

A SAIL LIKE NO OTHER

STORY & PHOTOS
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IPST'S ENERGY CHALLENGE '01 ENCOURAGES INNOVATION AND EFFICIENCY

IN THE HAZY DAWN OF A WARM SPRING MORNING, STUDENTS representing five colleges converged on a tiny section of Lake Lanier in Gainesville, GA, to put their technical prowess to the test. Months of preparation led up to this contest. The teams pushed outside the technology envelope, innovated existing equipment and adapted research in new fields to develop their sails that carried them to victory. There were many obstacles to success, and only one team would triumph over man and nature to emerge victorious, claim top honors, and US\$ 15,000 cash.

On April 7, 2001 the Energy Challenge '01, sponsored by the U.S. Department of Energy, Institute of Paper Science and Technology (Atlanta, GA), Vanguard Sailboats and Hercules, Inc., became the proving ground for the technical competitors. The purpose of the Challenge was to increase interest in science and engineering and promote awareness of energy efficiency, manufacturing design, recycling, waste minimization, package maximizing and pulp and paper industrial processes. The event

pulled engineering students and fascinated sailors together to create a wood fiber-based nonwoven synthetic composite-sail for an Olympic class sail boat, and competitively sail the boat in a closed course competition.

The post-dawn hours saw the arrival of the competing teams from North Carolina State University, State University of New York, College of Environmental Science and Forestry (SUNY ESF), University of Maine, University of Central Florida, and Miami University (Ohio). Garbed in colorful, distinctive shirts with unique logos ranging from the crisp, clean Central Florida Pegasus in gold on a black polo to the high-spirited Miami (Ohio) Survivor™-esque screen-printing on long-sleeve white T's, each team exhibited the enthusiasm and determination that would prove vital to the outcome of the day's event. The hard-working students cautiously negotiated the sloping ramp which led to the set-up area on the floating pier below.

Each team was given a grant of US\$ 2000 to assist with start up costs and 100 lbs. of solid loblolly pine of the same age, provided by Georgia-Pacific Wood and Fiber Procurement. The sail had to be at least 80% wood fiber by weight. Higher scores for greater percentages of wood fiber were given. Synthetic fibers and paper chemicals could be used, but scrim materials were not allowed. The design and construction stage of the program was scored on the basis of fiber yield, total energy used to convert the wood to fiber and the environmental impact of the process regarding the byproducts produced.

Carefully unrolling their sails onto the undulating pier, the students scoured over the surfaces of their constructs to ensure each made the trip intact. Grommets were tightened; adhesives applied; tensions began to rise as minor imperfections were dealt with. Despite each team's trepidation, the atmosphere between students remained cordial and admiring. Team-members interspersed amongst their competitors, comparing notes about design concepts, material use, and durability. Sailors chatted jovially about the light breeze that blew in, and the challenges of making the best of what little was available.



While onlookers gathered to view what was hoped to be an exciting race, the deciding factor in determining the victor was the research and novelty of design that went into each team's sails. Performance on the water would be only one element of the final score.

Once the crowd assembled beneath the canopy provided to shade the onlookers, the teams were each given five minutes to present the concept behind the manufacture of their sails. Using diagrams, pictures, and PowerPoint presentations, the details unfolded, amongst the nods and sighs of acknowledgement by the audience at the efforts of each team. From the use of RTS thermomechanical pulping, which consumes lower energy while producing a higher yield pulp with no chemical costs, to the pioneering efforts in biopulping, which increases mechanical pulping efficiency and improves paper strength while reducing the environmental impacts, the commitment to innovation from the teams shone through.

At last, the most anticipated aspect of the Challenge had arrived. Would the sails hold up outside of the laboratory? While some teams were able to test the sails prior to arrival, winter weather conditions prohibited SUNY and University of Maine from even a test run on the water. Carefully, each team threaded their sails with the shiny, aluminum masts, and prepared for the first round of sailing competition.

Three Olympic-class, single-person sailboats were provided for the 5-race event, and a round-robin competition format was adopted, with each team sailing a total of three races. The team with the lowest point total at the end (1 point for 1st, 2 for 2nd, 3 for 3rd) would be the winner of the race element of the Challenge, which represented 20% of the team's total score.

The competitive spirit amongst the teams was exuberant. Despite the lack of a significant wind to propel the boats, each team shouted out cheers of encouragement to the sailors. However, even a light breeze proved too much for one team's sail. As the navigator for the University of Miami, Ohio began his first attempt at the course, a grommet ripped loose from the paper sail, and he was forced to return to the dock for repairs. While Miami made every attempt to reconstruct their sail, the



damage would prove too great, and they were unable to complete a single heat of the race.

Strategy, skill and a little luck determined the winner of the sailing competition, with SUNY emerging victorious, and UCF bringing in a close second.

With the paper sail performance element completed, the judges adjourned to consider the written reports, gross weight, tear and tensile strength and novelty of design of each of the team's submissions. The judges returned with the results, and evidence of the dedication and hard-work of the students came through in the presentation of the awards.

Scoring an 82.8, SUNY ESF emerged as winner of the event, earning a US\$ 15,000 prize for their excellence in performance and design. University of Maine, who had triumphed in IPST's 1999 challenge, scored 78.1 to take home second place and US\$ 10,000, and third place finish and US\$ 5000 was secured by a shocked University of Miami (Ohio), scoring 76.2 points, whose screams of exhilaration broke the somber mood of the team, after the disappointing performance of their sail. **TJ**

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