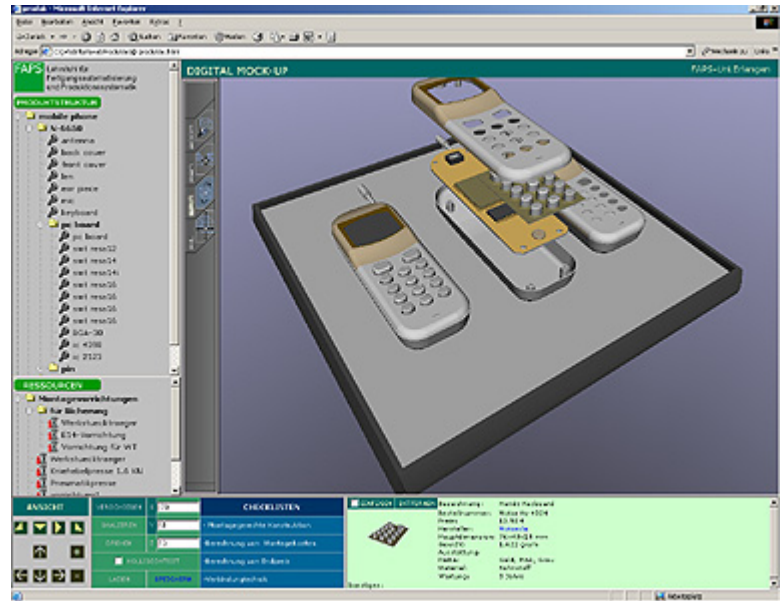


Web-based environment for collaborative planning of production systems

Overview

The Institute of Manufacturing Automation and Production Systems (FAPS) is a subdivision of the Department of Mechanics and Manufacturing at the University of Erlangen-Nuremberg (Germany). The main objective of the institute's research is to connect all production-related sub-functions into a highly integrated computerized production system with a special focus on the assembly of devices with electronic and mechanical components into mechatronic systems.

With support from the State of Bavaria, within the framework of the Bavarian Competence Network for Mechatronics (BKM), FAPS is now developing a Web-based collaborative environment to facilitate the planning and design of production systems.



Challenge

The planning processes today, particularly for mechatronic products, require collaborative work, information sharing and exchange of ideas among multiple parties in different locations. The background trend is towards globalization, intensive partnership and concurrent engineering in product and production development. As a result there is a big demand for a solution that provides remote users with multiple, simultaneous and distributed access to the project data including 3D designs of complete production lines, particular working environments, and 3D simulations of assembly processes.

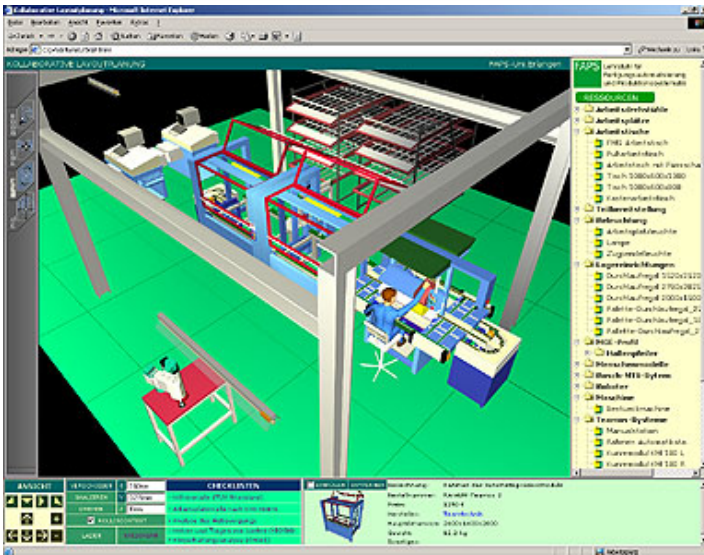
Solution

FAPS has developed a Web-based collaborative environment for the planning of production systems. Each production system can be defined by such parameters as products, processes, resources and their relationships, so the environment consists of four Web-based modules connected to the central repository of 3D/VRML objects:

- Digital mock-up: supports product digital mock-up;
- Process planning module: provides time estimation and the analysis of working sequences;
- Layout planning module: responsible for designing the layout of production lines;
- Work place layouts: a system for workplaces design with ergonomic considerations.

This development project utilizes ParallelGraphics 3D technologies for the Internet. The 3D models of products originating from CAD systems have been optimized for use on the Web with the help of ParallelGraphics Internet Model Optimizer (IMO).

The 3D representations of the work stations, transfer systems and other production facilities have been assembled using ParallelGraphics Internet Scene Assembler (ISA) which allows for the development of highly interactive 3D models with complex behavior. The FAPS developers have created a catalog of the



objects endowed with a range of interactive abilities (e.g. robots with animated kinematics, transfer systems with circulated workpiece carriers, lighting effects, etc.) and then specified how they will behave based on the users actions or other events.

Another ParallelGraphics product that the FAPS developer team has found extremely useful is VrmIPad. It allows for the creation of new VRML node types (prototypes) with appropriate predefined features. These prototypes have been effectively used to assign, position, orient and collide 3D objects in a virtual environment.

Finally, the 3D models have been integrated into collaborative environment using ParallelGraphics Cortona® Software Development Kit, which allows developers to manipulate 3D models from external applications. As a result any changes in assembly processes and production facilities layouts are immediately displayed in the 3D area.

The online environment with 3D capabilities allows the parties at different locations to speed up the exchange of ideas, reduce misunderstandings and facilitate problem solving and as a result significantly improve the collaborative design process.

Links

FAPS at the University of Erlangen-Nuremberg:

<http://www.faps.uni-erlangen.de/>

Cortona SDK:

<http://www.parallelgraphics.com/products/sdk>

VrmIPad:

<http://www.parallelgraphics.com/products/vrmlpad/>

Internet Scene Assembler:

<http://www.parallelgraphics.com/products/isa/>

Internet Model Optimizer:

<http://www.parallelgraphics.com/products/imo/>



About ParallelGraphics

ParallelGraphics is a world leader in the provision of Web3D graphics solutions with a proven track record of innovation and development over the last decade. The company's technologies and tools have been used widely in providing online training solutions, remote user support, virtual manuals for technical maintenance, and interactive applications for design and modeling. The Company's list of clients includes Boeing, NASA, Ford, MAN Roland, Siemens and Samsung.

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