Annals of DAAAM for 2010 & Proceedings of the 21st International DAAAM Symposium, Volume 21, No. 1, ISSN 1726-9679
ISBN 978-3-901509-73-5, Editor B. Katalinic, Published by DAAAM International, Vienna, Austria, EU, 2010
Make Harmony Between Technology and Nature, and Your Mind will Fly Free as a Bird
Annals of DAAAM International

SYNCHRONOUS TECHNOLOGY TOOL FOR RAPID PRODUCT DEVELOPMENT

MAXIM, M[arek]; SEMINSKY, J[aroslav] & WESSELY, E[mil]

Abstract: *Following generally accepted trend of implementing of PLM systems this paper proposes anticipated trends and obstacles related to PLM. It is hoped that the next-generation PLM technology solutions will form the frontier basis for further research, development, and application of PLM systems to quickly adapt to the dynamic changing market for industry companies to pursue the most advanced competitiveness. For current economic climate that is stressing business anywhere companies need strong tool for freedom design and have to implemented appropriate methodology for that access.*
Key words: *Trends in Manufacturing & Automation, CAD/CAM/CAE Systems*

1. INTRODUCTION

In the modern global economy, companies are facing ever increasing challenges for short to enter into the market early new sophisticated products (Kuric, et. all, 2002), (Fig 1). Product Lifecycle Management (PLM), a new paradigm for product manufacturing (Stark, 2004), enables a company to manage its products all the way across their lifecycles in the most effective way (Stark, 2007). It helps companies get products to market faster, provide better support for their use, and manage end-of-life better. In today's highly competitive global markets, companies must meet the increasing demands of customers to rapidly and continually improve their products and services (Katalinic, 2003).

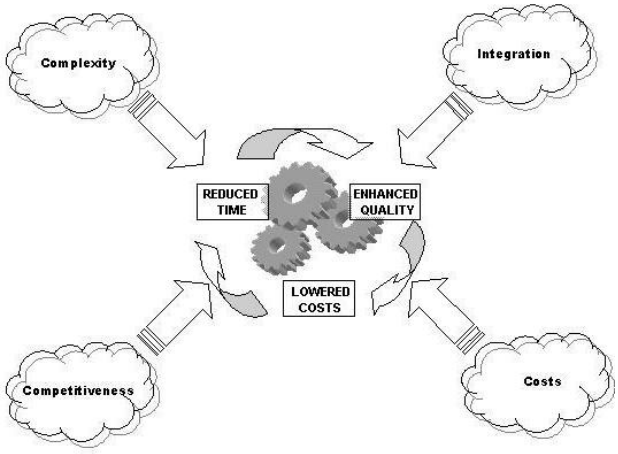

Fig. 1. Innovation and current economic climate

In the present time companies are facing to current economic climate that is stressing businesses everywhere. Product lifecycle management (PLM) is recognized as one of the key leading technologies to facilitate companies to overcome these challenges, which will offer companies a new way to rapidly plan, organize, manage, measure, and deliver innovations and new products much faster, better, and cheaper in an integrated way. Potential industrial impact of the developed PLM technology solutions is generally accepted.

PLM meets these needs, extending and bringing together previously separate fields such as Computer Aided Design, Product Data Management, Sustainable Development, Digital Manufacturing, Enterprise Resource Planning, Life Cycle Analysis and Recycling. Innovation (understanding as permanent product improvements and long-term positioning and process improvement, gaining efficiency, cost reduction, improving quality) plays a key role. Innovation is count as key competitive differentiator Monka & Monková, 2008).

PLM as one of the key leading technologies in CAD and IT related technologies passed from 90ties long journey from Image/Document Management across Product Structure management and Process management to present Product Innovation Management Is this way before end, or no? As we see new perspective IT technologies as 3D lifelike experience technologies, digital factory, synchronous technology etc. demonstrate next development from of the view of all product life cycle (Tichkiewitch & Brissaud, 2004).

In 2008 year Dassault Systèmes introduced concept PLM 2.0 (inspired by Web 2.0), that integrate social communication do the PLM scene:

- PLM products are oriented to web.
- PLM products are concerned to the online cooperation shared knowledge and on-line digital teams.
- PLM expands to new areas as crowd-sourcing and all web community PLM is enhanced outside company.

2. SYNCHRONOUS TECHNOLOGY

Another from advanced feature of present CAD/PLM systems is so called Synchronous Technology. The Synchronous Technology process combines the speed and flexibility of direct modelling with precise control of dimension driven design (features and synchronously solving parametrics). Parametric relationships can be applied directly to the solid features without having to depend on 2D sketch geometry, and common parametric relationships are applied automatically. This modelling process is claimed to make certain CAD design activities up to many times faster.

Unlike other direct modelling systems, it is not driven by the typical history-based modelling system, instead providing parametric dimension-driven modelling by synchronizing geometry, parameters and rules using a decision-making engine, allowing users to apply unpredicted changes. This object-driven editing model is known as the Object Action Interface, which emphasizes a User Interface that provides Direct Manipulation of objects (DMUI) (*** 2008).
Synchronous Technology has been integrated into Siemens commercial CAD software (Solid Edge, NX) software components. Synchronous technology, the tool for rapid development of product make possible to less experienced users

make changes that before on-coming this technology required serious knowledge not only of software tool but history of development of product model too. Curve of time of design model is so simplified to minimum and saved time will widely express in lowered costs to product development.

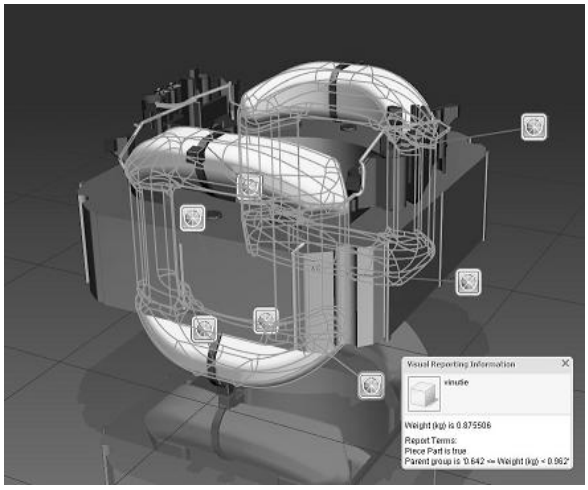

Fig. 2. Example of using of PLM technology for visualising of mass of part of component

Synchronous Technology method automates realisation of planning or non-planning changes in design, namely without consideration to source of the model and if is or is not known his history.

Present tolls of Synchronous Technology make possible to users using from the other CAD systems without to make model again. This feature is possible with advance to fulfil in globalise R&D environment. Users have flexible system where system automatically forecasts functions of various model elements (Fig. 2.). This presents big breakthrough in digital product development.

An important step forward is a new technology HD3D (High Definition Information for Product Development integrated in Unigrafix release NX7), which allows all users immediate access to PLM information about the product in 3D, with easy access to the administrative contexts of project status, design changes, shows the team responsibility, questions, problems, price, suppliers and other attributes.

3. CONCLUSION

In PLM systems new technologies are implemented presently (Siemens has started to use the term Design Freedom to describe the capabilities provided by Synchronous Technology, Dassault Systèmes speaks about lifelike design, etc.) that offer more creative environment for designers.

This capability of so new tools can be utilised only with appropriate implementing methodology (Parpala, 2009).

With regard to design of complex (mechatronic) engineering/technical systems the necessity of methodology of implementing in R&D companies is more and more important from these minimal points of view:

- Quick changes on the market and therefore of production conditions resulting in systematic product and production systems innovation. So innovation requires adequate concepts and new engineering tools on corresponded basis.
- Individual components cannot be constructed in isolation. CAD models of components are designed within the context of part or all of the product being developed and new engineering complexes are build like integrated from various components: mechanical, electrical and electronic, optical, maybe bionic sometime in future), what brings new quality but new problems in designing of so complex systems (Seminsky, 2007).
- Computer aided design based on simultaneous solvers (used in most of today's parametric feature-based modellers) are more advanced. They solve all the equations representing the constraints (including relationships and dimensions) defining a feature simultaneously, as a group. This is computationally more expensive and more difficult for data processing.

New generation of CAD/CAM/PLM systems are challenging to implementing of the innovation–enabling environment of companies therefore. Effective service support is critical therefore in all aspects: integration process flow, system integration and internal resources identification. Present design theory and methodology has to respect this development and to propose appropriate practices for integrated manufacturing.

4. ACKNOWLEDGEMENTS

Paper was made under grant support of Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences No. 1/0559/08 Virtual designing of mechatronic systems and project of ITMS No. 26220220038 Design and technology support in the diagnostics of components and engineering units by means of computer tomography.

5. REFERENCES

Katalinic, B. (2003) "Globalisation and Technology: New Possibilities and Risk Factors"; Vortrag: 14 th DAAAM International Symposium, Sarajevo (eingeladen); 22.10.2003 - 25.10.2003; in: *"Annals of DAAAM for 2003 & Proceedings of the 14th International DAAAM Symposium"*, B. Katalinic (Hrg.); DAAAM International Vienna, Vienna (2003), ISBN: 3-901-509-34-8; S. 205 - 210

Kuric, I.; Košturiak, J.; Janáč, A. & Peterka, J. (2002). *Počítačom podporované systémy v strojárstve*. (Computer aided Systems for Manufacturing). University of Zilina / EDIS, ISBN 80-7100-948-2, Žilina.

Monka, P. & Monková, K. (2008). Increasing of competitiveness in East European countries by computer aided process planning. In: *DAAAM International Scientific Book 2008*. Chapter 44. - Vienna : DAAAM International Vienna, 2008. - ISSN 1726-9687 / ISBN 978-3-901509-66-7. - P. 525-534

Parpala, L. (2009). How to lower cost and time for manufacturing in virtual enterprises. In: *Annals of DAAAM for 2009 & Proceedings of the 20th International DAAAM Symposium*. Vienna, 2009, ISSN 1726-9679 P. 0317-0318

Seminsky, J. (2007). Recent progress of design theory. In: Acta Universitatis Pontica Euxinus. vol. 6, no. 8 (2007), p. 54-58. ISSN 1223-7221

Stark, J.; (2004). *Product Lifecycle Management: 21st century Paradigm for Product Realisation*. Springer Verlag. ISBN 1-85233-810-5

Stark, J.; (2007). *Global Product: Strategy, Product Lifecycle Management and the Billion Customer Question*. Springer Verlag . ISBN 1-84628-914-9

Tichkiewitch, S. & Brissaud, D. (Eds.) (2004). *Methods and Tools for Co-operative and Integrated Design.* Springer Verlag ISBN: 978-1-4020-1889-3

*** (2008) Siemens PLM Software Delivers the Next Big Breakthrough in Digital Product Development with Synchronous Technology. *http*://www.plm.automation.siemens.com/en_us/about_us/newsroom/press/press_release.cfm?Component=58721&ComponentTemplate=822 *Accessed on: 2010-05-29*