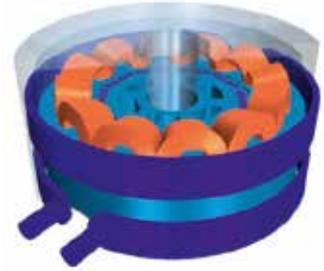


Motor design with an end-to-end solution

CD-adapco is a multinational computer software company that authors and distributes applications used for computer-aided engineering. The company is best known for its computational fluid dynamics (CFD) products. It has over 30 years of experience in delivering industrial strength engineering simulation, and with its products STAR-CD and STAR-CCM+, the company provides the world's most CFD solutions. Mr. Stefan Holst, EMAG Application Specialist at CD-adapco, highlights their recent integration of STAR-CCM+® and SPEED™: "The link between SPEED™ and STAR-CCM+® creates a total electric machine solution."



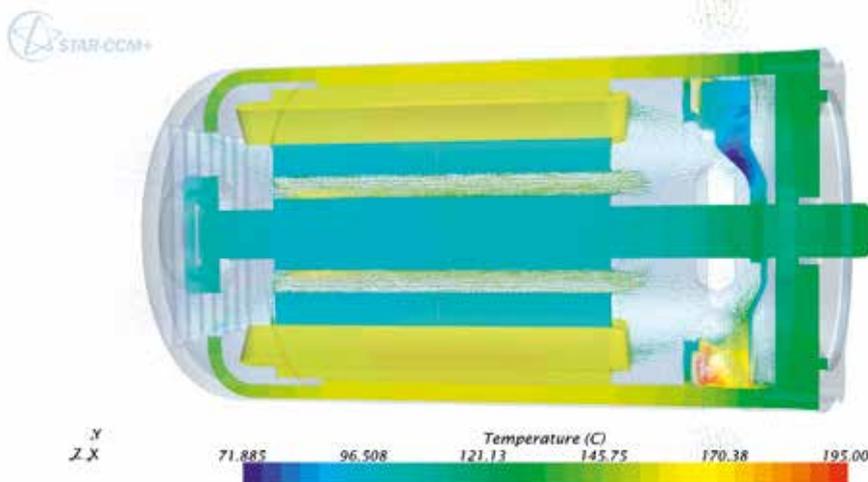
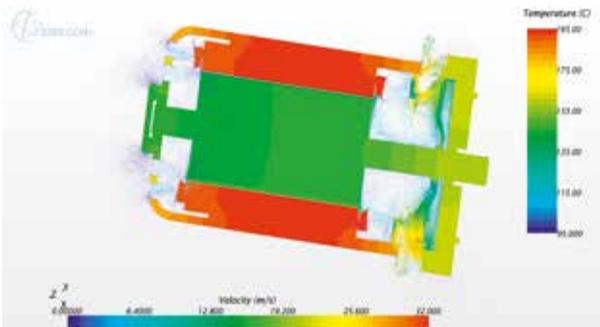
Privately owned CD-adapco was founded in 1987. The company has since evolved to become the leading global provider of full-spectrum engineering simulation (CAE) solutions for fluid flow, heat transfer and stress. The scope of the company's activities extends well beyond software development to encompass a wide range of CAE engineering services in both CFD and FEA. CD-adapco boasts a

software user base of over 8,000 across 3,000 different companies. It spends over USD 181 million on its software and services. The company has maintained 17% organic year-on-year growth over the last 5 years and employs over 850 talented individuals. These professionals work at 30 offices around the globe, and are involved in dedicated support software development and engineering services. Based in Melville, New York, CD-adapco provides its engineering services across many industries such as aerospace and defence, building services, electric machines, electronics, energy, ground transportation, life sciences, oil and gas and turbo machinery.

with simulation solutions that reduce engineering time and cost associated with bringing new products to market. The company's global team of highly qualified support engineers ensure that clients are successful at every stage of the analysis process. "From the minute our customers start using our software, they have the support of a dedicated support engineer available whenever they need it, and however they need it: on the telephone, through an e-mail, online chat, or on our website." In a recent customer survey, 93% of CD-adapco customers declared themselves satisfied, or very satisfied with their software and services, a fact reflected in a consistently high customer retention rate.

CD-adapco strives to achieve "Engineering Success", says Mr. Holst,

A key component in CD-adapco's portfolio, STAR-CD is a simulation solution for internal combustion engine development. CD-adapco has been actively involved with in-cylinder analysis from its inception and there are many engines in production around the world today that have benefitted from detailed analysis using STAR-CD and es-ice. Mr. Holst says: "Although CFD analysis of in-cylinder flow and combustion has been established for over 30 years, the demands for increasing accuracy, flexibility, speed of turnaround and closer integration of analysis into engine development programs have never been greater. We



aim to be at the forefront of technological developments in this space.”

Mr. Holst additionally highlights STAR-CCM+, an engineering simulation tool for solving problems involving flow of fluids or solids, heat transfer, and stress. “It’s the world’s most comprehensive engineering simulation inside a single integrated package,” says Mr. Holst. “STAR-CCM+ is developed to be accurate, efficient, easy to use, and easily to scale up. Over the past year, more than 600 customer requested enhancements have been integrated into STAR-CCM+.” CD-adapco releases three major updates of STAR-CCM+ every year. “Without sacrificing product quality, enhancements and new features are effectively deployed and made available to users as quickly as possible,” Mr. Holst adds.

In May 2014, CD-adapco announced it has integrated SPEED™ with STAR-CCM+® to provide motor design engineers with an end-to-end solution. SPEED™ is the leading all-in-one tool for characterising almost all main classes of electric machines and drives. “Over the past 25 years, millions of electric motors were produced with designs that have been developed using SPEED. However, as performance requirements for electric machines increase, designers have to embrace the vitally important aspect of thermal analysis alongside the fundamental electromagnetic design. Hence engineers demand more from their electric machine related design and analysis tools,” says Mr. Holst. To enable them to remain competitive in today’s world of ever-increasing

performance and efficiency, CD-adapco has introduced a new and unique process for the design of electric machines by combining two highly-accomplished and market-leading codes: the electric/electromagnetic design tool SPEED, and the flow/thermal CFD-centric CAE software STAR-CCM+.

A press release on the subject states that SPEED™ performs a 2D magnetic design using both analytical equations and finite element analysis links (using PC-FEA, a 2D FE solver) for electric motors, generators, alternators, and other magnetic actuators. It also combines electronic drive models with the machine’s magnetic design. “Understanding the thermal and electromagnetic phenomena that are operating in modern high power density electric machines is vital to achieving a state of the art design,” says Mr. Holst. That is the reason that STAR-CCM+® takes the SPEED™ simulation results, converts their 2D

model into a 3D model and models the machine’s thermal performance under a wide range of environmental conditions. STAR-CCM+® can also be used for the electromagnetic 2D calculations as the GoFER’s to PC-FEA will be available for STAR-CCM+® using the 2D magnetic FV solver.



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