

COVER

The Alpha Crucis saga



After being renovated, the ship went through its first test at sea in March near Seattle.

A platform for research on biodiversity, climate change and exploitation of the pre-salt layer, the new oceanographic vessel of the State of São Paulo is scheduled to arrive in May at the port of Santos. The vessel's renovation in a U.S. shipyard and its transfer to Brazil required the overcoming of technical and bureaucratic hurdles.

Fabrcio Marques

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It was a couple of minutes to one P.M. on March 29 when Michel Michaelovitch de Mahiques, Director of the Oceanography Institute of the University of São Paulo (USP), received an e-mail that announced a tough day ahead. “Professor, get on Skype because I have a problem,” read the message sent by Rosely Aparecida Figueiredo Prado, nicknamed Rose, who is the import and export manager at FAPESP. The message sounded pessimistic because in the past 15 months, Mahiques had made enormous efforts to overcome a succession of obstacles related to the purchase and renovation of the new oceanographic vessel and its transfer to the State of São Paulo. March 29 had been scheduled as the date for the ship to leave the shipyard in Seattle and sail to Brazil. The ship had been completely renovated in the U.S. shipyard. Prior to its renovation, the ship’s name had been Moana Wave, and it had sailed under the U.S. flag. The ship had previously been owned by the University of Hawaii.

Completely exhausted (“I often felt that we would never be able to get the ship out of the United States because of all the obstacles we had to overcome,” the professor says), Mahiques was not in Seattle at that time because he had been unable to wait for the resolution of a problem detected after the conclusion of the renovation. The problem had retained the vessel in the Seattle shipyard, along with the crew and researchers, for 43 days. Rose had to remain in the United States during this entire period, even though she had only packed enough clothes to stay for a week. The professor took a deep breath and logged on to Skype. How-

ever, the news was surprisingly good. “Since you can’t be here personally to see the ship sail away, I decided to bring the ship to you,” said Rose, who had connected her computer to the shipyard’s internet cable and, with the help of a webcam, sent shots of the crew and researchers boarding the ship and sailing away. “It was raining in Seattle and I was afraid of damaging my laptop, but professor Mahiques, more than anybody else, deserved to be there. That was my birthday present for him,” Rose explained. Mahiques turned 51 on that day.

Baptized as the Alpha Crucis, the name of the star that represents São Paulo on the Brazilian flag, the ship sailed on its maiden voyage to the

port of Santos, with its arrival scheduled for mid-May. The first crossing, named InterOceanos, was celebrated with a poster. Professors and students of USP’s Oceanographic Institute and of other higher education institutions in the state are eagerly awaiting the ship because it will improve the quality of their research. The ship is 64 meters long and 11 meters wide. It can remain at sea for up to 40 days without the need to refuel. This autonomy will enable researchers to go on transoceanic trips, which represents a significant improvement compared to the previous

The ship can take 40 people (25 researchers and 15 crewmembers) on board, representing an additional 10 people over the capacity of the Professor W. Besnard ship

ship, the Professor W. Besnard, whose autonomy was only 15 days, meaning that it could never stay far from the coast. “This acquisition will make Brazilian oceanography more competitive and will allow us to partner with countries already doing research in the South Atlantic Ocean,” says Frederico Brandini, a professor at the Oceanographic Institute. “The open sea of the South Atlantic is one of the least known oceans in the world,” he adds. The Alpha Crucis can take 40 people on board, 25 researchers and 15 crewmembers, representing an additional 10 people compared to the previous ship. “We can take bigger research teams, with specialists from different fields. Research studies on oceans are becoming increasingly more interdisciplinary,” says Iلسon Silveira, who teaches at the Oceanographic Institute and is one of the researchers who sailed most frequently on the Professor W. Besnard.

The new ship is equipped with two engines and a system that allows it to anchor in the ocean. The Alpha Crucis will enable researchers to con-





The Alpha Crucis control room at three different times: before the renovation (top left), after the existing equipment had been removed at the shipyard in Seattle (left) and re-equipped (top right). On the previous page, the ship with its former name, Moana Wave

duct more accurate studies on sea currents than those conducted by researchers on the Professor W. Besnard. The older ship is equipped with only one engine and moves constantly when it is anchored for use as an oceanographic station. “The fact that we have a modern ship and state-of-the-art equipment will enable us to improve the quality of the information and of the research endeavors and take them to a higher level,” says Luiz Nonnato, an engineer at the Oceanographic Institute’s instrumentation laboratory. Nonnato designed the ship’s new equipment. Among the new equipment is a multi-beam ecoprobe that can provide images of the bottom of the sea for the purpose of surveying the terrain. “We had never had equipment of this kind – it was something we had always wanted,” says Nonnato. The ship is also equipped with two acoustic systems, appropriate for surveying ocean currents, and a meteorological station. A computer room will integrate all of the data provided by the equipment, which will allow researchers to use data in real time.

The ship will begin operating as an open sea platform as of the second half of the year. It has already been scheduled to go on several cruises. The first cruise is for a project of the Carbone National Institute of Science and Technology, coordinated by Professor Frederico Brandini, the objective of which is to study carbon fluxes on Brazil’s continental margin. The second cruise, the Atlas-B, is scheduled for November, and the

objective of this cruise is to install the first Brazilian-made Atlas buoy as part of the projects funded by CNPq and FAPESP. “The main purpose of the buoy is to monitor the conditions of the ocean and of the atmosphere in the region off the coast of the State of Santa Catarina, where Hurricane Catarina was formed in 2004,” explains Edmo Campos, who is also a professor at the Oceanographic

Institute. Professor Campos is the coordinator of the Atlas-B project and of the ocean activities of the National Science and Technology Institute for Climate Change. Another cruise, scheduled for the first three weeks of December, is part of the Samoc Project, an international research project focused on the study of the southward heat flux in the South Atlantic. Samoc is a joint effort of institutions from Brazil, South Africa, the

United States, France and other European countries. “The Brazilian component is being entirely funded by FAPESP. Brazil’s contribution will be in the form of the monitoring of the western part of a transoceanic line between Brazil and South Africa. The United States, France, and South Africa will be responsible for the rest of the network,” says Campos, who also coordinates the Samoc Project.

In addition to being used by professors of the Oceanographic Institute, the ship will be used by researchers working on two FAPESP programs: one is the Program on Global Climate Change, which includes a project coordinated by researcher Tércio Ambrizzi of USP’s Institute of Astronomy,

“The improved quality of the collected information will be outstanding,” says engineer Luiz Nonnato.



Rosely, from FAPESP (left), spent two periods in the United States to clear the ship's transfer

Geophysics, and Atmosphere Sciences (IAG), and the other is the Biota-FAPESP program for studies on biodiversity. The ship will also be made available to other São Paulo State institutions.

“The ship’s autonomy will allow us to cover regions which are located far from the continent and whose biodiversity we do not know much about,” says Carlos Joly, a professor at Unicamp and coordinator of the Biota-FAPESP program. “This will provide us with a qualitative advance in terms of ocean research, in relation to marine biodiversity as well as to the understanding of the importance of the role of the South Atlantic in regulating current and future climate conditions. It will be fantastic to schedule joint missions, and bring together researchers and students from different fields, to integrate physical-chemical, atmospheric, and biological studies,” Joly adds. It is only natural that the production of knowledge provided by the vessel on themes that range from biotechnology to the planning of the installation of oil platforms over the pre-salt layer will overshadow the suspense-filled and resilient plot that involved the purchase of the ship. However, the name of FAPESP’s import and export manager - Rosely Aparecida Figueiredo Prado - will be remembered by all of the people who sail on board the ship because this name is written on a plate with the names of all of those who made this acquisition possible.

The story of the purchase of the Alpha Crucis goes back to 2009, when Michel Mahiques became the Director of the Oceanographic Institute. At that time, the institute’s situation was discouraging; after years of good service, the ship Professor W. Besnard had caught fire and was out of operation. Mahiques contacted a shipyard in Guarujá with the idea of refurbishing the old ship. He concluded that this was unfeasible, as the shipyard had a backlog of orders and was not interested in the job. Another option was to contact a shipyard on the coast of Rio de

Janeiro or Santa Catarina and tow the ship to the shipyard, but nobody was sure of whether the ship would survive the journey. It was also unfeasible to buy a new ship because of the high cost - more than US\$ 30 million. However, purchasing a second-hand ship and renovating it was a tempting option.

With the support of other professors from the institute, Mahiques visited several countries to look at research ships for sale. Some were too expensive, while others had seen better days. He found the Moana Wave - renamed Alpha Crucis - on his 19th attempt. The vessel had been purchased by the Stabbert Shipyard in Seattle after having been used by the University of Hawaii. It had then been leased to the U.S.’s National Oceanic and Atmospheric Association (NOAA); NOAA had sent the ship on a mission to Antarctica. A group of engineers and crewmembers from the Oceanographic Institute visited the ship when it was anchored in Punta Arenas, Chile. The group liked what it saw. The price was also reasonable: US\$ 4 million. The next step was to find funding. The request for funding was sent to the Ministry of Science and Technology but was denied.

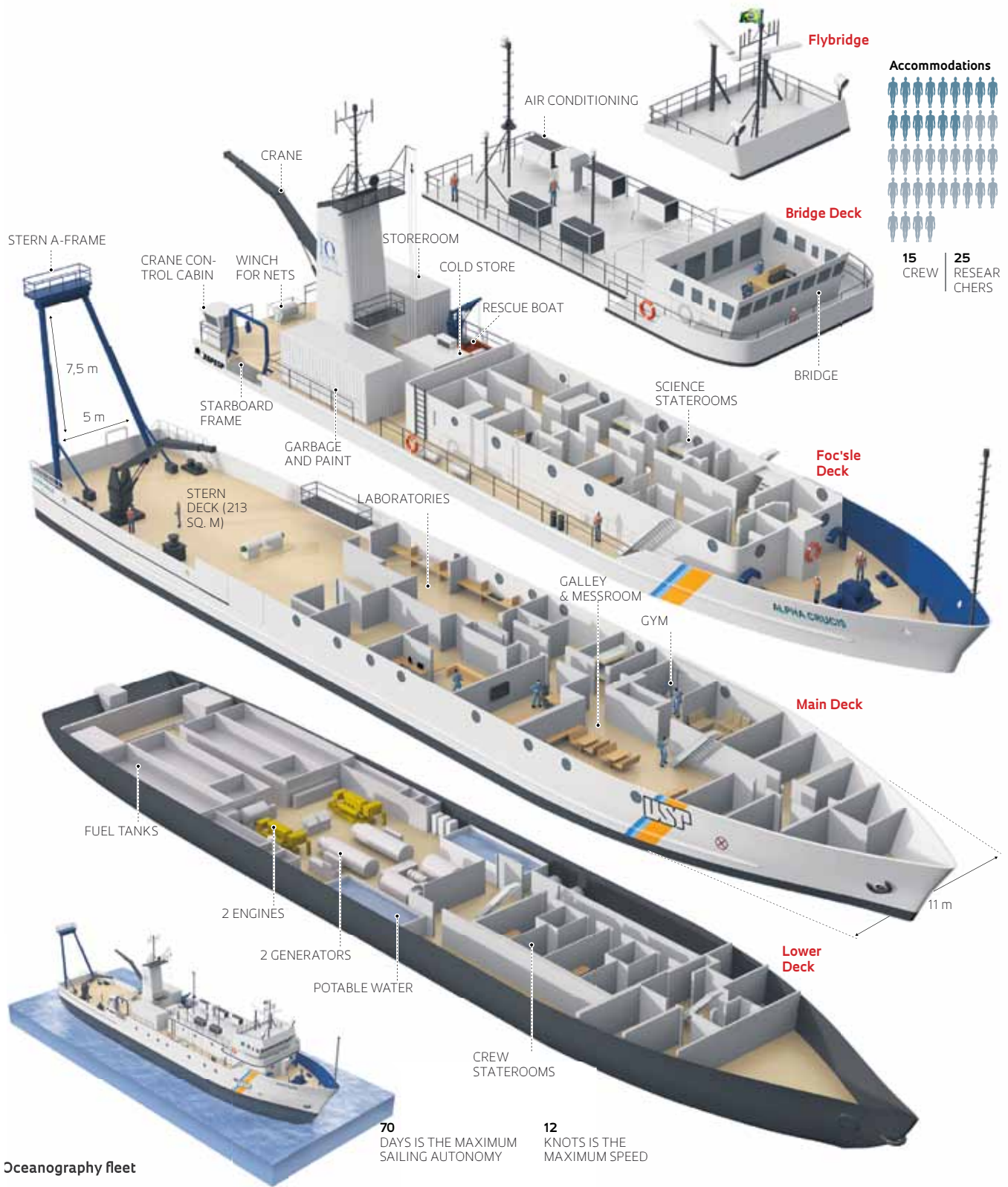
The project was presented to FAPESP at a meeting held on March 1, 2010. João Grandino Rodas, President of USP; Professor Mahiques; Celso Lafer, President of FAPESP; Carlos Henrique de Brito Cruz and Joaquim J. de Camargo Engler, respectively, Scientific Director and Administrative Director of the Foundation, respectively; and Fernando Menezes, advisor to the President of FAPESP, were present at the meeting. Brito Cruz stated that “a proposal with the objective of expanding the capacity of oceanographic research in the State of São Paulo, ensuring access to the ship to all potentially interested scientists with approved research projects, would be a major step forward for the state’s scientific and technological development. In addition, USP should take on the commitment of ensuring that the ship be manned and perfectly maintained.” USP President Grandino Rodas immediately agreed to such support, which was formalized soon thereafter. The support included funds from USP for the project. The proj-

The renovation was more extensive than had been initially expected because the ship had to comply with the latest updates to the International Convention for the Safety of Life at Sea

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Inside Alpha Crucis

The ship acquired in the United States is the largest and most advanced one in Brazilian science.



Oceanography fleet

Alpha Delphini
26 m



Atlântico Sul
36 m



Professor Besnard
49 m



Alpha Crucis
64 m





1 A close-up of the ship (above) and crew during the 40-day wait in Seattle while the problem detected in the propulsion shafts was remedied



PHOTOS 1 LUIZ NONNATO 2 CHICO VICENTINI

The ship's crew, which was the same as the crew that had sailed the Professor W. Besnard, had to attend training programs to learn how to sail bigger ships

ect was also evaluated by the Foundation and obtained favorable opinions from international consultants. In addition, FAPESP demanded that the ship be examined by a specialized company that looks after the ships of the U.S.'s National Science Foundation (NSF).

In November 2010, Rose – the import and export manager – heard about the ship for the first time. JMS, a naval engineering company from the United States contracted by FAPESP to conduct the technical inspection of the vessel, was paid for the service. This company prepares periodical expert reports on all research ships funded by the NSF. The acquisition process, which encompassed changing the ship's name and flag, and import procedures began once the expert report attesting to the ship's good condition had been prepared and submitted.

This was the first time that a ship would be imported in the history of the Foundation. "I am very grateful to the directors of FAPESP and to Professor Mahiques for their confidence in me. The import and export staff's support, as well as the support of my children, were very important," says Rose. In the following months, the related procedures took up most of Rose's time. However, she was always optimistic and viewed all of the obstacles that she came across every day as challenges to be overcome.

One of the major challenges was to change the ship's name and flag in the United States. "This

procedure was also responsible for one of the most outstanding moments of the process," Rose recalls. On March 26, 2012, still on U.S. territory, all Brazilians on board put on their official uniforms, walked up to the upper deck and sang the National Anthem as the Brazilian flag went up the flagpole for the first time. "I am much moved every time I watch the film produced by the researchers," says Rose. The video is available on www.youtube.com/watch?v=qatKbY4EVYM.

Celso Lafer, President of FAPESP, and Joaquim J. de Camargo Engler, the Foundation's Administrative Director, helped establish contact with the Ministry of Foreign Affairs and the Brazilian Consulate General in San Francisco. After several rounds of negotiations, in January 2012, Rose, acting as the attorney-at-law for FAPESP, the new owner, landed in San Francisco to officially transform the Moana Wave into the Alpha Crucis. Due to time zone differences – San Francisco is six hours behind Brasilia – the Brazilian Consulate and Itamaraty, Brazil's Foreign Ministry, had a one-hour window to work together. "Thanks to the help of the consulate staff, and especially to the help of deputy consul Mauro Peixoto Alves, the registration was duly carried out. The Alpha Crucis was numbered 001, because it was the first

Brazilian ship to be registered in the consulate,” says Rose. In San Francisco, Rose, on behalf of FAPESP, appointed the ship’s captain, José Helvécio Moraes de Rezende, who had been captain of the Professor W. Besnard; then, she appointed the crew of the Alpha Crucis; some of the crew members had attended training programs over the course of the acquisition and renovation process to become qualified to sail the new ship.

Another difficulty was related to the need to provide the countless certificates necessary to obtain a permit to sail to Brazil. To this end, frequent contacts were made with the Brazilian Navy’s Department of Ports and Coastal Regions (DPC). For example, one of the requirements was that the ship be equipped with an engine order telegraph, for crew communication from the bridge to the engine room, in the event of a power failure on the ship. After endless negotiations, during which it was demonstrated that the Alpha Crucis is equipped with a safer and more sophisticated communication system, the DPC issued the permit for the ship to sail to Brazil, although the definitive release from the need for the engine order telegraph will only be officially requested in June. “The navy personnel of the DPC were very patient and provided us with professional guidance,” says Rose.

Many of the problems resulted from the fact that the Moana Wave was built in the United States in 1974, under laws that waived various certificates. As the owner, name and flag of the ship had been changed, it became mandatory to comply with the international and Brazilian laws in effect, referred to as Safety of Life at Sea (SOLAS). As a result, the renovation was more involved than had been initially foreseen. The ship’s renovation began in April 2011 at the Stabbert Shipyard, which had purchased the ship from the University of Hawaii. All of the furniture and coatings were replaced; wood was replaced with nonflammable material. New equipment was installed. The ship’s final cost came to US\$ 11 million; the related funds were provided by FAPESP and USP.

Detailed planning did not prevent surprises from occurring. The American Bureau of Shipping (ABS), the international rating agency that monitored the renovation, called attention to a pending matter when the renovation had already been concluded. The ABS announced that it would not allow the issuance of the certificates necessary for the ship to navigate. The carbon gas cylinders of the anti-fire system, installed next to the engine

room, had to be removed and installed outdoors. This requirement increased the ship’s usable area; as a result, the documentation had to be updated.

As attorney-at-law for the ship’s new owner, Rose landed in Seattle in February 2012 to comply with one more requirement, namely, to officially welcome the ship’s captain onboard. However, there was another obstacle in the way. A problem was detected before the ship sailed off: a leak had been found in the propulsion shaft, and the captain was worried about this development. “We decided to remain in Seattle until the problem was solved, even though the shipyard employees claimed that the ship had always sailed in this condition,” says Rose. “So there I was, in an office, facing a roomful of Americans, highly trained men in this field. I introduced myself. I then explained that I was not familiar with the technical jargon, and that I was there to organize the next steps that had to be prioritized by the shipyard. I became the spokesperson for professor Mahiques, for captain Rezende and the crew. Whenever I needed something, I would say: I have a homework assignment for you. They nicknamed me homework,” she recalls. “Some of the moments were tense,” says Mahiques.

However, the solution to the problem was not simple – it took 40 days. Mahiques had to go back to Brazil, and Rose remained in Seattle. On March 5, the 28-day entrance visas for the 14 crewmembers expired, and their passports were retained. Rose was responsible for keeping all of the documents safe. From then on, no crewmember was allowed to leave the ship. “This was one of the most stressful moments that I went through during the entire acquisition process,” says Rose. “On the other hand, it was very gratifying to hear from the crew members that they would only go back to Brazil on the ship,” she adds, and this is what happened on the rainy morning of March 29, 2012, at 9:30 A.M. Seattle time, 1:30 P.M. Brasilia time. ■

In Seattle, ready to sail: funding from FAPESP and USP



Alpha Delphini in the shipyard

As of September, in addition to the Alpha Crucis, the Oceanographic Institute will have a new boat equipped to conduct research up to 200 miles off the Brazilian coast. Named Alpha Delphini, the oceanographic vessel is the first of its kind built in Brazil. The ship is 27 meters long and can take 20 students, 2 professors and a crew. The boat's autonomy is 10 to 15 days, depending on how many people are on board. "Leading oceanographic research institutions have one or two ships, as well as smaller vessels for coastal regions," says Rolf Roland Weber, a professor from the department of oceanography of USP's Oceanographic Institute.

"The boat can be used to study São Paulo State's continental shelf, including the pre-salt region," says the professor.

The construction of the boat is part of a project to increase the Oceanographic Institute's research capacity. The project was submitted to FAPESP, within the scope of the Multiuser Equipment Program (EMU). The boat's total cost comes to R\$ 4.75 million. FAPESP will allocate R\$ 4 million, and the rest of the funds – allocated for the engines and scientific equipment – will be provided by the Oceanographic Institute. As it is part of the Multiuser Equipment Program, the boat may be requested for research work by any university in the State of São Paulo, including private universities. The rules establish priorities for certain cases, such as projects funded by FAPESP. Initially, the Oceanographic Institute had explored the possibility of purchasing and renovating a second-hand boat, as was the case with the Alpha Crucis. "We even went to Turkey and New Zealand to see some boats. But no small boats in good condition were available, so we decided to build the boat here," says Weber.

With the exception of electronic navigation instruments and specific oceanographic electronic equipment, most of the equipment is Brazilian-made. "The boat will be an

intermediary vessel – smaller than an oceanographic ship and bigger than a small boat. At the moment, we have small wooden fishing boats that have been adapted for our needs. In the case of the new boat, no adaptations will be necessary. It is being built specifically for research purposes," he adds. Weber notes that the boat is simple and inexpensive to operate in comparison to an oceanographic ship. The boat's operating costs range from US\$ 4 thousand to US\$ 5 thousand per day, as opposed to the Alpha Crucis, whose daily operating costs are expected to range from US\$ 15 thousand to US\$ 16 thousand. The boat is being built at the

Inace shipyard, in the city of Fortaleza, State of Ceara.

The boat's delivery, initially scheduled for July, will be in September due to delays related to the manufacturing of the winch by a company from the city of Petropolis. Weber chose the boat's name. "We decided to baptize the boat with the name of a star, as was the case with the Alpha Crucis. Alpha Delphini is a star of the Delphinus constellation, and we thought it was a nice-sounding name," he says.



The boat's hull at the Inace shipyard, in Ceará: delivery is scheduled for September.