

# Hi-Tech Battles on the High Seas

*In 1995, New Zealand captured the America's Cup by using computers and simulation*



Photo: Sharon Green, courtesy of AmericaOne.org

*techniques to create an extremely fast boat.*

*This year, relying on the premier tools and talents of our aerospace, computer, automotive, and marine industry, the U. S.*

*sailors tried to 'Yank' The Cup back.*

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*by Susan Davidson*

An international battle for technological superiority was waged on New Zealand's Hauraki Gulf. Disguised as a sailboat race, the America's Cup is not just about tactics and crew work, it's about a nation's ability to harness its sharpest minds and latest technology to produce the fastest boat.

International syndicates spent millions of dollars in R & D to develop the "optimum" boat under specific and complex rules. A winning equation requires designing a boat that performs well in the broad spectrum of conditions that New Zealand's Hauraki Gulf dishes out.

There's a fine line between saving weight and engineering components too lightly. Many teams lost races and watched their efforts literally explode under load when critical gear failed – the Spanish, Swiss, Italians, and Japanese saw their carbon fiber spars collapse, lightly built sails ripped almost daily, and the New York Yacht Club's hopes sank when their boat's hull actually split open during a race.

St. Francis Yacht Club's *America One* was one of the most technically endowed campaigns. Its corporate sponsors include HP, SAIC, Telcordia, Ford, and United Technologies Corp. The design team used HP's supercomputer with a 128-processor compute

server, processors, and a 16GB system with 100GB of disk space. Using Computational Fluid Dynamics, 3D visualization techniques, and velocity prediction programs, the SAIC team revamped the level of performance simulation, and increased their understanding of hydrodynamic forces on the hull and appendages (rudder, keel, winglets). Telcordia's algorithmic experts analyzed the boat's performance data and testing sequence. And, Ford helped develop software that provided critical real-time performance analysis used during the races. Nondestructive testing with structural analysis software ensured the boat and its parts could withstand the enormous loads that racing produces.

But, even with all the design advantages that this country's best technological brains and machines could deliver, the final race came down to catching the first favored wind shift. *America One's* highly skilled tactician, cool and capable driver, and synchronized crew work, were not enough to beat *Prada*, the extremely well funded Italian team. *Prada* beat *America One* by 47 seconds and won the right to challenge New Zealand. For the first time in 149 years, there was no American boat in the America's Cup. The international battle resumes in 2005. Prepare to "Yank" The Cup back home! 🏴‍☠️

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*Susan Davidson is a Bradenton, Fla.-based writer and sailor.*