

WG 5.4 Computer Aided Innovation

Aims and Scope

The design of products and systems is becoming more demanding and complex and the product and process development must now take into account the entire lifecycle while avoiding environmental damage and facilitating the use of new technologies and physical principles. The transition from resource-based products to knowledge-based products is driving the New Product Development (NPD) process to be more innovative and efficient, making innovation processes even more challenging.

The development of a new category of tools known as CAI (Computer Aided Innovation) is growing as a response to a higher industry demand. These new tools stand out from the current CAD/CAE/CAM tools because they challenge the previous standards. The goal of these CAI tools is to assist designers and process developers in their creative stage, expecting changes in paradigms through the use of this software, which structure is partially inspired by the Theory of Inventive Problem Solving (TRIZ).

Many empirical studies point out that a structured and goal-oriented innovation process is mandatory for innovation success. Therefore, innovation supporting software becomes a key factor for the NPD process that may guide the project teams through the complexity of the market nowadays. As Product Life Cycle Management tools are being integrated with Knowledge management methods and tools, new alternatives arise regarding the creation of new paradigms of the Engineering Desktop. Resulting from these developments and insights, new methods and tools are taking shape under the name of Computer Aided Innovation (CAI). The goal of CAI is to assist managers, designers and process developers in their creative stage and it is expected that changes in paradigms will occur through the use of these methods and tools. CAI therefore stands out as being a break from the usual trends.

The 1st IFIP Working Conference on Computer Aided Innovation was organized by the Special Interest Group Computer Aided Innovation and took place November 14-15 in Ulm, Germany, hosted by DaimlerChrysler Research and Technology, Digital Engineering Competence Center. The conference was aimed at clarifying the essential factors characterizing these new arising methods and tools for bridging the gap between the traditional methods and current trends in search of efficient innovation. In accordance with these dramatic changes the 1st IFIP Working Conference on Computer Aided Innovation provided a forum for presenting and discussing current research and recent advancements in all fields of supporting innovation with computer tools for product and process development.

Two Keynote speakers presented the themes:

- Where are the horizons we want to reach?
- Computer Aided Innovation: The Perspective of the 7th Framework Program for Research

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22 papers were presented at the conference with following aims:

- Offering a space for presenting contributions for clarifying the role of CAI tools.
- Contributing to the further development of the Engineer's Desktop focusing on end-to-end product creation processes with methods and tools to ensure the feasibility and success of innovations in early stages of the innovation process.
- Addressing the main motivations of the industrial sector, regarding the engineering innovation activity with computer tools and methods.
- Discussing organizational, technological and cognitive aspects of the application of CAI methods and tools, and also an evaluation of their effectiveness and efficiency.
- Addressing the main motivations of the academic community regarding theoretical foundations of CAI.

The contributions were published in the proceedings [1] and represent the state of the art in research, development and implementation in these fields. It included:

- Research Papers describing contributions and latest results of fundamental investigations;
- Industrial Papers identifying industrial needs for CAI approaches and methods, experiences and demands;
- Speculative Papers advancing experiences with new theories, approaches and methods, without necessarily offering validated results;
- Engineering Creativity and Innovation Education Papers on new experiences from education, training, teamwork and case examples.

Two panel discussions took place during the conference with the themes:

- Computer Aided Innovation at the Fuzzy Front End of the Innovation Process
- Computer Aided Innovation at the embodiment Design Stages of the Innovation Process

During the conference the 1st Meeting of the Special Interest Group proposed the conversion of the Special Interest Group Computer Aided Innovation in a Working Group with following aims and scopes:

AIMS

- To contribute to identify the underlying scientific foundation of Computer Aided Innovation and also to evaluate their effectiveness and efficiency
- To identify the state of the art and trends of computer aided innovation software and its tools and methods by discussing organizational, technological and cognitive aspects of the application of CAI methods and tools
- To promote the development of Computer Aided Innovation Software focusing on end-to-end product creation process with methods and tools to ensure the feasibility and success of innovations
- To address the main motivations of the industrial sector, regarding the engineering innovation activity with computer tools and methods ,



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- To address the main motivations of the academic community regarding theoretical foundations of computer aided innovation.

Scope:

- The Working Group will promote regular working conferences, seminars and workshops on Computer Aided Innovation calling for contributions for clarifying the role of computer aided innovation tools.
- The Working Group will focus in connecting together managers, engineers, scientists and academics interested in pushing forward the development of this new kind of tools and methods
- The Working Group will promote that the best papers presented at its conferences, seminars and workshops will be further developed and enhanced for being published in selected journals with high impact.

[1] Leon, N. and Ovtcharova, J., Trends in Computer Aided Innovation, Proceedings of the 1st IFIP Working Conference on Computer Aided Innovation, November 14-15,2005, Ulm Germany, ISBN 3-00-017325-0