



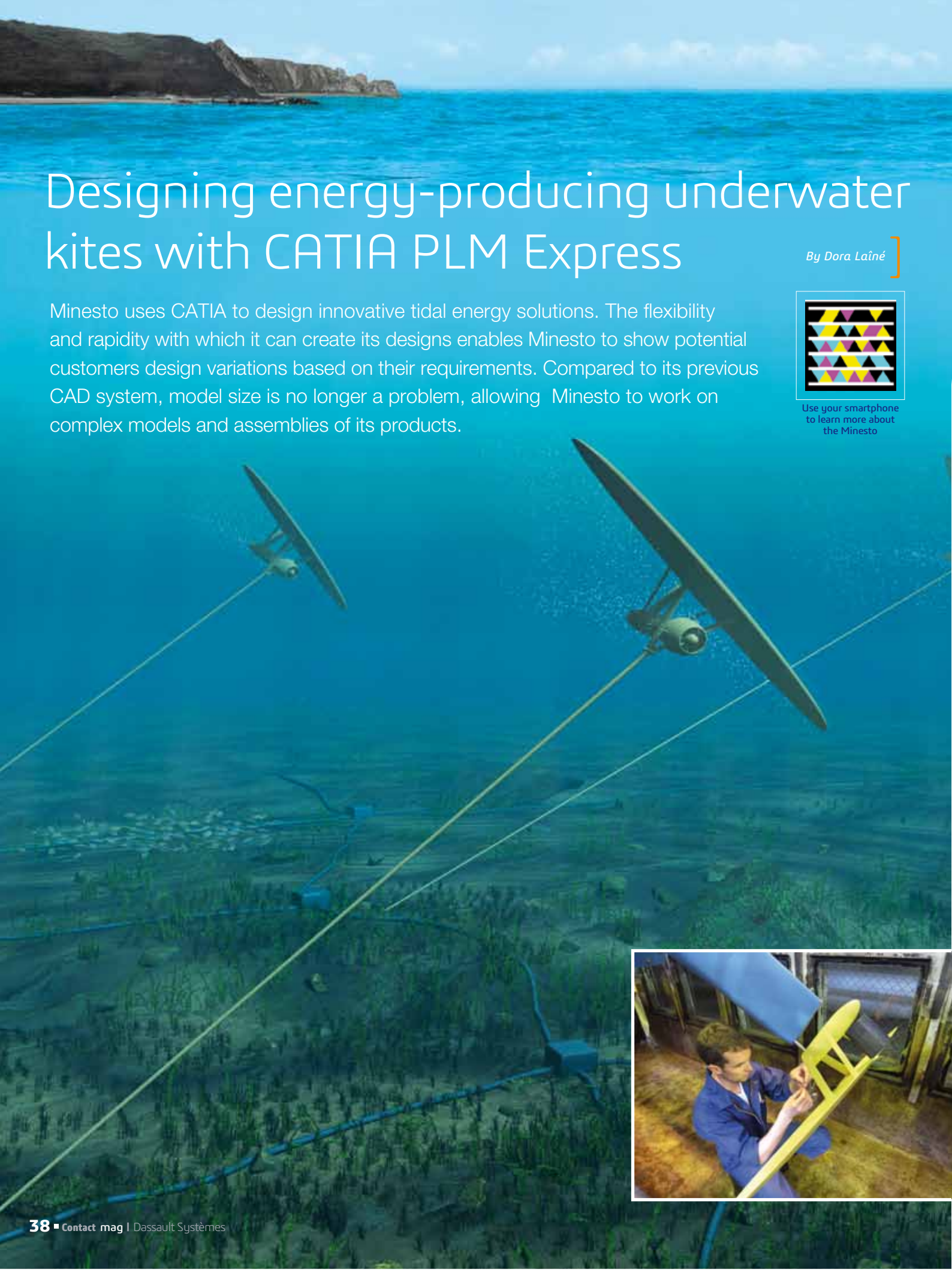
# Designing energy-producing underwater kites with CATIA PLM Express

By Dora Lainé



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Minesto uses CATIA to design innovative tidal energy solutions. The flexibility and rapidity with which it can create its designs enables Minesto to show potential customers design variations based on their requirements. Compared to its previous CAD system, model size is no longer a problem, allowing Minesto to work on complex models and assemblies of its products.



With CATIA, we can work on more complex models and assemblies with all the related details. Model size is no longer a problem.

**Arne Quappen**  
Development Manager, Minesto

**M**arine energy comes from two main sources: waves, which originate from wind; and tides, which are caused by the gravitational pull of the moon and sun. One of the benefits of harnessing tidal currents is that, unlike wind and waves, they are predictable and offer an ecologically friendly and reliable source of energy.

Minesto has developed a new kind of tidal energy solution based on its Deep Green concept, which uses low water speeds to create energy. This revolutionary concept makes it possible to install and operate plants in areas where no other known technology can operate cost effectively, thus expanding the number of sites where tidal energy can be generated.

## A GROUNDBREAKING AND UNIQUE SOLUTION

The Deep Green technology converts energy from tidal stream flows into electricity by way of a novel principle: an underwater kite. The kite consists of a wing, turbine and generator, and is attached by a tether to a fixed point on the ocean bed. The speed of the kite determines the flow velocity to the turbine. Electricity is transmitted onshore through a power cable inside the tether.

“What makes our technology unique is that we can extract energy, in a cost-efficient way, from low stream velocity,” said Arne Quappen, Development Manager, Minesto. “Our competitors use tidal streams that are habitually 2.5 meters/second (8.2 feet/second), whereas we can use tidal streams between 1.5 and 2 meters/second. Another advantage of our system, compared to our competition, is that their installations are bigger, heavier and more difficult to install,” he said. The technology developed by Minesto is lightweight and small compared to other tidal solutions, resulting in reduced costs in material, transport, installation, service, maintenance and disassembly.

“We have to compete with other more established energy sources such as coal or nuclear,” Quappen said. “The fact that we are not as established as traditional energy producers is a tough challenge and one that we have to meet by improving the reliability and cost-effectiveness of our solutions.”

## CATERING TO THE NEEDS OF POTENTIAL CUSTOMERS

Minesto is currently developing and testing prototypes of its solution before going to production. “Our objective is to create a robust design of our kite that we can then adapt to the needs of our customers,” Quappen said. “As a development company we are in discussion with potential customers to collect their requirements and to implement them in our commercial products.”

In 2010, Minesto chose CATIA PLM Express from Dassault Systèmes for its 3D design work and for drawing production. “Our previous solution lacked the design precision and flexibility we needed,” Quappen said. “During this initial product development phase, it is important for us to create different design variations quickly and to show them to potential customers before converging on the right design. With CATIA, as opposed to our previous solution, we can work on more complex models and assemblies with all the related details. Model size is no longer a problem.”

Semcon, a Dassault Systèmes’ partner, helped Minesto implement CATIA and provided training and consulting services. “Semcon’s industry know-how and extensive knowledge of CATIA accelerated our learning curve,” Quappen said.

## Minesto

Minesto, based in Gothenburg, Sweden, is a spin-off of the Saab Group. Formed in 2007, the company develops technology for a new type of tidal power plant. After validating the cost-effectiveness and viability of its designs, Minesto was chosen by the Carbon Trust to participate in its Marine Energy Accelerator program. Minesto was recently granted £350,000 from the Carbon Trust to deploy the first prototype of its Deep Green underwater kite. Carbon Trust’s programs support those companies that are most promising in the development of alternative energy solutions.

For more information:  
[www.minesto.com](http://www.minesto.com)  
[www.3ds.com/energy](http://www.3ds.com/energy)

