Colloque National AIP.PRIMECA, La Plagne, 6 avril 2005

Atelier sur l'enseignement du PLM (Product Life-cycle Management)

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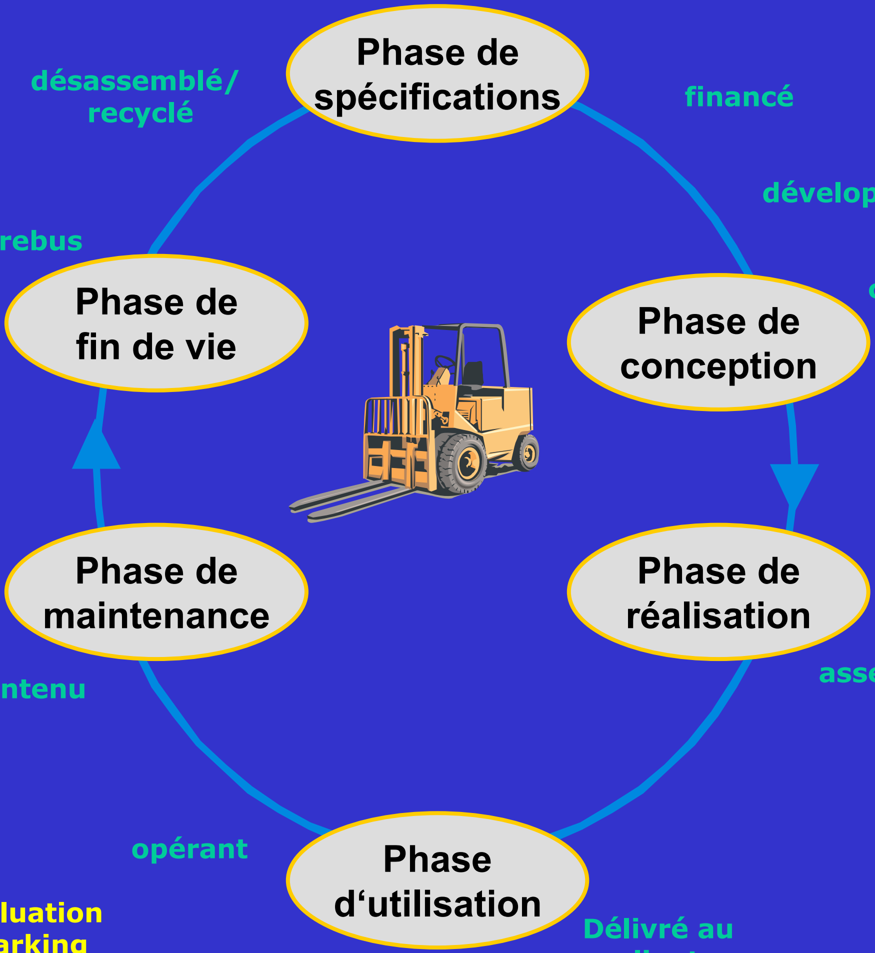
Déroulement de l’atelier :

- introduction générale sur le PLM et positionnement (10’)
- témoignages de différentes expériences et pratiques pédagogiques (40’)
    - Milan, Pôle IdF, Pôles RA, Pôle PdL, Pôle MP, Pôle L
- quelques éléments relatifs à une plateforme industrielle de PLM : une proposition de Dassault Systèmes (15’)
- discussion (30’)
- constitution d’un groupe de travail (5’)

Phases du cycle de vie (états et services associés)



Phase de spécifications

spécifié

financé

développé

conçu

Phase de conception

calculé, simulé

Phase de réalisation

assemblé

Délivré au client

Phase d'utilisation

opérant

maintenu

Phase de maintenance

réparé

Phase de fin de vie

Mis au rebus

désassemblé/ recyclé

Formalisation /Spécification Des besoins

Analyse préliminaire des services associés

Co-développement

Services dépendants ou indépendants des produits

Services pour supporter les co-opérations des entreprises

Intégration du client lors de la phase de réalisation

Qualification et formation

Support opérationnel

Services d'évaluation et de benchmarking

Réparation

Services financiers

Maintenance routinière

Services de démontage

Collecte de matériaux

Services de collecte

Mise à disposition de matériaux et composants

D'après BROWNE et HIGGINS, Jim, CIMRU-NUIG, 2002

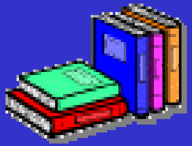
Des tendances :

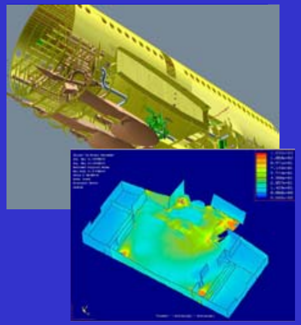
- Évolution des méthodes de conception et d’industrialisation
- « zéro proto », « zéro défaut », « bon du premier coup »
- Le référent : la maquette numérique (DMU)
- Conception conjointe du produit et des moyens de production
- Intégration des situations d’usage du produit
- Évaluation des performances du produit dès sa conception

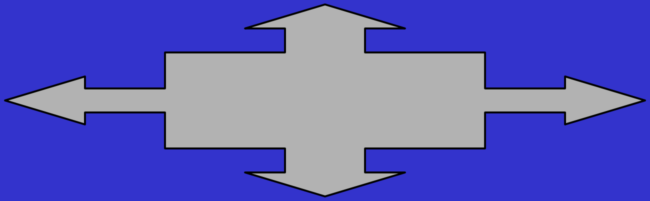
Des constats :

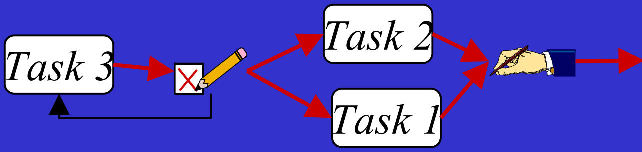
- Collaboration en ingénierie simultanée d’acteurs de métiers différents, utilisant des outils différents et appartenant à des organisations (services ou entreprises) différentes
- Intérêt des approches intégrées de type « produit/process »
- Existence de systèmes de gestion des données produits (PDM)
- Prise en compte des aspects organisationnels/documentaires/multi-vues/processus

Organisations



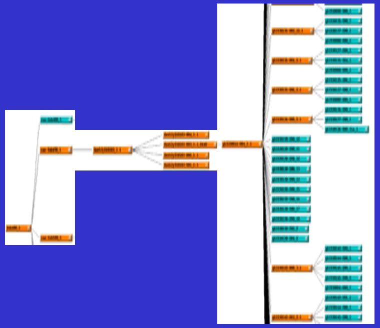





Task 3
Task 2
Task 1

Tâches, processus

Documents,
Savoirs et savoir-faire,
Outils et méthodes



Système virtuel multi-vues, maquette numérique

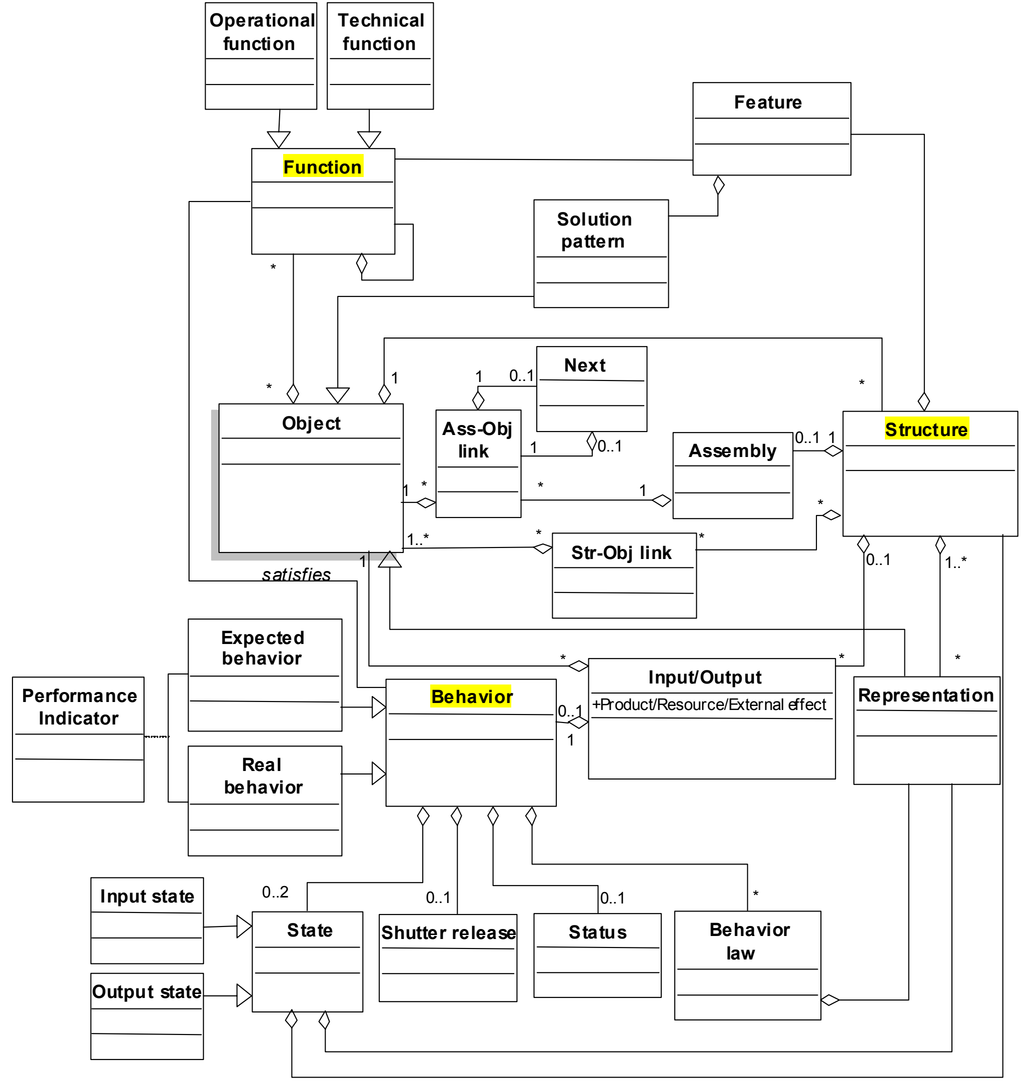
D'après TOLLENAERE, AS STIC, 2002

Principaux besoins :

- Modèles intégrant la représentation des produits et des possibilités d'analyse de leurs performances dans les situations de leur cycle de vie
- Méthodes supportant l'utilisation des ces modèles
- Formats des modèles et outils interopérables
- Environnements de coopération
- Possibilités d'optimisation incluant différents aspects du cycle de vie des produits
- Outils d'aide à la décision dès les premières phases du cycle de vie des produits

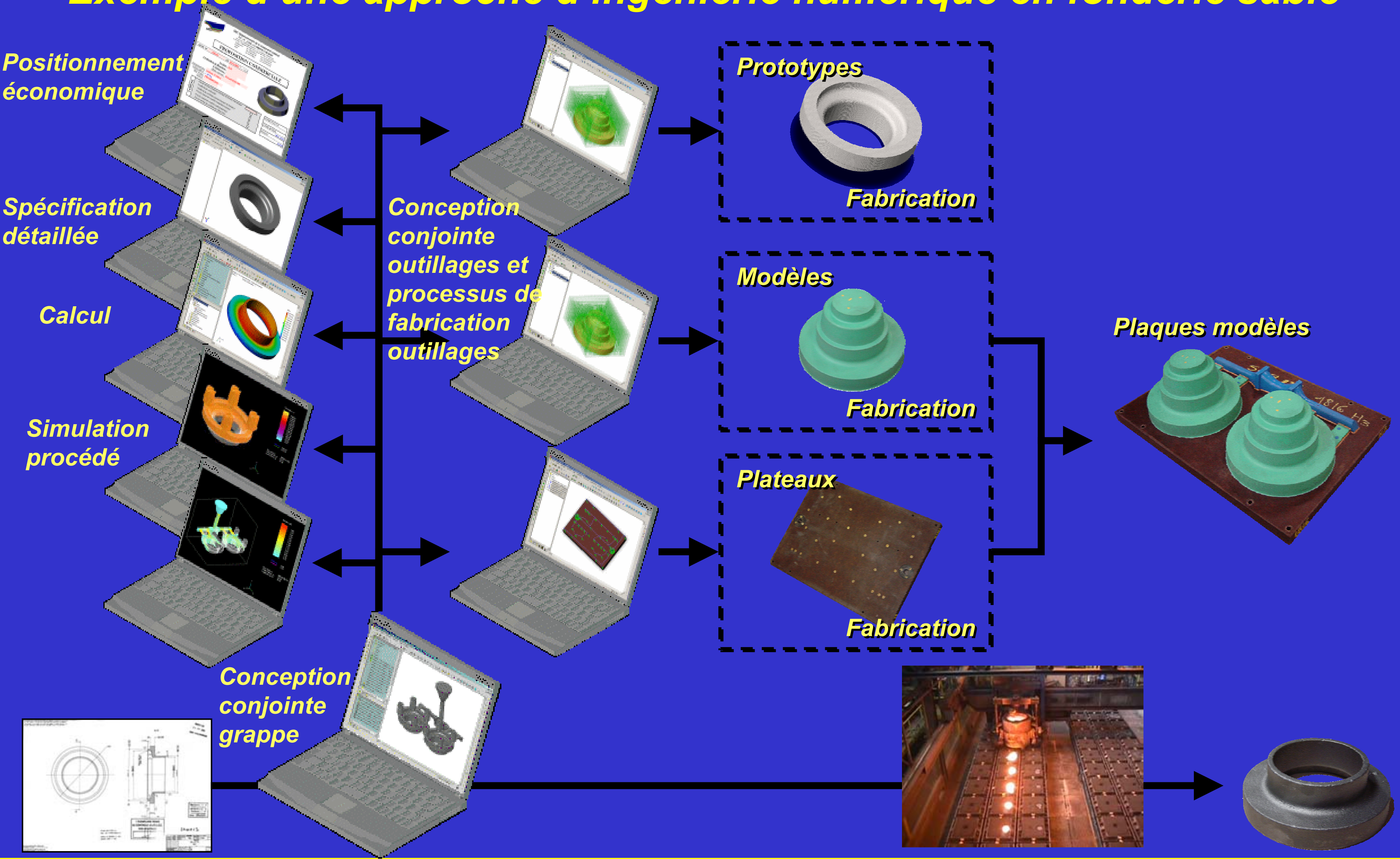
Des modèles pour le PLM

Exemple d'un modèle unique pour tous les objects d'entreprise


Operational function
Technical function
Feature
Function
Solution pattern
*
Next
1
0..1
1
*
Object
Ass-Obj link
1
0..1
Assembly
0..1
1
Structure
1
*
*
1
*
1..*
*
Str-Obj link
*
1
satisfies
0..1
1..*
Expected behavior
Performance Indicator
*
Input/Output
+Product/Resource/External effect
*
*
Representation
Behavior
0..1
1
Real behavior
Input state
0..2
0..1
0..1
*
State
Shutter release
Status
Behavior law
Output state

Des méthodes et outils pour le PLM

Exemple d’une approche d’ingénierie numérique en fonderie sable



Positionnement économique

Spécification détaillée

Calcul

Simulation procédé

Conception conjointe outillages et processus de fabrication outillages

Prototypes

Fabrication

Modèles

Fabrication

Plateaux

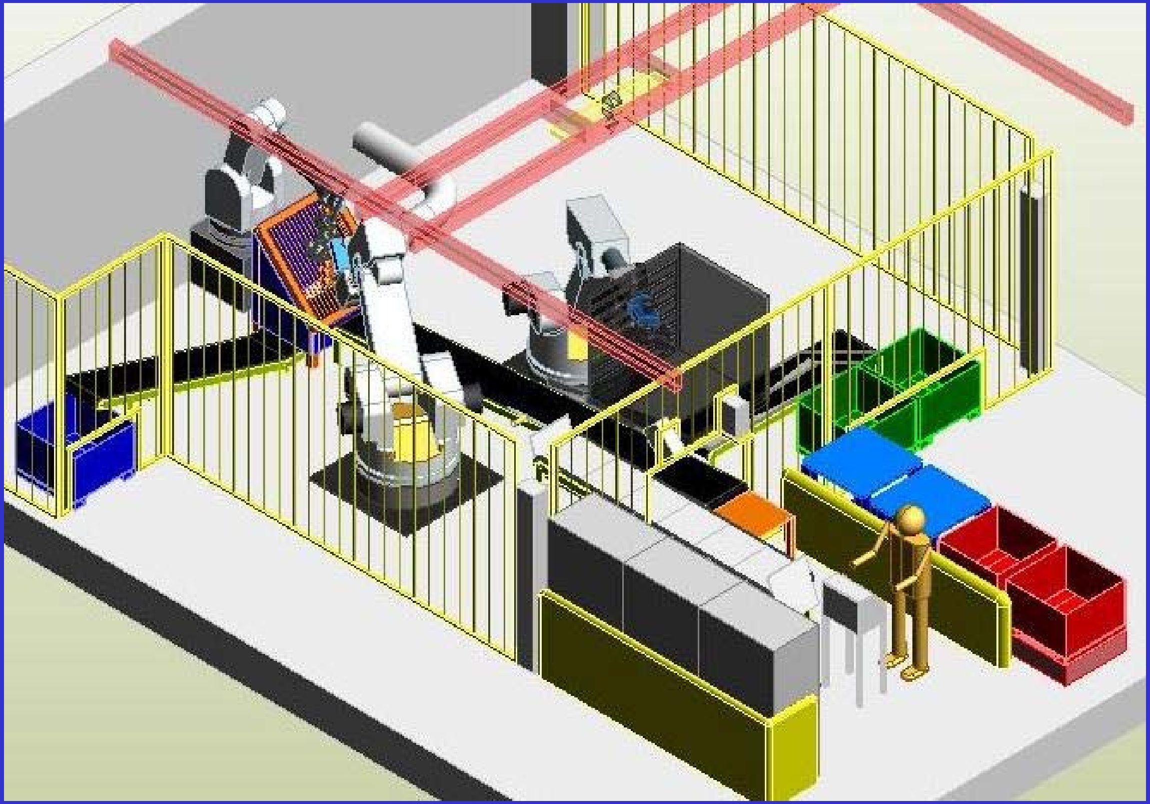
Fabrication

Plaques modèles

Conception conjointe grappe

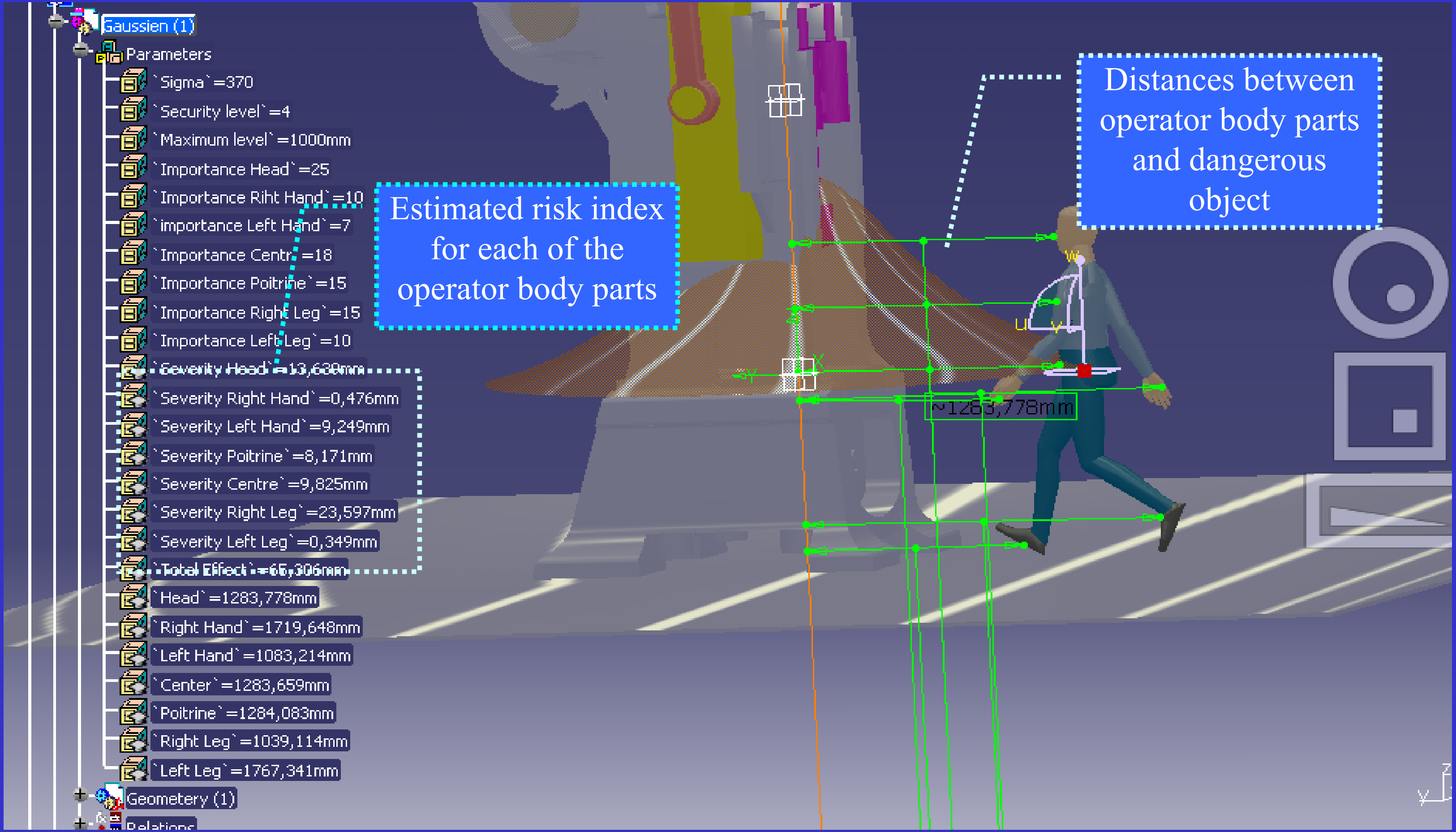
Des méthodes et outils pour le PLM

Exemple de la conception d’une cellule robotisée pour le dégrappage



Des méthodes et outils pour le PLM

Exemple d’un outil d’évaluation des risques au travail



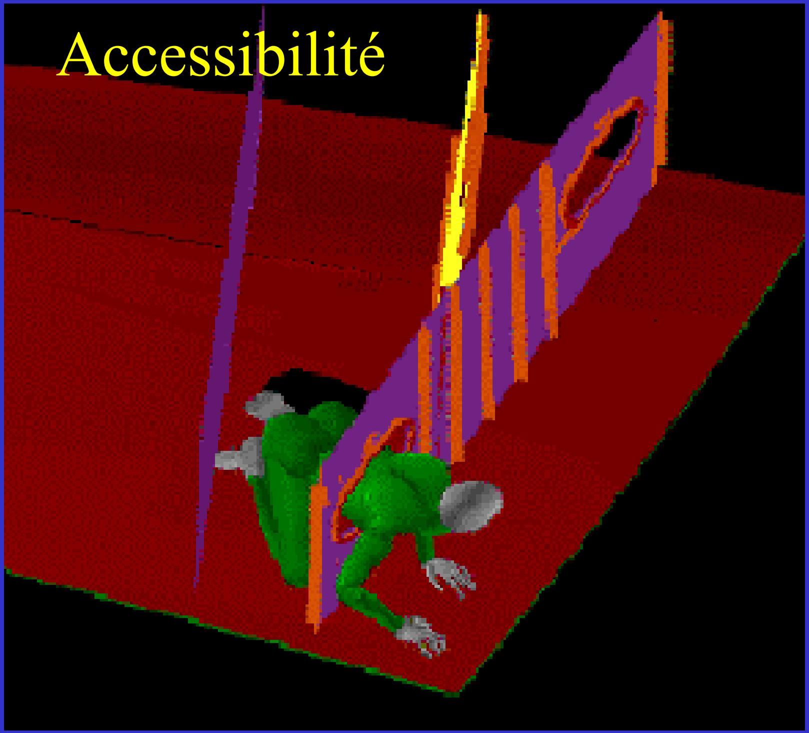
Gaussien (1)
- Parameters
  - `Sigma`=370
  - `Security level`=4
  - `Maximum level`=1000mm
  - `Importance Head`=25
  - `Importance Riht Hand`=10
  - `importance Left Hand`=7
  - `Importance Centre`=18
  - `Importance Poitrine`=15
  - `Importance Right Leg`=15
  - `Importance Left Leg`=10
  - `Severity Head`=13,639mm
  - `Severity Right Hand`=0,476mm
  - `Severity Left Hand`=9,249mm
  - `Severity Poitrine`=8,171mm
  - `Severity Centre`=9,825mm
  - `Severity Right Leg`=23,597mm
  - `Severity Left Leg`=0,349mm
  - `Total Effect`=65,306mm
  - `Head`=1283,778mm
  - `Right Hand`=1719,648mm
  - `Left Hand`=1083,214mm
  - `Center`=1283,659mm
  - `Poitrine`=1284,083mm
  - `Right Leg`=1039,114mm
  - `Left Leg`=1767,341mm
- Geometery (1)
- Relations

Estimated risk index for each of the operator body parts

Distances between operator body parts and dangerous object

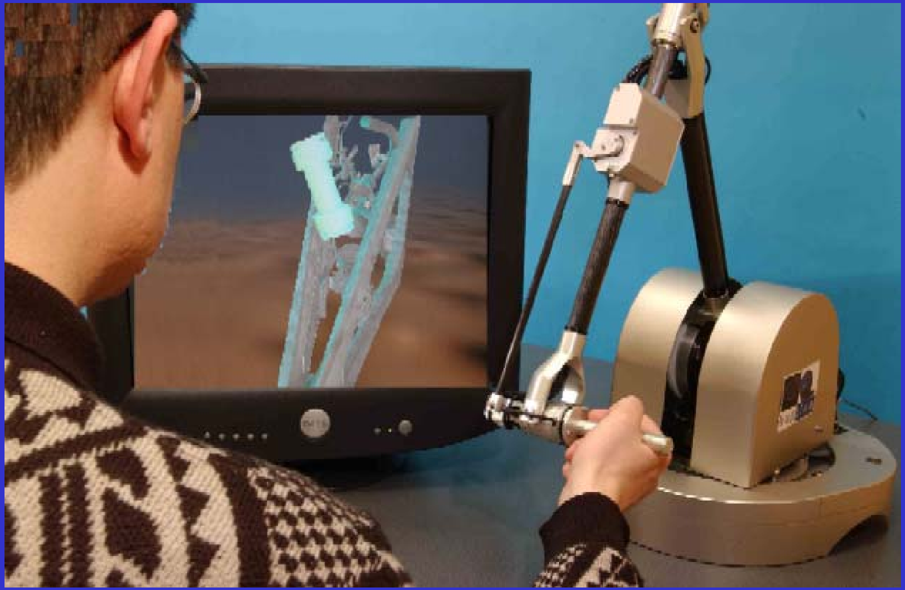
Des méthodes et outils pour le PLM

Exemple d'évaluation de l'accessibilité et de la montabilité



Courtoisie : IRCCyN/CEA

Montabilité (périphérique haptique)

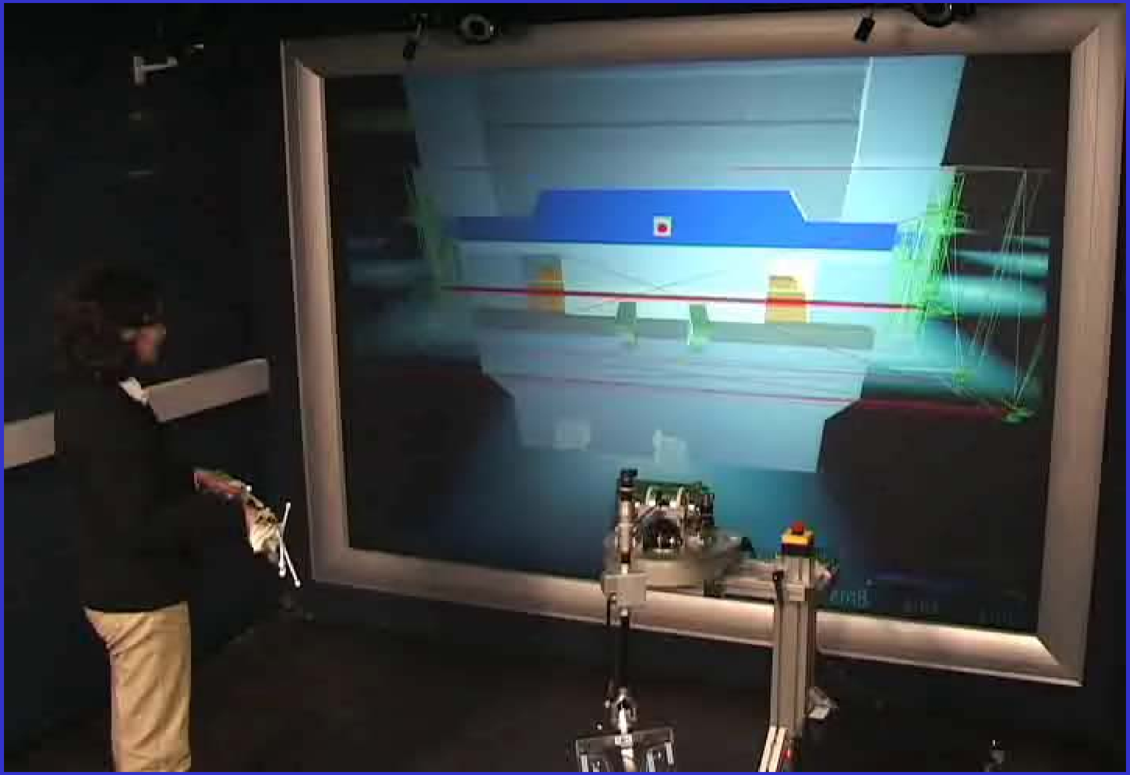


Courtoisie : CEA/PERF RV

Des méthodes et outils pour le PLM

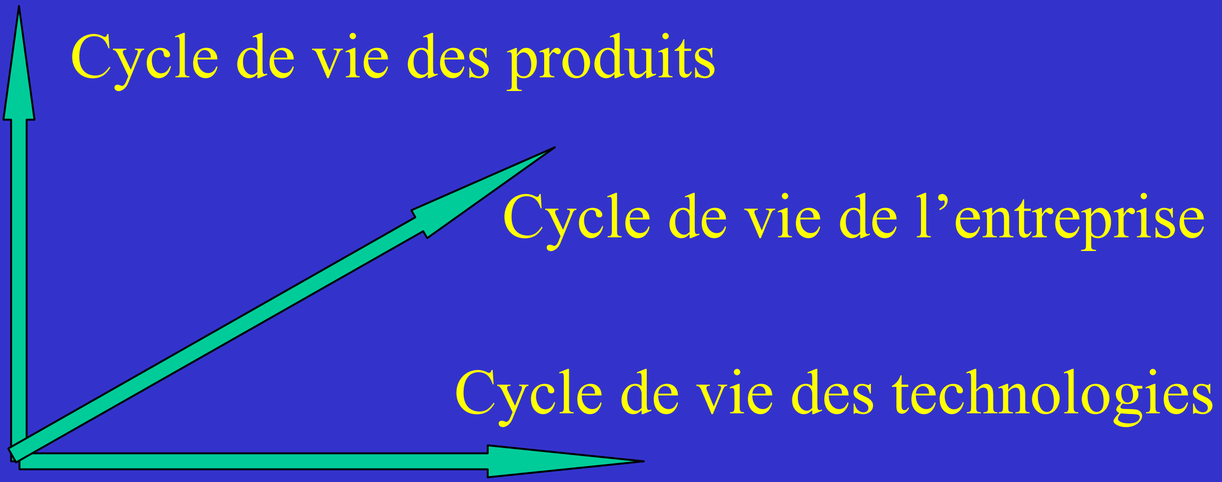
Exemple d'évaluation de l'accessibilité sur un poste de travail

Accessibilité (réalité virtuelle)



Courtoisie : IRCCyN/CEA/INRS

Gérer le cycle de vie des technologies et des organisations

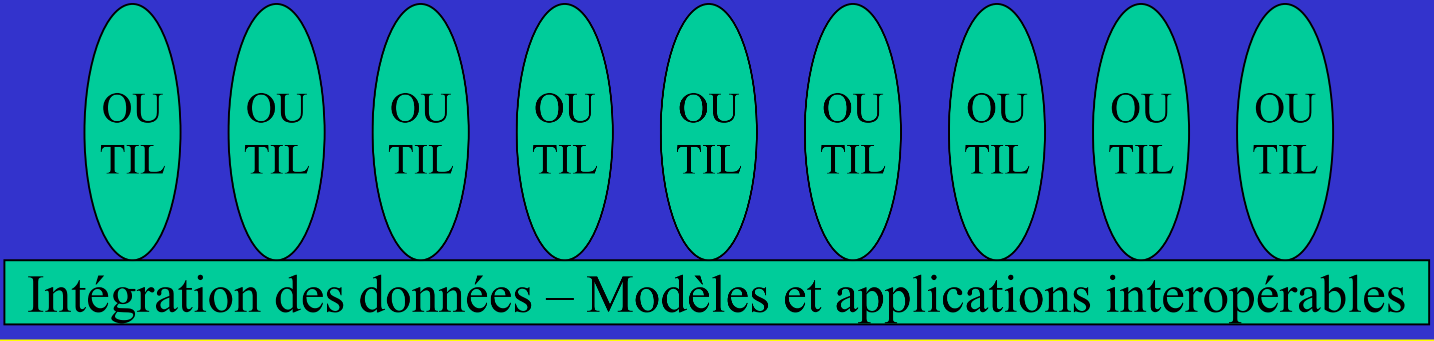

Cycle de vie des produits

Cycle de vie de l’entreprise

Cycle de vie des technologies

Deux nécessités principales :

- Fournir des outils « numériques » (virtual product development)
- Permettre la coordination cohérente du cycle de vie des informations


OU TIL
OU TIL
OU TIL
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OU TIL
OU TIL
OU TIL
Intégration des données – Modèles et applications interopérables

PLM

- **P** comme PRODUCT : avec toute sa sémantique

- **L** comme LIFE-CYCLE : de l'idée à la fin de vie

- **M** comme MANAGEMENT : gestion cohérente des informations relatives au produit et aux composantes de son cycle de vie au fur et à mesure de leur création, de leur modification, de leur destruction

PLM

- Un essai de définition :

Le PLM est une approche intégrée pour la gestion de la création et de la dissémination des données d'ingénierie à travers l'entreprise étendue.

- Du point de vue des outils, le PLM peut être considéré comme possédant deux domaines majeurs :

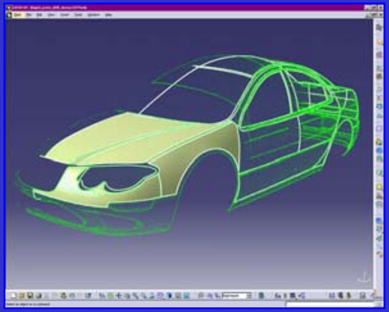
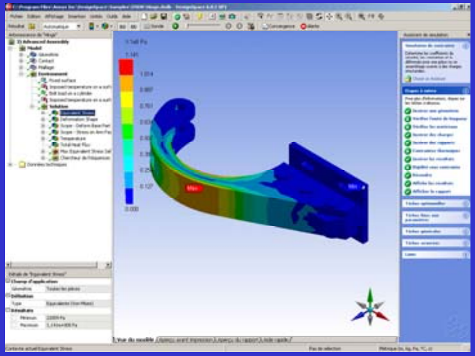
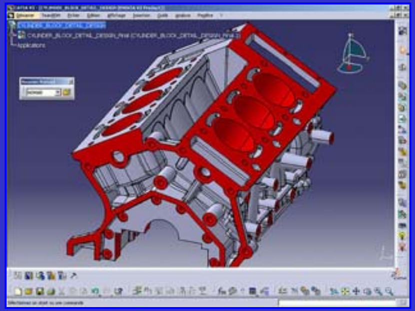
☐ *outils pour la création du produit et des composants techniques liés à son cycle de vie : les systèmes de CAO/IAO*
☐ *outils pour la gestion et l'optimisation des processus impliqués dans le cycle de vie du produit de sa naissance à sa fin de vie : PDM (Product Data Management), avec une partie de CRM (Customer Relationship Management), de SCM (Supply Chain Management) et en appui sur ERP (Enterprise Resource Planning)*

Enseigner le PLM

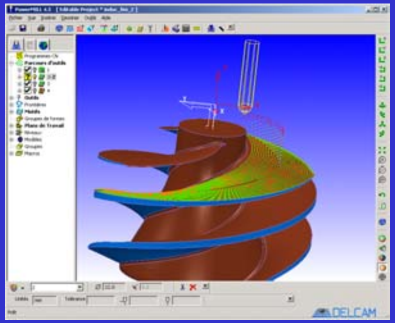
- Le PLM est-il une matière à part entière ?
- Quelles sont les composantes du PLM ?
- Quelles composantes du PLM peut-on enseigner et à quel niveau ?
- Est-ce que le PLM a une influence sur nos curricula de formations ?
- Est-ce que le PLM a une influence sur nos méthodes pédagogiques ?
- Quels outils et plates-formes utiliser pour enseigner le PLM ?
- Quelle place pour les projets dans l'enseignement du PLM ?

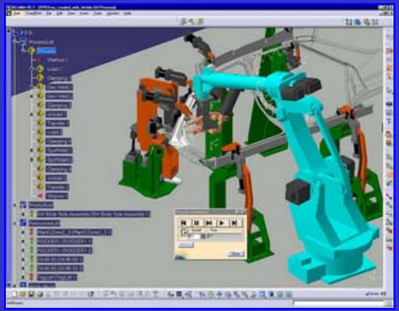
Contexte de conception

Conception de produits manufacturés de + en + complexes

co-opération d'équipes
Pluri-disciplinaires





Enterprise étendue

Activité distribuée : dans l'espace, le temps, les champs de compétences

D'après MARIN et al., Colloque AIP.PRIMECA, 2005

Des témoignages d'expériences pédagogiques (40')

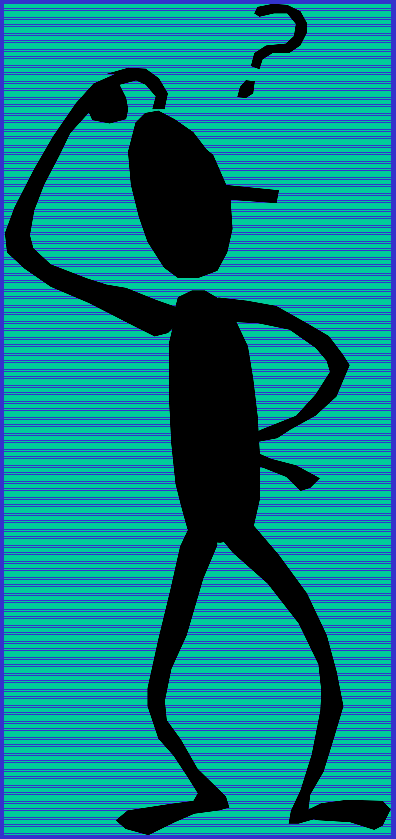
- Politecnico di Milano : Professor CUGGINI
- IdF : Jean-Claude BOCQUET (merci à P. MORENTON)
- RA : Frédéric NOEL et François VILLENEUVE
- PdL : Alain BERNARD (merci à D. CHABLAT et P. DEPINCE)
- RAO : Didier REMOND (merci à Michèle GUINGAND)
- MP : Alain DEDIE (merci à André PERE)
- L : Gabriel RIS

Un exemple de plate-forme industrielle (15’)

- Dassault Systèmes : Pierre-Jacques BAUER

« L’enseignement du PLM dans les institutions académiques »

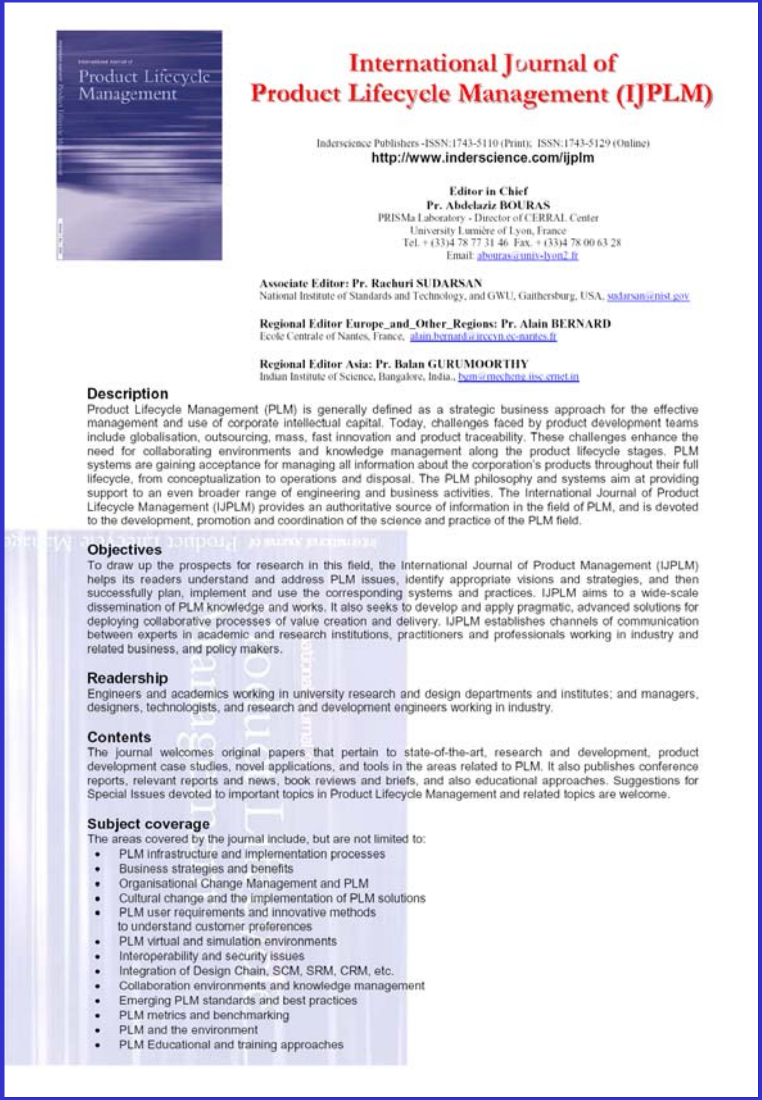
DISCUSSION - QUESTIONS



Synthèse

- Réalités pédagogiques pratiques
- Réalités des outils
- Existence d’une communauté internationale du PLM
- Nécessité de coordonner nos efforts au niveau pédagogique
- Nécessité d’un vrai partenariat avec les fournisseurs d’outils
- Création d’un groupe de travail

Une revue internationale



Product Lifecycle Management

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Description

Product Lifecycle Management (PLM) is generally defined as a strategic business approach for the effective management and use of corporate intellectual capital. Today, challenges faced by product development teams include globalisation, outsourcing, mass, fast innovation and product traceability. These challenges enhance the need for collaborating environments and knowledge management along the product lifecycle stages. PLM systems are gaining acceptance for managing all information about the corporation's products throughout their full lifecycle, from conceptualization to operations and disposal. The PLM philosophy and systems aim at providing support to an even broader range of engineering and business activities. The International Journal of Product Lifecycle Management (IJPLM) provides an authoritative source of information in the field of PLM, and is devoted to the development, promotion and coordination of the science and practice of the PLM field.

Objectives

To draw up the prospects for research in this field, the International Journal of Product Management (IJPLM) helps its readers understand and address PLM issues, identify appropriate visions and strategies, and then successfully plan, implement and use the corresponding systems and practices. IJPLM aims to a wide-scale dissemination of PLM knowledge and works. It also seeks to develop and apply pragmatic, advanced solutions for deploying collaborative processes of value creation and delivery. IJPLM establishes channels of communication between experts in academic and research institutions, practitioners and professionals working in industry and related business, and policy makers.

Readership

Engineers and academics working in university research and design departments and institutes; and managers, designers, technologists, and research and development engineers working in industry.

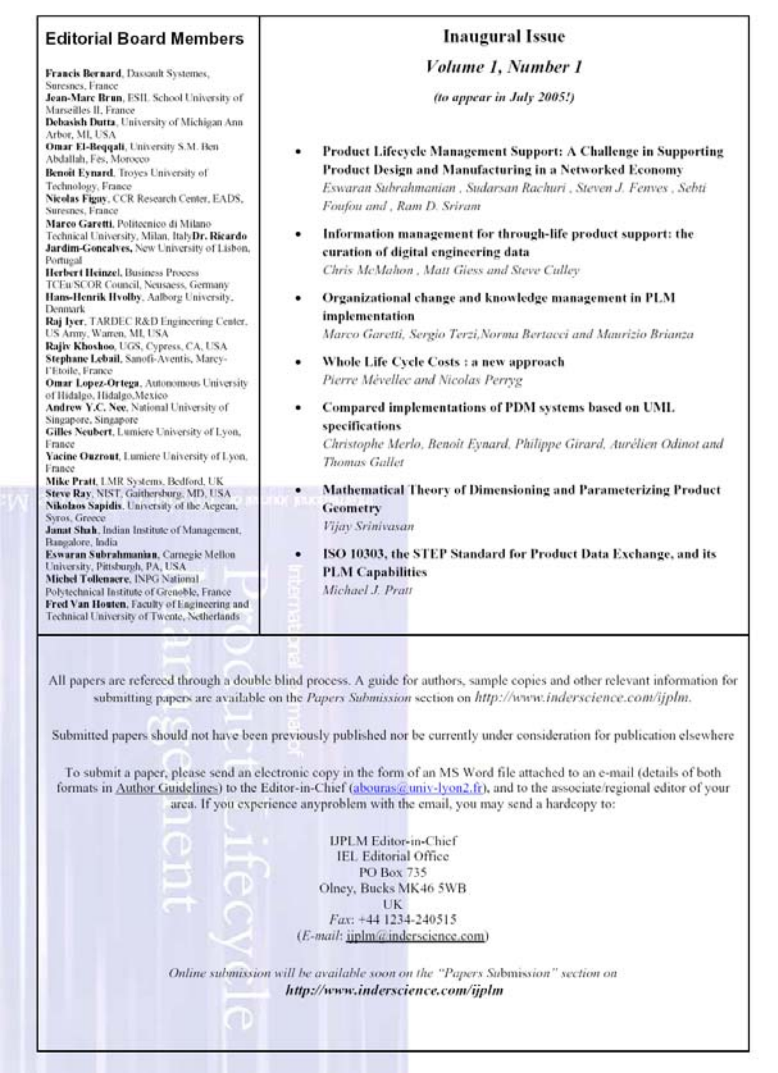
Contents

The journal welcomes original papers that pertain to state-of-the-art, research and development, product development case studies, novel applications, and tools in the areas related to PLM. It also publishes conference reports, relevant reports and news, book reviews and briefs, and also educational approaches. Suggestions for Special Issues devoted to important topics in Product Lifecycle Management and related topics are welcome.

Subject coverage

The areas covered by the journal include, but are not limited to:

- PLM infrastructure and implementation processes
- Business strategies and benefits
- Organisational Change Management and PLM
- Cultural change and the implementation of PLM solutions
- PLM user requirements and innovative methods to understand customer preferences
- PLM virtual and simulation environments
- Interoperability and security issues
- Integration of Design Chain, SCM, SRM, CRM, etc.
- Collaboration environments and knowledge management
- Emerging PLM standards and best practices
- PLM metrics and benchmarking
- PLM and the environment
- PLM Educational and training approaches



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Inaugural Issue

Volume 1, Number 1

(to appear in July 2005!)

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  Vijay Srinivasan
- **ISO 10303, the STEP Standard for Product Data Exchange, and its PLM Capabilities**
  Michael J. Pratt

All papers are refereed through a double blind process. A guide for authors, sample copies and other relevant information for submitting papers are available on the *Papers Submission* section on *http://www.inderscience.com/ijplm.*

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere

To submit a paper, please send an electronic copy in the form of an MS Word file attached to an e-mail (details of both formats in Author Guidelines) to the Editor-in-Chief (abouras@univ-lyon2.fr), and to the associate/regional editor of your area. If you experience anyproblem with the email, you may send a hardcopy to:

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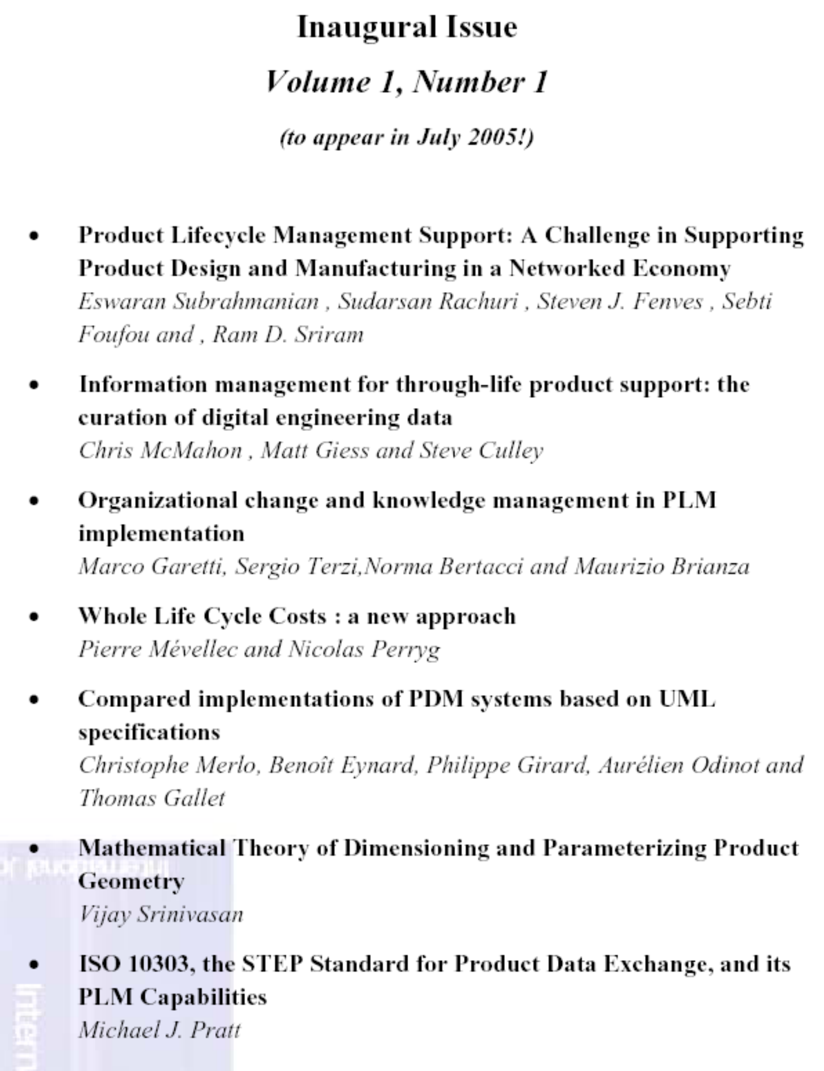
Une revue internationale



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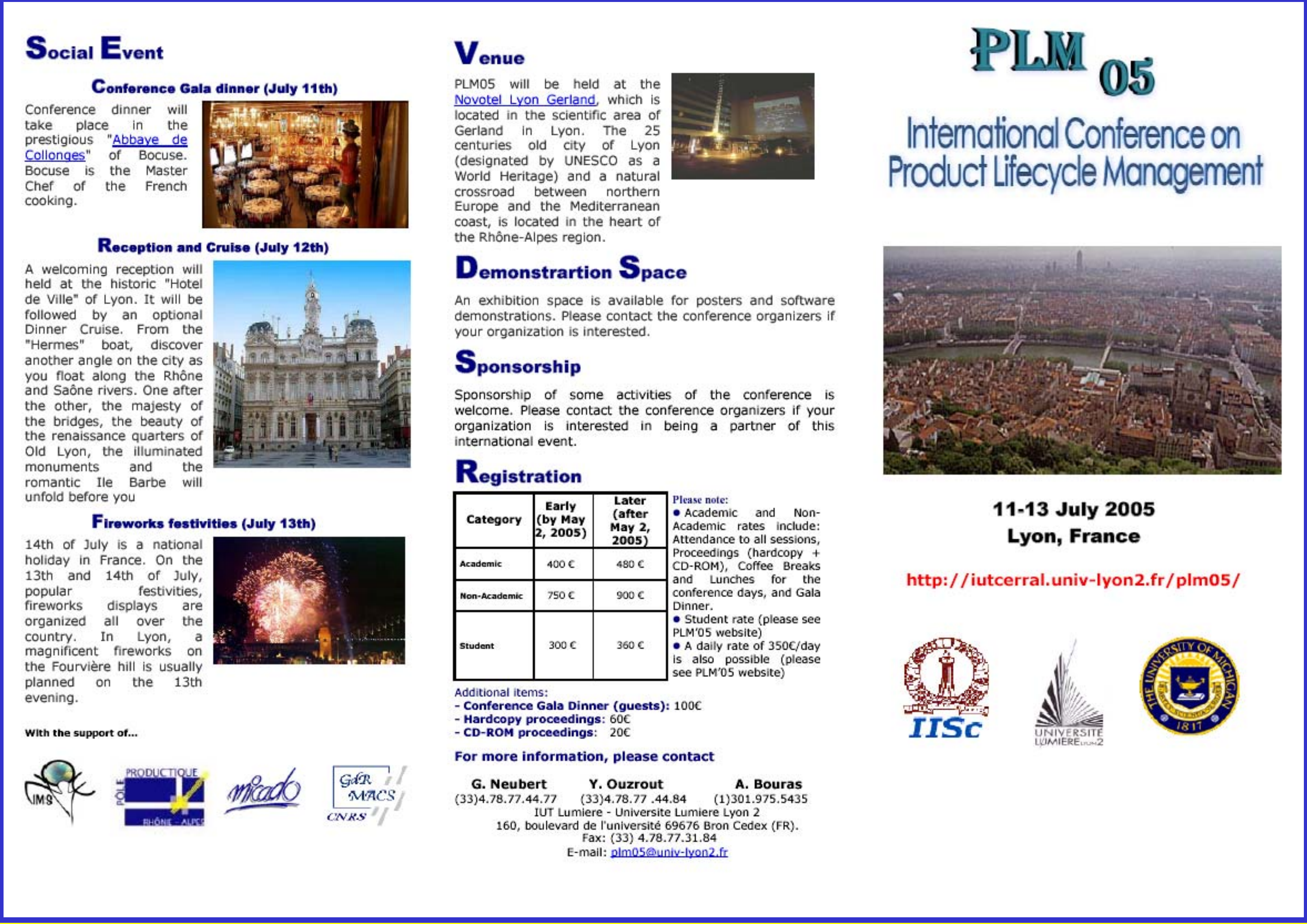
Une conférence internationale



Social Event

Conference Gala dinner (July 11th)

Conference dinner will take place in the prestigious "Abbaye de Collonges" of Bocuse. Bocuse is the Master Chef of the French cooking.

Reception and Cruise (July 12th)

A welcoming reception will held at the historic "Hotel de Ville" of Lyon. It will be followed by an optional Dinner Cruise. From the "Hermes" boat, discover another angle on the city as you float along the Rhône and Saône rivers. One after the other, the majesty of the bridges, the beauty of the renaissance quarters of Old Lyon, the illuminated monuments and the romantic Ile Barbe will unfold before you

Fireworks festivities (July 13th)

14th of July is a national holiday in France. On the 13th and 14th of July, popular festivities, fireworks displays are organized all over the country. In Lyon, a magnificent fireworks on the Fourvière hill is usually planned on the 13th evening.

With the support of...

Venue

PLM05 will be held at the Novotel Lyon Gerland, which is located in the scientific area of Gerland in Lyon. The 25 centuries old city of Lyon (designated by UNESCO as a World Heritage) and a natural crossroad between northern Europe and the Mediterranean coast, is located in the heart of the Rhône-Alpes region.

Demonstrartion Space

An exhibition space is available for posters and software demonstrations. Please contact the conference organizers if your organization is interested.

Sponsorship

Sponsorship of some activities of the conference is welcome. Please contact the conference organizers if your organization is interested in being a partner of this international event.

Registration

Category	Early (by May 2, 2005)	Later (after May 2, 2005)
Academic	400 €	480 €
Non-Academic	750 €	900 €
Student	300 €	360 €

Please note:

- Academic and Non-Academic rates include: Attendance to all sessions, Proceedings (hardcopy + CD-ROM), Coffee Breaks and Lunches for the conference days, and Gala Dinner.
- Student rate (please see PLM'05 website)
- A daily rate of 350€/day is also possible (please see PLM'05 website)

Additional items:
- **Conference Gala Dinner (guests):** 100€
- **Hardcopy proceedings**: 60€
- **CD-ROM proceedings**: 20€

For more information, please contact

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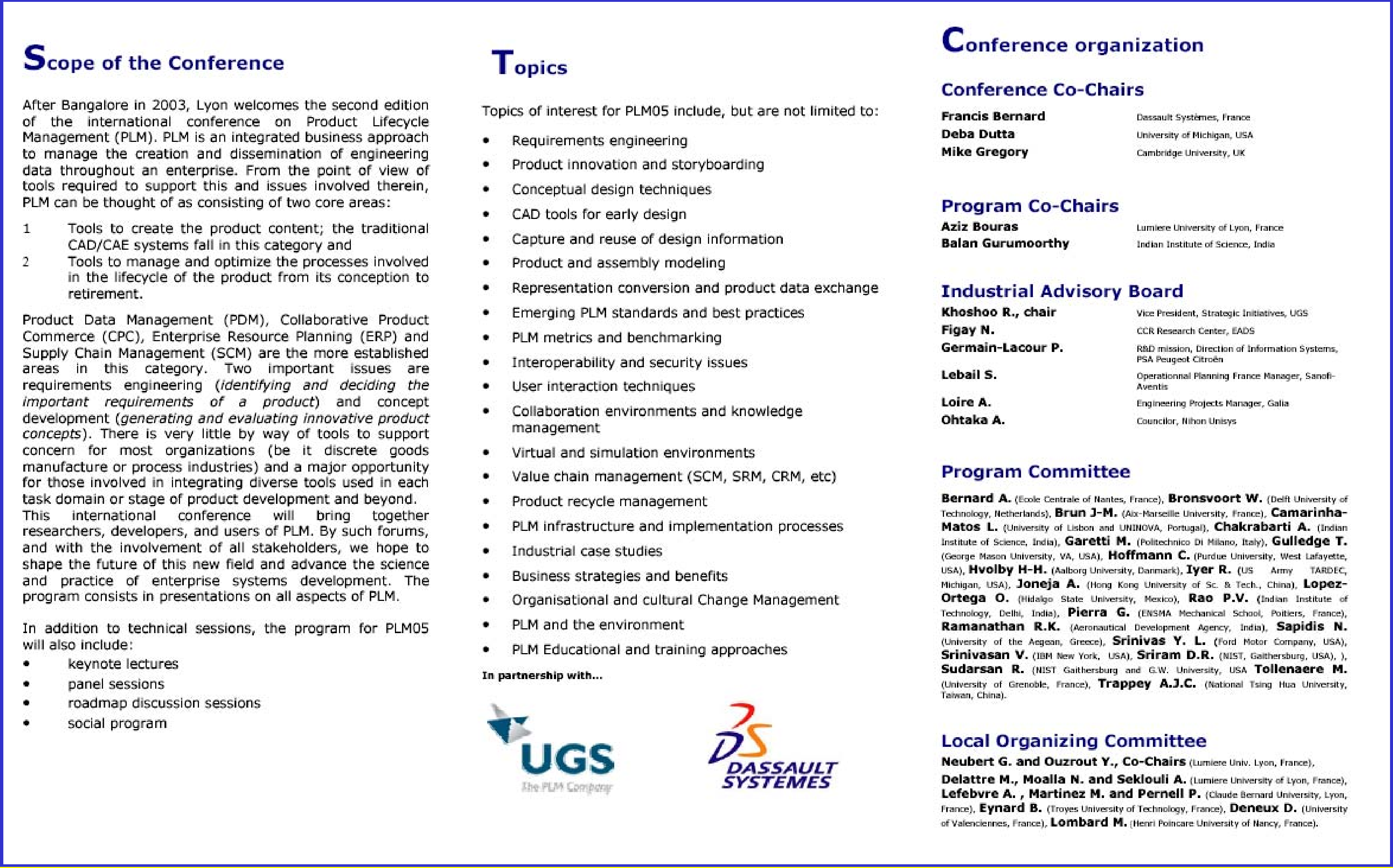
PLM 05

International Conference on Product Lifecycle Management

11-13 July 2005
Lyon, France

http://iutcerral.univ-lyon2.fr/plm05/

Une conférence internationale



Scope of the Conference

After Bangalore in 2003, Lyon welcomes the second edition of the international conference on Product Lifecycle Management (PLM). PLM is an integrated business approach to manage the creation and dissemination of engineering data throughout an enterprise. From the point of view of tools required to support this and issues involved therein, PLM can be thought of as consisting of two core areas:

1 Tools to create the product content; the traditional CAD/CAE systems fall in this category and
2 Tools to manage and optimize the processes involved in the lifecycle of the product from its conception to retirement.

Product Data Management (PDM), Collaborative Product Commerce (CPC), Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) are the more established areas in this category. Two important issues are requirements engineering (*identifying and deciding the important requirements of a product*) and concept development (*generating and evaluating innovative product concepts*). There is very little by way of tools to support concern for most organizations (be it discrete goods manufacture or process industries) and a major opportunity for those involved in integrating diverse tools used in each task domain or stage of product development and beyond. This international conference will bring together researchers, developers, and users of PLM. By such forums, and with the involvement of all stakeholders, we hope to shape the future of this new field and advance the science and practice of enterprise systems development. The program consists in presentations on all aspects of PLM.

In addition to technical sessions, the program for PLM05 will also include:

- keynote lectures
- panel sessions
- roadmap discussion sessions
- social program

Topics

Topics of interest for PLM05 include, but are not limited to:

- Requirements engineering
- Product innovation and storyboarding
- Conceptual design techniques
- CAD tools for early design
- Capture and reuse of design information
- Product and assembly modeling
- Representation conversion and product data exchange
- Emerging PLM standards and best practices
- PLM metrics and benchmarking
- Interoperability and security issues
- User interaction techniques
- Collaboration environments and knowledge management
- Virtual and simulation environments
- Value chain management (SCM, SRM, CRM, etc)
- Product recycle management
- PLM infrastructure and implementation processes
- Industrial case studies
- Business strategies and benefits
- Organisational and cultural Change Management
- PLM and the environment
- PLM Educational and training approaches

In partnership with...

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The PLM Company

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Conference organization

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