

Secret 3D Model Helped Kiwis to Yachting Gold

One of the secrets behind New Zealand's successful Gold Medal-winning yachting performance at the Beijing Olympics has been revealed -- a three-dimensional model of the land and undersea terrain that gave sailors knowledge of what to expect from wind and currents.

In the unique conditions off the Olympic yachting venue at Qingdao in China, the heavy pollution and haze in the air meant sailors were often sailing "blind", unable to see land or get a bearing from landmarks. Plus, the course was made complex by major variations in seabed depth, "crazy" currents and light winds.

However the three-dimensional model gave the New Zealand sailors an intimate knowledge of the depth of water under them at any part of the course, the expected tide directions and the current speed.

These readings were based on detailed research done before constructing the model in Auckland, and proved to be significantly better than the "official" tidal information given to competitors by the Chinese administrators.

It is also believed that no other team had any technology as advanced as the Kiwis' model.

The idea was born in a meeting between Leslie Egnot, Olympic Operations Manager for Yachting NZ, and sailing enthusiast Peter Dawson, director of Albany-based printing company 3D Print Ltd.

Peter and his co-director Martin Brewer were Supreme Finalists in the Innovation Category at the New Zealand Pride in Print Awards in 2007 for combining print technology to three-dimensional modelling. CAD files from architects, engineers and designers are transformed into solid objects using ink-jet printer technology.



Leslie Egnot of Yachting New Zealand surveys the secret 3D model that helped Kiwis win Gold at the Olympics, with (from left) Martin Brewer, Grant Beck and Peter Dawson

Leslie Egnot – herself an Olympic Silver Medalist in the 470s with Jan Shearer at the 1992 Barcelona games and helm for the all-womens Mighty Mary campaign at the 1995 Americas Cup – saw the benefit in creating a model of the area off Qindao where the five yachting courses would be positioned.

"We had a dilemma in that we were sailing at a venue we knew little about, with very different depths of water all around the course giving rise to strong and complicated currents. With the pollution, the sailors could often not see the land to give them reference points to know where they were on the course.

Nor could they see the tall buildings or hills that would influence wind patterns," said Leslie.

"We felt a 3D model would be a very useful tool in giving the sailors a visual understanding of where the shallows and troughs were that affect the currents and the hills and tall buildings that affect the wind. The sailors found they could interpret this easier than looking at charts."

Sparc came on board and agreed it would add value to the Olympic sailing campaign and funded the project. They could see a great potential for other largescale sporting events. From there, Peter and Martin began assembling the data needed to create a 3D file capable of being built into a solid model.

"It involved software modeling prepared by Dave Johnson, of Met Oceans in Raglan who has a business wave modeling for oil rigs. Hydrographic and GIS data was obtained for the undersea and land terrain. Google earth satellite data was then used for overlaying the shore photography," said Peter.

Sally Garrett of the Royal New Zealand Navy was seconded to go to the venue to help gather the tidal data from the site. This was assembled into tide charts overlaying the model and into a handbook used out on the race course by coaches showing current direction and strength for every 15 minutes. Sally's data revealed glaring differences from the official data given out by local Chinese administrators.

"The undersea terrain was colour-coded for depth showing the shallow sand banks and deeper channels so the sailors would know where the tidal flows were faster. Hillside and buildings ashore that were useful as reference points were included. Then latitude and longitude were marked in a grid on the model to predetermine where each sailor's course would be on each day. All permanent buoys were part of the model," said Peter.

The model was completed in six months and was used in Qingdao a year in advance for the Pre-Olympics.

New Zealand's most successful yachting coach, Grant Beck, says the

model was a major help in preparing for the Olympic campaign which ended with Tom Ashley as Gold Medalist in the RSX board sailing and the majority of Kiwi sailors finishing in the top ten of their class.

"When you can't see the shore or reference points, and the currents are so difficult, you need all the help you can get. This model helped the sailors reconcile where they were on the course and know what was under them. It had a major impact on our planning, particularly at the pre-Olympics where the sailors first came to grips with the course and the pollution," said Grant.

The story was kept silent or secret for a time until after the Olympics, and the model has only recently been shipped back to New Zealand.

Iain MacIntyre

*For further information, please contact:
Peter Dawson, Director,
3D Print Ltd (09) 415 8534
Leslie Egnot, Olympic Operations
Manager, Yachting NZ, (09) 361 4028*

