



APECS WINS 2007 NATIONAL TECHNOLOGY TRANSFER AWARD

Description

The Federal Laboratory Consortium (FLC) presented a national 2007 Excellence in Technology Transfer Award to the U.S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL) for innovative efforts in transferring the Advanced Process Engineering Co-Simulator (APECS) to the private sector. Winner of an R&D 100 Award in 2004 and an FLC Mid-Atlantic Region (MAR) Excellence in Technology Transfer Award in 2006, APECS is an innovative software tool that the process and energy industries are using to meet aggressive performance and environmental targets for their production plants while continuing to operate them profitably. APECS provides the industries with high-fidelity modeling capabilities for the design of sophisticated, highly-integrated plants by combining best-in-class commercial process simulation and computational fluid dynamics (CFD) software. Using high-performance computing and advanced visualization tools, APECS virtual plant co-simulations allow the industries to analyze and optimize overall plant performance with respect to complex thermal and fluid flow phenomena.

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Technology Transfer

NETL offers several different ways for industry to obtain commercial rights to technology developed at the government-owned, government-operated national laboratory, or work cooperatively with expert members of the lab's research staff. The approach used to transfer the APECS software includes a DOE-funded cooperative R&D project and agreement among NETL; Fluent, the world's leading supplier of CFD software and services; Aspen Technology, a major supplier of process simulation software; Carnegie Mellon University; Iowa State University; West Virginia University; and ALSTOM Power, a major worldwide industrial player in equipment and services for power generation. The cooperative agreement



NETL Research Engineers Review APECS Results



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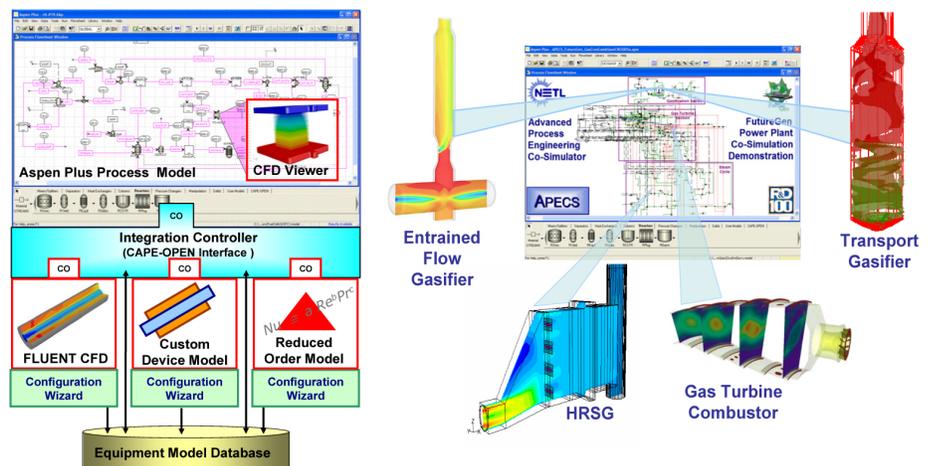
assigned the commercialization rights to Fluent to ensure that APECS enters the marketplace as quickly as possible. Technology transfer is also facilitated by close collaboration of Dr. Stephen Zitney of NETL's Office of Research and Development with Fluent on APECS R&D, applications, technical publications, marketing, and promotion.

Outcome of Technology Transfer Efforts

The development of APECS and the commercialization efforts of the government-industry-university collaboration have resulted in the seamless and open integration of what had been two separate simulation technologies and markets with little interaction: process simulation and CFD. With APECS, Fluent is well positioned to address the increasing industry need for efficient and powerful process/CFD co-simulation technology. The outcome of the technology transfer effort is that Fluent commercially offers the APECS product and corresponding consulting services to the process and energy industries, as well as universities, national labs, and other research entities.

Today, APECS is used by engineers and researchers at more than a dozen organizations worldwide. In the chemical industry, process engineers are using APECS to optimize the performance of their chemical production plants by analyzing the impact of complex reactor mixing and fluid flow phenomena on overall plant product quality and yield. In the power industry, cycle engineers are employing APECS technology to design and optimize commercial-scale power plants including conventional pulverized coal-fired steam plants and natural gas-fired, combined cycle power plants. In the research community, APECS is used for research on reduced-order modeling strategies for CFD, development of stochastic analysis and multi-objective optimization capabilities for process/CFD co-simulation, and integration of process/CFD co-simulation with immersive 3D virtual engineering software. At NETL, system analysts are applying APECS to reduce the time, cost, and technical risk of developing high-efficiency, near-zero emissions power plants such as the coal-fired, gasification-based power and hydrogen generation plant in the \$1 billion, 10-year DOE FutureGen R&D Initiative.

The process and energy industries manage some of the most complex and expensive plants in the world, spending nearly \$600 billion annually in plant design, operation, and maintenance. The development, transfer, and commercialization of the APECS co-simulation technology through NETL's leadership and innovation efforts is helping these industries to address the grand challenge of designing next-generation plants to operate with unprecedented efficiency and near-zero emissions, while operating profitably amid cost fluctuations for raw materials, finished products, and energy.



APECS Co-Simulator Framework and FutureGen Process/CFD Application