

Computers in engineering

Optimization speeds development

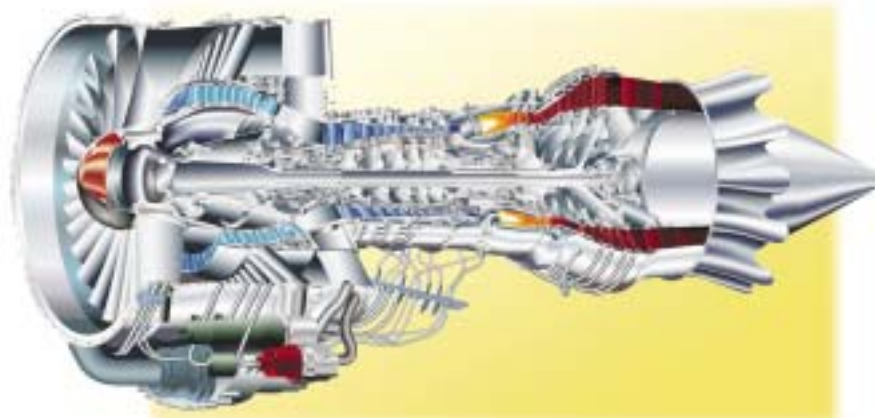
With the rise in the complexity of product and process design, the use of computer-aided simulation tools has become widespread. However, the design process in a typical engineering environment is still manually intensive, involving a lot of repetitive trial and error using a variety of proprietary and third party software tools. The process is usually sequential and design knowledge is not easily captured.

iSIGHT, from **Engineous Software Inc.**, was developed to replace the manual trial and error processes with an automated, iterative procedure (i.e., a software robot). The software integrates all relevant design tools, such as CAD/CAM, in-house codes, and **Microsoft Excel**, and then automatically changes the input data, runs the analysis codes, accesses the output, and changes the input again based on pre-defined mathematical exploration schemes.

iSIGHT represents a new paradigm for simulation-based design processes. The software's combination of a process-integration and automation framework and a suite of mathematical routines has enabled companies—large and small—to effectively deploy Design For Six-Sigma strategies, and automate engineering processes.

The software architecture includes a graphical user interface (GUI) to provide an easy-to-use methodology for defining, executing, and analyzing design studies. All entries made through the GUI are written to a text-based format in the Engineous proprietary Multi-Disciplinary Optimization Language (MDOL). MDOL is a user-friendly language that converts GUI definitions into iSIGHT's communication protocol. It is customizable and programmable to further streamline the execution of a frequently used design procedure.

The inter-process communication layer provides the fundamental glue



The development time for the PW6000 engine from Pratt & Whitney was reduced by using iSIGHT from Engineous Software.

to seamlessly integrate a collection of simulation programs, numerical techniques, databases, monitoring and analysis tools, and both command-driven and GUI tools into a cooperative design automation system. Due to the nature of multi-discipline design studies, iSIGHT has incorporated both distributed and parallel execution facilities to leverage existing hardware capability in a network or server environment. iSIGHT also works with commercial queuing and load balancing software.

Pratt & Whitney (P&W), a division of **United Technologies (UTC)**, chose iSIGHT as its company standard for design exploration and optimization.

"Using iSIGHT, P&W engineers have greatly decreased product design time and developed products that meet increasingly strict design standards, both of which have saved the company many millions of dollars," said Joe Adams, Vice President of Engineering at UTC/Pratt & Whitney. "Based on our successful experience using iSIGHT on the PW6000 and other engines, we plan to use it extensively in the design of the new F135 engine for the Joint Strike Fighter."



Pratt & Whitney engineers will use iSIGHT extensively in the design of the F135 engine for the Joint Strike Fighter.

In addition to P&W in the U.S. and Canada, engineers at **Carrier Corp.**, **Hamilton Sundstrand**, **UTC Fuel Cells**, **Otis Elevators**, and the **United Technologies Research Center**, all subsidiaries of UTC, are also currently using Engineous' solutions in their product design processes.

David Alexander

Briefs

Brazilian aircraft manufacturer **Embraer** has equipped its Corporate Aviation section with Pacelab Mission/SCAP software from **PACE Aerospace Engineering and Information Technology**. The tool is already in use by Embraer's Commercial Aviation section for the assessment of aircraft and engine performance and the optimization of flight profiles. The software provides interfaces to manufacturer's Standard Computerized Aircraft Performance modules and data files, commercial airport databases, and the **Boeing** WindTemp library.

The Defense Advanced Research Projects Agency (**DARPA**) has awarded funding to **Sun Microsystems** for Phase II of the High Productivity Computing Systems (HPCS) program. Phase II focuses on research and development that will produce a prototype design for a new high-performance computing system that will also deliver high programmer productivity. Sun's Phase I concept design, done in collaboration with academic institutions, includes revolutionary chip technologies with a greatly simplified architecture. DARPA's goal for the HPCS program is to achieve a new generation of economically viable systems that can perform quadrillions of operations per second without the problems of ease-of-use or reliability that have beset previous giant systems.

The avionics in modern fighter aircraft rely on digital bus networks for onboard communications and control. **Qualtech Systems, Inc.** has been awarded a contract by the **U.S. Air Force** to develop a prototype system for active bus monitoring and testing, and software for diagnostic analysis and data management. Phase I feasibility research showed that a monitoring and data analysis system can significantly aid timely detection of problems, failure forecasting, and maintenance planning.

NordTech Aerospace has selected Impresa software from **Avexus, Inc.**, to manage all maintenance, repair, and operations at its new commercial aircraft facility in Quebec, Canada. The Impresa software suite provides comprehensive planning, scheduling, and financial management for aircraft maintenance and modification.

SPC software

Synergy 2000 from **Zontec** is used in quality management applications to monitor and react to process variation during production and inspection. Release 5.0 provides many new chart and report options, in addition to improvements that simplify program



operation. Some of the new features include an overlay run chart that compares individual sample observations for a process characteristic, a high/low run chart that compares extreme spreads in sample data, a capability report that features both box chart and tabular displays when capability indices are applied to the process data, charting on user-defined ranges of data and entire sample populations, automatic control trend test warnings triggered by non-random patterns in the data, and simplified data re-linking when file locations change.

For more information, circle 87

CAD from photographs

Vexcel's FotoG close range photogrammetry (CRP) software allows the creation of 3-D models and extrac-



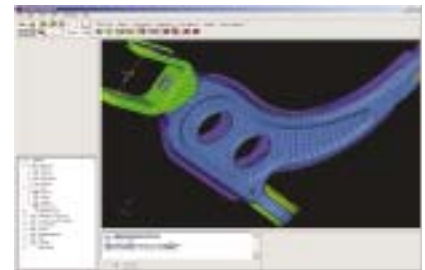
tion of precise measurements from film or digital photography. Auto-targeting functionality provides users with the power to automate the CRP process, resulting in substantial savings in time and labor. It works

by using numerous unique target patterns that are placed around the project area. After capturing photos of the area of interest, specialized algorithms are able to identify each target pattern and correlate them across the images. Instead of the user manually picking tie points in the photos, the software uses the auto-target locations for tie points, then labels and matches those points automatically.

For more information, circle 88

Model handling

AI*Environment is the latest pre- and post-processing tool from **Ansys Inc.**, to support complex simulation



techniques. Developed initially for CFD modeling, the package has been extended to support both everyday finite-element analysis and advanced multidisciplinary simulation. Features include robust geometry handling with parametric links to commercial CAD software, extensive geometry repair and feature suppression tools, and multiple meshing options.

For more information, circle 89

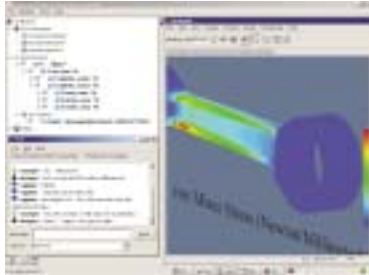
Integrated electrical design

Simplorer electrical simulation software from **Ansoft, Inc.** is being integrated with HarnessLink wiring and system design tools from **Altair Engineering**. The combined tools provide a complete design environment for electrical distribution systems. HarnessLink's data management and Simplorer's system analysis capabilities allow engineers to analyze a wide range of vehicle configurations with a high degree of automation.

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Collaboration for everyone

CoCreate Software has launched a new version of its engineering team collaboration product called

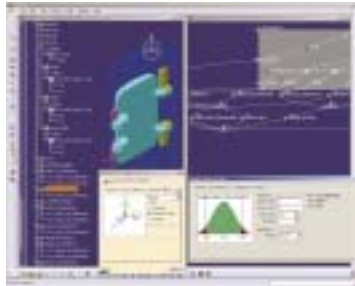


Onespace.net. With new lower pricing and a hosted service available for a monthly fee, the object is to make online collaboration available to small- and medium-sized businesses where cost sensitivity has prevented them from looking at higher-end collaboration solutions.

For more information, circle 91

Quality software

Sigmatix, LLC, has delivered a version of its CETOL software that works closely with CATIA V5 from Dassault Systemes. CETOL has been adopted by



many large corporations to help implement Design for Six Sigma practices. The CETOL 6 s CAA V5-based solution enables engineers to perform mechanical tolerance analysis early in product development within the CATIA V5 environment. Early identification of part tolerances that would cause manufacturing problems helps

manufacturers avoid production delays, and reduce scrap and warranty costs.

For more information, circle 92

Predicting noise

A new module in LMS SYSNOISE Rev 5.6, from LMS International, calculates flow-induced noise such as turbulence



on an aircraft landing gear, or fan noise in a ventilation system, long before the physical prototype stage of product development. The software couples with many of the industry-standard computational fluid dynamics codes to solve the flow equations, and then post-processes the results to define sets of equivalent sources that characterize the noise. SYSNOISE computes the radiated noise using its acoustic solvers, giving results at the surfaces and at any point in the field.

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