# EDITOR'S NOTE

THE TERM "MULTIPHYSICS" has been a part of simulation engineers' vocabulary for some time. It describes any situation where two or more physical phenomena are coupled together. Often, the term is used to describe simulations that involve both fluid and structural mechanics, such as fluid-structure interaction (FSI). During the past few years, we have run stories on FSI in *Fluent News* and in the current issue, several stories are featured that illustrate different approaches to this difficult engineering problem. The articles cover applications ranging from aerospace (p. 5) to healthcare (p. 10). Most describe tightly coupled interactions between CFD and structural solvers and one illustrates the use of MpCCI (Mesh-based parallel Code Coupling Interface, from Fraunhofer SCAI) to manage the coupled calculation (p. 11). Not all such applications are tightly coupled however, and the Support Corner (p. 34) describes a tool, based on user-defined functions in FLUENT, that can be used to transfer data between fluid and structural solvers for loosely coupled interactions.

In addition to the FSI stories, several of the articles in the Process Industries supplement could be given the multiphysics label as well. Multiphase flows and reacting flows are examples where strong coupling exists between either separate fluid phases (p. S13 - S14) or chemical species through temperature-dependent reactions (p. S8 - S14). Traditional processes such as mixing are covered (p. S3 - S6) as are novel processes that involve the flow through microchannels (p. S7) or the extrusion of foam products (p. S16).

As is customary with *Fluent News*, the current slate of articles represents engineering efforts from many corners of the world. Air conditioning units being manufactured in Malaysia (p. 13) and aircraft fuselage design being performed in China (p. 19) are two examples. There are several articles from the US and Europe, covering topics such as automotive components (p. 16 - 17), a unique dough conditioner (p. 22), a car in a crosswind (p. 14), and a two-stroke engine (p. 18). A few new applications of CFD are also presented. The flow inside an infant incubator is optimized (p. 24), and a ventilation system is installed in an Egyptian tomb to help preserve the ancient wall paintings (p. 28). Students shine once again with their unbound energy for innovation. This time, their efforts are used to develop a human-powered submarine (p. 29).

Last November, a 64-bit version of FLUENT running on a Windows Cluster was showcased at Supercomputing 2005. The performance of this exciting new capability is summarized (p. 30). In other product news, the upcoming releases of GAMBIT 2.3 and TGrid 4.0 are reviewed (p. 32). These new products and computing opportunities will make our work more manageable in the months and years to come. Please continue to keep us informed of your own efforts to push the limits of CFD and let us know what CFD has been able to do for you. ■

Liz

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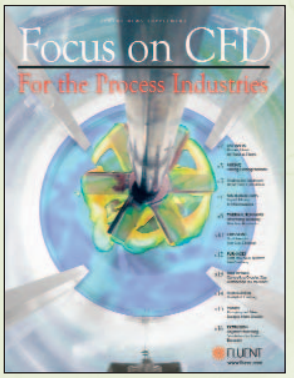
**ON THE COVER:**
Contours of presssure on the wing of the Aermacchi M346 Advanced Trainer
*Courtesy of Politecnico di Milano and Aermacchi SpA*




**ON THE SUPPLEMENT COVER:**
Contours of velocity magnitude on a plane between two impellers in a stirred tank and vortex structures near the upper impeller, colored by velocity magnitude
*Courtesy of Prague Institute of Chemical Technology*

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