

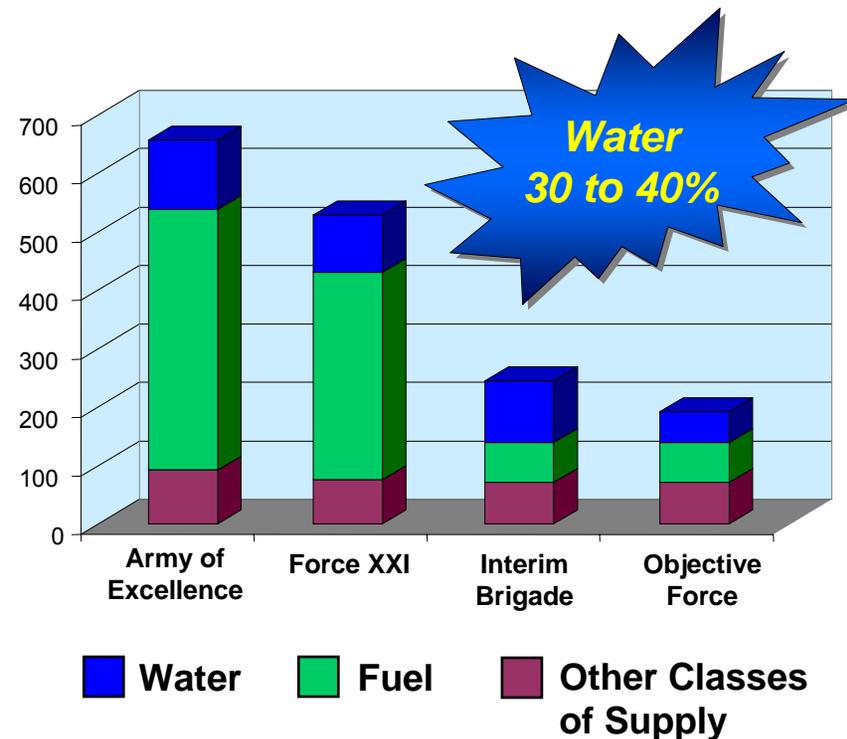
## Logistics Payoff

### Current Logistical Burden

- Interim Brigade—water is 40 percent of daily sustainment requirement.
- Small groups on short missions (12 soldiers, 3 days)—carry one day's supply of water and depend on re-supply for the remainder.

### Program Goal

With emphasis on the creation of water from the atmosphere, use low-energy water harvesting systems to reduce logistics burden.



**Example:** Carry one-half day's supply of water, use low-energy water harvesting system with same space/weight as one-half day's supply to produce water for the remainder of the mission.



# Water from Air Projects



## Current SOTA

High-energy, refrigeration-based

## Oasis Water Machine

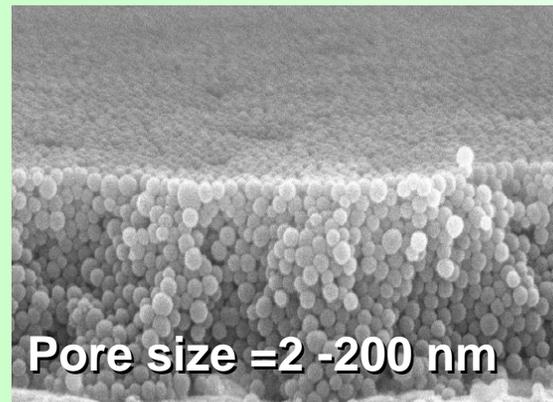


Commercial Product  
90 Kg (200 lbs), 340 L volume

## DARPA DSO Projects

Low-energy water from air

## NanoPore, Inc.

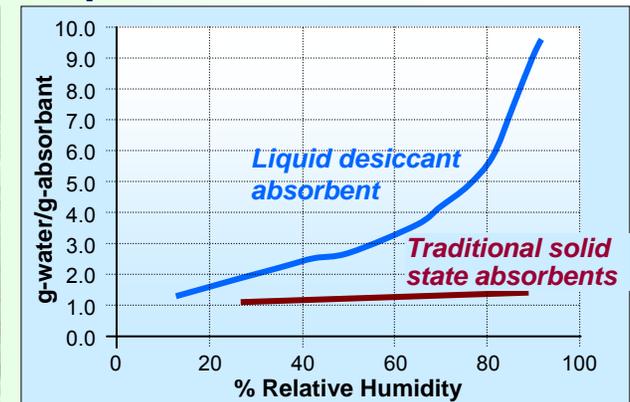


Pore size = 2 - 200 nm

## ElectroWetting in nanoPores

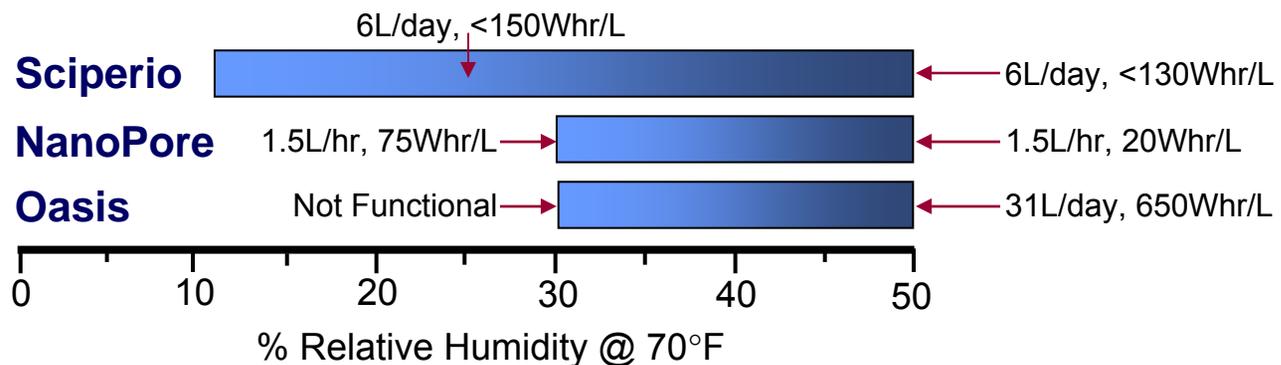
Ph II Prototype  
36 Kg (80 lbs), 15 L volume

## Sciperio, Inc.



## Liquid Desiccant System

Ph II Prototype  
Size and weight TBD



## Adsorption – Electrowetting

### Electrowetting in Pores (EWIP)

- Templated 2-5nm pores
- Variable surface chemistry
- Wire mesh electrodes

### Rotating Sorption Beds

- 2 beds in adsorb state
- 2 beds in desorb state

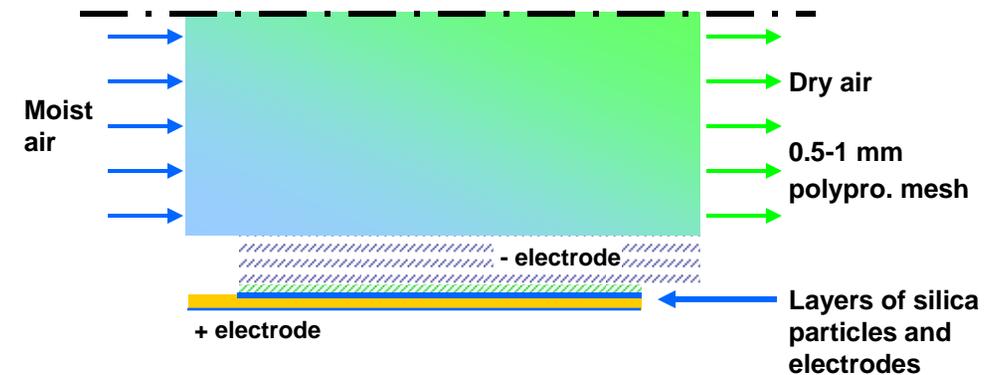
### Meso-Channel Condenser

- Optimizes heat rejection to air
- Minimizes  $\Delta T$  rise

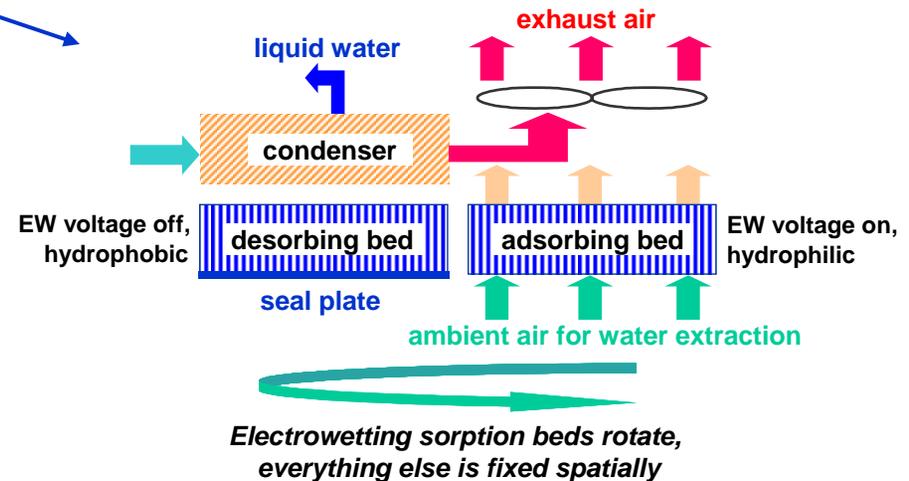
### Adaptive Control Electronics

- Optimizes operation for ambient humidity-temperature conditions

Efficient adsorption when voltage applied and desorption when off



Eliminates valves/minimizes volume, weight, number of fans



## Liquid Desiccant Absorption

### Evaporator/Condenser Module

- Liquid desiccant reservoir
- Closed loop scavenger air plenum
- Air-H<sub>2</sub>O vapor mass exchanger
- Heat Xer/H<sub>2</sub>O vapor condenser
- Heat pump hot zone for evaporation

### LiBr/LiCl Collector Module

- LiCl reservoir
- Process air plenum
- Air-liquid-H<sub>2</sub>O vapor mass Xer
- Heat pump cold zone

### Concentrator/Regeneration Module

- Energy recovery/RO system
- Energy recovery pump
- RO cartridges
- RO feed pump

