# Table of Contents

## User Keynotes

- **PDM/ EDM as Integration Layer for Continuous Workflows Based on Relevant Product Data**
  
  K.H. Mühleck

  ................................................................................... 1

- **DMU@Airbus – Evolution of the Digital Mock-up (DMU) at Airbus to the Centre of Aircraft Development**
  
  R. Garbade, W. R. Dolezal

  ................................................................................... 3

- **Knowledge-based Design – An Integrated Approach**
  
  A. Katzenbach, W. Bergholz, A. Rolinger

  ................................................................................... 13

## Vendor Keynotes

- **Cross Disciplinary Methods for Accelerated Product Delivery**
  
  C. Grindstaff

  ................................................................................... 23

- **Advances in PLM Methodologies Driving Needs for New Competencies**
  
  X. Fouger

  ................................................................................... 29

- **A Systematic Approach to Product Development Best Practises**
  
  J. Heppelmann
Design Theory

SPALTEN Matrix – Product Development Process on the Basis of Systems Engineering and Systematic Problem Solving .................. 43
A. Albers, M. Meboldt

How to Measure the Success Potential and the Degree of Innovation of Technical Ideas and Products ........................................ 53
H. Binz, M. Reichle

Towards a Generic Model of Smart Synthesis Tools .................. 65
W. O. Schotborgh, H. Tragter, F. G. M. Kokkeler,
F. J. A. M. van Houten, T. Tomiyama

Improving Product Development by Design-for-X (DfX) Support .......... 75
A. Bufardi, A. Edler, M. Frey, D. Kiritsis, A. Metin, B. Smith

Looking at “DFX” and “Product Maturity” from the Perspective of a New Approach to Modelling Product and Product Development Processes ......................................................... 85
Chr. Weber

Support of Design Engineering Activity for a Systematic Improvement of Products ......................................................... 105
A. Albers, T. Alink

The STEP Standards in Semantic Web – A Way to Integrate the Product Development Chain ................................. 115
K. Schützer, A.A.A. Moura

Configuration instead of New Design Using Reference Product Structures ......................................................... 125
E. Nurcahya

Implications of Complexity in Early Stages of Innovation Processes for the Definition of Heuristic Engineering Methods ......................................................... 135
M. Weigt
Trends of Evolutions and Patent Analysis: 
An Application in the Household Appliances Field
A. Crotti, M. Ghitti, D. Regazzoni, C. Rizzi

Understanding the Link between Aesthetics 
and Engineering in Product Design
R. Roy, P. Baguley, L. Reeve

Preliminary Study of Cognitive Model of Designer’s Creativity 
by Using Formal Protocol Analysis
S. Yao, Y. Zeng

Results of an Industry Survey on the Application 
of Dependability Oriented Design Methods
Th. Müller, K. Manga, M. Walther, J. Wallaschek

Holistic Methods in Product Development
H.-J. Franke

Requirements

A Holistic Approach for Integrated Requirements Modeling 
in the Product Development Process
M. Maletz, J.-G. Blouin, H. Schnedl, D. Brisson, K. Zamazal

Multi-level Representation for Supporting 
the Conceptual Design Phase of Modular Products
M. Germani, M. Mengoni, R. Raffaeli

Dependency of the Product Gestalt on Requirements 
in Industrial Design Engineering
A. Götz, T. Maier

Synergy of Technical Specifications, Functional Specifications 
and Scenarios in Requirements Specifications
J. Miedema, M. C. van der Voort, D. Lutters, F. J. A. M. van Houten

Modeling of Heterogeneous Systems in Early Design Phases
M. Reebing, U. Döring, T. Brix
### Table of Contents

**Requirement-oriented Configuration of Parallel Robotic Systems**

*C. Stechert, H.-J. Franke*

Page 259

**A Scandinavian Model of Innovative Product Development**

*T.C. McAloone, M.M. Andreasen, P. Boelskifte*

Page 269

**Collaborative Engineering**

**Toward a Framework for Effective Collaborative Product Development**

*M. Sadeghi, F. Noël, K. Hadj-Hamou*

Page 279

**Scalable Product Development in a Collaborative Environment**

*G. Schuh, C. Nonn, M. Jung*

Page 291

**A New Concept for Collaborative Product & Process Design within a Human-oriented Collaborative Manufacturing Environment**

*D. Mavrikios, M. Pappas, V. Karabatsou, G. Chryssolouris*

Page 301

**Towards a Framework for Managing Conceptual Knowledge in Distributed and Collaborative R&D Projects**

*A. Vacher, D. Brissaud, S. Tichkiewitch*

Page 311

**DEPNET: A Methodology for Identifying and Qualifying Dependencies Between Engineering Data**

*M. Z. Ouertani, K. Grebici, L. Gzara, E. Blanco, D. Rieu*

Page 319

**Distributed Product Development in the Framework of Modern Engineering Education**

*S. Consiglio, G. Seliger, S. Severengiz*

Page 331


*G. Draghici, A. Draghici*

Page 341
Table of Contents

Complex Design, Mechatronics

Facing Multi-Domain Complexity in Product Development.......................... 351
U. Lindemann, M. Maurer

Using Evolutionary Algorithms to Support the Design of Self-optimizing Mechatronic Systems ....................... 363
R. Radkowski, U. Frank, J. Gausemeier

Case Study of a MEMS Switch Supported by a FBS and DFM Framework......................................................... 377

Reverse Engineering

Digital Processing and Fusion of 3D Data from Emerging Non-Contact 3D Measurement Technologies ...................... 387
A. Fischer

3D Digitalization for Patrimonial Machines.......................................................... 397
F. Laroche, A. Bernard, M. Cotte

Using a Modified Failure Modes and Effects Analysis within the Structured Design Recovery Framework.................. 409
R. J. Urbanic, W. H. ElMaraghy

Knowledge Reengineering for Reverse Engineering Purposes .............. 421
Z. Weiss, M. Pankowski

Virtual Prototyping

Extended Virtual Prototyping ........................................................................ 431
G. Höhne, S. Husung, E. Lotter

MagicMirror & FootGlove:
A New System for the Customized Shoe Try-on ........................................ 441
S. Mottura, L. Greci, E. Travaini, G. Viganò, M. Sacco
Contact Pressure Calculation Methodologies in Aeronautic Gearboxes in the CAD Process .............................................. 451
L. Zamponi, E. Mermoz, J.M. Linares

**Product Design**

Common Representation of Products and Services: A Necessity for Engineering Designers to Develop Product-Service Systems .......................................................... 463
N. Maussang, D. Brissaud, P. Zwolinski

Toward Design Interference Detection to Deal with Complex Design Problems ............................................................ 473
T. Tomiyama, V. D’Amelio

About the Efficiency and Cost Reduction of Parallel Mixed-Model Assembly Lines .......................................................... 483
S. Hazbany, I. Gilad, M. Shpitalni

The Application of a Statistical Design of Experiment for Quantitative Analysis and Optimisation of Development Processes ........................................... 493
F.-L. Krause, Chr. Kind, C. Biantoro

**PLM**

PLM Services in Practice .......................................................................................................................... 503
L. Lämmer, R. Bugow

Composite Applications Enabling Product Data Management Applying SOA Principles and Software Factory Methods ........................................... 513
Y. Bock

A Holistic, Methodical Approach to Evaluate the PDMS-capability of Companies .................................................. 521
J. Feldhusen, B. Gebhardt, M. Löwer

Lifecycle Information Model for Higher Order Bifurcated Sheet Metal Products .................................................. 531
R. Anderl, Z. Wu, Th. Rollmann, M. Kormann
# Table of Contents

Simulation-based Multiple Project Management in Engineering Design .......................... 543  
T. Licht, L. Schmidt, C.M. Schlick, L. Dohmen, H. Luczak

Towards “The Timeless Way of Product Lifecycle Management” .......... 555  
J. Feldhusen, F. Bungert

Development of a Strategy Tool for Environmental Compliance Management .................. 565  
A. Dimache, L. Dimache, E. Zoldi, T. Roche

## KBE

Software Engineering and Knowledge Engineering: From Competition to Cooperation ........ 575  
S. Ammar-Khodja, N. Perry, A. Bernard

Applying KBE Technologies to the Early Phases of Multidisciplinary Product Design .................. 587  
A. Schneegans, F. Ehlermann

A Way to Manage CalculationEngineers’ Knowledge ...................................................... 597  
C. Beylier, F. Pourroy, F. Villeneuve

On the Way to Knowledge Awareness in Early Design .............................................. 607  
Å. Ericson, M. Bergström, C. Johansson, T. Larsson

Enhanced B-Rep Graph-based Feature Sequences Recognition Using Manufacturing Constraints ........................................... 617  
R. Harik, V. Capponi, W. Derigent

Facilitating Product Development with the Help of Knowledge Management: the McKnow Platform .............................................. 629  
J. Vertommen, J. D’hondt, J. Duflou

Integration of Learning Aptitude into Technical Systems ............................................ 639  
K. Paetzold
Science Keynotes

New Perspectives on Design and Innovation ........................................ 649
L. Alting, C. Clausen, U. Jørgensen, Y. Yoshinaka

Future Trends in Product Lifecycle Management (PLM)..................... 665
M. Abramovici

Modeling, Evaluation and Design of Product Quality
under Disturbances throughout the Total Product Life Cycle............... 675
F. Kimura

Closing Keynotes

Hype or Reality: Service Oriented Architecture
in Product Lifecycle Management –
How IBM Can Help You Achieve Innovation That Matters.............. 685
C. An

The Future of Product Development in India .................................... 691
A. Chakrabarti

Virtual Product Development as an Engine for Innovation............... 703
F.-L. Krause, H. Jansen, Chr. Kind, U. Rothenburg
The Future of Product Development
Proceedings of the 17th CIRP Design Conference
Krause, F.-L. (Ed.)
2007, XX, 713 p., Hardcover
ISBN: 978-3-540-69819-7