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Turanor Planetsolar: sailing the world on solar power [link](#)

*Research vessel Turanor Planetsolar is studying Gulf Stream currents
and role of ocean-generated aerosols*

From [GulfNews](#)

Last year, after it became the first solar-powered boat to circumnavigate the globe, the Turanor Planetsolar could have taken its 5,500 square feet of photovoltaic cells and eight tons of lithium-ion batteries and sailed off into the sunset.

Instead it is becoming a scientific research ship, at least for the summer.

The boat, a 30-metre, \$17 million (Dh62 million) catamaran that was dreamed up by a Swiss eco-adventurer and bankrolled by a German businessman, will cruise the Gulf Stream studying the role of atmospheric aerosols and phytoplankton in regulating climate, under the direction of Martin Beniston, a climatologist at the University of Geneva.

The research cruise, with five crew members and up to four researchers aboard, began in Miami several weeks ago and will stop in Newfoundland and Iceland as it tracks the northeasterly current. The voyage is expected to end in Bergen, Norway, in August.

Last week, the boat stopped in New York City for a few days on its way north.

The squat carbon-fibre craft, its wide and flat top deck dominated by the photovoltaic array, looked a bit out of place among the luxury yachts and other more conventional nautical playthings docked at a marina near the city's financial district.



www.planetsolar.org

In some ways the boat is suited to research.

Being completely powered by the sun — the high-efficiency solar cells charge the batteries that power electric motors connected to the craft's twin propellers — it produces no emissions of carbon dioxide or other gases that could contaminate air samples.

And the boat has no problem going slowly, if necessary, as it samples the water — average speed is a sluggish 5 knots.

“But clearly, it's not a research vessel,” said Bastiaan Ibelings, a microbial ecologist at the University of Geneva who is working on the project.

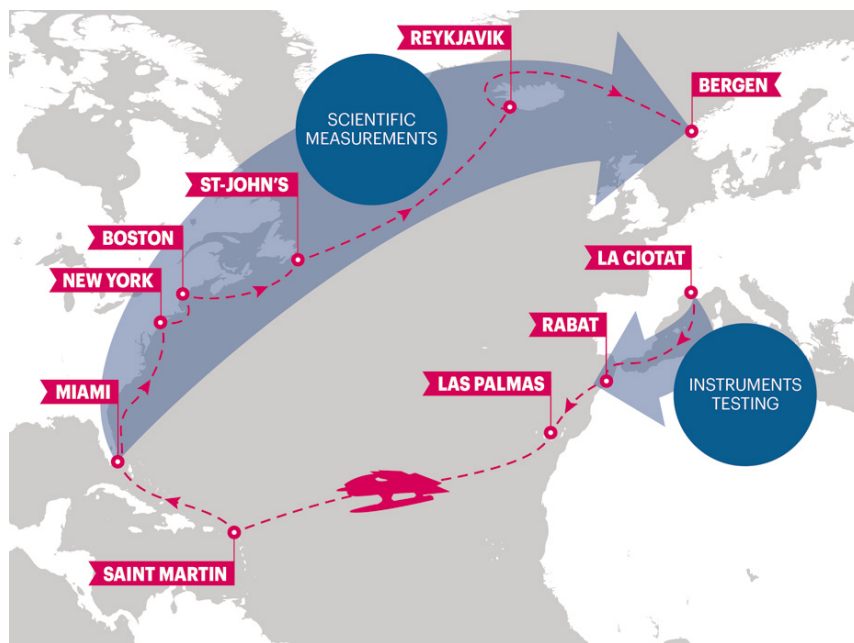
The catamaran had to be outfitted with research equipment, including a “ferrybox,” originally developed for ferries in the Baltic Sea, that constantly records the temperature, salinity and other characteristics of the water the boat is passing through.

It also has a “biobox,” developed by the university's applied physics department, which uses a laser to analyse the number and type of aerosols in air samples.

The issue of ocean-generated aerosols — solid or liquid particles suspended in the atmosphere that can have an impact through cloud formation, reflection of sunlight and other processes — is a relatively new one in climate science, Beniston said.

“We suppose that the ocean must be a fairly large contributor” of aerosols through the action of waves and wind, he said, but their abundance and how different types are distributed are fairly unknown.

“Their exact role is still open to question,” he said.



The Gulf Stream is one of the most intensely studied ocean currents in the world, but Beniston's plan is to examine some of its smaller-scale structures.

These include eddies, swirling offshoots of the current (which, although they are smaller in scale than the entire Gulf Stream, can still be 320km or more in diameter).

Eddies tend to have more upwelling of colder, deeper water than the Gulf Stream itself, so one goal is to see whether different water conditions produce different kinds of aerosols.

With his plankton research, Ibelings wants to see whether the water conditions in eddies result in greater or less biological diversity than elsewhere.

The modifications to the catamaran — which also included new propellers and some remodelling of living quarters to provide work space for the researchers — were undertaken at a French shipyard after the boat ended its 19-month, 60,000km circumnavigation in May 2012.

That voyage was intended more to demonstrate the general capabilities of solar energy than the practicality of solar-powered ships.

(After all, vessels powered efficiently by alternative energy have existed for centuries. They're called sailboats.)

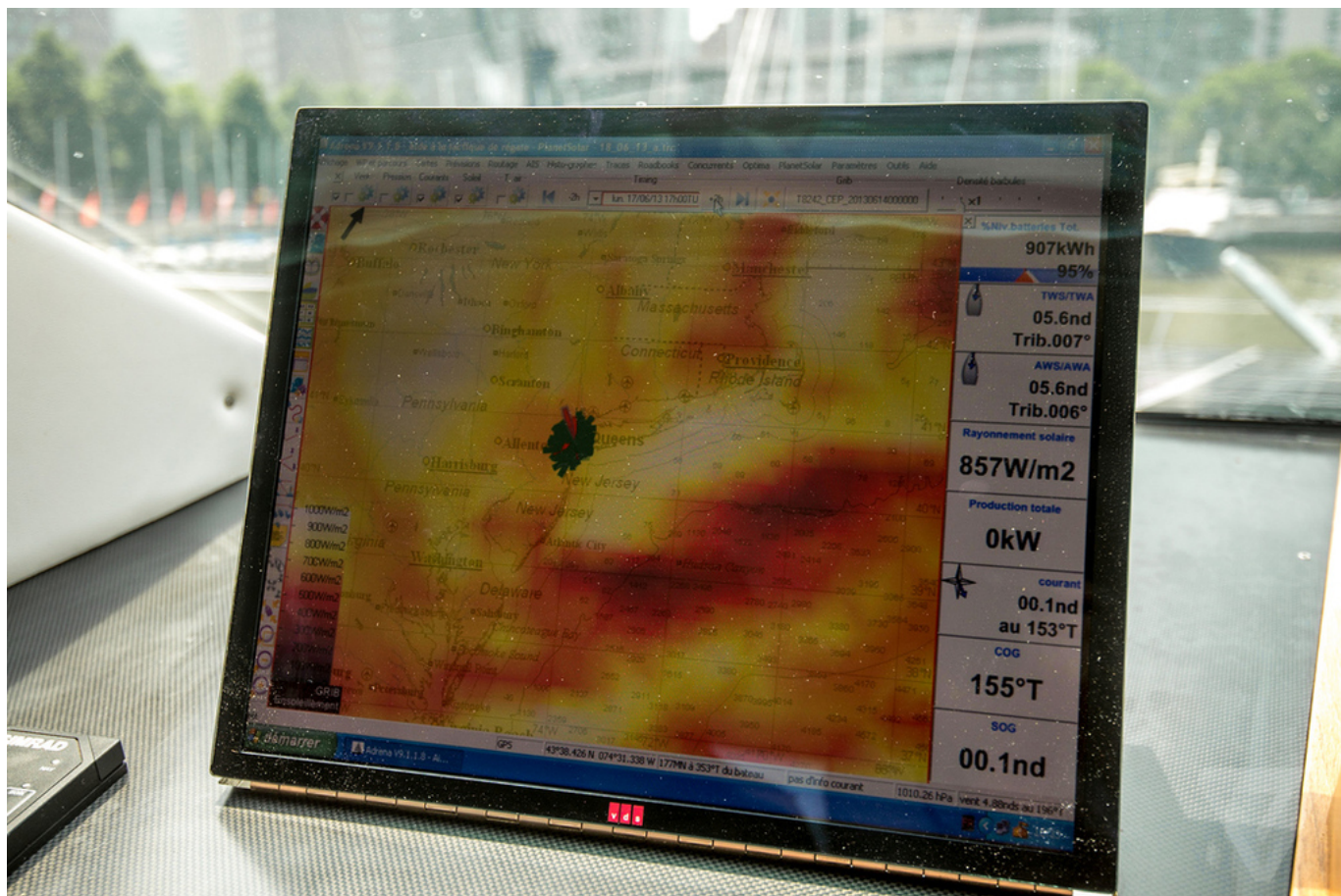
"It's an ambassador for solar energy," said [Gerard d'Aboville](#), Planetsolar's current captain.

"But I'd have to be crazy to say, let's order 20 boats like this."

Besides issues of cost and speed, Planetsolar poses some unique challenges.

In addition to wind, waves and current, d'Aboville must constantly consider the amount of sunlight hitting the photovoltaic cells, with the goal of keeping the batteries as charged as possible in case of a long stretch of cloudy weather.

(They can power the boat for about 72 hours when fully charged.)



This map (**Adrena software**) offers a three-day prediction of cloud cover. Captain d'Aboville explains that when plotting trips "usually we take care of the sea, of the wind, and of the current. But [here] we have to take care of the Sun." He adds, "usually we don't go from A to B... we try to avoid the clouds."

He has a laptop computer on which he gets detailed, and constantly updated, maps from France's national meteorological agency, Météo-France, showing the potential solar gain (calculated by taking into consideration cloud cover and other factors).

If there's a cloud on the horizon, he might decide to skirt it, figuring that he will gain more energy from the clearer skies than he'll lose in making the detour.

"I have this new parameter of the sun, and it makes life interesting," he said.