

Shaping the Future of Manufacturing – IMS 2020 reveals research and development challenges for the manufacturing industries in the upcoming decade

How do manufacturing companies meet the challenges of global change in their industry? Following the advice of experts, for these companies it is essential to develop new manufacturing strategies based on research and innovation. The international manufacturing sector calls for a deep industrial transformation in order to meet the needed competitive, environmental and social challenges.

The project IMS2020, funded by the European Commission, picks up these challenges. It focuses on the creation of technological and foresight roadmaps towards Intelligent Manufacturing Systems (IMS) in the year 2020. The roadmaps highlight the main milestones of innovation activities (research and development, management and policy actions) needed to achieve the desired vision. "This roadmapping process is a big challenge, but also a great opportunity" says the project leader Prof. Marco Taisch, Politecnico di Milano. "It offers us the possibility to create the future of manufacturing, and to lay one cornerstone for the wealth and sustainability of our society. Therefore, we take this project very seriously."

Project Content

The roadmapping process focuses five Key Areas, which have been identified as future challenging fields. In Sustainable Manufacturing the entire lifecycle of the product and process is taken into account, paying close attention to the technology adoption to support the use and assessment of resources and materials from their design phase, through production until the end of life. Energy Efficient Manufacturing aims to reduce the use of scarce resources and the carbon footprint by considering innovative methods and technologies, as products and processes are no longer just subject to cost and quality. Key Technologies are those that yield a high impact on the next generation of manufacturing, such as model-based enterprises, nano-technology, smart materials, robotics, etc. Standardisation is critical to the successful uptake of efficient interoperable solutions in the modern globalised enterprises, and it is at the same time the essential basis for transferring research results into industrial implementation. Innovation, Competences Development and Education contains the understanding and diffusion of new learning tools such as eLearning, Technology Enhanced

Learning, Serious Games, 3D tools, etc.

Focusing on these 5 Key Areas, the project follows five objectives in total:

- Prepare a roadmap for future manufacturing research in five IMS Key Areas;
- Identify new schemes & frameworks to support manufacturing systems research;
- Stimulate small and medium enterprise's participation in international cooperative research and development projects;
- Prepare the ground for new IMS proposals and manufacturing projects;
- Establish international and inter-regional communities in the five IMS Key Areas.



Marco Taisch
IMS 2020 Project Co-ordinator

Project Vision

The IMS 2020 Vision can be summarised through three main statements. The first vision is to enable rapid and adaptive user-centred manufacturing which leads to customised and "eternal" life cycle solutions. Secondly, highly flexible and self-organising value chains have to be developed, which enable different ways of organising production systems, including infrastructures, and which reduce the time between engaging with end users and delivering a solution. Finally, sustainable manufacturing has to be promoted, due to cultural change of individuals and corporations supported by the enforcement of rules and a regulatory framework co-designed between governments, industries and societies.

Project Approach

With the help of the global industrial and academic community, the IMS2020 Roadmaps depart from the research topics and supporting actions identified in each of the five Key Areas named above. The IMS 2020 Roadmaps show the possible impacts and benefits that the implementation of research topics through international collaboration could deliver between 2011 and 2013.



The IMS2020 Roadmap is based on inputs from an online survey, industrial workshops and more than 100 interviews with industry representatives. A framework outlining the main IMS dimensions influencing all five Key Areas was designed and used to define, which snapshots to develop, according to the following figure. All features within each snapshot were then assessed on their likelihood and desirability by 2020. During a vision building workshop, inputs from each of the five KATs were gathered on how manufacturing and the world would look like in 2020, if all research topics identified within each Key Area become real. Finally, the fine granular research topics were elaborated with the help of a wiki website, where all members of the Roadmapping Support Group could log in and support shaping the most concrete ideas.

Project Community

International cooperation plays an important role for the success of the project. Only if different perspectives from different institutions from all over the world are brought together, the whole picture of research and development challenges becomes visible. Therefore, a core project team consisting of Politecnico di Milano (Italy), the Institute for Operations Management (FIR, Germany), BWI at ETH Zurich (Switzerland), the European Committee for Standardization (CEN, Europe), Comau (Italy), Clemson University (USA), Ecole Polytechnique Fédérale de Lausanne (Switzerland),

Fatronik (Spain), Institute for Prospective Technological Studies (Europe), Keio University (Japan), KAIST (Korea), CNR-ITIA (Italy), Holcim (Switzerland) and the Norwegian University of Science and Technology (Norway) was built.

But next to this wide range of international partners, another relevant group contributing to the roadmapping activities exists. The Roadmapping Support Group is a large community (more than 200) of characters and institutions from research and industry, who are interested in accompanying the roadmapping process, as well as profiting from its results. Together, the project community discovers new destinations for developing Intelligent Manufacturing Systems in the forthcoming decade. Anybody interested is allowed to join and share its knowledge.

Marco Taisch summarises "IMS2020 wants to attract interested people and organisations to have the worldwide most qualified actors in the five IMS Key Areas to discover common innovations and potential in manufacturing. Whoever wants to join us, is very welcome!"

www.ims2020.net

For more information on IMS2020, please contact:

Marco Taisch – Politecnico di Milano

IMS2020 Project Co-ordinator

Department of Management, Economics and Industrial Engineering

Ph +39 02 2399.4815 - marco.taisch@polimi.it

EnginSoft Event Calendar

ITALY

14-15 April - Affidabilità e Tecnologie 2010
EnginSoft will present a seminar: Co-Design e Sperimentazione Virtuale. Un Esempio Applicativo
www.affidabilita.eu

14-17 April - Metef 2010 International aluminium exhibition
EnginSoft will be present with the process simulation technologies. www.metef.com

7 May - Seminario Automotive. Miglioramento di prodotto con il CAE - Mirafiori Motor Village Torino
www.enginsoft.it/eventi

27-28 May - International modeFRONTIER Users' Meeting 2010. Starhotel Savoia Excelsior Palace, Trieste.
<http://um10.esteco.com/>

October 2010 – EnginSoft International Conference 2010 CAE Technologies for Industry. Italy Stay tuned for the major CAE event!

www.caeconference.com

CAE Webinar Virtual Tour 2010

see the program on www.enginsoft.it/eventi

FRANCE

17-18 Mars 2010 - Micado: Etats Généraux Micado: "La contribution de l'ingénierie numérique à l'ECO conception" Evry (91) Edition exceptionnelle en partenariat avec la Chambre de Commerce de l'Essonne sur le thème: "La contribution de l'Ingénierie Numérique à l'ECO Conception"
www.af-micado.com

EnginSoft France 2010 Journées porte ouverte dans nos locaux à Paris et dans d'autres villes de France et de Belgique, en collaboration avec nos partenaires.

Prochaine événement: Journées de présentation modeFRONTIER

2010 Séminaires Simulation de Process et Optimisation EnginSoft France Boulogne Billancourt – Paris. Seminars hosted by EnginSoft France and EnginSoft Italy
Veuillez contacter Marjorie Sexto, m.sexto@enginsoft.com, pour plus d'information ou visitez: www.enginsoft-fr.com

21-23 June – ASMDO 2010 3rd International Conference on Multidisciplinary Design Optimization and Applications - Co-sponsored by ISSMO, ESTP, EnginSoft, and NAFEMS. Paris. ASMDO 2010 will bring together scientists and practitioners

