

# X-CHANGE NEWSLETTER

ISSUE 3      MARCH 2007

## FLEXIBILITY EVALUATION PLATFORM Quantifiable flexibility indicators to support the production engineer

The X-Change Flexibility Platform includes the mechanism to automate the calculations of the flexibility measures and provides with the requested flexibility evaluation results. It consists of three main entities:

1. *Flexibility Evaluation Toolbox*. This module lies in the core of the platform and provides the required flexibility measurements.

2. *Data Collector*. The data collector module is used for importing and normalizing data from the manufacturing system (either PPC or direct) via appropriate interfaces into the database

3. *Graphical User Interface*. The GUI is used as the interface between the production engineer or stakeholders and the Flexibility Platform. Manual data input can be initiated here.

Within the Flexibility Evaluation Toolbox five individual flexibility measures are integrated.

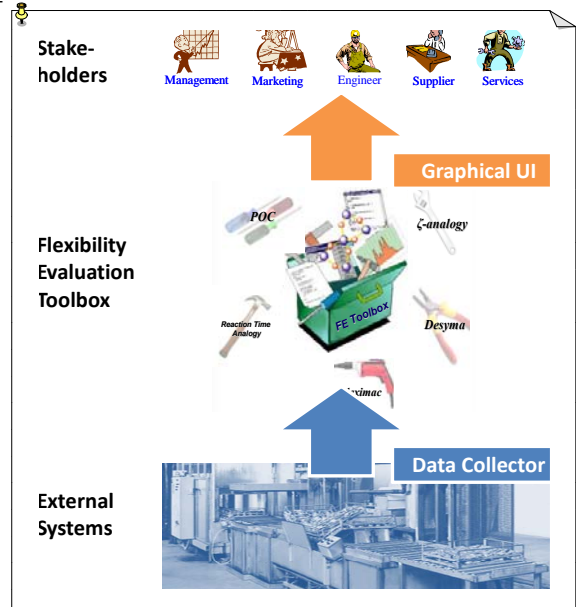
- POC which is a generic measure since it can be applied to different

flexibility types and combines both technological and economical terms.

- DESYMA (Design of Systems for Manufacture) which is based on measuring flexibility with the help of demand probabilities.
- ‘ $\zeta$ -analogy’ which basically makes use of an analogy between a manufacturing and a mechanical system.
- FLEXIMAC can be valuable for comparing different production systems when they have been exposed to a similar excitation from the external environment.
- The ‘reaction-time’ analogy method is an approach of modeling and analysis of the dynamic behaviour of manufactur-

ing systems.

The synthesis of the Flexibility Evaluation Toolbox has been made with the primary objective of applicability. Short, mid or long term flexibility considerations have been examined as well. As expected the measures utilizing market scenarios for instance, are more accustomed to long term considerations.



## SUCCESSFUL 2<sup>ND</sup> REVIEW MEETING HELD IN BRUSSELS

On October 5th, 2006 at the premises of the European Union in Brussels, the second X-Change review meeting has been successfully held. After a five hours meeting all of the current research and management activities have been presented by the responsible consortium

members. The work progress has been elucidated so far. In a glance, the presentations and the pro-

ject were very well focused, the layout and the content of the presentations was quite easy to

follow, and all essential information have been given.



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## CURRENT PROJECT PROGRESS

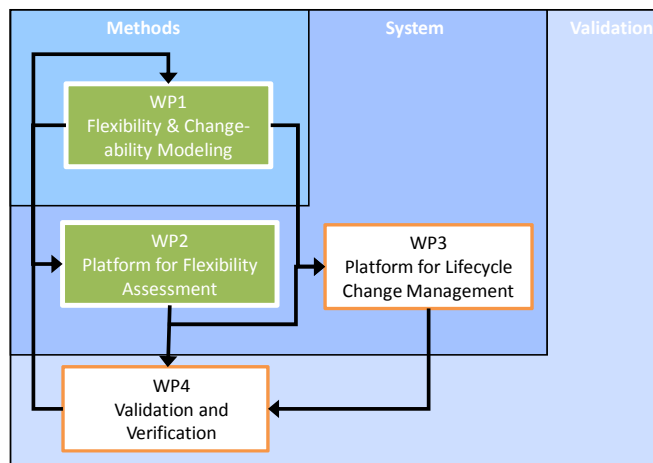
The X-Change business case studies at the premises of the end users have been analysed thoroughly and four dedicated case studies have been identified.

Based on these case studies flexibility modelling aspects have been deduced. These aspects basically include the necessary input and output values of the production system of each end user according to each dedicated case study. Furthermore they have been structured into short, mid and long term considerations.

Accordingly, the Flexibility Evaluation Platform has been developed as a “stand-alone” module. The offered functionalities include the integration of five flexibility methods as

services. The IT architecture was realized as a service oriented architecture in which all relevant components are embedded in a loosely coupled manner.

The next step will be to integrate the change management aspects into the Flexibility Evaluation Platform using the already developed architecture and services.



## DELIVERABLES

### AVAILABLE X-CHANGE DELIVERABLES

#### D5.1 X-Change Web Portal

*The X-Change portal provides the main dissemination tool of the project, but is also the gateway to the X-Change special interest group.*

#### D5.2 X-Change Dissemination Report

*Within the dissemination report all promotional activities of the consortium are listed in detail and referenced to the corresponding events.*

#### D5.4 Cluster Interaction Report

*The cluster “ambient intelligence technologies for the product lifecycle” will be used for research input and dissemination in a wider scale. Within this report the results of the interaction with other parties in this cluster will be accounted.*

## DISSEMINATION

### Two Selected Publications

At the ICMA 2007 the paper “Efficient Change Management for the Flexible Production of the Future” written by FZI and IMI has been accepted. The abstract describes the problem and the challenges:

Over the past years manufacturing enterprises are confronted by a more and more sophisticated and even faster changing environment that results from a stronger customer individualisation. The success of these enterprises strongly depends on their ability to recognize early necessary changes and to react on them appropriately. Therefore, flexibility marks the ability of a company to master complex environ-

mental situations in order to boost its chances to survive and secure its long-term success. In this context, a consistent systematic for the evaluation of flexibility of production systems and its integration in the technical change management is both an existing problem and a key factor to enhance the competitiveness of production enterprises. The following article will introduce an innovative methodology to support manufacturing changes in the foundation of flexibility measurements and evaluations and to integrate this in the companies internal as well as companies’ cross-organisational processes of change management.

At the ICE 2007 the paper “Flexibility Assessment Platform for the factory of the future” written by LMS and IMI has been accepted. Following, the content in a nutshell:

In order to consider flexibility as an important decision making attribute, companies must first find a way to quantitatively assess it. In this work, we attempt to address this problem and provide industrial users with a holistic platform, capable of quantitatively assessing flexibility. The solution presented, has two main objectives. Firstly, to provide engineers with appropriate measures in order to successfully gauge flexibility quanti-

tatively. Secondly, to integrate the provided measures into a flexibility assessment platform by taking advantage of modern information technologies. This will result in the formation of a flexibility assessment platform, expected to become a useful asset to production engineers and stakeholders. In order to cover a wide range of applications, a number of flexibility measures have been proposed. This enables the selection and use of the most appropriate measure, depending on the characteristics of the situation and manufacturing system under study.



Flexible Change Management for the Factory of the Future



## AITPL CLUSTER ACTIVITIES

The Ambient Intelligence Technologies for the Product Lifecycle Cluster (AITPL) aspires to enable organisations in a networked world to deliver better products in a more efficient way faster to the market by enhancing the product and the product lifecycle processes using ambient intelligence technologies. The strength of the European economy is substantially based on relationships among many enterprises, which together form agile networks, able to react to market demands in shortest time. These networks (sometimes formalized as

virtual enterprise for a specific product) are still competing successfully on a worldwide scale with enterprises from distant countries which offer wages in completely different dimensions. This success can be kept, only, if the networks establish and maintain smooth communications which cover the complete life cycle of the product. Significant effort has been spent to synchronize the product development in such networks.

The next scheduled AITPL cluster meeting will take place in Krakow, Poland,

in correlation with the "Challenges in Collaborative Engineering" workshop that will take place on April 11-13th 2007. Some of the objectives during the CCE 2007 are

- Distributed collaborative design
- Distributed BP modeling
- Workflow technology
- Standards in collaborative product design and execution

More information can be found at

<http://cce.ecolleg.org/2007>

## ICMA 2007

Following on from previous ICMA's held in Hong Kong and Wuhan, China this conference aims at providing a forum for exchange of ideas between researchers in the areas of manufacturing automation with a view to fostering a better link between industry and academia. The main theme of the conference is on rapid product development. The conference will bring together international experts to promote greater research interests in the areas of:

- Design Theory and Methodology
- Computer-Aided Design
- Internet-Based Product Development
- Intelligent and Knowledge-Based Systems
- Concurrent Engineering
- Layered Manufacturing
- High Efficiency Machining

## THE X-CHANGE CONSORTIUM



**FATMAN OY**

**PSI**

## UPCOMING EVENTS

**ICMA** (International Conference on Manufacturing Automation), Singapore, Singapore, 28-30 May 2007

**2nd Panhellenic** Conference of Mechanical and Electrical Engineers, Greece, Spring 2007

**40th CIRP** International Seminar on Manufacturing Systems, Liverpool, UK, 30 May-1st June

**13th ICE** (International conference on Concurrent Engineering) Sophia Antipolis, France, 4-6 June 2007

**2nd CARV** (International Conference on Changeable, Agile, Reconfigurable and Virtual Production), Toronto, Canada, 22-24 July 2007

**57th CIRP** General Assembly, Dresden, Germany, 19-25 August 2007

**ETFA** (Conference on Emerging Technologies and Factory Automation), Patras, Greece, 25-28 September 2007

## CONSORTIUM WEBSITES

[www.x-change-project.net](http://www.x-change-project.net)  
[www.imi.uni-karlsruhe.de](http://www.imi.uni-karlsruhe.de)  
[www.frigoglass.com](http://www.frigoglass.com)  
[www.vincent-industrie.com](http://www.vincent-industrie.com)  
[www.psi.de](http://www.psi.de)  
[www.fatman.fi](http://www.fatman.fi)  
[www.lms.mech.upatras.gr](http://www.lms.mech.upatras.gr)  
[www.fzi.de/pde](http://www.fzi.de/pde)

## IMPRINT

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