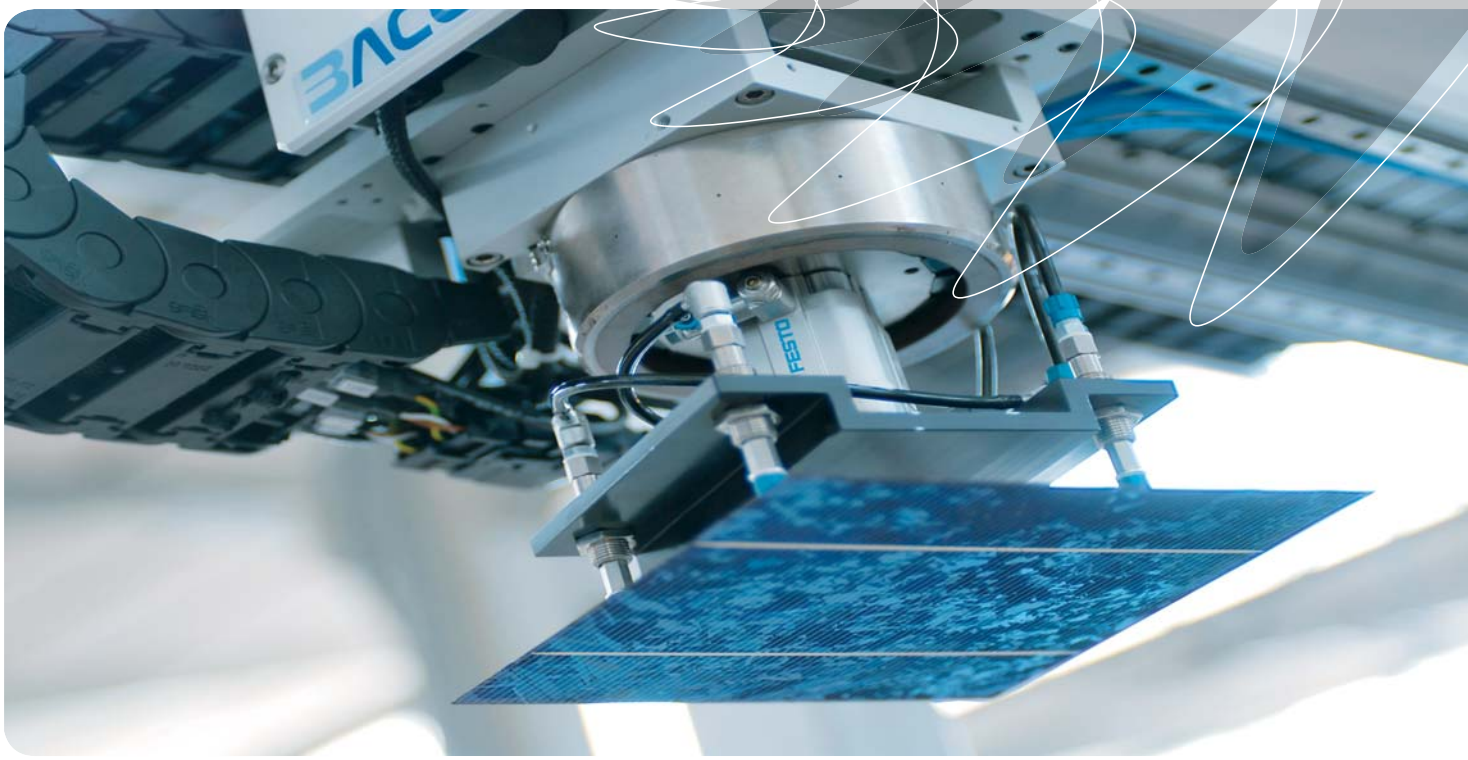
Overview of FP7-funded projects under the first call

DEVELOPING TECHNOLOGIES FOR 'FACTORIES OF THE FUTURE'



prepared by:

EFFRA
EUROPEAN FACTORIES OF THE FUTURE RESEARCH ASSOCIATION
a MANUFUTURE initiative

Editorial Information:

The 'Factories of the Future' public-private partnership (PPP) is a joint initiative of the European Commission and the private sector to promote research in advanced manufacturing across Europe.

In close cooperation, the European Commission's Directorate-Generals for Research and Innovation (DG Research) and Information Society and Media (DG INFSO) are devoting € 645 million stemming from the 7th Framework Programme for Research, Technological Development and Demonstration (FP7) over the period 2010 to 2013. All the projects described in this brochure receive FP7 funding under the FP7-2010-NMP-ICT-FoF call. Their European grant agreement ID numbers are specified on each project summary page.

In order to help put the 'Factories of the Future' partnership into practice, the European Technology Platform on future manufacturing technologies (MANUFUTURE) has created the European Factories of the Future Research Association (EFFRA), which is the main interlocutor of the European Commission from the private sector. EFFRA now comprises of more than one hundred organisations from across Europe and is open to welcoming new members.

EFFRA has compiled this brochure to inform both the general public and the manufacturing industry on the scope of the research projects carried out under the 'Factories of the Future' public-private partnership. The aim of the brochure is to support the dissemination of information on this major European initiative and to increase its transparency.

The information on each project has been kindly provided by the project participants. Neither EFFRA nor the European Commission, nor any third party can assume responsibility for any errors, factual or otherwise, appearing in the texts. This brochure should not be used for commercial gain.

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Engineering the future

As part of the 'Factories of the Future' public-private partnership hundreds of European engineers are cooperating across borders, businesses and disciplines in order to develop new production technologies to be applied in the aeronautics, automotive, consumer electronics, energy generation, footwear, medical, micro-systems, optical and textiles industries.

Work launched on 25 research projects funded under FP7 is paving the way for smart and networked manufacturing that will allow for a fast reaction to changing customer demands and ever tougher precision standards.

Innovative production technologies are central to increase productivity in European manufacturing, to promote sustainable growth and to create well-paid jobs in the manufacturing sector. Production technologies can also form part of the solution to additional long-term challenges such as demographic change, dwindling natural resources and the need to reduce greenhouse gas emissions. For these reasons the European manufacturing sector has committed to a strategic public-private partnership with the European Commission called 'Factories of the Future'.

Launched in early 2009, this major European initiative has embarked upon its first 25 research projects which will achieve their final results in 2013 and 2014. Loosely grouped, they focus on four main technological challenges: Using more streamlined information and communications technologies (ICTs) *smart factories* will address the next generation of robotics, automation as well as planning, simulation and optimisation software. *Virtual factories for networked production* will support the management of ever more complex supply chains between manufacturing plants around the world and contribute to the real-time monitoring of complex material flows. In order to comply with the current market demand for shorter lag times between successive product generations, *adaptive production equipment* will create manufacturing systems with the required flexibility while remaining at the same time robust, reliable and cost-effective. *High-precision manufacturing* solutions will enhance the accuracy of the production process on the micro-scale.

216 organisations
working across borders

Coming waves of 'Factories of the Future' research projects will also cover digital factories to help reduce the need for physical prototyping and the construction of pilot plants. Furthermore, innovative solutions will be found to improve quality control and achieve the zero defect manufacturing paradigm.

A further two research areas will form a core focus of future projects: sustainability and exploiting new materials. Sustainable manufacturing will lead the way to a low-carbon economy and make use of new green technologies in industrial production. But future manufacturing plants will have to be people-friendly, not only eco-friendly. Factories that support improved occupational health and enhance labour productivity require new, human-centred production environments. This requires innovative developments in ergonomics, the customisation of machinery and the optimisation of working conditions and methods.

€141 million
of total R&D investment in 2010

Finally, the gradual depletion of global resources makes it necessary to rethink the use of materials in manufacturing. In addition to finding improved waste reduction measures during the production process, future production technologies will have to adapt to processing with new high-performing materials.

A partnership for growth and jobs: *EFFRA Chairman Dr Massimo Mattucci (left) together with EU Commissioners Viviane Reding and Janez Potočnik meeting on the 'Factories of the Future' public-private partnership in July 2009. The cross-departmental cooperation of the European Commission's Directorate-Generals for Research and Innovation and for Information Society and Media has been fundamental to the success of this joint venture.*

To define the scope of the current 25, as well as forthcoming research projects, EFFRA has supported the preparation of a 'Factories of the Future' multi-annual technology roadmap.* Following a European-wide, open and transparent stakeholder consultation process lasting 16 months, 50 high priority research areas have been selected. Grouped under the four main research sub-domains of sustainable manufacturing, ICT-enabled intelligent manufacturing, high-productivity manufacturing and exploiting new materials in manufacturing most of these topics are expected to be financially supported by the European Union in the coming years.

8 ½ months
processing time of project proposals

As a sign of its commitment to the public-private partnership, the European Commission has earmarked a sum of € 645 million in support funds. The funds are drawn from the budget of the 7th Framework Programme for Research, Technological Development and Demonstration (FP7) and will be distributed in four annual calls for proposals. The European Commission has planned to gradually increase its financial support from € 95 million in 2010, to € 160 million in 2011 and 2012 and € 230 million in the year 2013. Companies, research institutes and universities can bid for these funds through the well-known FP7 application procedures.

The success rate for proposals in the first call launched in July 2009 was 19%. Moreover, the European Commission has now streamlined its internal administrative procedures and shortened the waiting time between the submission of the proposal and the start of the project ("time to grant") to 8.5 months on average; a clear indicator that significant efficiency gains in EU programme management are possible for priority initiatives.

*http://www.effra.eu/research-priorities/technology-roadmap.html

In order to support the European Commission in the public-private partnership, the European manufacturing sector has created the non-profit association EFFRA which maintains a small office close to the European Institutions in Brussels. EFFRA acts as an information hub for the private sector and consults with industry and academia to identify the most important research priorities. To make the public-private partnership a reality, EFFRA engages in close contact with the public sector through the channel of the European Commission's 'Ad-Hoc Industrial Advisory Group' and through a regular exchange of views with representatives of the Commission, the European Parliament and EU Member States. EFFRA also helps to mobilise private investment in the 'Factories of the Future' partnership, to ensure the industrial relevance of ongoing and future projects and to inform the private sector of the outcomes and results of the research and innovation activities.

49 euro cent
private investment mobilised by each € 1 of public funding

This catalogue presents the 25 'Factories of the Future' research projects from the first FP7 call (FP7-2010-NMP-ICT-FoF). Each project summary covers the individual research objectives, the total sum of public and private investment, timelines and guidance for obtaining further information. While the projects are thematically grouped under the four technological areas outlined above, their scope often covers several 'Factories of the Future' research sub-domains at the same time (*see table to the right*).

Using the FP7 tool-kit has allowed the 'Factories of the Future' initiative to take off with a phenomenal pace. However, with around 100 additional research projects scheduled for launch in the next years, one challenge will be to strengthen and formalise the role of the private sector within the public-private partnership. This will be central

1 common goal
putting Europe's industry first

to boost the (currently low) leverage effect of EU funding on private investment. A larger role for demonstration activities in future research projects will help to increase the contribution of the private sector in the short run. EFFRA and its members are committed to work at the same time with the public side to find a more sustainable solution that puts both sectors on an equal footing and provides the necessary long-term stability for this European joint venture.

● *main focus* ◑ *secondary focus* ○ *no or minor focus*	Sustainability	ICTs	Productivity	Materials
001 - ActionPlanT	◑	●	◑	○
002 - CustomPacker	◑	●	◑	○
003 - FoFdation	◑	●	○	○
004 - KAP	◑	●	○	○
005 - PlantCockpit	◑	●	◑	○
006 - RoboFoot	◑	●	◑	○
007 - TAPAS	◑	●	◑	○
008 - QCOALA	◑	●	◑	◑
009 - CoReNet	◑	◑	●	○
010 - E-Custom	◑	◑	●	○
011 - ManuCloud	◑	◑	●	○
012 - Micro-Dress	◑	◑	●	◑
013 - Phocam	◑	◑	●	◑
014 - S-MC-S	◑	◑	●	◑
015 - AIMACS	◑	◑	●	○
016 - COMET	○	◑	●	○
017 - Dynxperts	○	◑	●	○
018 - HARCO	◑	◑	●	○
019 - Locobot	○	◑	●	○
020 - PopJim	○	◑	●	○
021 - FAB2ASM	○	◑	●	◑
022 - Femtoprint	○	◑	●	◑
023 - IMPRESS	○	◑	●	◑
024 - Manucyte	○	◑	●	◑
025 - WaferLevelOptics	○	◑	●	◑

ActionPlanT

The European ICT forum for 'Factories of the Future'

The ActionPlanT project aims to develop a vision on the short, medium, and long term role of Information and Communication Technologies (ICTs) in the European manufacturing industry in order to ensure its sustainable competitiveness.

START	June 2010
DURATION	24 months
TOTAL BUDGET	€2.1 million
EU SUPPORT	71%
EU GRANT ID	FP7-ICT 258617
COORDINATOR	Anirban Majumdar (SAP AG)

ActionPlanT
Factories of the Future

www.actionplant-project.eu

ICTs play multiple roles in all of Europe's major industrial sectors, and manufacturing is no exception. Its contribution to the industry is set to increase even more markedly in the near future and it will become increasingly interwoven within the 'Factories of the Future' initiative over the coming years.

Europe has been investing heavily in efficient ICT-enabled manufacturing over the past decade, but in spite of this, Europe's profitability and innovative capacities have been on the decline. To counter this, a thorough analysis is needed to determine how to deploy R&D resources most effectively so that productivity and innovation may once again contribute to Europe's economic growth to the fullest degree.

Such an analysis will take into account current trends in technology and business, as well as social, environmental and political considerations. To do this, the project has three main objectives:

- To draw up a 'vision' for ICT-enabled manufacturing to serve future users and service providers, based on the above-mentioned analysis.

- To elaborate a detailed roadmap which will prioritise and schedule the most promising topics submitted for the upcoming Eighth Framework Programme for Research and Innovation (FP8).

- To develop a concept for 'industrial learning' within the framework of ActionPlanT, which means defining methods for bringing results into application through dialogue with the various industrial stakeholders, bringing the latter into contact with the results of research already carried out. This concept will be validated and extensively piloted through summer schools and workshops held for all the relevant stakeholders, from industry, academia and the various European technology platforms.

Project Number 001

CustomPacker

Highly customisable and flexible packaging station for mid-to-upper sized electronic consumer goods using industrial robots

CustomPacker aims to act as an aid to human workers to automise the packaging process, meaning that a fuller range of goods can be packaged on the same production line.

This project aims to develop a scalable and flexible packaging tool to aid human workers in packaging a range of goods. The idea is to automate the packaging process so that several production lines of various consumer goods, mostly heavy goods such as TVs, can be amalgamated into one packaging line.

Many consumer goods have large numbers of variables (size, colour, range of features) and thus need to be packaged manually. Automating the packaging process decreases production cycle times and associated costs, even for mixed-variable production lines, meaning that several production lines can be merged into a smaller number of packaging stations and parameters such as the number of items produced per day can be easily modified.

To achieve these goals, CustomPacker will bring together the skills of human workers with the precision and dexterity afforded by robots.

The final goal is to achieve one setup which is able to package a high variety of products and components using a programmable system architecture. Notably, the system will include an innovative feature to recognise the worker's intentions, namely if it realises that the worker is due to walk over to it, eventually it will be able, for example, to hand over a tool to him/her, thus streamlining the production process even further.

All of this will enhance the ways in which industrial robots are used today, in particular with regard to human-robot interaction. In addition, product cycle times will be reduced, paying for the increased investment in complex equipment by optimising reliability and the precision of existing technologies.

Given the range of consumer goods produced in Europe and the scope for automation, the impact of this project on European industry is expected to be important for automated companies and consumers.

Project Number 002

START	July 2010
DURATION	36 months
TOTAL BUDGET	€3.8 million
EU SUPPORT	68%
EU GRANT ID	FP7-ICT 260065
COORDINATOR	Frank Wallhoff (TU Munich)

CustomPacker
www.custompacker.eu

FoFdation

The foundation for the smart factory of the future

FoFdation creates a data integration standard to help overcome difficulties faced by manufacturers. It seeks to create the foundations of the future of digital manufacturing to overcome productivity pressures, environmental aspects and allow for greater product variability.

The Foundation for the Smart Factory of the Future

Today's major challenges for manufacturing companies are clear: global cooperation with multiple supply chain partners, the boosting of productivity and finally the tracking and management of information so as to meet new requirements in terms of traceability, security and sustainability.

FoFdation will establish a universal manufacturing information system based on a "data integration" standard such as STEP and its EXPRESS language, which allows individual entities and their associated devices to share data in a common format. This foundation will then allow the Smart Factory architecture to be implemented based on a high bandwidth 'manufacturing information pipeline' for data interoperability.

Incorporation of the project into the Smart Factory sub-domain, in view of real-time networking and adaptive capability, also includes:

- Optimisation of numerically-controlled machining systems, including programmable logic controllers through an embedded Supervisory Control and Data Acquisition (SCADA) system.

- Support for an advanced Manufacturing Execution System (MES), providing not only integrated process automation but also an extension of its scope to achieve energy efficiency and sustainability objectives and promote e-manufacturing and waste reduction.

- Reduction of time-to-market costs and costs related to resource diagnosis-maintenance through a common control and monitoring platform.

- The use of homogenous information sources which generate data from the entire process, achieving information binding from the extended MES to innovation in product lifecycle management and incorporating the business dimension of enterprise resource planning.

Jean-Bernard, project manager from Airbus Operations SAS said:

"The FOFdation project addresses our major strategic objectives for a global industry player, e.g. to better integrate and streamline CAD data towards our NC machines, thus addressing both optimisation and environmental issues through a fresh concept towards the global sustainability vision based on complete information integration."

Project Number 003

START	June 2010
DURATION	48 months
TOTAL BUDGET	€10.4 million
EU SUPPORT	64%
EU GRANT ID	FP7-ICT 260137
COORDINATOR	Jean-Bernard Hentz (Airbus)

KAP

Knowledge, awareness, and prediction of man, machine, material, and method in manufacturing

The KAP research project aims to provide manufacturing standards to ensure that every existing resource can be used as efficiently as possible through the effective coordination of man, machine, material and method.

Manufacturing is the driving force behind Europe's economy, providing over €6,553 billion of GDP. Against a background of climate change legislation, volatile energy prices, and increased environmental awareness, modern manufacturing must encompass a focus on sustainability and eco-efficiency. Given the current economic situation, this has to be achieved without the need for large capital expenditure. The application of information technologies to an already-existing production facility is a cost-effective investment.

KAP stands for knowledge of past performance and awareness of the present state, enabling the prediction of future outcomes. By creating transparency through the usage of data generated on the shop floor, every existing resource can be used as efficiently as possible. This guarantees the effective coordination of man, machine, material, and method.

In order to achieve this, the KAP research project will focus on production performance indicator definitions, including aspects of sustainability and energy-efficiency. Techniques such as complex event processing and data stream analysis will compute these indicators on-the-fly to provide effective real-time monitoring. Data mining in combination with OLAP can support problems with diagnosis and resolution. Perceptually efficient visualisations will communicate the production performance indicators to decision-makers in a format which can help reduce cognitive workload and effectively aid improvments of situational awareness.

START	September 2010
DURATION	36 months
TOTAL BUDGET	€12.8 million
EU SUPPORT	59%
EU GRANT ID	FP7-ICT 260111
COORDINATOR	Raik Hartung (SAP AG)

Within the research project, a well-balanced consortium of research centres and academic as well as industry partners provides the ideal opportunity to develop research outcomes proposed in the project. The research partners estimate reductions of over 5% per annum in waste and energy and 10% in time to market if the research prototype is potentially used in the future.

Project coordinator Raik Hartung, SAP AG, said "We believe that manufacturing can be improved by efficiently using all kinds of sensor and machine data. By applying most prominent IT solutions such as real-time business intelligence to the shop floor, information can be generated out of the vast amount of data available. This will help us to detect bottlenecks and gaps and finally leverage the optimisation potential of already-existing productions without requiring big investments."

Project Number 004

KAP
knowledge › awareness › prediction
www.kap-project.eu

PLANTCockpit

Production logistics and sustainability cockpit

The PLANTCockpit research project will focus on defining standard interfaces and a reference model for integrating the most prominent manufacturing processes.

START	September 2010
DURATION	36 months
TOTAL BUDGET	€12.7 million
EU SUPPORT	63%
EU GRANT ID	FP7-ICT 260018
COORDINATOR	Daniela Wünsch (SAP AG)

Numerous methods, systems and tools exist to facilitate production management, optimise resource utilisation and increase process efficiency. With an increasing focus on sustainability, complexity grows even further as production supervisors have to manage energy and materials consumption, carbon footprints and waste output as well as traditional key performance indicators such as process efficiency, use of assets, quality, scrape rate and overall costs. Efforts to find the optimum levels for yield, quality, speed and energy consumption often result in individualised rates for each area, which is far from the ideal.

The 'Production Logistics and Sustainability Cockpit' (PLANTCockpit) research project aims to incorporate existing enterprise resource planning systems, as well as MES (Manufacturing Execution Systems), SCADA (Supervisory Control and Data Acquisition) and special-purpose solutions. They provide the integration of visibility and process needed to be able to actually identify potential and optimise intralogistics processes with respect to yield, quality, energy consumption and other such indicators.

The project team's vision is to offer PLANTCockpit to manufacturing communities as the central environment for monitoring and controlling all intra-logistical processes. The research project aims to supply production supervisors, foremen and line managers with the required visibility to make well-informed decisions for optimising plant processes.

PLANTCockpit plans to provide a model for integrating heterogeneous shop floor management systems, including enterprise resource planning, condition-based maintenance, energy management and other special-purpose systems. It will focus on defining standard interfaces and a reference model for incorporating the most prominent manufacturing processes. Current shop floor integration standards, such as ISA 95, OAGIS, OPC Unified Architecture and MTConnect will be used as starting points. The consortium includes world-leading system providers, influential academic partners and prominent end-users.

Project Number 005

PLANTCockpit
Production Logistics and Sustainability Cockpit

www.plantcockpit.eu

RoboFoot

Smart robotics for high added value footwear industry

This project aims to introduce robots into the production process for footwear to improve productivity in the footwear sector.

Currently, robots are underutilised in the footwear sector, unlike in the automotive, food and metal processing industries. Most shoes are still made by hand. Thus far, only technical shoe producers have introduced robots as an aid in the injection moulding process, but the scope for using robots is far wider. Introducing robots into the footwear industry will help overcome current complexities in process automation, which sometimes lead to shorter than necessary production runs.

The project will incorporate six operations to test when and where robots should be introduced. They will be used in three prototypes to be scheduled throughout the project so that the industry becomes aware of the potential applications and benefits of robotics from the outset.

Although the main aim of this project is to improve productivity by means of the introduction of robotics, further jobs will be created around this, as the introduction of new machinery requires the presence of highly-skilled workers and will also create job opportunities in the area of maintenance and upkeep.

START	September 2010
DURATION	30 months
TOTAL BUDGET	€3.7 million
EU SUPPORT	69%
EU GRANT TD	FP7-ICT 260159
COORDINATOR	Iñaki Maurtua (Tekniker-IK4)

The consortium has ten members from three different countries across the European Union who started work on the project together in September 2010.

In pursuit of these objectives, the consortium aims to develop:

- New strategies and devices for flexible parts which allow shoes to be grasped, packaged and handled in a way that does not damage them.

- Sensor-based robot programming and control tools which use information from the CAD system and available sensors for visual serving (a technique to control the movements of the robot based on information extracted from images), which allows flexible robotic applications to be programmed easily.

- An overhaul of shoe production processes for robot-assisted manufacturing and assembly in areas such as selective heating, inspection and packaging.

Project Number 006

ROBOFOOT

http://www.robofoot.eu

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TAPAS

Robotics-enabled logistics and assistive services for the transformable factory of the future

This project aims to optimise European production, to prevent manufacturing jobs from migrating to low-wage economies, by breaking new in ground robot-based automation and logistics.

©KUKA

Today's automation and logistics paradigms make it difficult, time-consuming and costly to change the type of product manufactured in a given production line and adjust production levels in response to market shifts.

Compounded by current market uncertainties, it becomes more difficult to justify new automation lines being added to the overall production chain. To avoid a consequent shift in manufacturing to low-wage economies, TAPAS will make it possible for future factories to engage in more effective and streamlined production, regardless of changes in volumes and product type.

To do this, TAPAS will focus on the following tasks:

- Development of mobile robots with arms to make logistical tasks more flexible by collecting, as well as transporting, the parts needed at any given time and delivering these to their relevant locations.

- Automation of assistive tasks which naturally build on logistical tasks, such as preparatory and post-processing work, e.g. pre-assembly or machine tending with inherent quality control, since the simple movement of parts around the shop floor does not generate value in itself.

Through this additional creation of value and faster adaptation to changes, with tasks being completed in a shorter time, TAPAS will yield much earlier returns on investment and as such deliver better results.

To fulfil these aims, the project consortium will test and validate the above developments with two pilot installations of increasing complexity and scale. The consortium partners are made up of a robot manufacturer and a systems integrator, who will provide their production environments for testing and validation to take place, and one software technology provider. In collaboration with three research partners, they will develop logistical and assistive robotic solutions for transformable automation which are applicable across the board.

Project Number 007

START	October 2010
DURATION	42 months
TOTAL BUDGET	€5.2 million
EU SUPPORT	65%
EU GRANT ID	FP7-ICT 260026
COORDINATOR	Rainer Bischoff (KUKA)

QCOALA

Quality control of aluminium laser-welded assemblies

The QCOALA project will develop a new dual-wavelength laser processing system for welding thin-gauge aluminium and copper of 0.1mm to 1.0mm in thickness, with integrated process monitoring and in-line non-destructive inspection.

START	September 2010
DURATION	36 months
TOTAL BUDGET	€3.9 million
EU SUPPORT	67%
EU GRANT ID	FP7-ICT 260153
COORDINATOR	Geert Verhaeghe (TWI)

The development of the QCOALA laser processing system will mean that testing is carried out so that parts are not tested until breaking point. It will also provide a reliable, high-speed, low-cost and high-quality joining solution for electric car battery and thin-film photovoltaic cell interconnections.

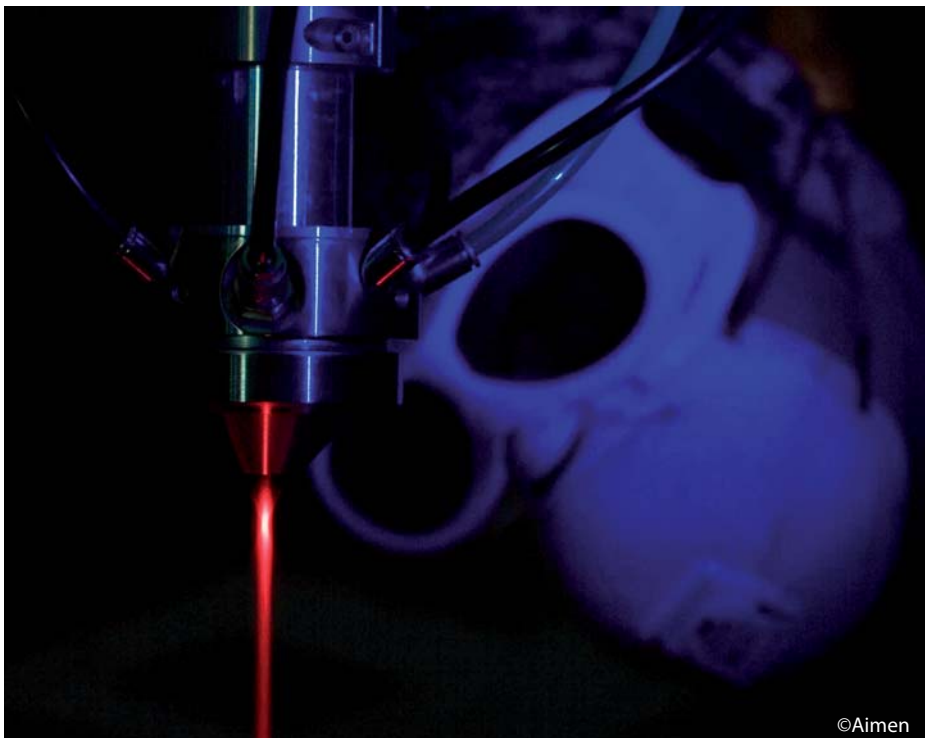
Through fully integrated process ICTs and statistical process control, the new system will facilitate in-line quality control, as well as a higher level of automation in manufacturing and thereby achieve higher yield and throughput for both of these high-in-demand applications.

This project will help the consortium partners to increase their annual turnover to the order of between 15 and 25%, productivity between 50 and 100% and yield by 2 and 10%.

The new laser processing system will be based on a pulsed platform, capable of laser pulses in the range of micro seconds to milli seconds and pulse energies of up to tens of joules able to generate both near infra-red and green wavelength through a dual-wavelength beam scanner. Real-time temporal pulse control will be developed to allow close-loop control of the monitored process. The fully-integrated system will produce continuous (i.e. not sample-based) inspection rates, 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, environmentally-friendly and agile manufacturing, through the feedback of in-line information into the production line relating to monitoring and inspection, allowing for process control and continuous quality improvement, as well as waste reduction. Whereas the aim of the project is to produce smarter and more energy-efficient manufacturing, the applications addressed in the project are categorised in the green, 'alternative' energy market.

Project Number 008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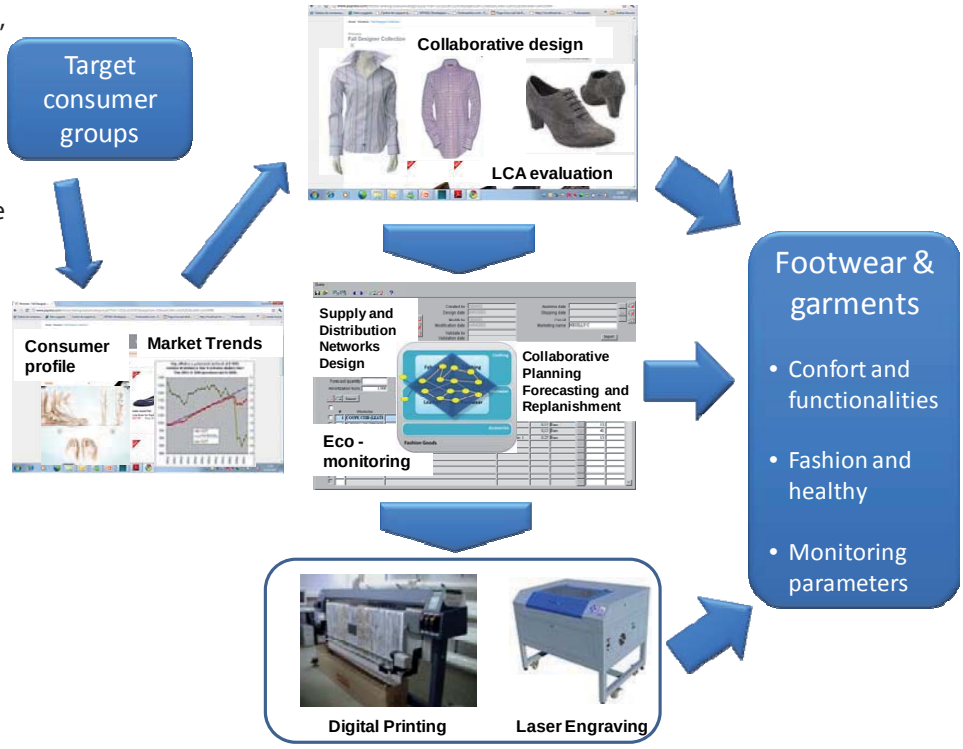
CoReNet

Customer-oriented and eco-friendly networks for healthy fashionable goods

CoReNet aims to support the production of clothes and footwear for the elderly, diabetic, obese and the disabled which are affordable, fashionable and eco-friendly.

Adopting the CoReNet framework, based on methods and tools for cost-efficient collaborative networking, the European textile, clothing and footwear industries will be able to provide small series of customised fashionable goods for these groups by keeping products digital for as long as possible, thus delaying production so as to be able to produce goods on demand. This has the effect of boosting efficiency and reducing waste, thus positively impacting the environment.



The most important elements of the project are:

• A reference model, which enables sustainable and collaborative supply networks to address, orient and coordinate organisational, technological and knowledge management issues.

• Web virtualisation systems which enable the production of healthy clothes and shoes to take place within design environments which are both collaborative and productive.

• Coordination of the supply networks for process configuration, forecast and planning for stock replenishment, real-time control and tracking and tracing, including the use of sustainability benchmarks.

• Innovations in production processes related to customisation via the adoption of rapid manufacturing technologies for optimised digital printing and laser engraving.

The consortium is strengthened by a large commitment from SMEs in the European textile, clothing and footwear industries, as it includes important actors in the value chain, from technology providers, component suppliers and manufacturers. Within CoReNet, all partners in the production process will be able to work together to add value, with the consumer in the driving seat. CoReNet's methods and tools will allow design changes to be made rapidly and production processes to be adapted seamlessly so as to enable rapid yet durable customisation.

CoReNet's results will be tested in industrial plants, demonstrating the full potential of this approach, which is based on sustained collaborative networking.

START	June 2010
DURATION	36 months
TOTAL BUDGET	€5.1 million
EU SUPPORT	69%
EU GRANT ID	FP7-NMP 260169
COORDINATOR	Nicola Magaletti (TXT)

www.corenet-project.eu

Project Number 009

e-CUSTOM

A web-based collaboration system for mass customisation

e-CUSTOM aims to bridge the gap between mass production and mass customisation, engaging the customer in the initial design of the products and realising the manufacturing of these personalised added-value products in a novel, coordinated, eco-friendly and efficient decentralised approach.

Mass production no longer seems suitable for today's market and is being replaced by mass customisation. The need to satisfy an individual customer's requirements is now stronger than ever. Customers require that the product they buy fulfils their personal requirements in an individualised way.

The e-CUSTOM project aims to overcome the challenges faced by European manufacturers by developing innovative approaches, making possible to prepare unique product designs, manufacture these products and communicate them on a mass basis. The innovative approach of e-CUSTOM supports the higher alignment of production with customer demand, while shortening design time for personalised products by up to 15%.

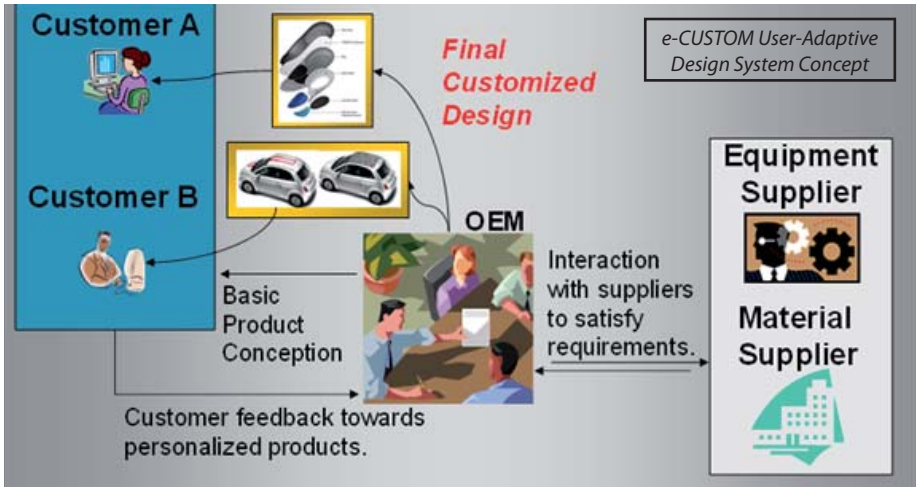
The e-CUSTOM consortium contains partners from industry, research institutes and universities, with expertise in the execution of RTD projects and a strong commitment to cooperate and deliver European manufacturing companies with the best possible project results.

The partners will attain a set of scientific and technical objectives, classified in accordance to the four Pylons of the project:

• Pylon I: User Adaptive Design System (UADS). Objectives focus on the development of user friendly design tools to allow customers to perform unique design changes on their order in a controlled way.

• Pylon II: Decentralised Manufacturing Framework (DEMAP). Technological objectives are based on the decentralised production concept that e-CUSTOM promotes. Following the design of highly customised products from Pylon I, the required supply and manufacturing schemes for production will be generated and verified by the developments of Pylon II.

• Pylon III: Environmental Assessment Module. The environmental impact of the schemes generated in Pylon II are critical. e-CUSTOM will develop the required tools and metrics for the evaluation of the alternative schemes. These tools will be supplemented by advanced Knowledge Management techniques so that the generated knowledge can be systematically re-used in future projects.



www.ecustom-project.eu

START	June 2010
DURATION	36 months
TOTAL BUDGET	€4.5 million
EU SUPPORT	68%
EU GRANT ID	FP7-NMP 260067
COORDINATOR	George Chryssolouris (University of Patras)

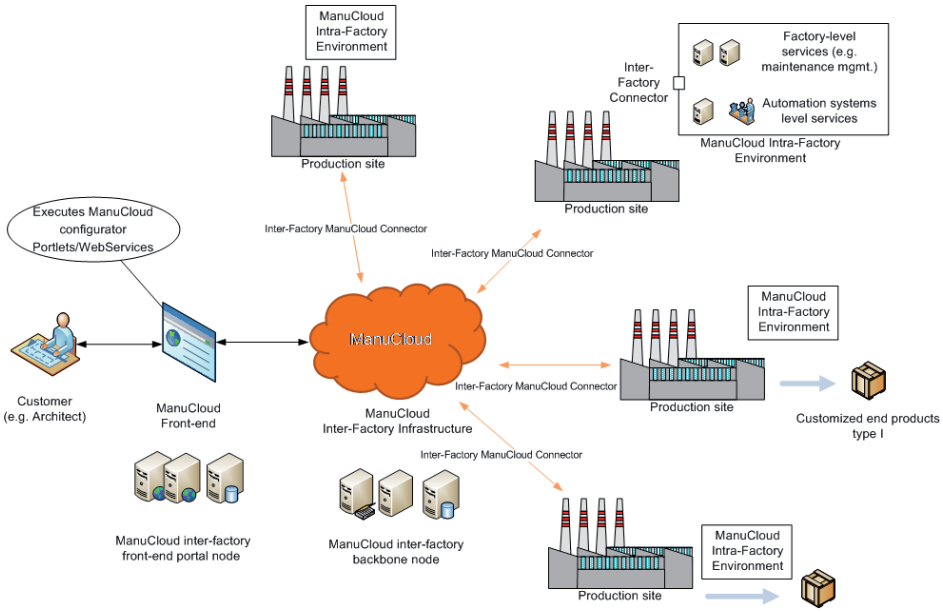
• Pylon IV: Network Infrastructure and Integration. Pylon IV focuses on creating the required infrastructures in terms of networks and ICTs for the standardisation of data exchange, synchronous and asynchronous cooperation and communication among individuals and user groups, efficient administration of personalised data files, automated generation of supplying schemes and evaluation of alternative ones.

These innovations are estimated to reduce energy consumption by approximately 5%-10%, transportation costs by up to 20%, the cost of raw materials by roughly 5%-10% , time-to-market by up to 15% and delivery time by approximately 15%-20%, thus resulting in an increase of market share by up to 10%. **Project Number 010**

ManuCloud

ManuCloud: The next-generation manufacturing-as-a-service (MaaS) environment

The objective of the ManuCloud project is the development of a service-oriented ICT environment as a basis for the next level of manufacturing networks by enabling production-related inter-enterprise integration down to shop floor level. Industrial relevance is guaranteed by involving industrial partners from the organic photovoltaic, organic lightning and automotive supply industries.



START	August 2010
DURATION	36 months
TOTAL BUDGET	€5.1 million
EU SUPPORT	70%
EU GRANT ID	FP7-NMP 260142
COORDINATOR	Matthias Meier (Fraunhofer)

The transition from mass production to personalised, customer-oriented and eco-efficient manufacturing is considered to be a promising approach to improve and secure the competitiveness of the European manufacturing industries in the future, which constitute an important pillar of the European prosperity. One precondition for this transition is the availability of agile ICT systems supporting this level of flexibility on the production network layer on the one hand and on the factory and process levels on the other hand.

The project ManuCloud has been setup with the mission to investigate the production-ICT related aspects for this transition and to develop and to evaluate a suitable ICT infrastructure to provide better support for on-demand manufacturing scenarios, taking multiple tiers of the value chain into account. On this path, ManuCloud seeks to implement the vision of a cloud-like architecture concept. It provides users with the ability to utilise the manufacturing capabilities of configurable, virtualised production networks, based on cloud-enabled, federated factories, supported by a set of software-as-a-service applications.

Two major ICT-related R&D focal points have been selected for the project. The intra-factory environment is comprised of production-related ICT systems within a single factory which lays the foundation to connect the factory into the inter-factory environment. A layer above the automation systems will support service discovery, management and orchestration, allowing for quick development and deployment of new factory-level services. The implementation of automation system services will be integrated with the engineering process for these systems. The inter-factory environment serves as a market place for virtualised manufacturing services, and supports the dynamic, on-demand interconnection of multiple factories for specific purposes. It will provide facilities for joint specification management, shop-floor data transfer, high level of traceability and distributed quality management.

A front-end system will support the dynamic configuration of virtual production networks and provide interfaces for product configurators, which are supported by a product design & manufacturing advisory subsystem.

Furthermore, the project aims to develop configurable organic photovoltaic and lighting products and corresponding virtual value chains on top of the ManuCloud infrastructure.

Project Number 011

ManuCloud

www.manucloud-project.eu

Micro-Dress

Customised wearable functionality and eco-materials extending the limits of apparel mass customisation

The main objective of Micro-Dress is to extend the limits of feasible customisation for men's and ladies' garments to include, for the first time, user-controllable wearable functionality and user-selectable degree of material eco-friendliness.

The challenges related to the production of new customisation features will be researched within a framework based on two distinct business and supply chain models. On the one hand Micro-Dress will introduce mechanisms to expand the existing mass customisation model of a major international brand, while on the other, to extend an innovative mass-customisation model known as 'micro-factories' which targets innovative SMEs.

The scientific and technological objectives of the Micro-Dress project are:

- To develop rapid manufacturing techniques to be able to directly write onto the fabric and produce microelectronics components directly woven into the articles themselves.

- To derive eco-efficiency and eco-logistics-related algorithms and web-tools, allowing user- configurable eco-certification based on information relating to materials and processes along the supply chain (yarn to garment).

- To develop a new biosensor-based screening test able to revolutionise the process of screening certain garment components created to address specific issues relating to consumer health (fabrics, accessories, etc).

- To develop an e-supply chain management platform to model the sourcing of e-devices and the concept of configurable eco-certification along the two supply chains (vertical brand chain and the supply network of micro-factories).

Project coordinator Konstantina Papachristopoulou said: "Micro-Dress will strive to extend the limits of apparel mass customisation. This will be achieved by providing the consumers the ability to select their own customised garments to include extended functionality added by micro-devices and also to be manufactured by fabrics with the customers' desired degree of eco-efficiency."

To support the Micro-Dress vision for the two selected business models, an e-supply chain management platform will be built on the principle of Software-as-a-Service in order to maximise its usability. The results will be demonstrated via two pilot schemes, one focusing on user-configurable eco-certification, the second on the customisable attachment of e-devices.

The project brings together a multidisciplinary consortium of nine partners, of which five are SMEs, two are prominent European institutes and two are leading textile and clothing groups.

Project Number 012

START	September 2010
DURATION	36 months
TOTAL BUDGET	€4.0 million
EU SUPPORT	72%
EU GRANT ID	FP7-NMP 260113
COORDINATOR	K Papachristopoulou (ATC)

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Phocam

Photopolymer based customised additive manufacturing technologies

Developing integrated lithography-based additive manufacturing systems which will, for the first time, facilitate the processing of photopolymer-based materials for the factory of the future.

Phocam aims to develop innovative lithography-based additive manufacturing systems which will facilitate the processing of photopolymer-based materials in the new factory environment. It will bring together industrial expertise and knowledge in the fields of supply chain and quality management, software development, photopolymers and ceramics, high-performance light sources, as well as systems integration so as to provide a fully integrated process chain.

The consortium will rely on two main techniques to process radiation-curable materials:

- Digital light processing (DLP) – this will be used to process ceramic-filled photopolymers, which will lead to the production of fully dense ceramic parts at the end of the process chain.

- Two photon polymerisation (2PP), which will be used to create high-resolution structures which have features in the range of 100-200nm.

Both processes will be fine-tuned to reduce system costs, while significantly increasing throughput and reliability. The ultimate goal is to deliver 'first-time-right' strategies for end users.

This will require the development of supply chains with integrated sensors to detect quality. It is hoped that the project will be used in various industries, e.g. on thread guides on textile machinery, ceramic moulds for the manufacture of high-performance turbine blades and finally microstructures for computer tomography equipment.

Lithography-based additive manufacturing technologies are capable of making parts which have excellent surface quality and good feature resolution and which display high precision. With recent developments in the field of ultra-short pulse lasers and light engines based on light-emitting diodes, robust and economical light sources have as such become available.

Project Number 013

START	July 2010
DURATION	36 months
TOTAL BUDGET	€3.6 million
EU SUPPORT	68%
EU GRANT ID	FP7-NMP 260043
COORDINATOR	Jürgen Stampfl (TU Wien)

S-MC-S

Sustainable mass customisation - mass customisation for sustainability

The S-MC-S project aims to help European manufacturing businesses adapt to global pressures by developing methods and innovative enabling technologies for personalised, customer-oriented, eco-efficient manufacturing.

START	May 2010
DURATION	36 months
TOTAL BUDGET	€5.0 million
EU SUPPORT	69%
EU GRANT ID	FP7-NMP 260090
COORDINATOR	Claudio Boer (SUPSI)

The S-MC-S project aims to define and research a new production process called sustainable mass customisation. This is an emerging paradigm which combines the efficiency of mass production with the benefits of customisation. Mass customisation also brings several advantages in terms of sustainability, as goods are produced only as and when necessary and according to precise customer specifications. This reduces waste, thereby significantly reducing energy consumption and cutting manufacturing costs.

There are several reasons why mass customisation is not fully utilised at present. First, there is no real networked environment based on a common strategy or appropriate supply chain to enable mass customisation to take place, nor the specific methodologies and tools to handle its implementation. Second, the evaluation of mass customisation must move beyond assessment of economic factors towards environmental and social considerations, incorporating the dimension of sustainability.

S-MC-S will promote four research pillars in response to this:

- The design and definition of methodologies and tools to manage the growing complexity of products, production and supply chain configurations imposed by mass customisation in networked environments.

- Creation of an assessment model to evaluate the impact of production systems and different supply chain configurations when dealing with customisation.

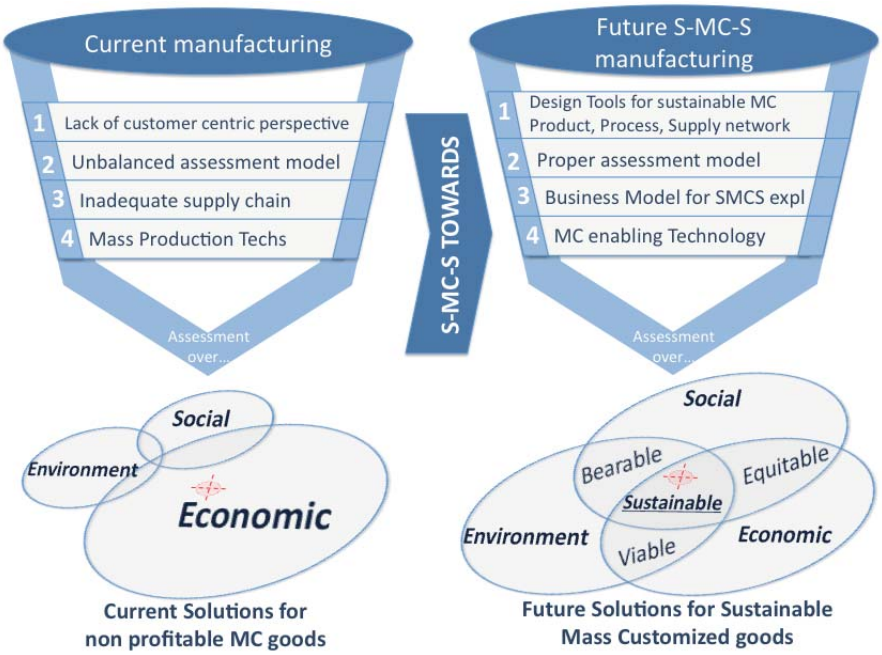
- The drawing up of a business model and definition of the framework and strategies for creating economic, social and ecological values through the systematic implementation of S-MC-S.

- The development of new specific mass-customisation technology, with enhanced on-demand manufacturing capabilities, greater flexibility and faster overall response times. S-MC-S will research pilot mass customisation technologies in three different sectors to support the transition of manufacturing towards sustainable mass customisation production thanks to new developments in rapid small series production.

S-MC-S
Sustainable Mass Customization
Mass Customization for Sustainability

http://smcs.ttsnetwork.net

Project Number 014



AIMACS

Advanced intelligent machine adaptive control system

The objective of AIMACS is to develop active, self-optimising control systems which continuously analyse a wide range of monitored parameters in the machining process and automatically adapt machine operations, thereby enhancing machine productivity.

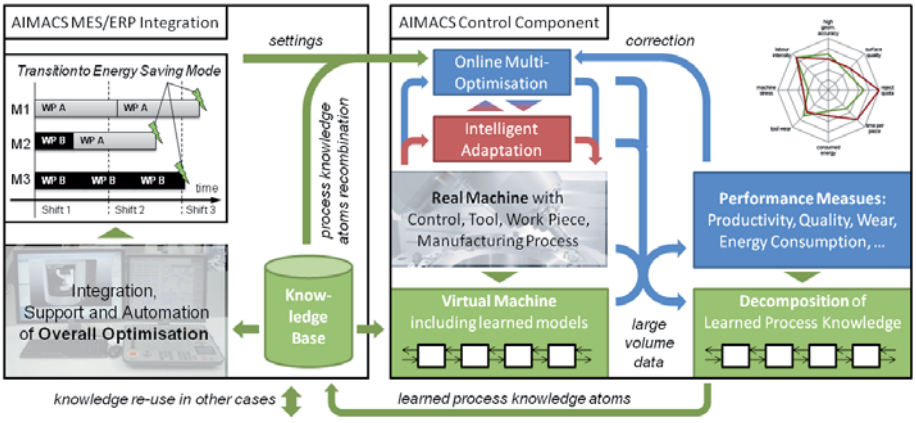
START	August 2010
DURATION	36 months
TOTAL BUDGET	€4.5 million
EU SUPPORT	66%
EU GRANT ID	FP7-NMP 260204
COORDINATOR	Peter Pruschek (DMG Electronics)

Currently, most machines in a manufacturing chain are not running at their peak load and hence deliver a sub-optimal performance. AIMACS will develop reliable techniques for monitoring and online-tuning of machining parameters, while ensuring overload and damages are avoided.

Inefficiencies in current machining practices are caused by operating at basic parameter configurations that are robust towards any possible process. Choosing different parameter sets without extended experience and knowledge can result in instability, machine overloads and consequential damage to tool systems, meaning that disruption to production is frequent and excessive.

As it stands, many projects try to improve the efficiency of production facilities by producing machine components which operate at higher speeds and are less resource-intensive. The added value of AIMACS is that this project will concentrate on generating new methods for efficiency improvements during the use phase, rather than the design phase, increasing the efficiency of existing machines and reducing the need for machines to be replaced, in turn reducing waste.

With the number of machines installed in Europe estimated at more than 1,000,000, the impact of AIMACS on the efficiency and productiveness of domestic European manufacturing will be very considerable. AIMACS aims at improving monitoring techniques for the most critical machining issues, such as load cutting, vibrations and the conservation of energy used in these processes.



Productivity in Europe is compromised at present as process planners, programmers and operators are currently forced to adopt a pre-emptive approach to programming, configuring machines for 'worst case' scenarios. This is because the quality and stability of the machines depends on multiple parameters which change with process conditions such as cutting speeds, degradation of the machine components and the weight, size and material of tools and basic parts.

At present, modifying these parameters manually with a view to enhancing performance would cause considerable overload and put the efficient functioning of the system in serious jeopardy. This in turn would result in frequent disruptions in production, giving rise to productivity losses, energy waste and the need for reinvestment in machinery.

As a plug-and-produce system, AIMACS will be able to be applied to newly-built machines, as well as existing ones to the benefit of a substantial number of large and small players in the European domestic manufacturing industry.

Project Number 015

COMET

Plug-and-produce components and methods for adaptive control of industrial robots enabling cost effective, high precision manufacturing in factories of the future

COMET aims to optimise and control the movement in robots by developing dedicated hard- and software modules combined within an innovative Plug-and-Produce platform. COMET outcomes will improve efficiency and boost productivity in the manufacturing industry.

www.cometproject.eu

The 30 month COMET project aims to overcome the challenges facing European manufacturing industries by developing innovative machining systems that are flexible, reliable and predictable with an average of 30% cost efficiency savings in comparison to machine tools. From a conceptual point of view, industrial robot technology could provide an excellent base for machining being both flexible (due to their lay-out) and cost efficient (robots cost 2-5 times less then machine tools). However, industrial robots lack absolute positioning accuracy, are unable to reject disturbances in terms of process forces and lack reliable programming and simulation tools to ensure right first time machining, once production commences. These three critical limitations currently prevent the use of robots in typical machining applications. COMET will overcome these problems that come with today's industrial robots.

Project Coordinator Jan-Willem Gunnink (Delcam) said: "COMET will fulfil the needs of the manufacturing industry for cost-effective, flexible and effective manufacturing solutions. It is a revolutionary solution which enables the use of industrial robots for high-end machining. The COMET consortium contains a unique combination of partners from industry, research institutes and universities who all have an enormous drive to deliver project results to European manufacturing industries. "

Developments are based on four innovations:

- A methodology for describing kinematic and dynamic models of industrial robots so as to accurately define the static and dynamic behaviour of any industrial robot, which is then represented by its unique signature.

- An integrated programming and simulation environment for adaptive robot path generation for machining with industrial robots.

- An adaptive tracking system for industrial robots to help adjust the robot arm in relation to where it should be according to the initial programmed robot path and make corrections via the robot controller.

- A high dynamic compensation mechanism (HDCM) to achieve accuracy better than 50 micrometres, significantly beyond the structural capacity of the robot system on its own.

These innovations will improve robot accuracy, reduce setup times by 50% and enable precise first time programming and simulation with real-time robot path correction.

The consortium expects to convert the 'proof of principles' from COMET research into commercial solutions (products and services) within 12 months after the project's end.

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Project Number 016

START	September 2010
DURATION	30 months
TOTAL BUDGET	€8.0 million
EU SUPPORT	66%
EU GRANT ID	FP7-NMP 258769
COORDINATOR	Jan-Willem Gunnink (Delcam)

DYNXPERTS

New machine functionalities through the process dynamic stability control

This initiative focuses on the development of active spindle heads and smart fixturing so as to offer a new generation of adaptive plug and produce components for the factories of the future.

Current machine tools are complex mechatronic structures full of sensors and drives where control laws are implemented. However, these measurement and action points are usually far away from the cutting zone and frequently the actuation bandwidth is not wide enough to avoid self excited vibrations and assure a proper dynamic behaviour.

The DYNXPERTS project will overcome these limitations introducing plug and produce actuators and sensors as close as possible to the machining point.

This initiative will focus in the development of active spindle heads and smart fixturing, proposing a new generation of adaptive plug and produce components. Such components will be able to improve the dynamic behaviour of machine tools in different senses and will increase their productivity introducing new functionalities on existing production equipment.

The project consortium will pursue four innovative plug and produce devices:

- A new concept of spindle head for heavy roughing operations: The so called 5 Functions Active Inertial Spindle Head, with the capability to calibrate machine dynamics, to estimate if a process may lead to an unstable response, to efficiently damp harmful vibrations, to monitor the state of the mechanical elements of the head and to feed the acceleration of the head to the control system.
- An innovative spindle head for High Speed Machining: The 5 Functions Magnetic Active Spindle Head, featuring the aforementioned five functionalities but for high speed machining operations.
- A new component for the automatic, intelligent and optimised introduction of the stability charts and process parameters into the production lines.
- New magnetorheological fixtures based on an active damper and clamping systems.

Project coordinator Dipl. Eng. MSc Joseba Perez Bilbatua from IDEKO-IK4 Research Centre said that "the DYNXPERTS project will mobilise resources from 11 partners from 5 countries, with a strong industrial involvement in the project. This strong industrial drive will ensure that DYNXPERTS meets the requirements of end users and results exploitation, as well as increasing the competitiveness of European machine tool OEM companies ."

Project Number 017

START	July 2010
DURATION	36 months
TOTAL BUDGET	€5.2million
EU SUPPORT	66%
EU GRANT ID	FP7-NMP 260073
COORDINATOR	Joseba Perez Bilbatua (IDEKO IK-4)

www.dynxperts.eu

HARCO

Hierarchical and adaptive smart components for precision production systems application

The HARCO project aims to achieve cost-effective structural solutions consisting of a new class of smart components based on plug-and-produce modular adaptronic devices which integrate smart and multifunctional actuators and sensors capable of performing a wide array of multiple functions.

HARCO will help to produce stiff, light and well damped structures with fully and deeply integrated new adaptronic devices based on electromechanical and electronic devices, measuring systems, sensors and actuators. Obtaining more intelligent and cost-effective solutions is essential for meeting performance targets in machines, and will bring enormous benefits in the design and development of machine tools.

Subsequently, the basic idea is to design and develop "fractal" and "hierarchical" elements (not only mechanical hardware but also controllers and software) which can easily be assembled (plugged in) to produce higher level modules and components for active vibration control, thermal compensation and adaptive fixturing in precision machine tool applications.

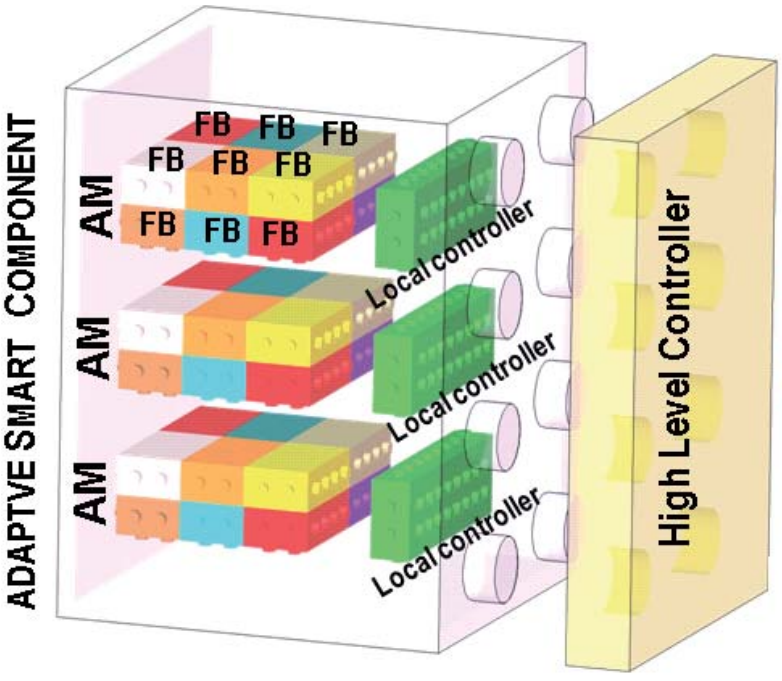
The results will be illustrated through several working demonstrators, such as:

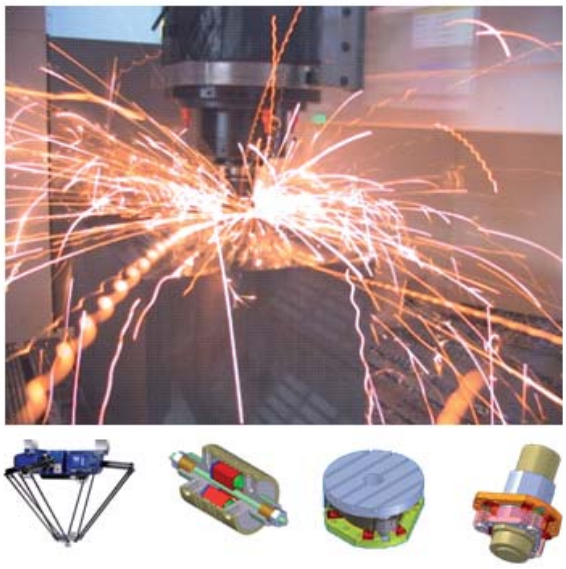
- A serial robot with an active wrist which aims to boost the robot's stiffness to allow it to perform serial robot machining tasks.
- A milling machine equipped with an adaptive table and adaptive spindle which integrates one or more adaptronic active vibration control interface modules. The arrangement is completely modular and scalable to the one related to the spindle.
- PKM Robots based on smart adaptive components (active struts and compact adaptronic joints) in order to drive the mobile platforms, offering a promising alternative for delivering high damping and stiffness, as well as lower weight. The active fibres can be actuated to damp overshoot and oscillation and reduce the robot's settling time.

START	July 2010
DURATION	36 months
TOTAL BUDGET	€5.4 million
EU SUPPORT	72%
EU GRANT ID	FP7-NMP 260051
COORDINATOR	Gian Mauro Maneia (CeSI)

Project Number 018

www.harcoproject.eu.com





LOCOBOT

The toolkit for building low cost robot co-workers in assembly lines

A system which reaches above and beyond what is currently available for those working in the automotive industry: it incorporates a flexible robotic assistant platform to support and increase manual production processes, as well as the engineering tools required for its setup. Further, this project aims to improve the ergonomics in industrial production processes.

LOCOBOT will develop a toolkit for low-cost robots built from a set of plug-and-produce kinematic modules with compliant yet precise actuators and intelligent sensors for man-machine cooperation. The toolkit will provide higher flexibility, adaptiveness and scalability, all of which are required to meet the challenges faced by manufacturing in the 21st century.

Key players in the automotive industry, along with the manufacturers of automation modules and components, as well as high-tech SMEs, are supported by a group of high-quality researchers in solving the project's technical challenges.

Production in the automotive industry is faced with the challenge of high numbers of variants. A robot co-worker will substantially enhance efficiency by cooperating with people and greatly reduce the need for heavy lifting.

The need to enter the market early, with reasonably priced vehicles, while increasing production, has to be met by new production technologies such as those developed at LOCOBOT.

LOCOBOT goes far beyond most available systems as it is safe, low-cost and tailor-made, complying with the end-user's need to produce greener, more customised and higher-quality products for their industry.

Stemming from its increased flexibility and efficiency, the immediate impact (2-5 years) of LOCOBOT will be about €150 million in savings. This will be 10 times as much in the following years, depending on how the production numbers of the e-vehicle evolve.

Three major objectives will be addressed:

- Development of a modular plug and produce robotic assistant platform in which the robot will consist of a set of lightweight, compliant kinematic modules built on a mobile platform.

- Reconfiguration of adaptive control for plug-and-produce components to avoid costly reprogramming and setup procedures for control algorithms and software. Control algorithms need to be adaptive and self-optimising to account for the different kinematic structures, deal with oscillations induced by the mobile platform and achieve precise positioning.

- Intelligent sensing and actuating structures, for which the robot will be equipped with a stereo camera system and audio components to obtain and process audiovisual information, so that it can learn to cooperate with human workers.

Project Number 019

locobot
low cost robot co-workers

www.locobot.eu

START	August 2010
DURATION	36 months
TOTAL BUDGET	€5.3 million
EU SUPPORT	70%
EU GRANT ID	FP7-NMP 260101
COORDINATOR	Andreas Pichler (Profactor)

PopJIM

Plug and produce joint interface modules

PopJIM creates an innovative solution to performance limiting problems by incorporating a self-configuring and optimising mechatronic module (a Joint Interface Module, or JIM) alongside a wireless network. It is based on a novel concept through which the dynamic stiffness of the machine is controlled to maintain process stability, rather than changing the process parameters.

START	September 2010
DURATION	48 months
TOTAL BUDGET	€4.4 million
EU SUPPORT	74%
EU GRANT ID	FP7-NMP 260048
COORDINATOR	Claudia Hakanen (KTH)

Traditionally, dynamic instability in a machining process is controlled by tuning the process parameters to match with the inherent dynamic characteristics of the machine tool structure which often results in lowering the rates of production.

The novelty of the JIM concept is that, instead of changing the process parameters, the dynamic stiffness of the machine tool is controlled to maintain the process stability. The distributed wireless configuration and control network enables plug and produce capability and decentralised control of JIMs through a wireless communication network. This development is essential for achieving modularity and plug and produce capability for JIM-based machine tools. Controlled design of JIMs allows the dynamic behaviour of the machine tool to be predictable with more accuracy.

The mechatronic design of the JIM includes an integrated control system and embedded intelligence which enable to be self-adaptive for optimising the dynamic stiffness within its design range during a machining process. The results of research and development work will be demonstrated in industrial context and there is a dissemination and exploitation activity to reach out potential stakeholders.

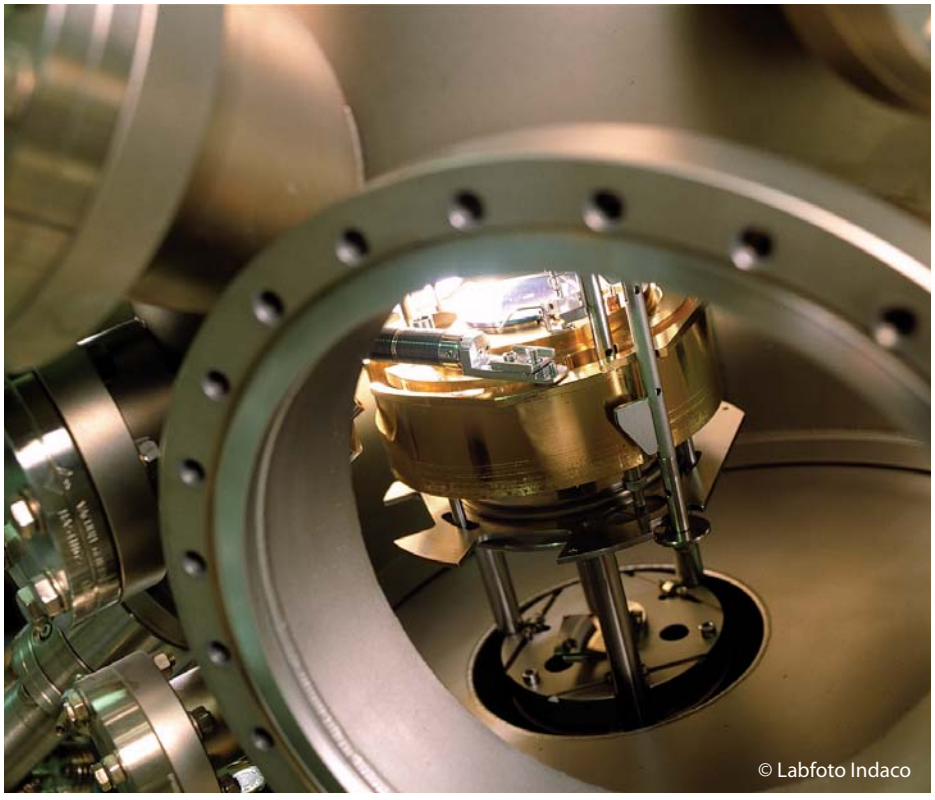
PopJIM identifies critical performance limiting problems in machine tool design and use.

The project idea is based on two crucial innovative solutions:

- Replacing conventional machine tool structural joint interfaces by a self configuring and optimising mechatronic module called Joint Interface Module, JIM, made of functional materials and

- A wireless network consisting of these modules and a machining process proxy to enable adaptive control and plug and produce capability to the JIMs. JIMs are designed to adapt the dynamic behaviour of a machine-tool during its interaction with the cutting process.

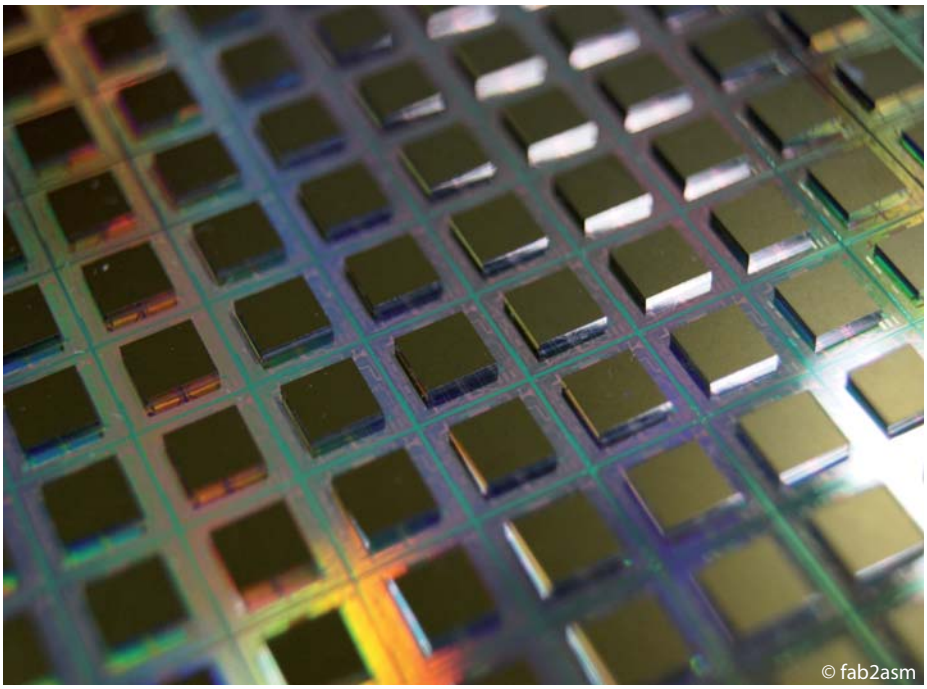
Project Number 020



FAB2ASM

Efficient and precise 3D integration of heterogeneous microsystems from fabrication to assembly

The FAB2ASM project will develop a new manufacturing technology for the 3D integration of microelectronics and microsystems. It aims to fulfil an urgent need of the industry in 3D integration to bridge the gap in technology which currently exists



3D integration is a rapidly emerging technology which vertically stacks and interconnects multiple materials, technologies, and components to form micro- and nanosystems for applications such as implantable medical devices, intelligent sensors and the radio frequency devices found in mobile phones.

3D integration is a very promising area of technological development and shows huge economic potential. This state-of-the-art technology relies on robotic pick-and-place machines and machine vision, which cannot be both fast and accurate at the same time. If high precision, e.g. a micrometer is needed, the cycle times for integration can be very considerable.

The FAB2ASM project will overcome these limits by marrying traditional robotic tools with the physics of self-alignment, where tiny chips will align owing to the surface tension of the liquid or other physical forces.

START	May 2010
DURATION	36 months
TOTAL BUDGET	€7.1million
EU SUPPORT	66%
EU GRANT ID	FP7-NMP 260079
COORDINATOR	ZhouQuan (Aalto Korkeakoulusaatio)

FAB2ASM will develop a technology which not only reuses most of the industrial process steps but also improves the performance of the integration process in terms of precision and efficiency. It will allow the handling of small (100 µm) and/or thin dies (20 µm) and ultra high-speed assembly.

It will improve the competitiveness of European nano- and µ-manufacturing by going beyond state-of-the-art integration technology. The partners in the consortium represent a major share of European industry in nano- and micro manufacturing. With the results of FAB2ASM, the project is expected to improve the market share in microsystem devices by up to 5%.

In contrast to many other new technologies, which use a totally different process than that of the current industrial base, FAB2ASM technologies are able to preserve the current investment from industry and re-exploit a great deal of technological know-how.

FAB2ASM will provide technology which enables innovative products to be produced competitively, while counterbalancing the trend of outsourcing production to low-wage economies.

Project Number 021

fab2asm
from fabrication to assembly
www.fab2asm.eu

Femtoprint

Femtosecond laser printer for glass microsystems with nanoscale features

Femtoprint will develop a printer for microsystems which can produce three dimensional patterns with nano-scale features in glass material using a low-power femtosecond laser beam. With increasingly efficient technologies, the scope of this project is foreseen to expand to the benefit of multiple commercial and industrial sectors.

START	May 2010
DURATION	36 months
TOTAL BUDGET	€3.4 million
EU SUPPORT	FP7-NMP 260103
EU GRANT ID	73%
COORDINATOR	Yves Bellouard (TU/e)

www.femtoprint.eu

The aim of Femtoprint is to develop a printer for microsystems with nano-scale features, so as to give a range of users from industry, research institutes and universities the ability to produce their own micro-systems rapidly and without the need for expensive infrastructure and specialist knowledge.

Recent research has shown that it is possible to form three-dimensional patterns in glass material using low-power femtosecond laser beams. The patterns produced are used to form integrated optics components or three-dimensional structures such as fluidic channels and micro-mechanical components. This simple manufacturing process opens avenues for a broad variety of microsystems with nano-scale features.

Thanks to the low amounts of energy required to pattern the glass, it is enough to use femtosecond lasers consisting of only one oscillator to produce these micro- and nano-systems.

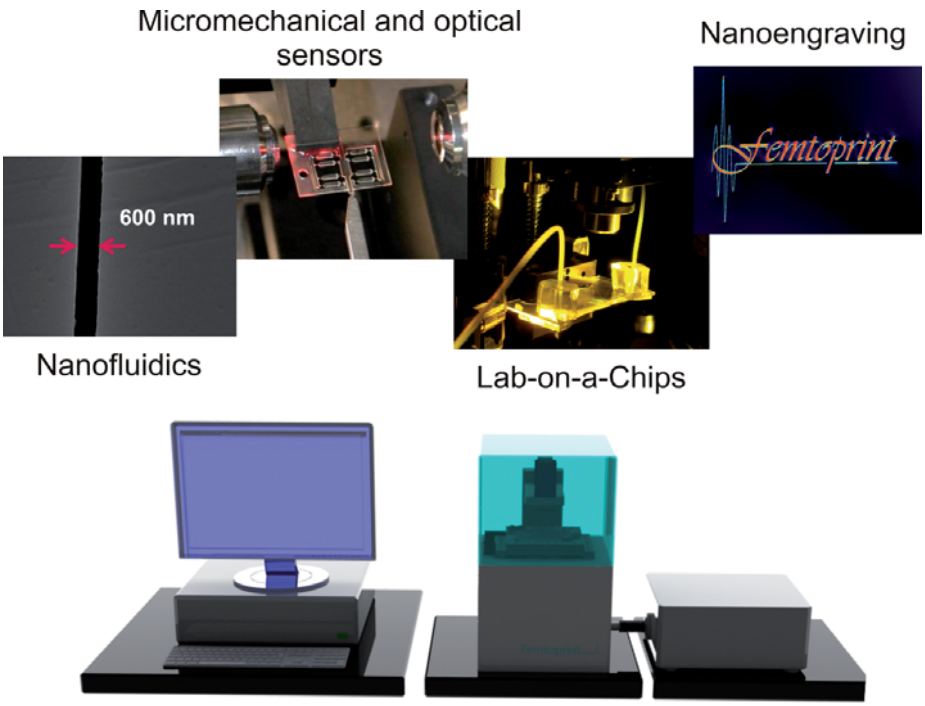
Nowadays, these systems are of table-top size and cost a fraction of the price of conventional clean-room equipment. It is even foreseeable that within three to five years, they will be small enough to fit inside a shoebox.

A clear outcome of Femtoprint will be the commercialisation of the 'femtoprinter' through the creation of a consortium spin-off. Potential economic impacts are considerable and expected to benefit various industrial sectors such as the biotechnologies, telecommunications, precision industries, microsystems and electronics industries.

The project team will pursue three main objectives:

- Development of a femtosecond laser which is suitable for glass that can be manufactured on a micro/nano scale.
- Incorporation of the laser into a machine similar to a printer which is able to position and manipulate glass sheets of various thicknesses.
- Demonstration of the printer's ability to generate a variety of micro/nano-systems with optical, mechanical and fluid-handling capabilities.

Project Number 022



IMPRESS

Flexible compression injection moulding platform for multi-scale surface structures

The IMPRESS project aims to develop an injection moulding platform to produce plastic components with micro or nano-scale functional features.

Impress will combine up-to-date and advanced facilities based on three main modules: a tool-manufacturing module, which involves different technologies for micro-nano direct manufacturing, an injection-moulding module, including equipment fitted with up-to-date hardware, and an intelligence module which is dedicated to advanced process control and the online integration of measurement tools (known as metrology).

This technology is already used in some restricted sectors of industry, such as the recording media industry (for CDs, DVDs and Blue Ray) and more recently in the production of anti-counterfeit holograms.

At present, technologies which add functions to plastic parts with surface micro or nano texturation only exist in very specific areas. As a result, the plastics industry lacks an overall means of developing new products and bringing them onto the market. In addition, long development cycles, excessive costs and high risk often prevent the industry from moving into the micro/nano area.

The objective of the IMPRESS project is to develop a complete injection moulding system (known as a technology platform) and to extend this so it is able to be used in much wider areas of industry, thereby helping to create new avenues of research for micro- nano-scale manufacturing.

This will significantly reduce time-to-market and bring down mass production costs for high-precision and cost-effective plastic components. Moreover, the platform will be tailored to offer total flexibility, with the aim of addressing a large number of high added value emergent applications in different sectors.

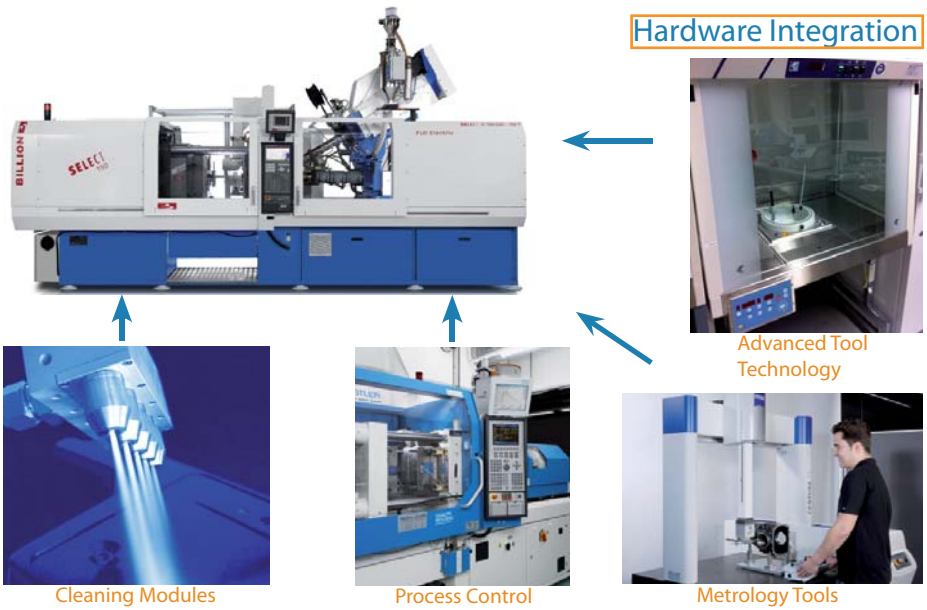
According to project coordinator Mael Moguedet: "All partners appreciated the speed of the PPP funding scheme in finalising the project during the negotiation phase. We were all eager to start the project and I believe this will be of great help in achieving our objectives in good time."

START	May 2010
DURATION	36 months
TOTAL BUDGET	€7.0 million
EU SUPPORT	66%
EU GRANT ID	FP7-NMP 260174
COORDINATOR	Mael Moguedet (PEP)

Project Number 023

IMPRESS

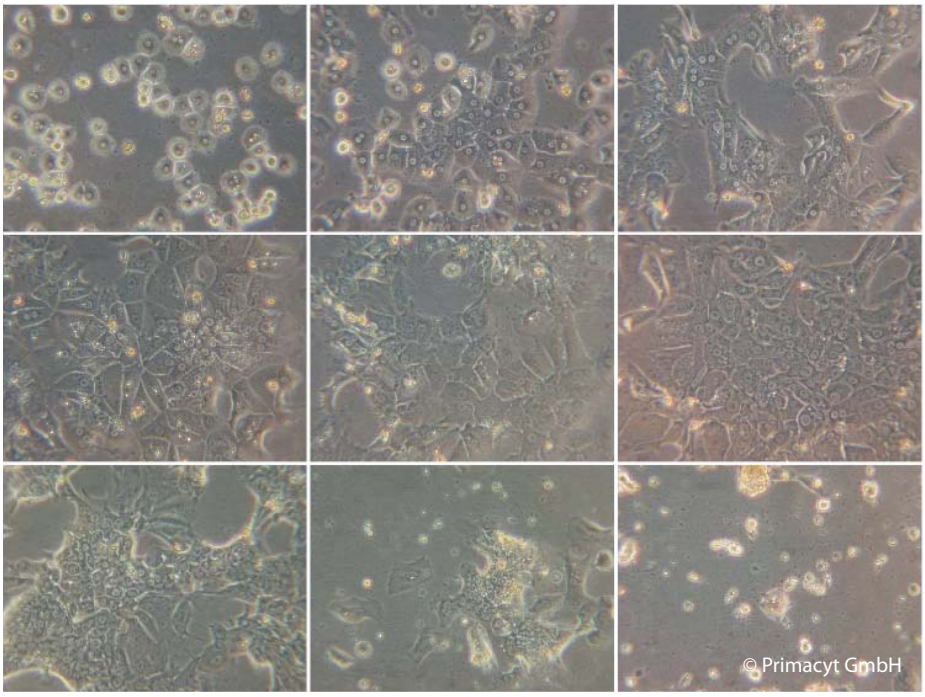
www.impress-fp7.eu



ManuCyte

Self-learning modular manufacturing platform for flexible, patient-specific cell production

The ManuCyte project will focus on the development of an intelligent, modular manufacturing platform for cell production with a view to creating personalised medicine. In particular, it will make cell production tailored to the patient's needs.



ManuCyte

www.manucyte-project.eu

Currently, personalised cell cultivation is only carried out through laboratory-scale manual processing. This makes the process highly dependent on human interaction, reducing accuracy and reproducibility.

To overcome these issues and make the patient-specific cultivation of cells available for a wide range of applications, ManuCyte will develop this technology to boost the efficiency of personalised cell cultivation, with a view to quality, throughput and costs.

Key SMEs and research institutes are at the root of the project consortium and will incorporate their specialisms in their respective fields into the ManuCyte project. Examples of these fields are: liquid handling; cell imaging; cell culturing; software development and automation.

According to project manager Ursula Rauschecker, it is only this close cooperation between organisations operating in different sectors and these various companies pooling their technologies which enable such multidisciplinary projects to get off the ground and be carried through to successful completion.

This objective will be obtained by combining several advanced technologies, such as:

- A modular and scalable plug-in concept for the setup of cell production platforms.
- Cleanroom and sterilisation policies to keep cell cultures free from the risk of cross-contamination.
- A micro-fluidic component which provides cell culture medium specifically customised for each cell culture.
- Bioreactors capable of highly automated processes, as well as the associated incubation component.
- Inline monitoring (monitoring while the process is ongoing) to enable the evaluation of cell status within the production process through optical and biochemical measurement.
- MES (Manufacturing Execution System) with LIMS (Laboratory Information and Management System) functionalities for control of the automation platform, including a self-learning knowledge-based cell behaviour model and advanced cell process control functionalities for self-optimisation of cell cultivation processes.

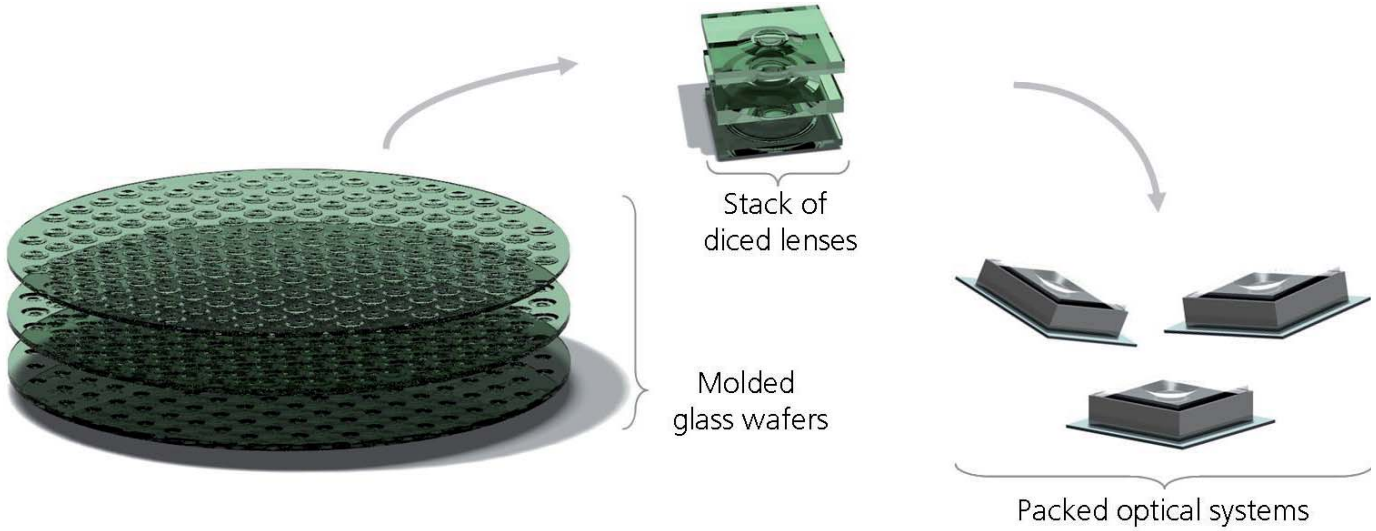
Project Number 024

START	May 2010
DURATION	36 months
TOTAL BUDGET	€4.5 million
EU SUPPORT	75%
EU GRANT ID	FP7-NMP 260100
COORDINATOR	Ursula Rauschecker (Fraunhofer IPA)

WaferLevelOptics

Specific technological developments to create an intelligent and scalable production platform for glass optics manufacturing

WaferLevelOptics stems from the concept of implementing wafer level glass moulding to reproduce micro optics at this level. The project will benefit manufacturing processes where there is both a current need to further miniaturise and produce in larger quantities at the same time.



The WaferLevelOptics project aims to develop precision glass moulding techniques for the replication of micro-optics at wafer level. It is foreseen that the moulding of multiple micro-optics on one glass wafer, stacking these to optical systems, bonding them and then dicing them will become the norm for micro-optics manufacturing in future.

Ongoing miniaturisation and the need for ever-larger quantities are only two issues which have led to a change in glass optics manufacturing within the last decade. Direct manufacturing techniques such as grinding and polishing are no longer able to meet the requirements of micro-optical components, and so precision glass moulding, a replicative approach, has been devised to keep up with technical developments in optics design. Here, a glass gob is formed to the final shape of a lens by applying a moulding process at glass-specific temperatures using ceramic moulds. Thus, a large variety of ultra precise optical elements can be manufactured efficiently from glass.

The incorporation of small micro optical lenses into highly precise optical systems requires innovative solutions. Here, the semiconductor industry is a leading example: the manufacturing of thousands of computer chips on one silicon wafer has brought down manufacturing costs considerably, while lowering the handling complexity and costs of systems integration.

For polymer optics, manufacturing at wafer level is already an established process. As such, thousands of small micro optics can be manufactured on wafers of up to six inches long. Since the technology needed to replicate glass wafers is by far more complex than those used for polymer optics, there currently exists no approach to producing glass micro optics at wafer level.

A European consortium was established to implement the idea of wafer level glass moulding. Ten partners from six different countries across Europe are working together to accomplish all the necessary developments to facilitate the efficient manufacturing of micro glass optics.

Project Number 025

Wafer · Level · Optics

www.waferleveloptics.org

START	October 2010
DURATION	36 months
TOTAL BUDGET	€4.0 million
EU SUPPORT	68%
EU GRANT ID	FP7-NMP 260146
COORDINATOR	Martin Hünten (Fraunhofer)

List of Participating Organisations

A

Aalborg University (TAPAS)

Aalto-Korkeakoulusaatio (FAB2ASM)

ABO Akademi (ManuCyte)

Acciona (PLANTCockpit)

ACP (IMPRESS)

Advanced Clean Production Information Technology (AIMACS, Manucloud, ManuCyte)

AFT Automation und Feinwerktechnik (ManuCyte)

Agoria (ActionPlanT)

Airbus (FoFdation)

Aixtooling GmbH (WaferLevelOptics)

Akeo Plus (e-CUSTOM)

Albert-Ludwigs-Universität Freiburg (TAPAS)

Alma Consulting Group (FAB2ASM)

Amplitude Systèmes (Femtoprint)

Amrc Manufacturing Limited (COMET)

Andrychowska Fabryka Maszyn SA (PoPJim)

Ardeje SARL (Micro-Dress)

Artis Gesellschaft für angewandte Messtechnik Mbh (COMET, FoFdation)

Asco Industries N.V. (AIMACS)

Asociacion de investigacion de las industrias del curtido y anexas (S-MC-S)

Assyst Gmbh A (CoReNet)

Athens Techology Centre (Micro-Dress)

ATOS (KAP)

Audi (AIMACS, Locobot)

Automatica y control numerico (RoboFoot)

B

Bazigos Abee (COMET)

Beam Express (FAB2ASM)

Beckmann Coultier Biomedical (IMPRESS)

Billion (IMPRESS)

BMW (PLANTCockpit)

Brandenburgische Technische Universität Cottbus (COMET, e-CUSTOM)

Budapesti Muszaki Es Gazdasagtudomanyi Egyetem (DYNXPERTS)

C

Cadcamation (FoFdation)

Carl Zeiss (IMPRESS)

Cedrat Technologies SA (DYNXPERTS, PoPJim)

Centre National de la Recherche Scientifique (DYNXPERTS)

Centre Technologique Alphanov (Femtoprint)

Centro Ricerche Fiat (e-CUSTOM, FoFdation)

Ceratizit Luxembourg Sarl (WaferLevelOptics)

CE.SI (HARCO)

Charmilles Technologies (FoFdation)

Chip-Man Technologies (ManuCyte)

Co.Fi.Plast (S-MC-S)

Consiglio Nazionale delle Ricerche (CoReNet, RoboFoot)

Comau (PLANTCockpit, RoboFoot)

Commissariat à l'énergie atomique et aux énergies alternatives (IMPRESS)

Compose Tools (IMPRESS)

Computerised Information Technology Ltd (QCOALA)

Conceria (S-MC-S)

Convergent (TAPAS)

Crospon (IMPRESS)

CSEM (Femtoprint, IMPRESS)

D

Delcam (COMET, e-CUSTOM, FoFdation)

De Montfort University (KAP)

Democenter (COMET)

Deskartes (PhoCam)

Deutsches Forschungszentrum für Künstliche Intelligenz (RoboFoot)

Deutsche Institute für Textil- und Faserforschung Denkendorf (CoReNet)

Deutsches Zentrum für Luft- und Raumfahrt (TAPAS)

Digital Imaging Technologie und Beteiligungs GmbH (PhoCam)

Dmg Electronics Gmbh (AIMACS)

Doehler (PLANTCockpit)

Douëlou Nv (CoReNet)

Dr. Matzat & Co. Gmbh (DYNXPERTS)

Digital Imaging Technologie und Beteiligungs GmbH (PhoCam)

Dmg Electronics Gmbh (AIMACS)

Doehler (PLANTCockpit)

Douëlou Nv (CoReNet)

Dr. Matzat & Co. Gmbh (DYNXPERTS)

DVST (HARCO)

E

Ebner Tec GmbH (PoPJim)

Ecole Centrale de Nantes (FoFdation, S-MC-S)

Ecole Polytechnique Fédérale de Lausanne (ActionPlanT, Femtoprint, FoFdation, PLANTCockpit)

Eidgenössische Materialprüfungs- und Forschungsanstalt (FAB2ASM)

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Ergosft (CoReNet)

ETH Zürich (FoFdation)

F

Fachhochschule Ingolstadt (Locobot)

FerRobotics Compliant Robot Technology (CustomPacker, Locobot)

Festo (Locobot)

Fidia (AIMACS, DYNXPERTS, FoFdation, HARCO)

Fisba Optik AG (WaferLevelOptics)

Flisom (QCOALA)

Fratelli Piacenza S.P.A. (CoReNet)

Fraunhofer-Gesellschaft (ActionPlanT, COMET, HARCO, IMPRESS, ManuCloud, ManuCyte, QCOALA, WaferLevelOptics)

G

Goi-Alde High Speed Slu (DYNXPERTS)

Grundfos AS (TAPAS)

H

Heliatek (ManuCloud)

Heriot-Watt University (Locobot)

Hochschule Regensburg (ManuCyte)

Homag Holzarbeitungssysteme (S-MC-S)

Humboldt-Universitat ZU Berlin (PoPJim)

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IMA TECNO (HARCO)

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Industrielle Steuerungstechnik Gmbh (AIMACS)

Inertia Technology BV (PoPJim)

Inesc Porto (CoReNet)

Infineon Technologies Dresden (KAP)

Institut Français du Textile et de l'habillement (Micro-Dress)

Instituto tecnologico y de estudios superiores de Monterrey (S-MC-S)

Instituto tecnologico del calzado y conexas (RoboFoot)

Intel (KAP, PLANTCockpit)

Intercim (ActionPlanT)

Interuniversitair Micro-Electronica Centrum (FAB2ASM)

ISG-Industrielle Steuerungstechnik (AIMACS)

K

Kaleido Technology APS (WaferLevelOptics)

Karlsruher Institut für Technologie (e-CUSTOM)

Katholieke Universiteit Leuven (HARCO)

Kistler Instrumente AG (IMPRESS)

Kuka (TAPAS)

Kungliga Tekniska Hoegskolan (PoPJim)

L

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Lasag (QCOALA)

Ledon Oled Lighting (ManuCloud)

Lion Calzature (S-MC-S)

Loewe Opta (CustomPacker)

Lunds Universitet (COMET)

LZH Laserzentrum Hannover (PhoCam)

M

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Magyar Tudomanyos Akademia (ManuCloud, ManuCyte)

Manas Spa (CoReNet)

Mecadtron (FoFdation)

Mecanica Mallabi (e-CUSTOM)

Mecartex (Femtoprint)

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Modern Testing Services GmbH (Micro-Dress)

Moldetipo II (IMPRESS)

MRK-Systeme (CustomPacker)

MTA Automation AG (ManuCyte)

N

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NXTCONTROL (ManuCloud)

NXP Semiconductors (FAB2ASM)

O

OMAT Ltd (AIMACS, HARCO)

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Osram Opto Semiconductors GmbH (WaferLevelOptics)

P

Paragon (FoFdation)

PDTEC (e-CUSTOM)

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Precitec (QCOALA)

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Primacyt Cell Culture Technology (ManuCyte)

Profactor (CustomPacker, Locobot, PoPJim)

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QDesign (RoboFoot)

Quintenz Kurt (Femtoprint)

R

Ridgeback (Locobot)

RWTH Aachen University (DYNXPERTS)

Robert Bosch (ManuCloud)

Robotnik Automation (RoboFoot)

Ropardo (S-MC-S)

Rotta (RoboFoot)

Ruhr-Universität Bochum (QCOALA)

S

SAFEL (QCOALA)

SAP AG (ActionPlanT, KAP, PLANTCockpit)

Sension Biolische Detektions-und Schnelltestsystem GmbH (Micro-Dress)

Siemens (FoFdation, PhoCam)

Sillia Energie (IMPRESS)

Sir Spa (COMET)

Solarpro (QCOALA)

Soraluce S. Coop. (DYNXPERTS, PoPJim)

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STMicroelectronics (FAB2ASM)

Strategies (CoReNet)

SUPSI (S-MC-S)

Synesis (CoReNet)

System 3R International AB (WaferLevelOptics)

T

TU Berlin (KAP)

TU Dresden (PLANTCockpit)

TU München (CustomPacker)

TU Wien (Phocam)

TU Eindhoven (Femtoprint)

Technology Transfer System (S-MC-S)

Tecnalia (ActionPlanT, AIMACS, e-CUSTOM, HARCO, KAP, PLANTCockpit)

Tekniker-IK4 (CustomPacker, DYNXPERTS, FoFdation, RoboFoot)

Teks Sarl (COMET)

Thema System SRL(S-MC-S)

Tomorrow Options Microelectronics S.A. (CoReNet)

Trioptics GmbH (WaferLevelOptics)

TTY-SAATIO (PLANTCockpit)

TWI (QCOALA)

Txt E-Solutions Spa (CoReNet)

U

Unicatum GmbH (Micro-Dress)

Universidad del Pais Vasco (DYNXPERTS)

Universita degli studi di Trento (KAP)

Université de Franche Comté (FAB2ASM)

Universiteit Twente (FAB2ASM)

University of Cardiff (IMPRESS)

University of Edinburgh (Locobot)

University of Huddersfield (HARCO)

University of Patras (ActionPlanT, COMET, e-CUSTOM, FoFdation, KAP)

University of Pohang (FoFdation)

University of Southampton (Femtoprint)

University of Strathclyde (ManuCloud)

Universität Stuttgart (AIMACS)

V

VTT (CustomPacker, Micro-Dress, WaferLevelOptics)

Visitech (PhoCam)

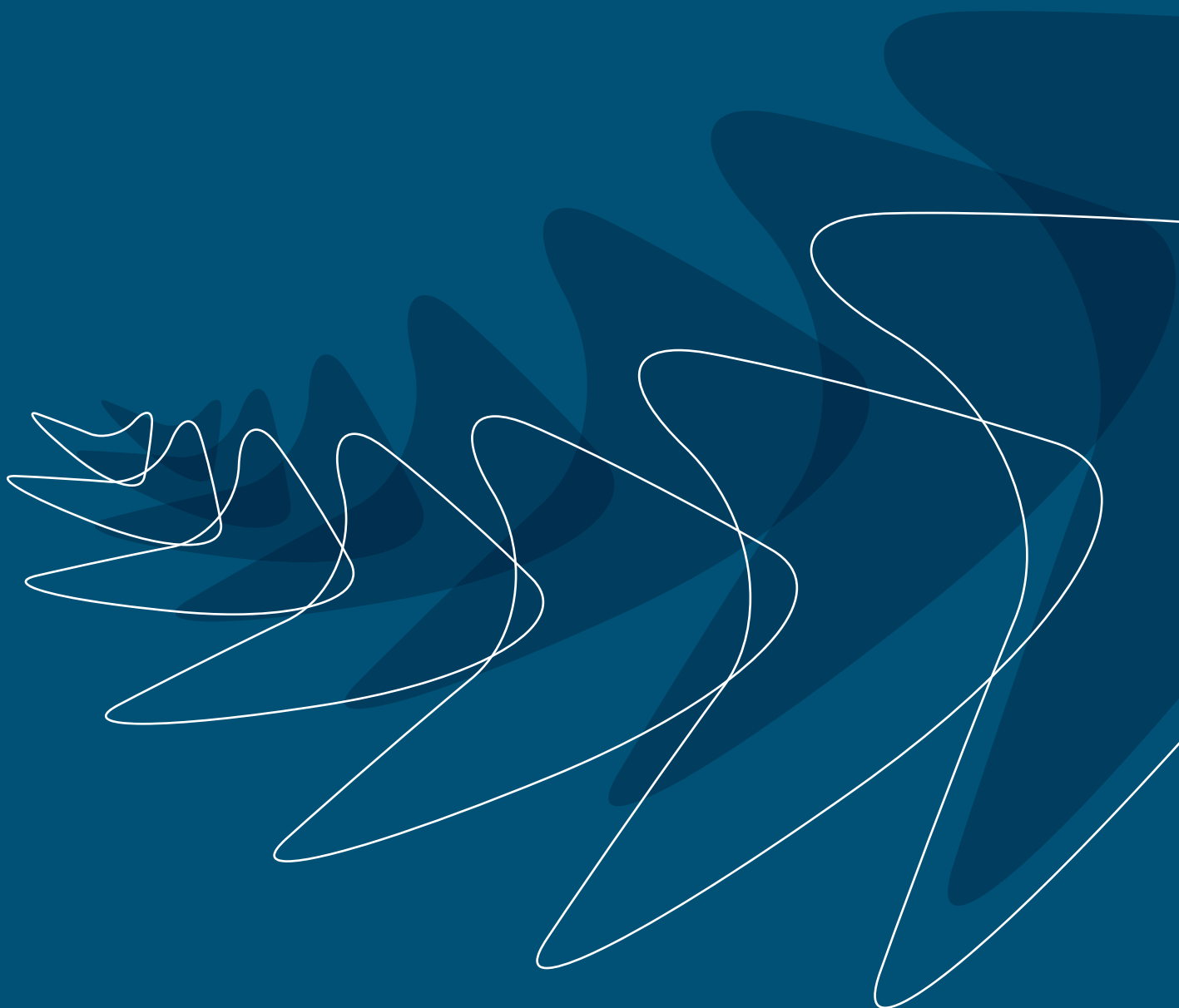
Visual Components Oy (Locobot)

Volvo (KAP)

Volkswagen (QCOALA)

W

Wartsila Finland Oy (AIMACS)



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