

# Passion for Innovation enhances CATIA system.

Dassault Systèmes' Passion for Innovation programme and CD-adapco's Computational Fluid Dynamics (CFD) software are helping to turn the Kalmar propulsion system from concept in to reality.

The Dassault Passion for Innovation programme was launched in 2005 and was based on the principle that, as is often the case, outstanding ideas fail through the lack of resources. The programme set out its mission to help individuals and not-for-profit organisations bring their innovative ideas to life using Dassault Systèmes' 3D software solutions.

Michal Latacz a mechanical engineer from Krakow, Poland was chosen to enter Dassault's Passion for Innovation programme after showing the first prototype of his Kalmar project at the Brussels Eureka exhibition in 2007, where it won the gold medal and distinction prize.

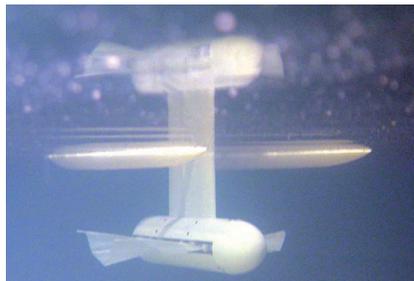
"The design was really innovative, very interesting and an eco design with silent output. We saw the design at the Eureka exhibition and it won the gold medal prize," says Richard Breitner, Passion for Innovation program manager, Dassault Systèmes.

He adds: "We saw that this project could be re-optimised from our point of view and end up with a product that might be able to be industrialised, but mainly we wanted to support Michal to help him take his invention further."

Mr Latacz started designing Kalmar when he was still a student and took his inspiration from nature, in particular from cephalopods and rays to design a revolutionary vessel propulsion system.

"Ever since I remember I found nature to be a fascinating thing. I can observe it and still it can astonish me. I am qualified as a mechanical engineer and when I approached the Kalmar project I wanted to develop something from nature and using my mechanical knowledge." Mr Latacz says.

Mr Latacz initially designed Kalmar using CATIA V5, Dassault Systèmes' design software, as he says that it was the most intuitive and quickest virtual software. The construction of the first prototype saw Mr Latacz experimenting with further



Kalmar in water trials.



Propulsor internal stress simulation using SIMULIA.

prototypes and also with the idea of a wave propeller. After running 10 simulations of Kalmar he took it to the towing tank to be tested, "it worked first time!" exclaimed Mr Latacz.

Since joining The Passion for Innovation run by Dassault Systèmes' Mr Latacz has been able to make further studies of the Kalmar project. In testing Kalmar has shown good efficiency and a good maximum speed, it has a high drive efficiency potential, when tested as a 1m prototype to other boats on the market. Mr Latacz has also remarked that the wave propulsion unit is more efficient than normal propellers. Kalmar has also looked at the efficiency of running on an electric engine.

Looking forward Mr Latacz is hoping to develop the design for the commercial market and can see potential for the design in the area of inland river vessels and leisure transport and also unmanned craft. He says that the design of the wave propulsor would be harmless to water animals and would suit

medium to low speed engines, and would be free of cavitation up to 3-4hertz. He has noted though that the system would lose efficiency should it go any faster.

Building on the success of the Passion for Innovation project, Mr Latacz is also working on a project called Stingray, in which he has used CD-adapco's STAR-CCM+ simulation tool to analyse different innovative propulsion systems.

The Stingray is a concept vessel that will "fly" underwater, controlled by active ballast water chambers and rudder system in an easy and intuitive manner using a joystick. "I sincerely believe that this energy efficient concept has enormous commercial potential," said Mr Latacz. "So far the major focus of the Stingray project has been centred on developing the control system, but we have also clocked up many simulation hours analysing pump and propeller propulsion systems."

"We are delighted to be able to support this project," said David Vaughn, CD-adapco's VP of marketing. "As a company our principle objectives are increased innovation, through providing a constant stream of engineering data to guide the design process, and cost reduction, by reducing the need for expensive physical prototypes. The Stingray is a great example of a truly innovative project that would not have been possible without in depth engineering simulation."

"Using STAR-CCM+ I have been able to optimise the flow around the vessel, paying particular interest to interactions between the free surface and the hull," said Mr Latacz. "I have also been able to couple flow solutions from STAR-CCM+ with membrane stress and deformation calculations from SIMULIA."

By using CATIA and SIMULIA and STAR-CCM+ Mr Latacz's innovative Kalmar prototype has been able to take further steps forward and now is ready and waiting for further investment. **NA**