



FP6 IST STREP PROJECT N° FP6-027 083

FLUID-WIN

Finance, Logistic and Production Integration Domain
by Web-based Interaction Network

Deliverable D34

Cluster Activity Report

Release 1



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1 Management Summary

This report summarizes activities performed in WP7 with respect to the “Ambient Intelligence Technologies for the Product Lifecycle” (AITPL) project cluster. The report is timely anticipated, as the major support activities conducted by the FLUID-WIN project have been finished in February 2008. Therefore, the focus of WP7 was rearranged first on the AITPL cluster activities, and then on the ERA activities, and the report on ERA (deliverable D18) will in turn be postponed for month 34.

Major AITPL cluster activities have been the support of the AITPL workshops and forums, the exchange of results and research backgrounds, and the dissemination of results from the cluster projects.

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3 Support of the Cluster Organization

The FLUID-WIN project manager has been elected as chairman of the cluster in December 2004, and re-elected in December 2005, November 2007, and February 2008.

In the role of the cluster's chairman, the project manager has organized or co-organized the following meetings of the cluster:

- 04.03.2005, Bologna
- 22.06.2005, Munich
- 13.12.2005, Brussels
- 18.10.2006, Heilbronn
- 16.04.2007, Krakow
- 07.06.2007, Sophia Antipolis
- 05.11.2007, Berlin
- 07.02.2008, Athens

Furthermore, the chairman has contributed to the development of a flyer presenting the cluster (cp. annex) as well as a brochure that shortly presents the cluster projects, planned to be published end of February 2008 by the X-Change project.

FLUID-WIN supported the European Commission by contributing to their reporting process for 2007. This was done by collecting suitable information from all cluster projects, and editing the draft report before delivery to the Commission. The report is attached as an annex. Furthermore, FLUID-WIN reported data for the 2006 report.

IPK has maintained an internal workspace of the cluster (which was kindly provided by the VE-FORUM project). This included the organization of documents, the provision of current information and also the maintenance of member access to the platform.

3.1 Workshops and Forums

3.1.1 EC Workshop, Brussels, February 2006

IPK prepared an AITPL workshop in Brussels in February 2006, and promoted this event in several research groups in Germany. IPK and TUK attended the workshop, managing one out of three "knowledge cafés" at this workshop, and delivered the corresponding report.

3.1.2 AITPL Forum, Milan, June 2006

IPK organized, prepared and conducted the AITPL forum in Milan in the framework of the ICE'06 conference. This workshop was used to discuss and refine the results from the February workshops with a broad auditorium.

3.1.3 AITPL Session, Sophia Antipolis, June 2007

FLUID-WIN prepared a specific AITPL session and further AITPL activities in the framework of the ICE'07. Activities include:

- Keynote held by Dr. Wolfram (Managing Director MGI METRO, CE RFID project) – one out of 3 opening keynotes, in cooperation with the CERP cluster.

- 9 extended abstracts submitted by 8 projects (E4, FLUID-WIN (2x), Pabadis'Promise, Smart, Stolpan, Stop, Traser, X-Change)
- 6 Papers finally accepted for presentation, allowing for a specific AITPL session plus 2 papers in other thematic sessions. The AITPL session was chaired by the FLUID-WIN project manager, who also contributed to the scientific committee in order to ease the preparation
- 2 Posters accepted (1 poster from FLUID-WIN also accepted as presentation)

In summary, a significant visibility of AITPL topics and the cluster was achieved.

3.2 Cooperation with other Project Clusters

FLUID-WIN supported the cooperation between the AITPL and the Interoperability cluster, mainly by sending IPK delegates to the Interoperability cluster meetings, who also contributed to the roadmap activities of this cluster.

Since its foundation, AITPL kept very close relations to the *Cluster of European RFID Projects (CERP)*. Both clusters sent mutually delegates to their meetings. The public Web sites are presented in parallel within the same environment, which is maintained by the CE RFID project. Where possible, each of the clusters supported the public activities of the other one, e.g. by including abstracts and papers from the CERP cluster in a book that was edited by the AITPL cluster (see below).

3.3 Special Interest Groups

The cluster founded three Interest Groups on specific topics (SIG):

- Business Process Modelling, involving FLUID-WIN, Net-WMS, MAPPER, and E4. The SIG is moderated by the FLUID-WIN project, with the moderator from IPK.
- Flexibility of Supply Chains, involving Traser, E4, ILIPT, and X-Change. The SIG is moderated by the Traser project.
- Flexibility of Production Lines, involving Pabadis'Promise, ILIPT, and X-Change. The SIG is moderated by the PABADIS'PROMISE project.

In addition, there is an interest group on pre-normative activities, moderated by E4, with contributors from several cluster projects, including FLUID-WIN.

3.4 Book Publications

The cluster has presented two books. The first book was published before the commencement of FLUID-WIN. The second book was prepared by the FLUID-WIN project, edited by IPK and TUK:

- Rabe, M.; Mihók, P. (eds.): *New Technologies for the Intelligent Design and Operation of Manufacturing Networks*. Stuttgart: Fraunhofer IRB Verlag, 2007.

This book was distributed to members of the AITPL and CERP cluster, and also submitted in 1000 copies to the European Commission, in order to be presented at the EPoSS workshop (11./12. February 2008) and further suitable conferences and workshops.

The book contains an introduction (written by IPK) and three further major parts (cp. Appendix):

- Part I: 10 Result Papers
- Part II: Challenges in AITPL: Results from public AITPL workshops in Brussels and Milan (2006)
- Part III: 10 Abstracts from new projects



Two papers are prepared by FLUID-WIN, involving IPK, TUK, AL, and Joinet:

- Giuliano, A.; Azzopardi, J.; Mihók, P.; Bucko, J.; Ramke, Ch.: Integration of Financial Services into Multidisciplinary Web Platforms. In: *New Technologies for the Intelligent Design and Operation of Manufacturing Networks*. Stuttgart: Fraunhofer IRB Verlag, 2007, pp. 149 – 162.
- Rabe, M.; Mussini, B.; Weinaug, H.: Web-based Integrated Services for Manufacturing Networks. In: Rabe, M.; Mihók, P. (eds.): *New Technologies for the Intelligent Design and Operation of Manufacturing Networks*. Stuttgart: Fraunhofer IRB Verlag, 2007, pp. 129 - 147.

Furthermore, the book contains a report from the forums and workshops listed above:

- Rabe, M.; Frederix, F.; Mihók, P. M. Pawlak, A.: Challenges in Advanced ICT Technology for the Product Lifecycle. In: Rabe, M.; Mihók, P. (ed.): *New Technologies for the Intelligent Design and Operation of Manufacturing Networks*. Stuttgart: Fraunhofer IRB Verlag, 2007, pp. 185-191.



4 Appendix: AITPL Cluster Activity Report (2007)

3.4 Ambient Intelligence Technologies for the Product Life Cycle

3.4.1 Description of the cluster

The aim of the work in this Cluster is 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.

Moreover, the “extended product” approach combines a product with services and enhancements that improve marketability. The customer proposition may subsist more in the benefits of the value-added elements than in the physical product itself. Enhancements can incorporate tangible features that make the product more intelligent, customised or user-friendly, including embedded features like maintenance. Other aspects, such as services, engineering or software, are intangible and make the offering more information or knowledge intensive.

The cluster’s mission (see full statement in the annex) is to bring these topics forward and to identify potential new strategies for further research, in order to keep Europe’s manufacturing industry not only ‘alive’, but fully competitive and in a strategically leading position, thereby enhancing the prospects for employment in Europe.

The cluster consists today of the following ten projects:

- CATER: Computerized Automotive Technology Reconfiguration System for Mass Customization
- E4: Extended Enterprise Management in Enlarged Europe
- FLUID-WIN: Finance, Logistic and Production Integration Domain by Web-based Interaction Network
- ILIPT: Intelligent Logistics for Innovative Product Technologies
- MAPPER: Model-based Adaptive Product and Process Engineering
- NET-WMS: Towards integrating Virtual Reality and optimisation techniques in a new generation of Networked businesses in Warehouse Management Systems under constraints
- PABADIS’PROMISE: PABADIS based Product Oriented Manufacturing Systems for Re-Configurable Enterprises (including RFID technology)
- X-CHANGE: Flexible Change Management for the Factory of the Future

- TraSer: Open, peer-to-peer Tracking and Tracing

Figure xx: Projects by Instrument in the Product Lifecycle Cluster

IP	STReP	CA	SSA
ILIPT 9.000.000€	CATER €		
	E4 2.152.945€		
	FLUID-WIN 1.998.550€		
	MAPPER 2.200.086€		
	Net-WMS 2.320.000€		
	PABADIS' PROMISE 2.349.172€		
	X-CHANGE 1.301.622€		
	TraSer		

Colours: red-IP, pink-STReP, orange-CA, yellow-SSA

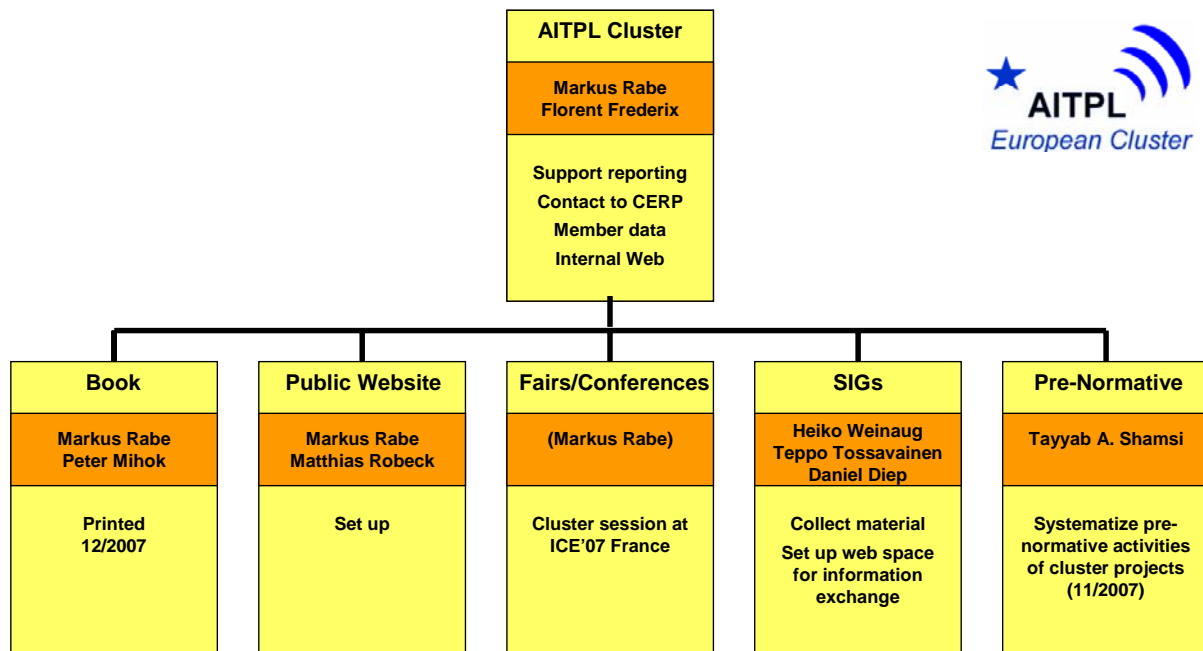
Source: European Commission

The aim of these projects is to enhance enterprise network configurations for the manufacturing industry. This objective will be reached in CATER, ILIPT, FLUID-WIN, Net-WMS and SPIDER-WIN by designing new innovating solutions. E4, MAPPER, PABADIS'PROMISE, TRASER and X-CHANGE will develop methodologies, models and ICT solutions to support enterprise flexibility in general, and development and production flexibility in particular. V-CES, VERITAS and CO-DESNET, from their side, are aiming at wide dissemination of knowledge and adoption of good working practices by the large manufacturing community in Europe.

3.4.2 Workplan 2007

The cluster developed a first work-plan at the initial cluster meeting in December 2004. This work-plan has served as a guideline for the cluster activities and was regularly monitored and updated on the cluster's meetings.

3.4.2.1 Objectives & scope of work (2007/2008)



The objectives of the workplan are:

- To promote the AITPL Cluster and to make it visible in the related research domains
- To produce a book that presents major results of the cluster.
- To link the cluster projects in a wider European Research Area.
- To hold cluster meetings on conference sites bringing a wider visibility to cluster project results.
- To establish special interest groups (SIG) within the cluster that share experiences in specific research areas.
- To initiate a concertation with respect to pre-normative activities in the cluster's projects
- To set up of a web platform.

3.4.2.2 Results 2007

- A cluster publication “New Technologies for the Intelligent Design and Operation of Manufacturing Networks” which presents relevant cluster activities to the research community and interested public. Subjects addressed are supply chain integration, interoperability, adaptive product and process engineering, flexibility methods for agile manufacturing, SMEs in the more competitive environment, SME Networks and integration of services in manufacturing networks.

- Collaboration with the CERP cluster, with mutual participation of a cluster delegate in the other cluster's meeting. Furthermore, CERP has supported the AITPL cluster through its CA project (CE RFID).
- Concerted participation in ICE 2007, with submission of 9 extended papers by 8 projects, of which 7 papers were finally presented, leading to one full session on AITPL (chaired by the cluster chairman) and visibility of AITPL in 3 further conference sessions. In addition, one out of the three keynote speeches was initiated by the AITPL cluster with kind support from CERP (Dr. Wolfram, Managing Director MGI METRO)
- Concerted participation in the 5th Workshop on Challenges in Collaborative Engineering (CCE07), with 2 cluster-related sessions on Standards in collaboration and exemplaric results of AITPL projects
- Update of the public web site and transfer to the context of the CERP cluster
- Setup of a collaboration workspace on the VE-FORUM platform in order to facilitate co-operation of the cluster members.
- Foundation of three interest groups on specific technical topics;
 - BPM: Business Process Modelling (Distributed Modelling, Modelling of Networks) – FLUID-WIN, Net-WMS, MAPPER; Moderator: Heiko Weinaug
 - FSC: Flexibility of Supply Chains including SME – TraSer, E4, ILIPT, (X-Change); Moderator: Teppo Tossavainen
 - FPL: Flexibility of Production Lines – Pabadis' Promise, ILIPT, X-Change; Moderator: Arndt Lüder

The cluster met physically three times in 2007, two times adjacent to a related conference. The invited experts attending the cluster meetings are of the opinion that the cluster is important and its successful operation is vital to the success of strengthening and concentrating the European research effort. Thus, the physical cluster meetings will be continued in 2008 and further supported by electronic collaboration tools.

3.4.3 Planned activities for 2008

The work-plan for 2008 was developed at the cluster meeting in November 2008 and comprises the following major activities:

- Continued work in the SIGs identified in 2007
- Preparation of a common document that summarizes proposals for possible standardization activities, where needs have been demonstrated by the cluster's projects
- Coherent dissemination of individual projects' results and an exercise to enhance cluster visibility in general.

3.4.3 Performance indicators

Indicators focus on specific and identifiable goals for the cluster.

Resp.	Activity	Timing/Actions	Future
FLUID-WIN	Book, aimed at a shared dissemination strategy and knowledge sharing.	Publication in 12/2007	N/A
FLUID-WIN	Internal information sharing platform, web space for SIG information interchange	Available with support from VE-FORUM (04/2007)	Will be maintained
FLUID-WIN	Update public website	Done 06/2007 with support from CE RFID	Will be maintained
FLUID-WIN	SIG Business Process Modelling	installed 04/2007, Document collection (at AITPL information sharing platform)	Document exchange, meeting to share experiences
Traser	SIG Flexibility of Supply Chains including SME	installed 04/2007	Document exchange
PABADIS PROMISE	SIG Flexibility of Production Lines	Meetings for result exchange: 1 st June 2007 (Workshop on Advanced Manufacturing Systems); 31 st August 2007 (Workshop on network security)	Workshop about software technologies and architectures applicable to increase flexibility (scheduled June 2008); Common special issue of international journal (Possibly ATP international)
E4	Concertation of pre-normative activities	Paper in 12/2007	Platform availability for test (2008)

Overall the results of the cluster in 2007 have been satisfactory for the performance indicators (table above). Activities in SIGs could have been more intense and should be improved in 2008.

3.4.4 Concertation meetings

Three cluster meetings have taken place in 2007. The first meeting took place on April 16/17, 2007 in Krakow (Poland), the second meeting on June 7, 2007 adjacent to the 13th International Concurrent Engineering Conference in Munich (Germany) and the last one on November 5 in Berlin preparing the roadmap for 2008. The cluster gives very much emphasis on internal exchange of knowledge and the continuous reflection on how results or need for

input from one project could be beneficial to the other projects. A portion of each meeting is therefore reserved for the presentation of latest project results, and especially of introducing newly joining projects. Moreover, a cluster workspace has been set up. The agenda of the meetings is found in the annex. In all concertation meetings, nearly all the cluster projects were present (see table xx).

Table XX: Attendance of Projects at meetings (note: CATER joined the cluster in OCT'07)

Project	Date			
	OCT'2006	APR'2007	JUN'2007	NOV'2007
CATER				X
E4	X	X	X	X
FLUID-WIN	X	X	X	X
ILIPT	X	X	X	X
MAPPER	X	X	X	X
Net-WMS	X	X	X	
PABADIS' PROMISE	X		X	X
TRASER	X	X	X	X
X-CHANGE	X	X	X	X

The invited experts attending the cluster meetings are of the opinion that the cluster is important and its successful operation is vital to the success of strengthening and concentrating the European research effort in the areas related to Ambient Intelligence Technologies for the Product Lifecycle (extract of the March 4, 2005 cluster assessment report).

3.4.5 Awareness-raising and dissemination

The cluster projects have conducted a high number of activities to raise public awareness of the activities both of the cluster and its projects. In total, more than 500 dissemination activities have been reported by the cluster projects (one of the projects is also member in the CERP cluster, and active in both).

Table XX: Cluster Dissemination Activities

Cluster Outcome 2007	CATER	E4	FLUID-WIN	ILIPT	MAPPER	Net-WMS	PABADIS' PROMISE	TRASER	X-CHANGE	TOTALS
Books			1	0	1					2
Contributions to books			2	4	2		1	2	1	12
Journal publications	6	14		19		1	2	2	3	47
Contributions to conferences	19	11	7	80	13	2	38	9	6	185
Further speeches and presentations in public		4	3	30	8				6	51
Posters	1	1	1	4			2		2	11
Successful PhD-Thesis				0		1	1			2
Press Releases	16		2	6	1	5	4	2	4	40
Presence at fairs	1	1	1	4	3	2	1		9	22
Organization of events/workshops	1	10	1	9	1	3	2	24	1	52
Seminars	1	10		15	4					30
University lectures		1	3	5	1				1	11
Demonstrators	2	1		3		1	1		1	9
Products				2						2
Start-ups or spin-offs initiated				0	1					1
Newsletters	2			2					3	7
Brochures	1	2	1	0		1		4	1	10
Web sites	1	1	1	1	1	1		1	1	8
Deliverables published through web site	3	3	1	0	3	7	6	1	1	25
Also member of CERP cluster								yes		

Activities reported include actions with specific cluster visibility, held in the name of AITPL. Major examples are:

- Workshops around the 5th Workshop on Challenges in Collaborative Engineering (CCE07) held in Krakow (Poland) April 11-13th, 2007. In this context, the MAPPER project organised 2 cluster-related sessions on
 - Standards in collaboration (moderated by Till Schümmer, FernUniversität Hagen)
 - Exemplaric results of AITPL projects (moderated by Adam Pawlak, SUT)
- Participation in the ICE'07 conference in Sophia Antipolis (France), June 4th-6th, 2007.
 - One out of 3 opening keynotes from AITPL by Dr. Wolfram (Managing Director MGI METRO)
 - 9 extended abstracts submitted by 8 projects (E4, FLUID-WIN (2x), Pabadis'Promise, Smart, Stolpan, Stop, Traser, X-Change)
 - 6 Papers finally accepted for presentation, allowing for a specific AITPL session plus 2 papers in other thematic sessions
 - 2 Posters accepted (1 poster from FLUID-WIN also accepted for presentation)
- Members of the X-Change project won the "Best Paper Award" at ICMA 2007, Singapur (<http://www.icma07.org/bestpaper/>).
 - Mr. Stilian Stanev won the best Paper Award for the paper "Efficient Change Management for the Flexible Production of the Future" at the ICMA 2007 (International Conference on Manufacturing Automation) in Singapore, submitted by H. Abul Ola, S. Stanev, S. Rogalski, K. Krahtov, H. Krappe, J. Ovtcharova.



5 Appendix: AITPL Book Publication – TOC

Markus Rabe • Peter Mihók (Hrsg.)

**New Technologies for the Intelligent Design
and Operation of Manufacturing Networks**

Markus Rabe • Peter Mihók (Hrsg.)

New Technologies for the Intelligent Design and Operation of Manufacturing Networks

**Results and Perspectives from the
European AITPL Project Cluster**

Fraunhofer IRB Verlag, Stuttgart

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Foreword

The Networked Enterprise is of utmost importance to realize the Lisbon goal of a world leading knowledge economy, as it represents a development that allows the bundling of the capacities and capabilities of the multitude of small and medium-sized enterprises, which are a major root of Europe's competitive strength in the global market. Networks enable the provision of products and services to the customers, especially to the large "global players", within Europe and towards the world. Information and communication technologies (ICT) are the backbone that renders such cooperation possible within regions and across Europe's inner borders. ICT enables the exchange of product and service requests in real-time and the bundling of information with products and activities. It also makes easier the follow up of workflows in complex and highly-interconnected environments.

The European Commission identified these challenges as crucial and has therefore fertilized a number of dedicated research activities in its 6th Framework Programme. Major activities in the domain have been bundled in "clusters" of projects in order to facilitate effective dissemination, to exploit synergies in research topics and to structure the demands for future research. The clusters most relevant for the addressed topic are the Interoperability Cluster, the Cluster of European RFID Projects (CERP) and the Ambient Intelligence Technologies for the Product Lifecycle (AITPL) Cluster, which is the main originator of the book in hand.

The European Commission especially appreciates the concerted work of the projects in the AITPL cluster, which during the last three years has brought significant results in improving the flexibility of manufacturing units, simplifying collaborative design and production, exploring new ways to short-term customization of mass products, and integration of service providers in manufacturing networks. Especially, the cluster has gained extensive visibility, e.g. by its regular presence at the International Conference on Concurrent Engineering (ICE) since 2006, by organizing workshops and forums, and – of course – by publishing this book.

I express my confidence that the research conducted in this context will further contribute to the success of Europe as a flourishing economy as well as an outstanding research area.

*Gérald Santucci,
December 2007*

*European Commission
Head of Unit "Networked Enterprise & Radio Frequency Identification (RFID)"*

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6 Appendix: AITPL Flyer

The Cluster's Mission

Bring forward topics such as “ambient aware services” and “higher flexibility” in the area of

- product configuration,
- supply network management,
- control of supply network capability and
- forecast for new model variants monitoring the time-to-empty of the supply chain for the variants going out of production.

Identify potential new strategies for further research, in order to keep Europe's manufacturing industry not only alive, but fully competitive and in a strategically leading position.

Enhancing the prospects for employment in Europe by

- developing new, innovative methods and IT support as well as
- promoting new stabile networks on basis of field studies which investigate the real business needs and additionally constraints, depending on companies' product categories, enterprise structures and size.

For further information see our homepage <http://www.rfid-in-action.eu/aitpl>

Cluster members

E4 - Extended Enterprise Management in Enlarged Europe

 - www.crfproject-eu.org/?site=E4

Net WMS - Networked businesses in Warehouse Management Systems

 - net-wms.ercim.org

ILIPT - Intelligent Logistics for Innovative Product Technologies

 - www.ilipt.org

X-Change - Flexible Change Management for the Factory of the Future

 - www.x-change-project.net

FLUID-WIN - Finance, Logistic and Production Integration Domain by Web-based Interaction Network

 - www.fluid-win.de

CE-RFID - Coordinating European Efforts for Promoting the European Value Chain

 - www.rfid-in-action.eu

Mapper - Model-based Adaptive Product and Process Engineering

 - mapper.troux.com

Pabadis'Promise - PABADIS based Product Oriented Manufacturing Systems for Re-Configurable Enterprises

 - www.pabadis-promise.org

TraSer - Identity-based Tracking and Web-Services for SMEs

 - www.traser-project.eu



**Ambient Intelligence
Technologies for the
Product Lifecycle**

AITPL in a Nutshell

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. However, the same exertion is indispensable to improve the manufacturing chain itself, providing means for a radical make-to-order strategy. This includes substantial new methods for product configuration, for supply network management, for the control of the supply network material capability (in contrary to the capability to deliver of single companies) as well as for propagating forecast for new model variants and carefully monitoring the time-to-empty of the supply chain for the variants going out of production. The importance of these aspects cannot be overestimated, as the closeness to the market (changing from years to days) requests for highly frequent changes. Changes are either general (for the model, due to improvements, new features responding to the more and more sophisticated customer demands or fault elimination) or directly customer-driven (configuring the specific delivered product). In both cases, even if changes may be minor, they can have implications on many supply networks nodes. Managing this information is, therefore, a major challenge for the near future.

While the challenge is to the network, the reaction to the challenge has to be performed by the companies as the only real actors. This addresses the need of acting locally in the network environment, thus driving the network's success globally. The keyword is context awareness, providing means to effectively manage decisions of different network partners for different product and production status. Different environments within one system should adapt to the roles of the human being addressing the network, and different (possibly conflicting) changes need to be detected and introduced into the workflow for problem solving. Such systems would behave different dependent from where they are contacted (in the extreme case, changing the role when physical interfaces like PDAs are moved into a new environment). Today, Europe's attitude with respect to agility is massively higher than from distant low-cost / high volume providers. However, achieving the goals mentioned requires a new step forward in terms of the business culture.



NET WMS



CE RFID

MAPPER

PABADIS PROMISE

Traser