

PI: Michael Izenson  
 Creare, Inc. - Hanover, NH

### Identification and Significance of Innovation

- Goal: Reduce use of consumables and conserve water
- Water vapor exchanger enables use of regenerable CO<sub>2</sub> absorber without venting excessive water
- Membrane water vapor exchanger (WVX) places no additional burden on thermal control system

### Phase I Proof of Feasibility

- Developed fabrication methods for efficient WVX
- Designed and built a proof-of-concept WVX
- Demonstrated high water recovery efficiency (90%)
- Demonstrated very low pressure losses
- Demonstrated very low CO<sub>2</sub> permeation rate

Estimated TRL at beginning and end of contract: ( Begin: 3 End: 5 )

### Technical Objectives and Work Plan

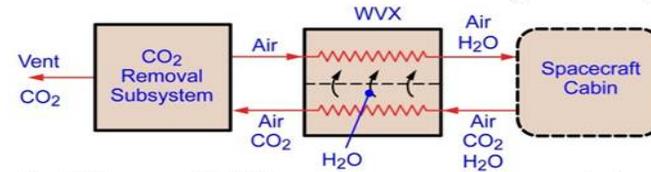
#### Phase II Technical Objectives

- At least 90% water recovery efficiency
- Very low pressure drop, compact, and lightweight
- Design for optimal performance with regenerable CO<sub>2</sub> absorbers

#### Phase II Work Plan

- Scale up and optimize design
- Build a prototype core
- Measure performance in separate effects tests
- Demonstrate operation with CO<sub>2</sub> absorber
- Demonstrate durability

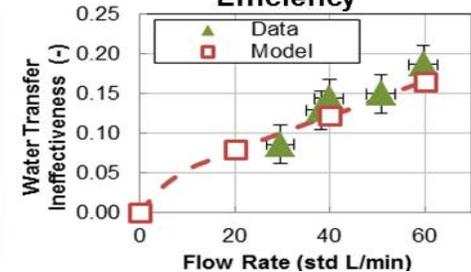
### The WVX Prevents Water from Venting with CO<sub>2</sub>



### Proof-of-Concept WVX Built in Phase I



### Demonstrated High Efficiency



### NASA Applications

Creare's WVX offers very high average water flux through membranes and very low pressure drop  
 NASA application: Environmental control and life support systems on future manned exploration spacecraft  
 NASA application: Advanced life support systems for International Space Station

### Non-NASA Applications

Non-NASA application: Recuperative cathode air humidifiers for fuel cell power systems

### Firm Contacts

Michael Izenson  
 Creare, Inc.  
 P.O. Box 71  
 Hanover, NH, 03755-3116  
 PHONE: (603) 643-3800  
 FAX: (603) 643-4657