WHAT GIVES US IMPETUS

RISING HIGH

Thomas Hildebrandt initially followed a very academic path: school qualifications, degree, doctorate. Then he discovered simulation, programmed software and set up his own business. Ever since then, he has been devoting himself to rotating flows – such as the airflows found in engines, turbochargers and turbines.

THOMAS HILDEBRANDT

Seizing the chances of simulations

Dark clouds have gathered in the sky; a cold wind blows across the hilly landscape. ‘I generally do this during the summer months,’ explains Thomas Hildebrandt, while tying his scarf a little tighter. Then he launches the streamlined glider model with an impressive wingspan of more than four metres almost effortlessly into the air. One thing is certain: Hildebrandt is highly familiar with airflows, both privately and professionally, when he works on simulation tools to develop modern computational fluid dynamics (CFD) machines. ‘Alongside the triathlon, model flying is the perfect way for me to relax,’ explains Hildebrandt. ‘But finding time for my leisure activities is not always that easy. I’m probably no different to anybody else in that respect.’

Hildebrandt is founder and managing director of Numeca, the German subsidiary of Numeca Int. S.A., a company that develops and markets software for CFD simulation. From the picturesque little town of Altdorf, near Nuremburg, he and his ten employees manage an area that not only encompasses Germany, Austria and Switzerland, but also the Czech Republic and faraway South Africa. With the help of software, his customers can calculate rotating flows in turbomachinery, including airflows in aircraft engines, turbochargers and steam turbines or the flow of water in water turbines and pumps. Hildebrandt’s engineering firm also offers CFD simulation as a service.

Simulation plays an important role in the development of modern turbomachines, because in order to optimally collect flow energy and operate the machinery with a high degree of efficiency, complex, three-dimensional blade geometries are used, which would be extremely difficult to develop – if at all – using the classic trial-and-error method. ‘Researchers and developers can get detailed insights and identify relationships using modern simulation methods,’ says Hildebrandt. ‘This forms the basis for optimising the flow mechanics of turbine geometry in an ongoing process. Once a developer sees that significant improvements can no longer be achieved, they build a prototype and verify the simulation results on the test stand.’

In this way, today’s simulation methods open up a world of completely new possibilities to designers of turbomachinery. It was all very different when Hildebrandt studied aerospace technology at the Technical University of Munich in the 1980s: simulation was still in its infancy. After graduating at the beginning of the 1990s, he became the ‘first simulator’ in

DR THOMAS **HILDEBRANDT**

Born 1963

Hildebrandt was born in Göppingen, but grew up outside Nuremberg. After leaving school, he studied aerospace technology at the **Technical University of Munich** between 1984 and 1990, completing his thesis at **MTU Aero Engines** in Munich. He began his doctoral studies in 1991 while working as a scientific assistant at the **Institute for Jet Propulsion,** part of the **Bundeswehr University** in Munich, and was awarded his doctorate in 1996. At the beginning of 1997 he founded **Numeca Ingenieurbüro,** of which he has been owner and managing director ever since. Hildebrandt is also a visiting lecturer and guest professor at the **OTH Amberg-Weiden** and **Stellenbosch University** in South Africa. Hildebrandt is married and has one child.

his role as scientific assistant at the Institute for Jet Propulsion, part of the Bundeswehr University in Munich. While his colleagues continued to use classic measurement techniques, he was the only one working on introducing and establishing new simulation tools. ‘When I became aware of the big opportunities presented by simulation, I began to write my own software tools,’ reports Hildebrandt. ‘I worked on my doctoral studies during the day and programmed at night.’

This did not prevent him from successfully being awarded his doctorate in 1998 under the aegis of Professor Leonhard Fottner. However, pursuing an academic career at the university was no longer an option for him. Hildebrandt's entrepreneurial instinct had been roused and before completing his studies he founded a small company and presented his self-written software to potential customers, such as manufacturers of aircraft engines and turbochargers. The success was so promising that he founded the German subsidiary of Numeca in 1997 as the sole shareholder.

Even though the early years of self-employment were rocky and Hildebrandt initially drove around the country in an old Alfa Romeo and stayed in youth hostels, today he is convinced: ‘That was the path I had to take.’ After three years, the fledgling firm moved out of Hildebrandt’s old family home into its current premises in Altdorf. This was also the time when he got in touch with the FVV again. ‘I had found my feet and was looking to share ideas and engage in dialogue with fellow professionals,’ he reports. ‘I was already familiar with the FVV from my time at the Institute for Jet Propulsion and I knew that I would be able to get a good overview of the German research landscape and meet colleagues and customers here.’ Hildebrandt currently chairs two working groups: the ‘blade forces’ working group, which is concerned with how flow forces affect structures, and the ‘advanced transonic compressor’ working group, which looks at how numerical processes can optimise a compressor for a specific purpose.

Meanwhile, Hildebrandt has also taken up teaching posts. He is visiting lecturer at the OTH Amberg-Weiden and honorary professor at Stellenbosch University in South Africa, around 50 kilometres south-east of Cape Town. ‘Passing on my knowledge to young people is what drives me,’ says Hildebrandt, before going on to stress: ‘Especially when I manage to get students interested in simulation.’ This may not always be easy, but Hildebrandt has experience of using an upward current at the right time.

How do flow forces affect a structure?

Photo: With the gliding model and when developing simulation tools, it’s all about the right airflow.