Boeing Brings Space Technology Down to Earth to Make Hydrogen Fuel Safer

The Boeing Company (NYSE: BA) successfully demonstrated new technology that could increase safety for rockets as well as hydrogen-fuel automobiles being developed by car makers.

Working in partnership with researchers from Intelligent Optical Systems, Torrance, Calif., Boeing scientists tested a fiber-optic hydrogen leak detection system in a real-world environment.

Dr. Alex Kazemi, a leading micro-technologist and a top-flight team of rocket scientists, engineers and technical and manufacturing specialists developed this new fiber-optic hydrogen detection system in Huntington Beach, Calif.

"While the new system is designed to greatly improve the ability to detect explosive hydrogen vapors on space launch vehicles, it can also bring benefits to other industries including the automotive sector where car makers are developing clean-burning, hydrogen-fuel automobiles," Kazemi said.

The successful demonstration occurred during a static hot fire test of the Delta IV common booster core (CBC) on April 23, 2001, at NASA's John C. Stennis Space Center in Mississippi.

The system detects hydrogen and then relays the information at the speed of light for quick analysis by computer.

The safety, speed and increased capability of the new Boeing system comes from spark-free, fiber-optic cables and special sensors. The system is capable of measuring hundreds of locations at once. Current devices, called mass spectrometers, are capable of measuring only a handful of locations.

"Leak detection of hydrogen at very low levels is very important to the fuel cell industries as well as chemical industries," said Dr. Surya Prakash, Olah Nobel Laureate Chair Professor of Hydrocarbon Chemistry at University of Southern California. The system uses an optical sensor called an optrode coated with a proprietary chemical substance. Light is sent down the fiber-optic cable and through the optrode. If the light returns as a different color, that color, along with the intensity of the signal, correlates to amounts of hydrogen present.

If safe levels are exceeded, a rocket launch can be stopped immediately with the leak quickly pinpointed. Conversely, false alarms can be prevented in the last seconds of countdown because the system responds with great precision in only one second versus two to six minutes for a mass spectrometer.

This new system can be used on all Delta rockets, commercial and military launch vehicles, Sea Launch, Space Shuttle, and any emerging reusable launch vehicles.

The Boeing Company, headquartered in Seattle, is the largest aerospace company in the world and the United States leading exporter. It is the world's largest manufacturer of commercial jetliners and military aircraft, and the largest NASA contractor. The company's capabilities in aerospace also include rotorcraft, electronic and defense systems, missiles, rocket engines, launch vehicles, and advanced information and communication systems. The company has an extensive global reach with customers in 145 countries and manufacturing operations throughout the United States, Canada and Australia.

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Boeing Delta Web Site: www.boeing.com/delta

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