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Autor: Wey, Alain / Domjan, Raphaël
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A solar-powered voyage around the world

A floating Swiss pavilion, the PlanetSolar catamaran has completed its first solar-powered voyage around the world. After a 585-day journey covering 60 000 km, the crew berthed in Monaco in May. We put the initiative under the spotlight with Neuchâtel-born project leader Raphaël Domjan and French captain Erwan Le Rouzic.

By Alain Wey



The PlanetSolar team in Abu Dhabi: Raphaël Domjan, Jens Langwasser, Erwan Le Rouzic and Christian Ochsenebein

Thousands of journeys have been made around the world, but never with a solar-powered vessel similar in size to the boats of the shipping companies operating on Swiss lakes. Measuring 35 by 23 metres, the MS Tûranor PlanetSolar has entered the history books and joined the prestigious Explorers Club* of New York, just like Bertrand Piccard's air balloon before it. This was a Jules Verne-type adventure dreamed up by Raphaël Domjan from Neuchâtel. Having set sail from Monaco on 27 September 2010, PlanetSolar sailed west on a course close to the equator and returned to its point of departure on 4 May 2012. It became the first solar-powered vehicle of any kind to achieve this feat.

The very beginning

As with icebergs, people are only aware of the visible parts of man's achievements. In this case, the PlanetSolar project, a round-the-world voyage, took up almost eight years of the life of the man behind it, 40-year-old Raphaël Domjan. The idea was conceived in the mind of this engineer by profession, who is also a paramedic, pilot, speleologist and mountaineer, in 2004. "I didn't have any money of my own and had to find twenty million Swiss francs. I therefore started by putting a team together", he recalls. In 2006, he presented his project to the media and began his long search for financial partners. It was not until February 2008 that the dream really took shape thanks to his meeting with Immo Ströher, the owner of Immosolar, a

German firm specialising in energy management. Other financial partners also then began to get on board. The boat was finally constructed between January 2009 and August 2010. The French company Adrena also became involved in the project, creating routing software adapted to the solar-powered vessel and enabling the most energy-efficient route to be found. "It is not just the rich and famous who can implement large-scale projects like this one. Anyone can succeed if you have an idea, are determined, persuasive and perhaps a little naïve", explains Raphaël Domjan enthusiastically. The voyage across the oceans could then begin.

From the Atlantic to Oceania

In the autumn, PlanetSolar sailed out of Monaco and passed through the Straits of Gibraltar to enter the Atlantic Ocean. On board were Raphaël Domjan, Patrick Marchesseau (the French captain), Jens Langwasser (the German head of the boat's construction team) and Christian Ochsenebein (the energy manager from Berne). The vessel reached Saint-Martin in the French Antilles in November 2010 and then called at Miami. In December, PlanetSolar arrived in Cancún, Mexico, where it took part in the UN's climate conference. The crew took advantage of the opportunity to allow several heads of state to visit the boat. "The intercontinental crossing of the Panama Canal remains a vivid memory because we found ourselves in the middle of a tropical rainforest", Raphaël Domjan reveals. Having entered the Pacific Ocean, the boat was 18,000 km from Australia. PlanetSolar passed the Galapagos Islands in silence thanks to its solar propulsion. Raphaël Domjan says: "The passage right up to the Marquesas Islands was incredible. We encountered no sign of life for 6,000 km, no aeroplanes, no boats, absolutely nothing at all."

When the eco-adventurers reached the Marquesas Islands in French Polynesia in March, they were welcomed by dozens of canoes and sixty people climbed aboard to of-

fer them fruit. There was no pomp and ceremony here, just the warm welcome of the local people. They then stopped off at Papeete on the island of Tahiti and in Tonga in Polynesia. French captain Erwan Le Rouzic took over from captain Marchesseau in New Caledonia in May. He took the helm in Nouméa.

"When I had the opportunity to take part in this global voyage, I thought of Jules Verne, who came from Nantes where I was born", says Erwan Le Rouzic. "I re-read 'Around the World in Eighty Days' during our voyage", he adds. They headed for Australia but encountered some difficult conditions. PlanetSolar hit a storm less than 300 km from Brisbane. "We sailed into a strong wind from the southwest with waves reaching five metres", the captain recalls. He explains: "We slowed to the minimum energy consumption level and waited for the weather to change. I was extremely impressed because the vessel proved very resistant and held up well in the rough sea." After visiting Brisbane, PlanetSolar sailed alongside the 2,300-kilometre Great Barrier Reef.

From Asia to the Mediterranean

PlanetSolar arrived in south-east Asia during the summer monsoon and had to endure several lengthy storms in the Philippines in July and in Vietnam in September. "We experienced days of non-stop rain with absolutely no sunshine and winds of 50 kmph", the captain recounts. He remarks: "We were unable to produce any power. We therefore had to take shelter and wait until there was some sunshine in order to set off again." After stopping in Manila, the solar team crossed the China Sea and reached Hong Kong in August 2011 where it received an extraordinary welcome. A presentation on the project was given to the university.

PlanetSolar arrived in Singapore in September where the final weeks of the monsoon season passed. It then crossed the Strait of Malacca, making a short stop in Thailand in October before two visits to



PlanetSolar outside Hong Kong in August 2011

Sri Lanka in November. Sailing along the coast of India, it arrived in Mumbai in December. The crew celebrated Christmas in the Arab-Persian Gulf at Doha in Qatar. They then took part in the Future Energy Summit in Abu Dhabi in January 2012, where they met the Chinese Prime Minister and his North Korean counterpart.

In February, PlanetSolar welcomed aboard an armed six-man security team to cross the Arabian Sea and the Gulf of Aden, which are pirate-infested waters. "I contacted the former head of the Swiss army, Christophe

Keckeis, who was my gliding instructor when I was younger. He arranged our security", Raphaël Domjan explains. After travelling 3,500 km without any incidents, their guardian angels disembarked from PlanetSolar onto a boat in the first part of the Red Sea in March. "A few days later, we were able to dive at the Precontinent II submarine site where Captain Cousteau's team spent a month some 50 years ago", Erwan Le Rouzic remarks. "It was a way of paying homage to Cousteau and all his explorations that we admired during our childhood." The eco-adventurers finally

crossed the Suez Canal and re-entered the Mediterranean on 1 April. After visiting Egypt, Greece and Italy, they received a triumphant welcome in Monaco on 4 May. Captain Le Rouzic says: "What I remember most about Jules Verne and his book is his conviction that human technology can have a positive impact on helping mankind and society to progress."

www.planetsolar.org

ALAIN WEY is an editor at "Swiss Review"

"Solar-powered boats are available to the general public."

"SWISS REVIEW": Do you think you have succeeded in promoting solar power even though the World Solar Challenge solar-powered car race has not?

RAPHAËL DOMJAN: You have to remember that the first solar-powered car race took place in Switzerland in 1983 between Romanshorn and Geneva. An Australian student who watched the race here later decided to organise the World Solar Challenge in Australia. All such initiatives are positive. We have to change people's mentality. Why is it that, even today, we won't change despite having the technol-

ogy to do so? It is hard enough on a personal level to keep resolutions you have made. So, just imagine how difficult it is to change the world's outlook. The problem is that solar-powered cars or SolarImpulse are based on state-of-the-art technology, a bit like Formula 1, and are not therefore available to the general public. Only technologies available on the market were used for PlanetSolar. It is already possible to buy solar-powered boats today. They are available from companies in Switzerland and Australia, for example.

What will happen to PlanetSolar now?

The PlanetSolar company has been handed over to Immo Ströher, who will continue to manage the boat and promote it commercially. He intends to find a new role for PlanetSolar. It will make a few stops in the Mediterranean this summer. It will then



Raphaël Domjan (right) and Erwan Le Rouzic with the Adrena routing system



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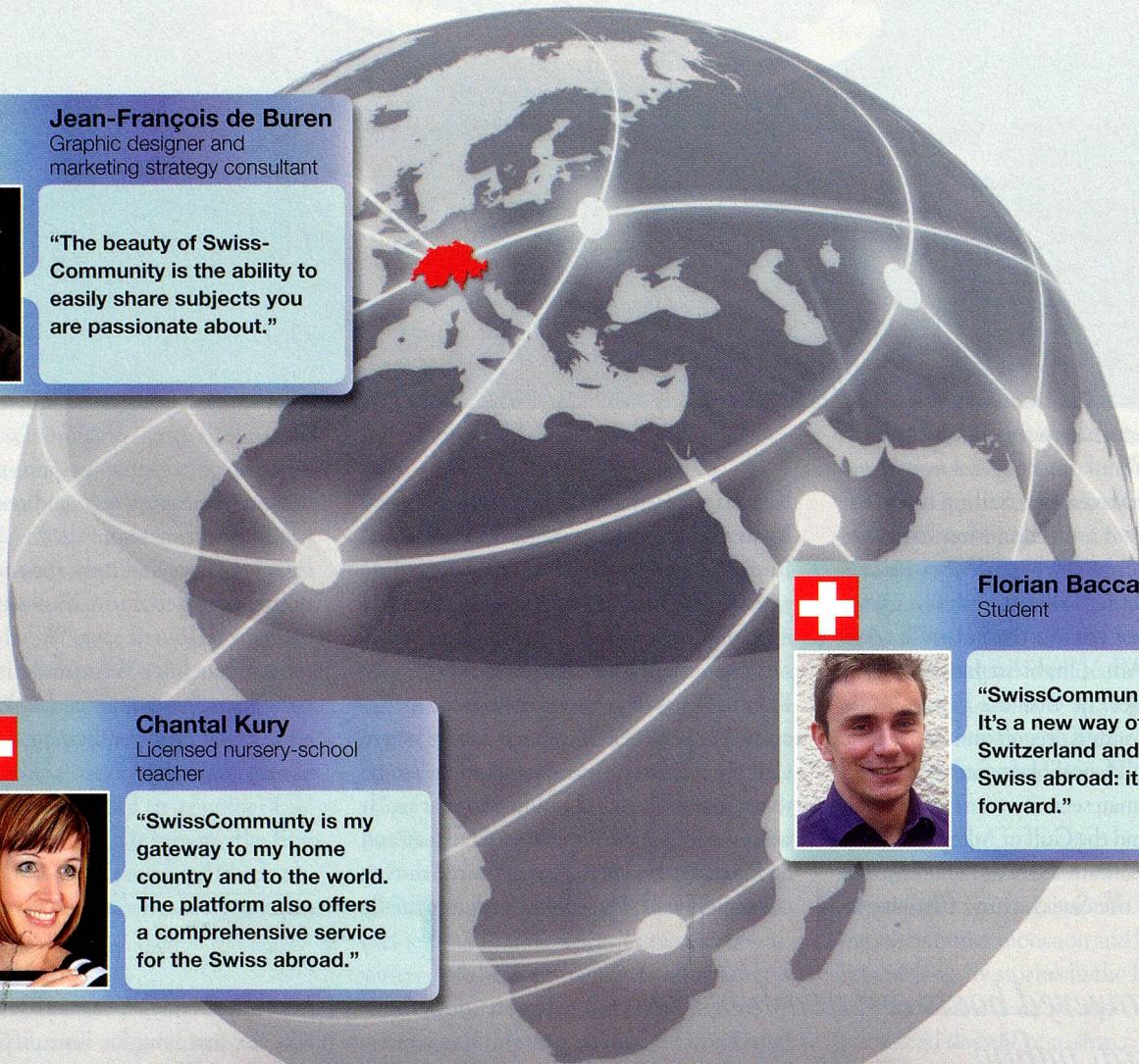
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Magnificent backdrop – PlanetSolar in Abu Dhabi harbour in January 2012

be found a home where optimal use can be made of it. This may be in the Galapagos Islands to transport tourists, in the Red Sea for divers or it may become a scientific research vessel. He is currently in the process of analysing its potential.

We could have built a solar-powered vessel that travels at twice the speed – an average of 10–12 knots – which would have been able to complete the voyage around the world in eight months. But this would have been a two-man speedboat which would not have been able to welcome anyone aboard. What would there be to show? Our boat was able to welcome 50 to 60 people including heads of state. It was comfortable and spacious. It's something completely different. Our boat can transport passengers and divers and can be chartered. It conveys our message. We also went around the world in a solar-powered boat that has a commercial future!

So, you're handing over the baton with the boat to focus on the SolarPlanet Foundation, the aim of which is to promote renewable energies?

Yes, we will continue to promote the vision and concept of this world tour by communicating them through a book, a documentary film and a platform where the content is checked. We intend to select a certain number of projects and to support research and development in the fields of renewable energies and energy storage and efficiency. Our message is a sincere one. It is apolitical and without any commercial interest.

What does the future hold for the navigation router developed by Adrena?

It can also be deployed for routing on traditional vessels, such as freight vessels, which could, for example, save between 100,000 and a million dollars when crossing the Pacific Ocean. This system does not take the fastest route geographically but the most rapid in terms of energy efficiency in relation to the wind, currents and sun.

And what about solar technology?

We have made innovations in terms of solar panels with the MPPT (maximum power point tracker) system. This optimises energy generated by a vessel's solar panels, as it is in perpetual motion, based on the temperature and angle of sunlight. PlanetSolar's message is an optimistic one. Our aim is to provide impetus and to raise awareness among politicians and industry leaders by showing that amazing things can be achieved with solar power.

A CLOSER LOOK AT THE MS TÛRANOR PLANETSOLAR

Characteristics: Carbon-resin catamaran, 35 metres in length, 23 metres in width and 6.1 metres in height. Weight: 95 tons. Solar cells: 38,000 on a 537 m² surface area.

Name: The name Tûranor comes from Tolkien's "Lord of the Rings" trilogy and means "victory" and "power of the sun".

Construction: The MS Tûranor PlanetSolar was built within 18 months in Kiel, Germany, and was financed by German company Immosolar, Swiss watch manufacturer Candino and state institutions such as Presence Switzerland.

Speed: It travels at the speed of a sailing boat, around five knots on average with a maximum speed of ten knots. Energy production provides enough power to last for three days.

Records with a solar-powered boat: Longest voyage at 60,000 kilometres. First voyage around the world. Largest solar-powered boat. Fastest crossing of the South China Sea in around five days and the Atlantic Ocean in around 27 days.

SolarVillage: Supplied with power from solar panels, it was set up during several PlanetSolar stops to give presentations on the project and solar power with games like remote-controlled solar-powered boat races, educational programmes and interactive exhibitions.

The SolarVillage was exhibited alongside the vessel at the European Solar Days event in Marseille from 9 to 12 May 2012.

In autumn: Release of the documentary film and book.