JPL-developed clean energy technology moves forward

May 27 2011, By Priscilla Vega

A team of scientists at NASA's Jet Propulsion Laboratory originally developed this 300-watt engineering prototype of a Direct Methanol Fuel Cell system for defense applications. Credit: NASA/JPL-Caltech

A team of scientists at NASA's Jet Propulsion Laboratory in Pasadena, Calif., in partnership with the University of Southern California in Los Angeles, developed a Direct Methanol Fuel Cell technology for future

Department of Defense and commercial applications. Recently, USC and the California Institute of Technology in Pasadena, which manages JPL for NASA, awarded a license to SFC Energy, Inc., the U.S. affiliate of SFC Energy AG. The non-exclusive license for the technology will facilitate the expansion of the company's methanol fuel cell products into the U.S. market.

This novel fuel cell technology uses liquid methanol as a fuel to produce electrical energy, and does not require any fuel processing. Pure water and carbon dioxide are the only byproducts of the fuel cell, and no pollutants are emitted. Direct Methanol Fuel Cells offer several advantages over other current fuel cell systems, especially with regard to simplicity of design and higher energy density. Current systems rely on hydrogen gas, a substance that is more difficult to transport and store.

"JPL invented the Direct Methanol Fuel Cell concept and also made significant contributions to all the facets of the technology. These contributions include: development of advanced catalyst materials, high-performance fuel cell membrane electrode assemblies, compact fuel cell stacks, and system designs," said JPL Power Technology Program Manager Rao Surampudi. He explained that USC worked with JPL in the development and advancement of this technology for defense and commercial applications.

Over the years, those applications have expanded from the original defense applications to include such uses as battery chargers for consumer electronics, electric vehicles, stand-alone power systems, and uninterrupted/emergency power supplies.

"We are looking forward to working closely with the fuel cell industry to further develop this technology to meet future market needs," said Erik Brandon, current Electrochemical Technologies group supervisor at JPL.

From 1989 to 1998, the Defense Advanced Research Projects Agency (DARPA) funded JPL and USC to develop direct methanol fuel cells for future defense applications. Inventors on the JPL team include Surampudi, Sri. R. Narayanan, Harvey Frank, Thomas Valdez, Andrew Kindler, Eugene Vamos and Gerald Halpert. The USC inventor team includes G.K. Surya Prakash, Marshall Smart and Nobel Laureate George Olah.

"This fuel cell may well become the power source of choice for energy-efficient, non-polluting military and consumer applications," said Gerald Halpert, former Electrochemical Technologies group supervisor at JPL.

Provided by JPL/NASA