



**MANAGING PRODUCT/PROCESS KNOWLEDGE IN THE
CONCURRENT/SIMULTANEOUS ENTERPRISE
ENVIRONMENT**

FAIM2005

BILBAO, July, 18-20 2005



- **Innovation**
 - Knowledge Management
 - Extended Enterprise/ Concurrent Enterprising
 - Extended Product
- **Intellectual Capital**
- **Access of SMEs to IT Tools**

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The European Commission
Community Research
ist information society technologies

aim

AIM

“Acceleration of Innovative Ideas to Market”
IST-2001-52222

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WHO SHOULD USE AIM

- Industrial companies with **complex products and/or processes**,
- with a substantial requirement for **incremental innovation** on products and processes,
- which need to **harness** the product and process **knowledge** of their staff, suppliers and customers,
- using the **latest technologies**.

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FOR WHAT AIM?

- For **analysing** innovative ideas to determine which are useful and which are not, that is, to enable the viability of ideas to be assessed.
- For **delivering** the innovative ideas to the product and process designers for maximum effect.
- For **combining** (experience based) knowledge on products/processes and innovation ideas.

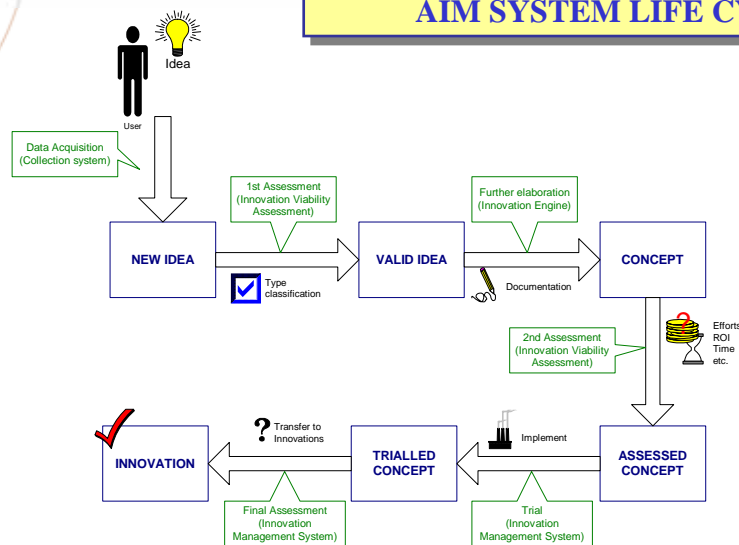
HOW?

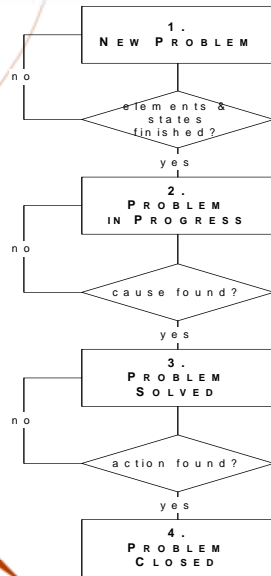
Specific research of the proposed approach on:

- Fostering the **creation of ideas** about products and processes throughout the extended enterprise.
- Interactive solution to be able to take basic ideas, and develop them (by collective working throughout the **extended enterprise**), into product and process design innovations.
- **Development of diverse ideas** form multiple sources into workable innovative designs (for industrial product and processes).

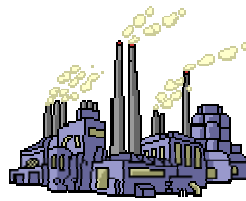
- **Assessment** of innovative ideas to analyse their likely success, and thereby evaluate the viability of ideas/designs.
- Development of specific **ontologies** needed to enable efficient exchange of ideas.
- Combination of methods for creation of innovative ideas with “classical” methods for **collection of knowledge** on products/processes and problems.
- Development of a combination of **repositories** with innovative ideas, product/processes knowledge and information/knowledge on problems/improvement potentials.

AIM SYSTEM LIFE CYCLE





Problem Solving Life-cycle



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Ball Packaging Europe



Ball Packaging Europe



Product Range and Locations in Europe

Beverage cans: Tin plate and aluminium cans with aluminium ends



<p>BPE</p>	<ul style="list-style-type: none"> • The current SW system enables only limited analysis options of the available data. • There is no classification scheme for the problems, problem causes and actions/ideas to remove these causes. • No transfer/exchange of ideas on how to solve (very often) problems in manufacturing from one plant to another. • Elaboration of ideas is not efficient due to missing clear ways to allocate them to problems in different plants. • Failure reports are paper based leading to difficulties in an IT based evaluation and allocation of problems to machine data. • The employees do not have all information and are not in a position to efficiently provide their ideas on how to remove failure causes. • After shift changeover the next shift currently does not have sufficient information about problems that have arisen in the last shifts/days. • The information of the several IT systems - (CAQ/QSYS), (MDE), (PDS), (CDS) - has to be evaluated by hand, to identify improvement measures and innovative ideas.
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AIM contributions to BPE

How the AIM tools can be applied:

- IT based collection and evaluation of problems, problem causes and ideas to remove these problem causes and to improve the production process
- establishment of a classification scheme for the problems, problem causes and ideas and innovations to remove these causes
- shorten the time needed for collecting and implementation of new ideas in the manufacturing process
- focus upon innovation in multiple site manufacturing process based on the identified problems and improvement potentials to foster the innovation process in all BPE subsidiaries
- reduction of scrap in the production line because of a better use of innovative ideas

Existing Problems – Required Innovations (1)

Problem	Innovation Required
The current SW system enables only limited analysis options of the available data.	An extension of the IT system will be needed to analyse the available data of the several IT systems by one system.
There is no classification scheme for the problems, problem causes and actions/ideas to remove these causes.	A scheme for the classification of problems, problem causes and actions/ideas to remove these causes are needed.
No transfer/exchange of ideas on how to solve (very often) problems in manufacturing from one plant to another.	To provide a means to support the exchange of ideas among different plants is needed.
Elaboration of ideas is not efficient due to missing clear ways to allocate them to problems in different plants.	Integrating the existing (currently non-integrated) IT-systems to identify ideas and allocated problems overall plants.

Existing Problems – Required Innovations (2)

Problem	Innovation Required
Failure reports are paper based leading to difficulties in an IT based evaluation and allocation of problems to machine data.	An extension of the Machine Data Acquisition System (MDE-System)
The employees do not have all information and are not in a position to efficiently provide their ideas on how to remove failure causes.	Need of a system that collects such ideas, assesses them and deliver them to engineers
After shift changeover the next shift currently does not have sufficient information about problems that have arisen in the last shifts/days	The documentation on failure causes/actions (ideas) exist in a certain form which is to be adapted to knowledge base form.
The information of the several IT systems - (CAQ/QSYS), (MDE), (PDS), (CDS) - has to be evaluated by hand, to identify improvement measures and innovative ideas	Integration of all existing information of the several IT systems, containing the failure and corresponding actions data for machine breakdowns and quality deviation.

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MB Air Systems



- The service and technical team provide a Customised Maintenance Solution to meet client needs.
- MB Air Systems supplies, installs, services and maintains a comprehensive range of products to almost every industry, utility and authority within the United Kingdom

Industries			
Aerospace	Agriculture	Automotive	Brewing
Building	Chemical	Construction	Dairy Processing
Distilling	Education	Electronic	Food Processing
Gas	Manufacturing	Nuclear	Oil
PetroChemical	Pharmaceuticals	Public Authorities	Shipbuilding
Steel	Transport	Utilities	

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MBAS

- Need to work better with suppliers to provide better solutions to the customer (in terms of developing compressed air systems). Need to provide these faster.
- Need to work with suppliers better, to solve problems quicker and with better results.
- Loss of knowledge when sales engineers and service engineers leave or are absent.
- Need to show customers that MBAS is committed to providing innovative services – marketing requirement.
- No internet service to customers. Want to provide customers with a better means of working with MBAS to improve what the customer receives in terms of service.

Contributions of AIM to MBAS:

- Innovating the level of service provided to customers when specifying a complete engineered solution to what customers want.
- Innovating the service provided to customers when solving problems.
- Enhancing and innovating the MBAS relationship with suppliers and customers to work together to improve the service for customers.

MBAS Innovation Problems (1)

Problem	Innovation Required
Need to work better with suppliers to provide better solutions to the customer (in terms of developing compressed air systems). Need to provide these faster.	Needs means of getting ideas and innovations from our staff and main suppliers, and working with them to develop innovative services and systems to customers. Need to provide these better ideas and service innovations on a more frequent and faster basis to develop our competitiveness.
Need to work with suppliers better, to solve problems quicker and with better results.	Need means of working with main suppliers to solve problems by generating ideas and innovative solutions. Need means of creating virtual problem solving ideas teams to provide rapid response services to customers to solve their problems.
Loss of knowledge when sales engineers and service engineers leave or are absent.	Need means of keeping ideas and solutions and innovation knowledge within the company.

MBAS Innovation Problems (2)

Problem	Innovation Required
No visibility to customers that MBAS work with IT.	Need to show customers that MBAS is committed to providing innovative services – marketing requirement.
No internet service to customers. Want to provide customers with a better means of working with MBAS to improve what the customer receives in terms of service.	Want to provide innovative services to customers. Need to get ideas and innovation suggestions from customers. Need to work with customers in developing innovations.

Metrics to be applied

Metrics have been defined to enable a quantitative assessment of the project progress and the results achieved:

- **Business metrics – benefits such as:**
 - Reduction of product innovation cycle
 - Reduction of time and efforts for solving product/ process problems
 - Improvement of process efficiency
- **Technical metrics – requirements upon the tools**

CONCLUSIONS UP TO DATE

- ***Increased efficiency within innovation development processes are obtained when systematic approaches are applied to incremental innovations.***
- ***Knowledge Management and the Extended Enterprise concept are key aspects to be considered when fostering innovation on products/ processes.***
- ***Motivation and Commitment form employees can be achieved through the use of friendly ICT Tools.***

ASSIST Project Knowledge-based Intelligent Design Assistant

COOP-CT-2004-512841

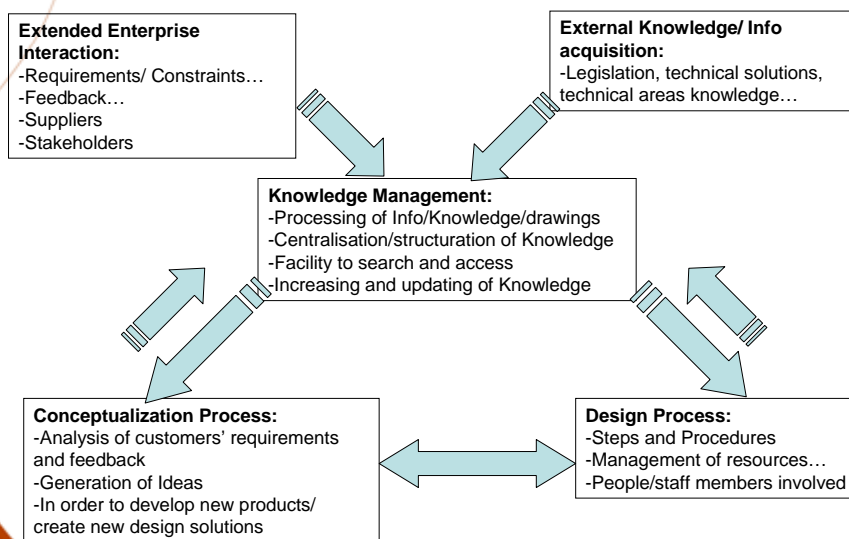
List of Project Partners

Partic. Role*	Partic. no.	Participant name	Participant short name	Country
CR	1	ASSANAKIS A&K Co	ASSANAKIS	Gr
CR	2	NORBERT BINKE UND PARTNER	BINKE	D
CR	3	CHARLES ROBINSON (CUTTING TOOLS)	CTOOLS	UK
CR	4	PRAESSENTIS, S.L.	PRAESSENTIS	E
CR	5	RODOS AIR LTD	RAIR	Gr
CR	6	TECNICAS DE CALENTAMIENTO, S.L	TECASA	E
CR	7	THIELE SPEZIAL KAROSSERIEBAU GMBH	THIELE	D
CO	8	FUNDACIÓN LABEIN	LABEIN	E
CR	9	INSTITUT FÜR ANGEWANDTE SYSTEMTECHNIK BREMEN GMBH	ATB	D
CR	10	INTEGRATED INFORMATION SYSTEMS SA	I2S	Gr

A leap forward in industrial design performance in SMEs, enabling:

- o To capture and structure knowledge from different sources as a part of the design process, so that the system which captures knowledge can be updated continuously.
- o To make best use of the extended enterprise knowledge of SMEs, by involving customers, shop-floor employees, field engineers, and suppliers.
- o To support knowledge sharing across the SME and the innovative solution reuse in the new designs, minimising the “reinventing the wheel”.

ASSIST Top-Level Approach

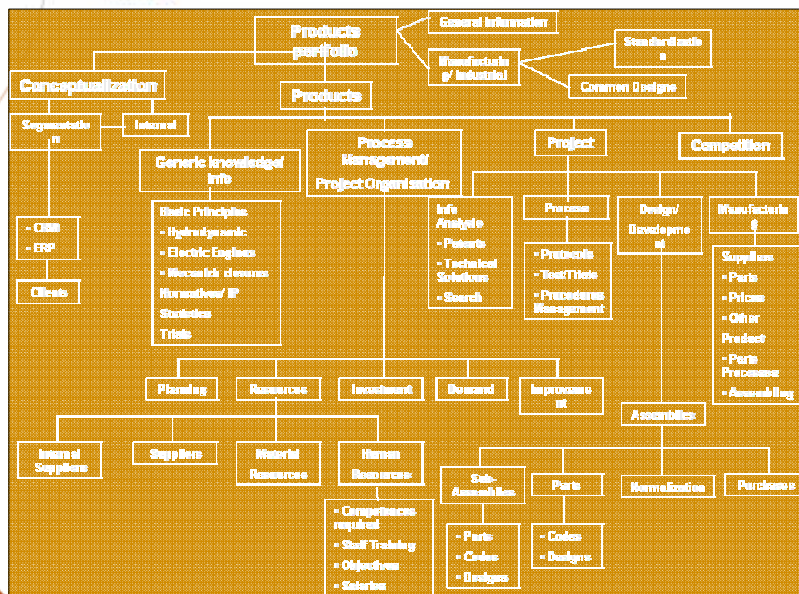


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- PRAESENTIS**
- To improve the design workflow, in order to redefine new products.
 - To improve Intellectual Capital of the company: past experiences, Tacit Knowledge, competences and technical skills required.
 - To improve conceptualization of new products.



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Overview of Core ASSIST Functionality

Functionality Requirement	Topic
Collection of Product/Process Related Design Knowledge:	<ul style="list-style-type: none"> employees' knowledge requirements, design constraints, specifications, instructions, rules/calculation employees' ideas conceptual designs connection to legacy systems connection to resources at Internet
Collection of Problems (internal feedback):	<ul style="list-style-type: none"> problems reported by employees information exchange from remote sites or different offices from other repositories or databases within the companies
Collection of Customer Feedback:	<ul style="list-style-type: none"> customer's feedback acquired by webpage customer's feedback from telephone calls, fax, e-mails etc.
Search for previous designs:	<ul style="list-style-type: none"> by characteristics by matching text connecting legacy systems
Design Development and Improvement:	<ul style="list-style-type: none"> access to the product/process knowledge access to the collected ideas access to the conceptual designs collected
Collaborative Design:	<ul style="list-style-type: none"> collaborative web interface to distribute and get together drawings, ideas, problems, specifications, calculations, rules, and other knowledge support of design work flow between involved co-workers

Correlation of Core ASSIST Functionality with Knowledge Model Entities

Functional Req.	Topic	Information Entity
Collection of Product/Process Related Design Knowledge:	<ul style="list-style-type: none"> employees' knowledge requirements, design constraints, specifications, instructions, rules/calculation employees' ideas conceptual designs from legacy systems from Internet 	<ul style="list-style-type: none"> Customer Requirements, Product Name, Product Specifications, Generic Free Notes, Ideas about the product, Regulations / Standards, Product Family, Subassemblies / Parts, Quality Requirements, Manuals, Technical Solution, Process Steps, Technical Production Note, Rules, Material Information and Specification, Drawings
Collection of Problems (internal feedback):	<ul style="list-style-type: none"> problems reported by employees information exchange from remote sites or different offices from other repositories or databases within the companies 	<ul style="list-style-type: none"> Product Number, Product Name, Ideas about the product, Working Tests, Feedback Notes, Technical Solution, Process Steps, Defects Customer Information, Product Application, Product Number, Product Name, Ideas about the product, Working Tests, Feedback Notes, Technical Solution, Defects
Collection of Customer Feedback:	<ul style="list-style-type: none"> customer's feedback acquired by webpage customer's feedback from telephone calls, fax, e-mails etc. 	<ul style="list-style-type: none"> Customer Requirements, Product Specifications, Customer Information, Product Application, Product Name, Specification, Product Family, Subassemblies/Parts, Quality Requirements, Technical Solution
Search for previous designs:	<ul style="list-style-type: none"> by characteristics by matching text connecting legacy systems 	<ul style="list-style-type: none"> Product Name, Product Specifications, Generic Free Notes, Ideas about the product, Regulations / Standards, Product Family, Subassemblies / Parts, Quality Requirements, Manuals, Feedback Notes, Technical Solution, Process Steps, Technical Production Note, Defects, Rules, Tooling, Machine Tools, Material Information and Specification, Drawings
Design Development and Improvement:	<ul style="list-style-type: none"> access to the product/process knowledge access to the collected ideas access to the conceptual designs collected 	<ul style="list-style-type: none"> Project Name, Project Family, Project Activity, Project History, Product Name, Product Specifications, Generic Free Notes, Ideas about the product, Regulations / Standards, Product Family, Subassemblies / Parts, Quality Requirements, Manuals, Feedback Notes, Technical Solution, Technical Production Note, Defects, Rules, etc.
Collaborative Design:	<ul style="list-style-type: none"> collaborative web interface to distribute and get together drawings, ideas, problems, etc. support of design work flow between involved co-workers 	<ul style="list-style-type: none"> Project Name, Project Family, Project Activity, Project History, Product Name, Product Specifications, Generic Free Notes, Ideas about the product, Regulations / Standards, Product Family, Subassemblies / Parts, Quality Requirements, Manuals, Feedback Notes, Technical Solution, Technical Production Note, Defects, Rules, etc.

