

Factories of the Future

**Projects launched
under the FP7 ICT Theme
in 2010 and 2011**

Brussels, 20 August 2011

Following its announcement of the European Economic Recovery Plan in late 2008, the Factories of the Future initiative was launched to help EU manufacturing enterprises, in particular SMEs, to adapt to global competitive pressures by improving the technological base of manufacturing across a broad range of sectors. The initiative aims to support Europe's industry in meeting increasing global consumer demand for greener, more customised and higher quality products by converting to a demand-driven industry with lower waste generation and less energy consumption. Under this initiative the European Commission encourages the rapid set up of industry-driven R&D projects through co-ordinated calls between the relevant 7th Framework Programme (FP7) Themes, Information and Communication Technologies (ICT) and Nanoscience, Nanotechnologies, Materials and New Production Technologies (NMP), in the years 2010-2013. The initiative is implemented as a public-private partnership (PPP) with a particular emphasis on SMEs. Its total envelope for 2010-2013 is € 1.2 billion, with half of the funds provided under FP7. It is foreseen to have one call for proposals per year with R&D objectives covering both FP7 Themes.

The thematic content for those calls has been elaborated by industry and laid down in the FoF Multiannual Roadmap. ICT has inspired an area of the FoF Roadmap called "ICT Enabled Intelligent Manufacturing". It aims at improving the efficiency, adaptability and sustainability of manufacturing systems and their smooth integration into business processes in an increasingly globalised industrial context.

"Manufacturing" in this context is meant to include relevant product and process design and engineering. It considers ICT as a key enabler for improving manufacturing at three levels:

- ICT enabling Smart Factories: Agile manufacturing and customization including process automation control, simulation and optimization technologies, robotics, and tools for sustainable manufacturing;
- ICT supporting Virtual Factories: Value creation from global networked operations including global supply chain management, product-service linkage and management of distributed manufacturing assets.
- ICT-driven Digital Factories: Towards a better understanding of manufacturing and design for better product life cycle management including simulation, modelling and knowledge management from product conception to production, including a product's after-sales, maintenance and end-of-life operations.

Proposals were expected to be industry-led, to focus on the use of advanced ICT-based technologies and to contain a strong validation element with quantifiable targets.

This document provides a summary of proposals selected under the first two Factories of the Future calls related to ICT.

Dr. Erastos Filos, ICT Coordinator „Factories of the Future“

The information contained in this booklet was compiled on the basis of information provided by the projects mentioned herein.

For inaccuracies of missing information, please let us know in order to keep this information up-to-date.

Kind regards,
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FoFdation - 260137

The Foundation for the Smart Factory of the Future

Partners:

AIRBUS OPERATIONS France
CADCAMATION KMR SA CAD/CAM Switzerland
CHARMILLES TECHNOLOGIES SA CT Switzerland
SIEMENS PRODUCT LIFECYCLE MANAGEMENT SOFTWARE (CH), Switzerland
ETH Zürich Switzerland
CENTRO RICERCA FIAT Italy
FIDIA SPA FIDIA S.P.A. Italy
DEL/CAM PLC DEL/CAM United Kingdom
Mecadtron GmbH Germany
FUNDACION TEKNIKER, Spain
UNIVERSITY OF PATRAS, Greece
PARAGON S.A. Greece
ARTIS GESELLSCHAFT FUER ANGEWANDTE MESSTECHNIK MBH Germany
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE Switzerland
POHANG UNIVERSITY OF SCIENCE AND TECHNOLOGY FOUNDATION – POSTECH Korea

Summary:

Today's major challenges for manufacturing companies are clearly identified as global cooperation with multiple supply chain partners, production optimisation, and tracking and management of information to meet new requirements like traceability, security, sustainability. Requirements are derived in the aerospace and automotive manufacturing sector. The project will establish a universal manufacturing information system based on a data exchange standard that allows disparate entities and their associated devices of a manufacturing system to share data seamlessly in a common format. This future digital manufacturing foundation will then enable the implementation of the Smart Factory Architecture based on a high bandwidth Manufacturing Information Pipeline for data interoperability. The Smart Factory integration of the project towards real-time networking and adaptive capability also envisions:

- Optimising the numerically controlled (NC) machining systems including programmable logic controllers (PLC) through an embedded Supervisory Control and Data Acquisition (SCADA) system
- Supporting an advanced Manufacturing Execution System (MES) providing not only integrated process automation but also extension of its scope to achieve energy efficiency and sustainability goals as well as waste reduction and e-manufacturing.
- Reducing product integration, time-to-market costs and resource diagnosis and maintenance costs through a common control and monitoring platform.
- Implementing homogenous information sources generating data from the whole process, thus achieving information binding and integration from the extended MES to both vertical (innovation) dimension with the Product Lifecycle Management (PLM) and horizontal (business) dimension with the Enterprise Resource Planning (ERP).

Starting Date: 01 June 2010

Duration: 48 months

Total costs: 9,855,009 €

EC funding: 6,659,910 €

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PlantCockpit – 260018

Production Logistics and Sustainability Cockpit

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BAYERISCHE MOTOREN WERKE AG Germany
COMAU SPA Italy
DOEHLER Netherlands
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE EPFL Switzerland
FUNDACION FATRONIK, Spain
ICONICS Europe B.V Netherlands
INTEL PERFORMANCE LEARNING SOLUTIONS Ireland
POLITECNICO DI MILANO, Italy
TECHNISCHE UNIVERSITAET DRESDEN TUD Germany
TTY-SAATIO Finland

Summary:

Today, numerous methods, systems, and tools exist to facilitate production management, optimise resource utilisation, and process efficiency. With the growing focus on sustainability, complexity grows even further as production supervisors have to manage energy and material consumption, the carbon footprint, and waste output in addition to classical key performance indicators (KPIs) such as process efficiency, asset utilisation, quality, scrap rate, and costs. Efforts to find the optimum for yield, quality, speed or energy consumption individually often result in local optima, far from the ideal solution. The project targets a tight integration of existing legacy ERP (Enterprise Resource Planning) systems, MES (Manufacturing Execution Systems), SCADA (Supervisory Control and Data Acquisition), and special-purpose solutions that provide the needed visibility and process integration to recognise the potential of and to optimise intra-logistics processes with respect to yield, quality, energy consumption, or waste.

The project's vision is to offer manufacturers the "Production Logistics and Sustainability Cockpit" (PLANTCockpit) as a central environment for monitoring and control of all intra-logistic processes. It will give production supervisors, foremen, and line managers the required visibility to make well-informed decisions for the optimisation of plant processes. PLANTCockpit will further provide a model for integrating heterogeneous shop floor management systems including ERP, MES, SCADA, condition-based maintenance, energy management, and other special purpose systems.

PLANTCockpit will focus on defining standard interfaces and a reference model for integrating the most prominent manufacturing processes. Current shop floor integration standards such as ISA 95, OAGIS, OPC Unified Architecture, MTConnect will be used as starting points.

The consortium includes world-leading system providers (INTEL, SAP), technology leaders (Iconics), strong academic partners (EPFL, FTK, POLIMI, TUD, TUT), and high-profile end-users (ACCIONA, BMW, COMAU, DOEHLER).

Starting Date: 01 September 2010

Duration: 36 months

Total costs: 12,711,558 €

EC funding: 7,979,682 €

Coordinator:

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QCOALA – 260153

Quality Control of Aluminium Laser-welded Assemblies

Partners:

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FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V Fraunhofer Institute for Laser Technology, FhG-ILT Germany
FLISOM AG Switzerland
LASAG AG Switzerland
PRECITEC KG Germany
COMPUTERISED INFORMATION TECHNOLOGY LTD United Kingdom
SOCIETE D'ASSEMBLAGES PAR FAISCEAUX D'ELECTRONS ET LASER, SAFEL France
SOLARPRO EAD Bulgaria
VOLKSWAGEN AG Germany

Summary:

The QCOALA project will develop a new dual-wavelength laser processing system for welding thin-gauge aluminium and copper, 0.1mm to 1.0mm in thickness, with integrated process monitoring and in-line non-destructive inspection, and establish its capability to provide a reliable, high-speed, low-cost and high-quality joining solution for electric car battery and thin-film photovoltaic (PV) cell interconnections. Through fully integrated process ICT and Statistical Process Control (SPC), the new system will facilitate in-line quality control, as well as a higher level of automation in manufacturing, and thereby achieve higher yield and throughput, for both these high-in-demand applications. This project will help the beneficiaries, with expertise in the constituent components of the new system, to increase their annual turnover between 15 and 25%, their productivity between 50% and 100% and their yield between 2 and 10%.

The new laser processing system will be based on a pulsed platform, capable of laser pulses in the range of μs to ms and pulse energies of up to (tens of) Joules, and capable of generating both the near-IR and green wavelength through a dual-wavelength beam scanner. Real-time temporal pulse control will be developed to allow closed-loop control of the monitored process. The fully-integrated system will produce 100% inspection rate, with a 'fingerprint' of each laser weld captured in 'real-time', and allow in-line process control when welding car battery and thin-film PV cell interconnections.

QCOALA is focused on energy-efficient, environmental-friendly and agile manufacturing, through the feed-back of in-line-monitoring and inspection information into the production line, allowing process control, continuous quality improvement and waste reduction. Whereas the concept of the project is aimed at smarter and more energy-efficient manufacturing, the applications that are addressed in the project fall are categorised in the 'green' alternative energy market.

Starting Date: 01 September 2010

Duration: 36 months

Total costs: 3,926,091 €

EC funding: 2,627,239 €

Coordinator:

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ActionPlanT - 258617

European Forum for ICT in Factories of the Future

Partners:

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Fraunhofer-IPK Germany
EPFL Switzerland
FATRONIK-TECNALIA Spain
INTERCIM France
University of PATRAS-LMS Greece
Politecnico di Milano Italy
AGORIA Belgium

Summary:

ICT plays a multifaceted role in all major European industrial sectors and its contribution to the manufacturing sector has become paramount over the last few years. Quite undeniably, ICT will become increasingly intertwined with Factories of the Future and will be seen developing efficient business processes through dynamically evolving business models. Although Europe has been investing in the efficient use of ICT-enabled manufacturing in the last decade, its innovation and profitability has been waning compared to other major economies such as the United States and Japan. In order to ensure the sustainable competitiveness of Europe's manufacturing industry, a thorough analysis is required such that R&D resources are applied most efficiently. This analysis will consider technology and business trends as well as policy, environmental, and societal needs. The threefold objective of ActionPlanT is therefore to come up with an ICT-enabled manufacturing vision for use cases and services of the future using this analysis as a basis. Secondly, this vision would pave the way for a detailed roadmap which will prioritise and schedule most promising topics for the upcoming Framework Programme 8. Finally, within the scope of ActionPlanT, a concept for industrial learning will be developed, validated and extensively piloted via summer schools and workshops amongst stakeholders in industry, academia, and the relevant European Technology Platforms.

Starting date: 1 June 2010

Duration: 24 months

Total costs: 2,103,623 €

EC funding: 1,499,964 €

Coordinator:

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KAP - 260111

Knowledge, Awareness and Prediction of Man, Machine, Material and Method in Manufacturing

Partners:

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ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA Spain
EUROPAEISCHES MICROSOFT INNOVATIONS CENTER GMBH Germany
DE MONTFORT UNIVERSITY United Kingdom
INFINEON TECHNOLOGIES DRESDEN GMBH UND CO OHG Germany
INTEL PERFORMANCE LEARNING SOLUTIONS LIMITED Ireland
FUNDACION LEIA CENTRO DE DESARROLLO TECNOLOGICO Spain
UNIVERSITY OF PATRAS Greece
MISSLER SOFTWARE France
NISSAN MOTOR IBERICA SA Spain
TECHNISCHE UNIVERSITAT BERLIN Germany
UNIVERSITA DEGLI STUDI DI TRENTO Italy
VOLVO TECHNOLOGY AB Sweden
OPTIMITIVE SL Spain

Summary:

Manufacturing is the driving force of Europe's economy, providing over € 6,553 billion in GDP. However, against a background of climate change legislation, volatile energy prices and increased environmental awareness, modern manufacturing must encompass a focus on eco-efficiency. Given the current economic situation, this must be achieved without the need for large capital expenditure. Adding information technology to an already existing production facility is a cost-effective investment. The KAP project will deliver energy management standards and a technology framework for next-generation, sustainable manufacturing. KAP stands for Knowledge of past performance, combined with Awareness of the present state, which together can support Prediction of future outcomes. This philosophy forms the basis of a framework that will enable every existing resource to be used as efficiently as possible through the effective co-ordination of man, machine, material and method. To achieve this goal the project will define a range of sustainable manufacturing standards. Measurements will be gathered through a factory-wide network of sensors. Complex Event Processing (CEP) and data stream analysis will compute on-the-fly production performance indicators (PPIs) for real-time monitoring. Data mining in combination with OLAP will support problem diagnosis and resolution.

Computational learning techniques will create a self-improving system for operational control. The inclusion of energy management makes the interpretation of system data an even greater challenge. Perceptually efficient visualisations will communicate PPI's to decision makers in a format that will reduce cognitive workload and improve situation awareness. A well-balanced consortium of research centres, academic and industry partners provides an ideal opportunity to realise the innovations proposed by the project. In terms of impact, partners estimate reductions of over 5% p.a. in waste and energy and 10% in time to market.

Starting date: 1 September 2010

Duration: 36 months

Total costs: 12,827,466 €

EC funding: 7,545,000 €

Coordinator:

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ROBOFOOT - 260159

Smart Robotics for High Added-Value Footwear Industry

Partners:

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CONSIGLIO NAZIONALE DELLE RICERCHE Italy
ISTITUTO TECNOLOGICO DEL CALZADO Y CONEXAS Italy
COMAU SPA - Italy
ROBOTNIK AUTOMATION SLL Spain
QDESIGN S.R.L. Italy
AUTOMATICA Y CONTROL NUMERICO SL. Spain
PIKOLINOS INTERCONTINENTAL S.A. Italy
ROTTA S.R.L. Italy
DEUTSCHES FORSCHUNGSZENTRUM FUER KUNSTLICHE INTELLIGENZ GMBH Germany

Summary:

Footwear production is still mainly handcrafted. Currently, opposite to other manufacturing sectors like automotive, food or metal processing, robots are not used in the footwear industry. Only technical shoe producers have introduced robots to assist in the injection moulding process, but other relevant applications are still not in use. The introduction of robotics in this industry will contribute to overcoming complexity in processes automation that may lead to shortest production runs.

To achieve this objective the consortium aims to research and develop:

- New manipulation strategies and devices for non-rigid parts that allow grasping, handling and packaging shoes without damaging them;
- Sensor-based robot programming and control tools that use information from the CAD system and available sensors, in particular vision sensors, for visual servo-ing, allowing easy programming of flexible robotic applications;
- The re-design of shoe production processes for robot-assisted manufacturing and assembly, in areas such as selective heating, visual inspection and packaging.

The project will further address six operations in shoe manufacturing that are most suitable for short-to-medium term introduction of robotics in this sector. They will be used in three prototypes that will be scheduled throughout the 30-month duration of the project in such a way that, from the beginning, the footwear industry becomes aware of potential applications and the benefits of robotics.

Starting Date: 01 September 2010

Duration: 30 months

Total costs: 3,685,073 €

EC funding: 2,559,540 €

Coordinator:

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TAPAS - 260026

Robotics-enabled Logistics and Assistive Services for the Transformable Factory of the Future

Partners:

KUKA ROBOTER GMBH Germany
GRUNDFOS AS - GBJ GRUNDFOS WATER EQUIPMENT AS GRUNDFOS ELECTRONICS AS GRUNDFOS INTERNATIONAL AS
Denmark
CONVERGENT INFORMATION TECHNOLOGIES GmbH Austria
AALBORG UNIVERSITET Denmark
ALBERT-LUDWIGS-UNIVERSITAET FREIBURG Germany
DEUTSCHES ZENTRUM FUER LUFT - UND RAUMFAHRT EV Germany

Summary:

Today's automation and logistics paradigms make it difficult, time consuming, and costly to change the type of the product manufactured and to scale the production up-and-down in response to market volatility. Consequently, and with the increasing market uncertainties, it becomes more and more difficult to justify new automation lines. To keep production in Europe instead of shifting it to low-wage countries, this project will break new ground in robot-based automation and logistics as the backbone of a transformable factory of the future, enabling an economic production regardless of changes in volumes and product type.

TAPAS aims to pioneer the following tasks in real production environments: mobile robots with manipulation arms will make logistic tasks more flexible and more complete by not only transporting, but by also collecting the parts needed and delivering them right to the place where they are needed. Since moving parts around the shop floor does not create value by itself, TAPAS robots go even beyond: they will automate assistive tasks that naturally extend the logistic tasks, such as preparatory and post-processing work, e.g., pre-assembly or machine tending with inherent quality control. Through this additional creation of value and by a faster adaptation to changes with new levels of robustness, availability, and completeness of jobs TAPAS promises to yield an earlier return of investment.

To reach the objectives, the TAPAS consortium will iteratively test and validate the developments with two pilot installations of increasing complexity and scale. The drivers behind TAPAS are a robot manufacturer and a system integrator, providing both their production environments for intensive testing and validation, and a software technology provider. Teaming up with three excellent research partners they will develop logistic and assistive robotic solutions for transformable automation that are generally applicable and scalable.

Starting Date: 01 October 2010

Duration: 42 months

Total costs: 5,179,257 €

EC Funding: 3,400,000 €

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CUSTOMPACKER - 260065

Highly Customisable and Flexible Packaging Station for Mid- to Upper-sized Electronic Consumer Goods Using Industrial Robots

Partners:

TECHNISCHE UNIVERSITAET MUENCHEN Germany
FerRobotics Compliant Robot Technology GmbH Austria
Loewe Opta GmbH Germany
PROFACTOR GMBH, Austria
VALTION TEKNILLINEN TUTKIMUSKESKUS Finland
FUNDACION TEKNIKER Spain
MRK-Systeme GmbH Germany

Summary:

The project aims at developing and integrating a scalable and flexible packaging assistant that aids human workers while packaging mid- to upper-sized and mostly heavy goods. Electronic consumer goods, e.g. TV sets, have a large number of variants and are packaged manually. Only in single-variant production lines with high lot sizes, automation of the packaging step has been introduced. However, automating the packaging process will decrease the production cycle time and costs also for mixed variant production lines, thus allowing that several production lines can be merged to a reduced number of flexible packaging stations. This also allows optimisation with regard to the actual demands of the various goods (i.e. number of items produced per day).

To achieve the realisation of these challenging goals for a highly flexible packaging station, CustomPacker will bring together the highly adaptable skills of a human worker with the precision and ability of robots to carry heavy goods. The main goal of CustomPacker is to design and assemble a packaging workstation mostly using standard hardware components resulting in a universal handling system for different products. Ideally one setup for packaging a high variety of products and components can be implemented, which can be achieved by a teachable system architecture. This will open a new dimension in how industrial robots are deployed today, namely the collaboration of human workers with robot co-workers. Only by driving reliability and precision of today's available technology to the limit and by additionally forcing the use of highly sophisticated software modules for worker detection and intention recognition, the cycle times can be reduced to justify the investment costs for additional complexity.

Starting Date: 01 July 2010

Duration: 36 months

Total costs: 3,812,766 €

EC Funding: 2,615,000 €

Coordinator:

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PREMANUS 285541

Product Remanufacturing Service System

Partners:

SAP AG Germany
POLITECNICO DI MILANO Italy
LOUGHBOROUGH UNIVERSITY United Kingdom
TIE Holding N.V. Netherlands
SKF SVERIGE AB Sweden
CENTRO RICERCHE FIAT SCPA Italy
EPLER & LORENZ AS Estonia

Summary:

For centuries mankind has attempted to exploit the resources available to it through the reuse of objects and artifacts. However, as wealth of modern man has grown, the financial necessity to utilize the lifetime of these objects has dramatically declined, especially in developed countries with high focus on manufacturing. The demand for new products also placed undue pressure on the world's resources, creating an ethical imperative to conserve and reuse. Remanufacturing is the process of bringing used products to "like-new" functional state with an equivalent quality assurance. As this activity provides profitability whilst reducing land-filling and usage of virgin material, it is a financially viable as well as a sustainable business concept. One of the key issues deterring the uptake of remanufacturing is the information gap which is created when products leave the OEM. The information gap is the result of the lack of data on product usage and its lifecycle. In general, the product user possesses much greater knowledge regarding a product as he has used it, repaired it, and replaced components. This, in turn, results in the fact that the input to the remanufacturing process is of unknown quality. The lack of reliable information on product usage and lifecycle leads to missed opportunities with respect to increased economic or environmental impact. The goal of PREMANUS is to overcome the asymmetric distribution of information in the End-of-Life (EoL) recovery of products, with a special emphasis on remanufacturing. To achieve this goal, PREMANUS will provide an on demand middleware which combines product information and product services within one service oriented architecture. In addition to closing the information gap, the PREMANUS middleware would compute EoL-specific KPIs based on product usage data and make recommendations to its users regarding the viability (in terms of profitability, scope, and time) of remanufacturing a product.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 5,887,743€

EC Funding: 3,944,550€

Coordinator:

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VENIS 284894

Virtual Enterprises by Networked Interoperability Services

Partners:

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LINK TECHNOLOGIES S.A. Greece
INTERSOFT A.S. Slovakia
FRAUNHOFER FIT Germany
INSTITUTE OF INFORMATICS SLOVAK ACADEMY OF SCIENCES Slovakia
ITLINK SRL Italy
FONDATION SOPHIA ANTIPOLIS France

Summary:

Enterprises interoperability is the emerging need in Europe for joint projects and business facing new marketing challenges. In multi-partners projects and business, aimed at developing innovative joint products, Large Enterprises suffer from a lack of synergy and cohesion with the Small-Medium and Micro Enterprises, due to the missing sharing of project information, knowledge, workflows, etc. A novel level of integration is expected, while guaranteeing the intellectual property rights and preserving the already existing company management processes fixed in years of past activity. The VENIS project is aimed at providing the a new level of interoperability between Large and Small Enterprises, according to “Virtual Enterprise” paradigm: - a distributed web-based repository will be implemented in order to connect the existing information systems; - a set of lightweight web services will be developed for a smart exchange of the common data based on legacy email systems; - the local business processes will be modelled and linked by a distributed business engine mechanism, in order to assist the work in joint businesses and create novel synergies in marketing competition. Latest documents and multimedia, project activity planning, joint work flow and milestones, etc. will be then easily available to all the persons involved from Large and Small enterprises, while leaving unchanged the already existing legacy procedures. The Consortium, composed by 7 Partners skilled in international collaboration, is well balanced in expertises between technology developers and final users. The VENIS results will be disseminated on the Web and in International Conferences. Boosted by VENIS results, the involved Enterprises expect to improve their competitive edge in joint projects, by receiving a significant advantage in their business, measurable in 20-30% increase.

Starting Date: 01 September 2011

Duration: 30 months

Total costs: 1,596,778€

EC Funding: 1,262,991€

Coordinator:

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GloNet 285273

Glocal enterprise network focusing on customer-centric collaboration

Partners:

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UNIVERSITEIT VAN AMSTERDAM Netherlands
IPLON GMBH THE INFRANET COMPANY Germany
STEINBEIS GMBH & CO. KG FUER TECHNOLOGIETRANSFER Germany
SKILL ESTRATEGIA, S.L. Spain
KOMIX S.R.O. Czech Republic
PROLON CONTROL SYSTEMS Denmark

Summary:

GloNet aims at designing, developing, and deploying an agile virtual enterprise environment for networks of SMEs involved in highly customized and service-enhanced products through end-to-end collaboration with customers and local suppliers (co-creation).

GloNet implements the glocal enterprise notion with value creation from global networked operations and involving global supply chain management, product-service linkage, and management of distributed manufacturing units. GloNet is based on cloud-based PaaS/SaaS-offering (CAS OPEN) of CAS, which is based on server-side OSGi-technology which enables CAS to build highly modularized applications that consist of multiple bundles each encapsulating a specific business case. Therefore, CAS OPEN is not only a full-featured SaaS but also comes with a platform, that can be easily adopted by partners to build new applications for vertical solutions (e.g. for manufacturing companies, Virtual Enterprises, etc.). OSGi technology enforces a clean architecture with hundreds of loosely coupled bundles each adding some new functionality to the system (e.g. a campaign module or e-mail support). Several extension points (e.g. OSGi services) allow partners to customize or extend the application for their needs. CAS Open is based on Equinox as OSG implementation and uses Eclipse RAP/Silverlight as web framework. CAS also offers a SDK to support developers to extend and leverage the benefits of the CAS Open platform.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 3,676,391€

EC Funding: 2,618,000€

Coordinator:

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ADVENTURE 285220

ADaptive Virtual ENTerprise ManufacTURING Environment

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ASCORA GmbH Germany
TIE Holding N.V. Netherlands
INESC PORTO - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES DO PORTO Portugal
VAASAN YLIOPISTO Finland
UNIVERSITAET WIEN Austria
I-SOFT OOD Bulgaria
TECHNOLOGY APPLICATION NETWORK LIMITED United Kingdom
AZEVEDOS INDÚSTRIA INDUSTRIAIS SA Portugal
ABB OY Finland

Summary:

Virtual factories are a well-established concept although existing solutions have limits:

- Scoped at the business level
- Provide an isolated view on certain virtual factory aspects
- Restricted to simple tasks
- Simple extensions to classic ERP and SCM systems
- Limited integration from other information sources
- Lack of distinction between -internal and cross-company processes
- Limited interoperability of systems/data across factories

There are limited tools and technologies which provide reliable end-to-end cross partner interoperability of ICT systems in the manufacturing domain and to easily fuse dispersed assets such as processes, information, status and other resources. In order to cope with the demand for flexibility and fast-paced business innovation, there is a need for an integrated, yet framework, environment which is able to establish, manage, monitor, and adapt virtual factories. This needs to be based on the requirements of the manufacturing processes at a deep technical level to provide easy, flexible interoperability with minimal user skills especially to support SMEs. ADVENTURE will deliver this platform and the accompanying tools by providing a holistic environment for plug-and-play virtual factories based on cross-organisational manufacturing processes. ADVENTURE consortium is experienced, geographically wide, and represents a spectrum of organisations being composed of Universität Darmstadt (DE & Coord), research organisations INESC (PT), U.Vaasa (FI), U.Vienna (AT) and companies Ascora (DE), TIE (NL), ISOFT (BG), TANET (UK), AZEV (PT) and ABB (FI) of which most are SMEs. The partners provide world leading expertise in SOA, Cloud, the Internet of Things, eBusiness/eCommerce, Interoperability, industrial engineering, complex supply chains, workflow, flexible process management, semantics, and virtualised Infrastructures, SME manufacturing & collaboration, Quality Management and measurement Systems.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 3,623,613€

EC Funding: 2,807,000€

Coordinator:

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BIVEE 2857467

Business Innovation and Virtual Enterprise Environment

Partners:

ENGINEERING – INGEGNERIA INFORMATICA SPA Italy
BIBA - BREMER INSTITUT FUER PRODUKTION UND LOGISTIK GMBH Germany
BOC ASSET MANAGEMENT GMBH Austria
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA Spain
CONSIGLIO NAZIONALE DELLE RICERCHE Italy
SRDC YAZILIM ARASTIRMA VE GELISTIRME VE DANISMANLIK TICARET LIMITED SIRKETI Turkey
Stephen Pattenden United Kingdom
AIDIMA, ASOCIACION DE INVESTIGACIÓN Y DESARROLLO EN LA INDUSTRIA DEL MUEBLE Y AFINES, Spain
GENERAL IMPIANTI S.R.L. Italy

Summary:

EU needs an effective exit strategy from crisis: to this end innovation is a key issue for the EU industrial system. Innovation is a complex issue, requiring both special expertise and a large amount of knowledge. I.e., domain knowledge (on the industry sector) but also knowledge on technology, business models, finances, markets, etc. Innovation is not an easily job for a single enterprise, then really a challenge for a networked virtual enterprise. The BIVEE project intends to develop a rich framework, i.e., a software environment that includes business principles, models, and best practices, to promote innovation in virtual enterprise environments.

Effective innovation needs to be aware of what is going on inside the VE, at the production level, and at the same time outside it, where a plethora of elements move fast and often unexpectedly (i.e., markets, technology, finances, competitors, etc.). In BIVEE we introduced the notions of Value Production and Business Innovation space that shape the BIVEE framework, including the knowledge repository that collects all the required elements, inside and outside the VE. The knowledge repository is the key asset of the Mission Control Room, that monitors and manages the VE production, and the Virtual Innovation Factory that produces innovation and manages its introduction in the VE. The work plan of BIVEE emphasizes the impact achievement. To this end it has been based on two different trial applications (in furniture and high tech equipments, respectively), both organised in two major trial phases: Phase1 for monitoring the course of production before the introduction of BIVEE environment and Phase2 where the VE achievements are assessed having the BIVEE environment in place.

The two trial cases are quite different, to prove the flexibility and adoptability of BIVEE. To achieve the objective goals we organised a strong industry-driven consortium, having 7 industrial and 2 research partners.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 4,268,054€

EC Funding: 2,989,000€

Coordinator:

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IMAGINE 285132

Innovative End-to-end Management of Dynamic Manufacturing Networks

Partners:

INTRASOFT INTERNATIONAL SA Belgium
SOFTWARE AG Germany
SANTER REPLY SPA Italy
LOGO ELEKTRONIK TICARET HIZMETLERI A.S. Turkey
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V Germany
NATIONAL TECHNICAL UNIVERSITY OF ATHENS Greece
THE UNIVERSITY OF WARWICK United Kingdom
SCIENTIFIC ACADEMY FOR SERVICE TECHNOLOGY Germany
UNIVERSITY OF PATRAS Greece
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE France
UNINOVA - INSTITUTO DE DESENVOLVIMENTO DE NOVAS TECNOLOGIAS Portugal
EUROPEAN AERONAUTIC DEFENCE AND SPACE COMPANY EADS FRANCE SAS France
AIDIMA, ASOCIACION DE INVESTIGACIÓN Y DESARROLLO EN LA INDUSTRIA DEL MUEBLE Y AFINES Spain
CENTRO RICERCHE FIAT SCPA Italy

Summary:

Effective end-to-end management of dynamic manufacturing networks is consistently touted as a top priority for manufacturing enterprises that need to strive to improve their efficiency, adaptability and sustainability of their production systems. Moreover, it is a crucial prerequisite for the emerging powerful new model of production based on community, collaboration, and self-organisation and openness rather than on hierarchy and centralised control. IMAGINE addresses the need of modern manufacturing enterprises for a novel end-to-end management of dynamic manufacturing networks and will develop a multi-party collaboration platform for innovative, responsive manufacturing that encompasses globally distributed partners, suppliers & production facilities (SMEs and/or OEMs) that jointly conduct multi-party manufacturing. The project will implement a novel comprehensive methodology for the management of dynamic manufacturing networks that provides consolidated and coordinated view of information from various manufacturing sources and systems and enables service-enhanced product and production lifecycle and responsive manufacturing processes throughout the value chain. Living Labs in major industrial sectors will drive the implementation, testing, evaluation and dissemination of the IMAGINE methodology and supporting ICT platform. The IMAGINE manufacturing model is an innovative plug and produce approach that implements an end-to-end manufacturing interoperability solution. The IMAGINE solution is market-oriented with focus on value chain streamlining and support for emerging manufacturing business models. IMAGINE promises to have a profound and long lasting impact on EU manufacturing enterprises to adapt to global competitive pressures by providing the technological base that helps reduce manufacturing cycle times, increase production and improve on-time delivery rates while enabling SMEs to participate in the design and production of new generation applications.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 10,670,093€

EC Funding: 7,537,000€

Coordinator:

Dr. Antonis Ramfos

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COMVANTAGE 284928

Collaborative Manufacturing Network for Competitive Advantage

Partners:

SAP AG Germany
NEXTEL SA Spain
ISN-Innovation Service Network d.o.o. Slovenia
DRESSCODE21 GmbH Austria
KÖLSCH & ALTMANN SOFTWARE & MANGEMENT CONSULTING GmbH Germany
BOC Business Objectives Consulting Ibérica,S.L.U. Spain
UNIVERSITAET WIEN Austria
BEN-GURION UNIVERSITY OF THE NEGEV Israel
TECHNISCHE UNIVERSITAET DRESDEN Germany
ASOCIACION DE EMPRESAS TECNOLOGICAS INNOVALIA Spain
COMAU SPA Italy
EVIDIAN SA France

Summary:

With ComVantage we envision an interorganisational collaboration space turning today's organisation-centric manufacturing approach into a product-centric one. Manufacturers will benefit from a flexible, efficient platform that helps them to operate as one virtual factory and thus gain competitive advantages in their markets. Based on best practises of Web 2.0 technologies the collaboration space will be an extension to existing business and engineering software. It will allow to share, administrate and monitor focused information throughout a product's life cycle in a de-centralised manner. The close collaboration on the B2B and B2C levels will foster existing trends such as Open Innovation or Crowd Sourcing. The framework of the virtual factory will encompass a secure access control that is founded on dynamic workflow models and flexible user roles accounting for large enterprises, SMEs and for end-customers. It will enable temporary and de-centralised access management for ad-hoc collaboration between geographically distributed experts. To adhere to changing working situations, to efficient communication, and to rich interaction technologies ComVantage will focus on mobile devices. Intuitive and trustful mobile apps shall support users in fast decision making and problem solving. Information from different sources across the organisations is provided and maintained via Linked Data . The integration of sensor data allows for products to be members of the collaboration space. A continuous evaluation of the ICT and business model considering use cases throughout the project will verify the added-value of ComVantage for the European industry. The utilisation of existing technologies, a close user approach, and an incremental project set-up will provide sound concepts ready for fast productisation. Thus implementing ComVantage will increase lean communication, agile and highly efficient production processes, cost control and a low carbon footprint.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 10,941,335€

EC Funding: 7,339,000€

Coordinator:

Dr. Gottfried Frank (Director Project Management Office-PMO)

SAP AG

SAP Research

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MSE 284860

Manufacturing Service Ecosystem

Partners:

TXT E-SOLUTIONS SPA Italy
LABORATOIRE VIRTUEL EUROPEEN DANS LE DOMAINE DE L'INTEROPERABILITE DES ENTREPRISES AISBL Belgium
SAP AG Germany
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V Germany
POLITECNICO DI MILANO Italy
FUNDACION TECNALIA RESEARCH & INNOVATION Spain
DEUTSCHE INSTITUTE FUR TEXTIL- UND FASERFORSCHUNG DENKENDORF Germany
BIBA - BREMER INSTITUT FUERPRODUKTION UND LOGISTIK GMBH Germany
HARDIS France
SINGULARLOGIC ANONYMOS ETAIRIA PLIROFORIAKON SYSTIMATON & EFARMOGON PLIROFORIKIS Greece
SOFTECO SISMAT SRL Italy
UNIVERSITAET INNSBRUCK Austria
PHILIPS CONSUMER LIFESTYLE B.V. Netherlands
INDESIT COMPANY S.P.A. Italy
DOUËLOU NV Belgium
IBARMIA INNOVATEK, S.L Spain

Summary:

VISION: "By 2015, novel service-oriented management methodologies and the Future Internet universal business infrastructure will enable European virtual factories and enterprises to self-organize in distributed, autonomous, interoperable, non-hierarchical innovation ecosystems of tangible and intangible manufacturing assets, to be virtually described, on-the-fly composed and dynamically delivered as a Service, end-to-end along the globalised value chain." The first Grand Challenge for MSE project is to make SSME evolve towards Manufacturing Systems and Factories of the Future, i.e. from a methodological viewpoint to adapt, modify, extend SSME concepts so that they could be applicable to traditionally product-oriented enterprises; from an implementation viewpoint to instantiate Future Internet service oriented architectures and platforms for global manufacturing service systems. The second Grand Challenge for MSE project is to transform current manufacturing hierarchical supply chains into manufacturing open ecosystems, i.e. on the one side to define and implement business processes and policies to support collaborative innovation in a secure industrial environment; on the other side to define a new collaborative architecture for ESA, to support business-IT interaction and distributed decision making in virtual factories and enterprises. The synthesis of the two Grand Challenges above in industrial business scenarios and their full adoption in some European test cases will result in new Virtual Factory Industrial Models, where service orientation and collaborative innovation will support a new renaissance of Europe in the global manufacturing context.

Starting Date: 01 October 2011

Duration: 36 months

Total costs: 15,206,520€

EC Funding: 9,870,000€

Coordinator:

Mr. Sergio Gusmeroli (Director)

TXT E-SOLUTIONS SPA

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EPES 285093

Eco-process engineering system for composition of services to optimize product life-cycle

Partners:

FUNDACION TECNALIA RESEARCH & INNOVATION Spain
INSTITUT FÜR ANGEWANDTE SYSTEMTECHNIK BREMEN GMBH Germany
SISTEPLANT SL Spain
VALTION TEKNILLINEN TUTKIMUSKESKUS Finland
ESTECO - ENGIN SOFT TECNOLOGIE PER L'OTTIMIZZAZIONE SRL Italy
GRUPO TAMOIN Spain
BOSCH REXROTH AG Germany
EADS UK Ltd. United Kingdom

Summary:

The project will develop a novel eco process engineering system (EPES) which will constitute of a comprehensive platform enabling a dynamic composition of services adaptable to the different products and operating conditions, supporting Product Service System. It will consist of:

- A set of ICT tools aiming to - an easy configuration/adaptation of new services - storing, re-using the apprehended knowledge in order to improve the services and develop new ones with the objectives of: - Continuous improvement of products in operation along its life cycle. - Applying best up to date technologies for end of life disposal of the products. - Same in order to improve future product designs.
- A methodology and working handbook

The set of ICT tools and the methodology and working handbook will enable the manufacturing companies to enter into a continuous process of upgrading their products along their life cycle within the frame of the virtual factory and Product Service System (PSS) concept through a configurable and adaptable set of services. The services will focus on improving the performance of products in operation taking into account different knowledge based aspects as reliability, availability, maintainability, costs, productivity, quality, energy efficiency, etc. This novel service oriented framework will allow industries to evaluate the performance of engineered products considering their whole lifecycle rather than only early stages such as design and manufacturing. The capabilities resulting from the research will enable the capitalisation on trustable global and local sustainability intelligence. Product engineering teams can exploit this intelligence to adapt design, operation and disposal strategies through managed “eco-constraints” relevant to their market contexts.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 5,558,200€

EC Funding: 3,836,000€

Coordinator:

Dr Mikel Sorli (Product Manager)

FUNDACION TECNALIA RESEARCH & INNOVATION

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EXTREMEFACTORIES 285164
***Internet-based platform implementing agile
management methods for enabling the set-up,
monitoring and follow-up of business
innovation processes in industrial SMEs.***

Partners:

INNOPOLE, S.L. Spain
INSTITUT FÜR ANGEWANDTE SYSTEMTECHNIK BREMEN GMBH Germany
CENTRE FOR FACTORIES OF THE FUTURE LIMITED United Kingdom
VAIBMU LTD. Finland
SAFEVIEW SL Spain
FABRICACIONES METÁLICAS MORENO, S.A. Spain
OAS AKTIENGESELLSCHAFT Germany
ARMBRUSTER ENGINEERING GMBH & CO. KG Germany
MB AIR SYSTEMS LIMITED United Kingdom
CHARLES ROBINSON (CUTTING TOOLS) United Kingdom
NIKARI OY Finland

Summary:

The ExtremeFactories project proposes the conception of a collaborative internet-based platform with semantic capabilities (by means of ontology modeling) that implements a new methodology for the adoption of a systematic innovation process in globally acting networked SMEs. The platform will support SMEs to manage and implement the complex innovation processes arisen in a networked environment, taking into account their internal and external links, by enabling an open multi-agent focused innovation (i.e. a customer/provider/supplier/employee focused innovation). The solution will be specifically focused on the needs of manufacturing companies and will observe both product and process innovation. The construction of the ExtremeFactoriesN methodology will be based on individual practices found in traditional innovation management methods, such as TRIZ, combined with a selected group of practices obtained from different Agile Methodologies (such as Extreme Programming, SCRUM and others). (The project gets its name from the Extreme Programming methodology). The platform will be built upon a service oriented architecture, implementing semantic functionalities. This platform will provide the SMEs with services to support them in any step of the innovation life-cycle (problem detection, inception of ideas, prioritization of ideas, implementation and follow-up). The project has a strong industrial basis, putting together the efforts of 7 industrial manufacturing SMEs in the way to become virtual networked organizations by the way they handle their relationships to third parties, such as customers, suppliers, distributors, etc. This big effort will result in a methodology and platform that will be validated and assessed in predefined business scenarios at these organizations. The project proposes a solid dissemination plan, offering a community management activity in order to get a wider target, as well as a first version of an exploitation plan to be further detailed.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 3,189,117€

EC Funding: 2,448,343€

Coordinator:

Mr. Fernando Ubieta

INNOPOLE

Management

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RLW Navigator 285051

Remote Laser Welding System Navigator for Eco & Resilient Automotive Factories

Partners:

THE UNIVERSITY OF WARWICK United Kingdom
MAGYAR TUDOMANYOS AKADEMIA SZAMITASTECHNIKAI ES AUTOMATIZALASI KUTATO INTEZET Hungary
POLITECNICO DI MILANO Italy
UNIVERSITY OF PATRAS Greece
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE Switzerland
UNIVERSITA DEGLI STUDI DEL MOLISE Italy
JAGUAR CARS LIMITED United Kingdom
STADCO LIMITED United Kingdom
COMAU SPA Italy
PRECITEC KG Germany
ENGINSOFT SPA Italy
QUOTEC LIMITED United Kingdom

Summary:

RLW Navigator aims to develop an innovative Process Navigator to configure, integrate, test and validate applications of Remote Laser Welding (RLW) in automotive assembly addressing today's critical needs for frequently changing operating conditions and product-mix provisions. Thus, RLW Navigator will crucially service as an enabler for future energy efficient smart factories. RLW is emerging as a promising joining technology for sheet metal assembly due to benefits on several fronts including reduced processing time, (50-75%) and decreased factory floor footprint (50%), reduced environmental impact through energy use reduction (60%), and providing a flexibility process base for future model introduction or product change. Currently, RLW systems are limited in their applicability due to an acute lack of systematic ICT-based simulation methodologies to navigate their efficient application in automotive manufacturing processes. The project aims to address this by developing a Process Navigator simulation system that will deal with three key challenges thereby allowing manufacturers to utilize the advantages of the RLW system. Firstly, the most critical obstacle that currently prevents the successful implementation of RLW is the need for tight dimensional control of part-to-part gap during joining operations, essential to ensure the quality of the stitch. Secondly, the existing assembly system architecture must be reconfigured to provide the opportunity to evaluate the RLW system in terms of its feasibility to perform all required assembly tasks. This will provide crucial information about the most advantageous workstation/cell reconfiguration, which will serve as the basis for optimal robot path planning to reduce joining process time and workstation level efficiency assessment. Finally the project will develop systematic evaluation and learning methods to assess and improve the overall performance, cost-effectiveness and eco-efficiency of the RLW system.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 6,687,036€

EC Funding: 3,979,984€

Coordinator:

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SIMPOSIUM 285549

Simulation Platform for Non Destructive Evaluation of Structures and Materials

Partners:

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES France
ARCELORMITTAL MAIZIERES RESEARCH SA France
UNIVERSITA DEGLI STUDI DI CASSINO Italy
EUROPEAN AERONAUTIC DEFENCE AND SPACE COMPANY EADS FRANCE SAS France EXTENDE France
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V Germany
IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE United Kingdom
INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE France
KATHOLIEKE UNIVERSITEIT LEUVEN Belgium
UNIVERSITA DEGLI STUDI DI NAPOLI FEDERICO II. Italy
SERCO LIMITED United Kingdom
SAARSCHMIEDE GMBH FREIFORMSCHMIEDE* Germany
SIMULAYT LIMITED United Kingdom
SKF SVERIGE AB Sweden
VOLKSWAGEN AG Germany

Summary:

In all industrial sectors, Non Destructive Evaluation techniques play a critical role for ensuring structures reliability, plant safety and increasingly also for ensuring quality and efficiency of products and processes. The emerging use of numerical simulation is a major trend in the field with tremendous potential benefits in terms of costs reduction, enhanced diagnosis reliability and consequently increased competitiveness. Today strong industrial needs exist for efficient NDE simulation tools which SIMPOSIUM aims at fulfilling. The project objective is to provide in a single software platform numerical models specifically designed to respond to manufacturers applications. The project will address both flaw detection and material characterization methods. Particular effort will be put on challenging modelling of material features, complex geometries of parts and complex defects. The models will be i) based on multi-scale and multi-physics approach, ii) capable to exchange data with CAD design software, mechanical codes, material models. Emphasis will be put on efficient coupling strategies based on hybrid semi-analytical / numerical approaches. Such strategies will be made possible by the development of software platform tools allowing communication between codes developed by different partners. Particular attention will be paid to the validation of the models codes challenging modelling of material features, complex geometries of parts and defects. SIMPOSIUM, will have significant impacts at the different stages of NDE practice: Design and implementation of emerging NDE techniques, reliability assessment and performance demonstration, training of NDE staff. By reducing the cost linked to inspections, making possible virtual testing at the earliest stages of the part design, SIMPOSIUM will significantly contribute to improve time-to-production, time-to-market and competitiveness. Last it will confirm the leading position of Europe in the field of NDE simulation.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 5,991,630€

EC Funding: 4,250,554€

Coordinator:

Catherine GILLES-PASCAUD

COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES

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TERRIFIC 284981

Towards Enhanced Integration of Design and Production in the Factory of the Future through Isogeometric Technologies

Partners:

STIFTELSEN SINTEF Norway
JOTNE EPM TECHNOLOGY AS Norway
ENGINEERING CENTER STEYR G.M.B.H. & CO KG Austria
UNIVERSITAET LINZ Austria
SIEMENS AG Germany
TECHNISCHE UNIVERSITAET KAISERSLAUTERN Germany
MISSLER SOFTWARE France
INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE France
ALENIA AERONAUTICA SPA Italy
UNIVERSITA DEGLI STUDI DI PAVIA Italy 3

Summary:

The project aims at significant improvement of the interoperability of computational tools for the design, analysis and optimization of functional products. An isogeometric approach is applied for selected manufacturing application areas (cars, trains, aircraft) and for computer-aided machining. Computer Aided Design and numerical simulation algorithms are vital technologies in modern product development, yet they are today far from being seamlessly integrated. Their interoperability is severely disturbed by inconsistencies in the mathematical approaches used. Efficient feedback from analysis to CAD and iterative refinement of the analysis model is a feature of isogeometric analysis, and would be an essential improvement for computer-based design optimization and virtual product development. The new paradigm of isogeometric analysis demonstrates that much is to be gained in efficiency, quality and accuracy of the analysis step by replacing traditional Finite Elements by volumetric (trivariate) NURBS elements. A general uptake of isogeometric approaches in industry can only be expected if there exist convincing technically verified and validated case studies showing real advantages over the current approaches, using both qualitative and quantitative indicators. It is also clear that the prior knowledge, such as it is contained in existing CAD-models, CAD-systems and numerical solvers, cannot just be dumped. It has to be investigated how the isogeometric concepts can actually be introduced on a large scale, starting from the interoperability of typical CAD-models and new isogeometric CAD-models all the way to product data management issues and standards. Our vision is to provide and disseminate tangible evidence of the performance of the isogeometric approach in comparison to traditional ones in four important application areas as well as addressing interoperability and other issues that necessarily arise in a large-scale industrial introduction of isogeometry.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 5,213,450€

EC Funding: 3,496,000€

Coordinator:

Tor Dokken, (Chief Scientist)

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FFD 285026

Future Fashion Design Real-time, Accurate Fabric to Garment Virtual Prototyping in Collaborative Environments

Partners:

FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V Germany
ATHENS TECHNOLOGY CENTER SA Greece
ASSYST GMBH Germany
SCOTCAD TEXTILES LTD United Kingdom
FRATELLI PIACENZA S.P.A. Italy
CONSITEX SA Manufacturing Division Switzerland

Summary:

The FFD project (targeting the Objective FoF-ICT-20111.7.4, focusing on target 7.4b and partly addressing 7.4c) aims to remove the main factors inhibiting the wide adoption of Virtual Prototyping (VP) by the Textile and Clothing companies (TCI), by drastically improving the speed of obtaining realistic garment simulations (development of massively parallel simulation techniques based on multi-core computing), the accuracy (simulation from yarn - to fabric - to garment, virtual garment close to real sample) and the functional integration aspects (Collaborative Prototyping offered as a SaaS platform). The new business model will offer drastic improvements in product development efficiency (reduced number of physical samples from 20% to 100%, time-to-market reduced by 3 weeks, collaboration between fabric and garment producers), services at low-cost (open, vendor independent and scalable platform), while opening new market opportunities to vendors of CAD and PDM/PLM systems. A just-right Consortium of 6 organisations: A leading European Institute (Fraunhofer-IGD) as Coordinator (will develop the massively parallel simulation engine), Assyst (apparel CAD) and ScotCad (fabric CAD) already offering state-of-the-art 3D VP solutions will work on improving simulation accuracy (from yarn to garment), ATC an ICT company with expertise in web integration based on the SOA model will develop a Collaborative Design and Prototyping platform (CPD), and two end-users (Piacenza-manufacturer of fine woollen fabrics and Consitex, the garment manufacturing member of the Ermenegildo Zegna Group) will integrate the innovative VP platform in their joint product development processes and will demonstrate/ evaluate it's efficiency and impact. Various exploitation schemes will be adopted (new packaged VP fabric and garment solutions, integrated fabric-garment design and VP offer, joint exploitation of the Software as a Service CPD platform. The project duration is 36 months.

Starting Date: 01 October 2011

Duration: 36 months

Total costs: 3,507,317€

EC Funding: 2,549,000€

Coordinator:

Dr.-Ing. Jörn Kohlhammer

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I-CONIK 284602

An Internet-based Collaborative Platform for Managing Manufacturing Knowledge

Partners:

VOLVO TECHNOLOGY AB Sweden
SAP AG Germany
UNIVERSITY OF PATRAS Greece
CENTRO RICERCHE FIAT SCPA Italy
KARLSRUHER INSTITUT FUER TECHNOLOGIE Germany
FUNDACION TECNALIA RESEARCH & INNOVATION Spain
PDTEC AG Germany
INNOVAZIONE AUTOMOTIVE METALMECCANICA Italy
ONTOPRISE GMBH INTELLIGENTE LOESUNGEN FUER DAS WISSENSMANAGEMENT Germany
CHALMERS TEKNISKA HOEGSKOLA AB Sweden
EDAG GMBH & CO. KGAA Germany
N.BAZIGOS ABEE Greece

Summary:

Current digital manufacturing ICT platforms have provided a series of tools, including CAX, PDM and PLM systems, to support engineers in a series of collaborative activities, allowing them to communicate as well as to design and validate the manufacturing processes. However, they still have a long way to go for effectively addressing engineering knowledge management issues: -Today's ERP systems are often detached from the engineering knowledge they are associated with, while PLM systems provide no link to actual performance indicators, such as cost, time, and quality parameters - Current User Interfaces (UI) are often too complex and require much effort to follow and use effectively; - Knowledge is often dispersed over many stakeholders and many IT systems; - There is still a significant absence of robust tools for automatic knowledge capturing as well as for systematic reuse of knowledge, especially in the area of engineering; The I-CONIK project will attempt to address the following objectives: - The more efficient knowledge management and collaboration throughout the product lifecycle, supporting the capture, the systematic organization in the form of manufacturing templates of knowledge; - To revolutionize the UI context in the engineering office and the shop floor, with particular emphasis on training activities: - Faster, easier, error-free UI for data entry / checking in the shop floor along with serious games options for instantaneous knowledge retrieval, training and/or design purposes; Ultimately, I-CONIK aims at delivering a state-of-the-art web-based ICT platform for managing manufacturing knowledge, comprising the following key characteristics: - Web-based "Engineering Desktop" for agent-based collaborative design (using cross-platform runtime environments, such as Adobe Air / Flash) throughout the value chain, using PPIs and manufacturing templates; - Faster, easier, guided UI for blue collar workers and engineers.

Starting Date: 01 September 2011

Duration: 48 months

Total costs: 9,664,633€

EC Funding: 6,154,998€

Coordinator:

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amePLM 285171

Advanced Platform for Manufacturing Engineering and Product Lifecycle Management

Partners:

FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V Germany
POLITECNICO DI TORINO Italy
ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET
PROCESSUS INDUSTRIELS – ARMINES France
UNIVERSITY OF LIMERICK Ireland
THE UNIVERSITY OF NOTTINGHAM United Kingdom
UNIVERSITA DEGLI STUDI DI TRIESTE Italy
ONTOPRISE GMBH INTELLIGENTE LOESUNGEN FUER DAS WISSENSMANAGEMENT Germany
INTEL PERFORMANCE LEARNING SOLUTIONS LIMITED Ireland
R.T.T. ROMANIA TELECOMUNICATION TRADING Romania
AEROGEN LTD. Ireland
MB-TECHNOLOGY GMBH Germany
SHANNON COILED SPRINGS Ireland

Summary:

Product and production engineering in companies are typically fragmented across different functional units, distributed across companies along the value chain, requiring input from experts from a variety of disciplines using different methods and tools. This leads to a high coordination effort to synergise work and information transfer as well as to sub-optimal decisions and unused knowledge and experiences. The resulting waste in engineering processes results in an unnecessary lengthening of time-to-market and time-to-production of new products and to a loss of competitiveness of European companies.

amePLM will offer a radically new and extensible approach to collaborative engineering, leveraging state-of-the art research on semantics, heuristics and visualization. The objectives are to -Engineer an ontology that serves as an -interoperable model and -integrating element for an open engineering system: the amePLM Platform -Develop an open engineering platform based on existing tools and libraries, by special consideration of open-source software -Research and develop tools to assist in product and process development, analysis, virtual testing and optimization based on heuristic methods and simulation that operate on knowledge represented by information which is structured by means of an ontology -Devise a visualization module to enable cross-disciplinary collaboration and remote consultation approaches The solution development will be accomplished through a user-centric approach by 2 leading edge high tech software providers, guided and validated by industrial cases from 3 SME and 2 international companies.

The research needed for the innovative amePLM-solutions is performed by 5 leading universities and Fraunhofer. The knowledge-driven amePLM-platform will drastically accelerate product and production engineering by integrated workflows, capturing and reuse of knowledge and experiences and by facilitating cross-disciplinary knowledge-sharing and collaboration.

Starting Date: 01 October 2011

Duration: 36 months

Total costs: 4,407,135€

EC Funding: 3,025,859€

Coordinator:

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LinkedDesign 284613

Linked Knowledge in Manufacturing, Engineering and Design for Next-Generation Production

Partners:

SAP AG Germany
AALTO-KORKEAKOULUSAATIO Finland
BIBA - BREMER INSTITUT FUER PRODUKTION UND LOGISTIK GMBH Germany
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE Switzerland
NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU Norway
POLITECNICO DI MILANO Italy
HOLONIX S.R.L. Italy
TRIMEK S.A. Spain
GIOUMPI TEK MELETI SCHEDIASMOS YLOPOIISI KAI POLISI ERGON PLIROFORIKIS ETAIREIA PERIORISMENIS EFTHYNIS Greece
UNIVERSITAET LEIPZIG Germany
AKER ENGINEERING & TECHNOLOGY Norway
COMAU SPA Italy
VOLKSWAGEN AG Germany

Summary:

Manufacturing is the driving force of Europe's economy, contributing over €6,553 billion in GDP and providing more than 30 million jobs. A strong manufacturing sector is vital to European economic growth and stability but this sector is facing increasingly difficult challenges. The economic crisis has decreased the industry output by around 20%, and global competition is dramatically growing. Further, we witness new trends and paradigms like an increasing demand for sustainable manufacturing and mass customization. ICT is the key enabler for coping with these changes to push engineering and manufacturing excellence as driver for European success.

With LinkedDesign we envision to boost today's engineers by providing an integrated, holistic view on data, persons and processes across the full product lifecycle as vital resource for the outstanding competitive design of novel products and manufacturing processes. To achieve this goal the project will develop the Linked Engineering and Manufacturing Platform (LEAP) as integrated information system for manufacturing design that federates all relevant product lifecycle information, independent of its format, location, originator, and time of creation.

Besides, LEAP will provide specific knowledge exploitation solutions like sentiment analysis and design decision support systems. Within LinkedDesign we aim for a user-centric lifecycle information management. LEAP will provide a context-driven access to federated information and knowledge and foster cross-discipline collaborations between users by novel approaches for collaborative engineering. Finally, LinkedDesign will provide tight feedback connections to existing engineering tools (e.g., CAx Systems) in order to push back formalised knowledge to enable the automated design of elementary product components.

Starting Date: 01 September 2011

Duration: 42 months

Total costs: 12,561,115€

EC Funding: 8,061,848€

Coordinator:

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VISTRA 285176

Virtual Simulation and Training of Assembly and Service Processes in Digital Factories

Partners:

DEUTSCHES FORSCHUNGSZENTRUM FUER KUENSTLICHE INTELLIGENZ GMBH Germany
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V Germany
STIFTELSEN FRAUNHOFER-CHALMERS CENTRUM FOR INDUSTRIEMATEMATIK Sweden
THE UNIVERSITY OF NOTTINGHAM United Kingdom
SERIOUS GAMES INTERACTIVE Denmark
VOLVO TECHNOLOGY AB Sweden
ADAM OPEL GMBH Germany

Summary:

The information gap between virtual product and manufacturing engineering and the physical start of production is a fundamental problem for Europe's manufacturers. Information about products and processes, which is currently distributed over heterogeneous systems, is rich of information, but a platform for presenting this knowledge according to the different user roles (e.g. production planners or shop floor people) is missing. Enterprise data must be captured, updated, enriched and transferred into an interoperable platform, which enables cross-disciplinary knowledge sharing throughout the product life-cycle. Reuse of product and process data is a promising approach to leverage virtual simulation of manual manufacturing processes. Up to now, the complexity and incompatibility of digital data is a main reason why planning and training of manual manufacturing processes, e.g. in automotive and aerospace, are still carried out in physical stages or during the ramp-up. The simulation and training of complex manufacturing processes in physical stages is expensive and often ineffective. In order to reduce the need for physical prototypes and to reduce time-to-market, virtual training must overcome the problems of former approaches, e.g. inadequate authoring times, cost-prohibitive hardware and insufficient user integration. We propose the development of a comprehensive platform for simulation, documentation and training of manual assembly processes based on advanced ICT-technology: auto-generation, realistic physical behaviour, game-based learning, advanced user-interaction, low-cost hardware and cross-disciplinary information sharing. VISTRA will allow to train workers in a way, which is more efficient, straightforward and resource-saving than today's methods. VISTRA will enable production engineers to analyse assembly processes before physical mock-ups exists. Overall, VISTRA will sustainably support Europe's labour-intensive industries in their worldwide competition.

Starting Date: 01 September 2011

Duration: 36 months

Total costs: 5,336,798€

EC Funding: 3,629,000€

Coordinator:

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