

Vectran Fiber Helps Energy-Generating Aerial Wind Turbine Lift Off *High Tech Material Tethers Magenn Power's Rotating Aircraft*

FORT MILL, S.C., Sept. 8, 2008 – A liquid crystal polymer fiber that has landed on planet Mars is now being used closer to earth for its high performance in another type of MARS application – the Magenn Air Rotor System.

Kuraray America's [Vectran® fiber](#) is being used in a cable tether that is suspending a new type of alternative energy solution – a lighter-than-air tethered wind turbine that rotates about a horizontal axis in response to wind, generating electrical energy.

Vectran is the core of a braided cable tether that is wrapped with copper that can carry electrical currents. The tether is part of a sophisticated connection system that hooks the generators on each side of the floating turbine 1,000 feet up in the air – where the winds blow steadily and reliably – to the ground below and transfers electricity that can be used immediately or stored in batteries.

The fiber's high strength yet light weight made it ideal for this new rotating aircraft that generates electricity, according to the developers of the unique hybrid tether that combines fiber and metal into one system that can hold up to 20,000 pounds.

Fiber Meets Specials Specs

Vectran fiber met the specific requirements sought by [Atkins & Pearce](#) (A&P), a 200-year-old leading producer of engineered textiles with an expertise in braids and fibers.

A&P collaborated with Canada-based [Magenn Power](#) on developing the prototype system for MARS over the past three years, which was successfully launched in April 2008 and is now being tested.

"We were looking for a material with high strength that also had to be lightweight so the helium could lift the balloon off the ground," said Jeramie Lawson with A&P's new product development team.

"Steel cables would be too heavy," he said. "We also needed a material with low elongation, even when carrying a large tensile load, and not stretch. We also were faced with the challenge of balancing the elongation of the Vectran fiber and copper."

A&P selected Vectran from a myriad of other high-performance aramid fibers.

"We have the world's largest inventory of raw fibers," Lawson said. "Vectran has a great strength-to-weight ratio. We knew from our experiences with Vectran that it would work because of its high strength, low weight, abrasion resistance when other yarns move against it, as well as its temperature and chemical stability."

Aluminum end fittings were designed by Applied Fiber to properly connect the Vectran cable segments to the wind turbine.

These resin-infused terminations at the ends of the rope allowed the segments to be threaded directly into a splitter box to secure the balloon, said Paul Badeau, vice president of business development of [Applied Fiber](#), a pioneering developer of an advanced composite termination technology for synthetic fiber cables that provided the end point terminations.

“Vectran’s high strength combined with the Applied Fiber terminations allowed a secure, light weight connection from the cable to the blimp,” said Badeau. “If the fibers stretch, the conductors within the cables can break. Vectran is a zero creep fiber that lends itself well to a balloon tether and this application.”

Vectran Expanding into Fabric

Based on the positive results of using Vectran in the tethers, Magenn Power now plans on using it woven in the fabric of the helium-holding aircraft that also contains a UV laminate for sun protection.

“We were looking for a stronger fiber for the fabric envelope and plan to use Vectran for its high strength and proven performance in the tethers,” said Mac Brown, Magenn Power’s chief marketing officer.

Vectran fiber also has been used as the fabric in the airbags on NASA’s Mars Spirit and Opportunity Rover missions that enabled the crafts’ soft landings. In addition, it has been used in bridle cables, space suits and inflatable spacecraft.

“From the surface of Mars to the bottom of Earth’s oceans, Vectran’s unique combination of properties makes it the material of choice in demanding applications where other fibers fail to meet requirements,” said Robert Knudsen, manager of sales and marketing for Kuraray America, Inc.’s Vectran division.

The Magenn story was featured on Discovery Channel’s new series, [Discovery Project Earth](#), on Sept. 5. The program features Fred Fergusen, the Canadian engineer specializing in airships, who invented the revolutionary wind turbine that uses the constant winds that exist at 1,000 feet above sea level to produce renewable energy.

About Kuraray America, Inc.’s Vectran Division

Based in Fort Mill, S.C., the Vectran division of Kuraray America, Inc. produces Vectran® fiber, the world’s only multifilament polyester-polyarylate yarn melt spun from liquid crystal polymer (LCP). Vectran fiber is used in a wide range of applications where strength, durability and dimensional stability are critical to performance and safety. For more information, please visit www.vectranfiber.com.

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