

Hydrogen and Hydrocarbon, Air –Independent Fuel Cells

A NEW PARTNERING OPPORTUNITY

Reference No: NNJ14ZBH025L

Potential Commercial Applications: sub-sea industry, commercial space, automotive industry, Department of Defense (DoD), and others

Keywords: fuel cells, hydrocarbon fuel, hydrogen

Purpose:

JSC is seeking partners to further Hydrogen and Hydrocarbon, Air –Independent Fuel Cells technology. NASA JSC has a long history in the development of fuel cell systems using pure oxygen as the oxidant and pure hydrogen as the fuel. Such a system was the primary power source for the Space Shuttle Orbiter. Along with spacecraft applications, these solutions could enhance mission capability in remotely operated subsea vehicles independent of surface power sources.

Technology:

For future spacecraft power, NASA will require air-independent fuel cells and plans to push this technology in three directions: (1) higher reliability, (2) higher-temperature heat rejection, and (3) efficient use of fuel from reformed hydrocarbons. Potential solutions for the first requirement include “dead-headed” fuel cells of any chemistry, which have no active components for reactant management in the balance-of-plant. Potential solutions for the other two requirements center on solid oxide fuel cell chemistries. These chemistries can operate above 800 °C, which can minimize the mass of heat rejection radiators, and can utilize both carbon monoxide and hydrogen as fuel, thus minimizing the stages required to reform hydrocarbon fuel sources.

R&D Status:

JSC has been working in collaboration with the US Navy to conduct testing programs and understand the system integration issues associated with potential solutions.

Intellectual Property (IP):

This Partner relationship may produce new IP that could be jointly owned by NASA and the partner or may become the property of the partner.