalability and flexibility</td>
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<td>Sustainability through Circular Economy - Circular Economy through industrial internet</td>
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<td>Distributed production/modular factories and services</td>
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<td>Artificial Intelligence and Big Data</td>
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<td>Autonomous plants and remote operations</td>
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<td>Safety-Human, machine and environment</td>
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<td>Competence and quality of work</td>
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<td>Human-Machine Interfaces and machine-to-machine communications</td>
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The game changers, “a matter that will have great impact and lead to significant change”, each comprise a number of R&D areas, which needs to be enough developed/matured in order to support the game changer:

• Modular factory for distributed and automated production
• Live virtual twins of raw-materials, process and products
• Increased information transparency between field and ERP
• Real-time data analytics
• Dynamic control and optimisation of output tolerances
• Process industry as an integrated and agile part of the energy system
• Management of critical knowledge
• Semi-autonomous automation engineering
• Integrated operational and cybersecurity management
New and emerging business models

**Currently most used:** products, services, products with services, solutions etc.

**New and emerging:** Product-Service Systems or Industrial Product-Service Systems (PSS/IPS²), Functional sales, Functional Products etc. with new contractual parameters

**Different:** no warranty, additional customer value, contract parameter, potential sharing of risk and profit, risk assumed by provider side, continuous development, procurement process…
Expected Industrial Impact

Current situation:
• Existing business models such as Products and Services – need to keep those
• Rigid legacy systems and integrations within the production systems (à la ISA-95)

Wanted situation:
• Move towards smaller batch sizes or lot sizes
• Improve availability of production systems and overall equipment efficiency (OEE)
• Increase production output flexibility
• Improve flexibility to change the production system
  • Need to progress towards an increased production system utilization, which is hard without additional automation, new and more agile architectures (need to move from ISA-95 towards for instance RAMI 4.0)
  • Need to adapt to multi-stakeholder innovation and environments – suppliers, logistics, maintenance etc.
  • Need to be able share and use data/information in a multi-stakeholder environment
Effects of ProcessIT.EU roadmapping

• **ProcessIT.EU Network** – partnerships, project brokerages and proposals
• **Basis for won proposals** – e.g. Arrowhead (68M€), Mantis (80M€), Productive 4.0 (100M€), Aeroworks, Disire, EMC2, ProcessSME, Compinnova, EuroCPS, Far-Edge, R5-COP, iMINE, SIMS and WROOMM
• **Industrial use** – large European steel companies, Process industries, Manufacturing industries
• **Affects other R&D areas and roadmaps** – ECSEL, Artemis, AceForm…
Summary

• Industrial process automation is necessary to stay ahead and competitive
• 10 R&D areas which are critical to achieve 9 game changers
• New and emerging business models – PSS/IPS2, Functional Sales, Functional Products etc.
• The process industry within the EU needs to stay ahead on strategic and tactical levels and innovate itself on a regular basis to stay competitive, profitable and sustainable.
Special thanks

Main Editors:
John Lindström, Petter Kyösti, Jerker Delsing - Luleå University of Technology, Sweden

Main Contributors: