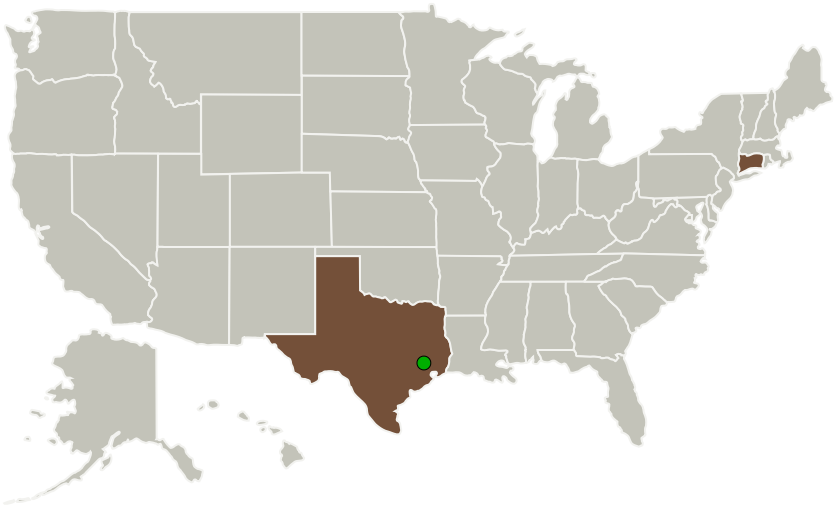
Membrane Water Recuperator, Phase I

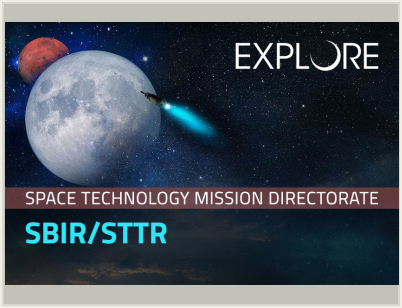
Completed Technology Project (2010 - 2010)

Project Introduction

One of the CO2 reduction technologies currently being developed by NASA is the CO2 and Moisture Removal Amine Swing-bed System (CAMRAS). One of the disadvantages of the CAMRAS for long duration missions is that it removes moisture in addition to CO2. One way to minimize the water loss from the atmosphere, yet still be able to implement the highly desirable CO2 removal function of the CAMRAS, is to implement a membrane water exchanger, or recuperator, at the inlet of the CAMRAS system. The water exchanger passes humidified, CO2 laden air on one side of a membrane. The water vapor passes through the membrane leaving the CO2 laden air to be treated by the amine system. The air returning from the amine system is dry and CO2 free, as its remaining moisture and CO2 have been absorbed by the amine beads. This dry air passes on the second side of the membrane. Its low dew point provides the driving force for the moisture that passes through from the inlet stream. The CO2 free air becomes re-humidified, thus conserving water in the overall system mass balance. The membrane is highly selective for water, and not for CO2. The amount of carbon dioxide passing through the membrane and returning to the cabin is negligible; therefore the functionality of the CAMRAS as a CO2 removal system will not be impeded. The improvement over the current state-of-the-art is a reduction in power and the elimination of moving parts.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Wolf Engineering, LLC	Lead Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Somers, Connecticut
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Connecticut	Texas

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:
- Final Summary Chart*(https://techport.nasa.gov/file/139207)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Wolf Engineering, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

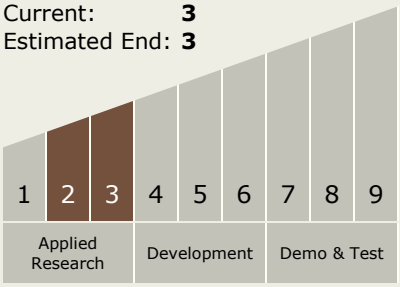
Carlos Torrez

Principal Investigator:

Karen E Murdoch

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - └ TX06.1.2 Water Recovery and Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System