Sustainability and Logistics-Basing (4a) Technology Enabled Capability Demonstration (TECD) Overview Briefing

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Sustainability and Logistics-Basing (4a) Technology Enabled Capability Demonstration (TECD) Overview Briefing

Presented at the 2012 Science, Technology & Requirements Forum held 17-18 October in Fort Leonard Wood, MO.
Problem Statement: The Army needs improved capability to enable sustainment independence/“self-sufficiency” and to reduce sustainment demands at contingency bases. It is too costly, too unpredictable, and too labor intensive for a Small Unit to carry all required consumables (fuel & water) to last for weeks or months at a COP/PB to small FOB (up to 1000 PAX). As a result, contingency bases are highly dependent on resupply/backhaul, which can be unpredictable and are costly in terms of soldiers at risk in convoys, and reduced mission availability, etc.

Challenge: Formulate a S&T program to increase self-sufficiency, reduce supply demands, and reduce waste at COPs/PBs to small FOB and improve the ability to sustain the Small Unit for the duration of the mission at lower cost and lower risk to suppliers without adversely impacting primary mission Soldier availability (troop to task ratio).

Challenge Boundary Conditions:  
Who: Small Units in Afghanistan-like (extreme/austere) environments  
What: Identify tools, tactics, and techniques to achieve demand reduction  
How: Measure demands for power, water and fuel; waste generated and/or waste-to-energy power; weight/volume of food; time to resupply.

Objectives:  
Near term (FY17): reduce need for fuel resupply by 25%, reduce need for water resupply by 75% and decrease waste generation by 50% while maintaining Force Provider like quality of life -(Note: metrics may differ for PB, COP, & FOB).
TECD 4a Purpose:

• Demonstrate an integrated approach to reducing sustainment requirements for small contingency base operations via a suite of capabilities that reduce the need to deliver water and fuel to the base and the burden of having to collect, manage, and dispose of solid and liquid waste.

• Identify and integrate an S&T supported suite of capability enabling solutions that increase self-sufficiency, reduce supply demands, and reduce waste at Combat Outposts/Patrol Bases (COPs/PBs), i.e. 1000 PAX and below.

• Demonstrate capability to sustain the Small Unit for the duration of the mission at lower cost and lower risk to suppliers without adversely impacting primary mission Soldier availability.

• Inform the maturation of contingency basing and operational energy requirements.
Sustainability & Logistics-Basing 4a Concept

Integrated, Waste, Water and Fuel Management Solutions for Base Camps

150-600 Pax

- Highly Adaptable, Mobile & Scaleable
- Stand Alone & Integrated Capabilities
- Organic and Contract Maintainable
- Inherent QOL Enhancing Capabilities
- Small Unit Leaders Trained to Manage Base Efficiency Efforts & Objectives

600-1000 Pax

- Fixed Integrated Systems
- Adaptable to Existing Infrastructure & Utilities
- Contract Maintained
- Optimal QOL is Standard
- Established Base Management Infrastructure

50-150 Pax

- Highly Mobile, Easy to Establish
- Tailorable, Mission Specific
- Robust, Organically Maintainable
- QOL Improving Options Available
- Small Unit Leaders Trained to Operate a Base (PSG, 1SG)

*Army Equipping Strategies are yet to be determined

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## Sustainability & Logistics: Basing 4a
### Focus Areas and Enabling Technologies

#### TeCD Focus Areas

<table>
<thead>
<tr>
<th>Focus Areas</th>
<th>Fuel Demand Reduction 25%</th>
<th>Water Demand Reduction 75%</th>
<th>Waste Reduction 50%</th>
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<tbody>
<tr>
<td>Supply Side</td>
<td>• Power Generation</td>
<td>• Water Purification</td>
<td>• Source Reduction</td>
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<td>• Alternative Thermal /</td>
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<td>• Power Control,</td>
<td>• Demand Side-Organizational</td>
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<td>Distribution, Storage</td>
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<td>• HVAC</td>
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<td>• Organizational Systems</td>
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<td>Demand Side</td>
<td>• HVAC</td>
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<td>• Habitation Systems</td>
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<tr>
<td></td>
<td>• Organizational Systems</td>
<td>(Kitchen, Laundry, etc)</td>
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#### TeCD Thrust Areas

- Demand Side: HVAC, Habitation Systems, Organizational Systems

#### Enabling Technologies (Examples)

- Microgrids
- Integrated Energy Efficient Shelters (Liners, HVAC, Lighting)
- Fixed and Flexible Photovoltaics
- Energy Efficient Organizational Systems (Kitchen, Laundry, etc)
- Water Recycling & Reuse
- Water Quality Monitoring
- Water Efficient Organizational Systems (Kitchen, Laundry, Hygiene)
- Water Generation (Air, etc)
- Waste Source Reduction
- Waste to Energy Conversion
- Blackwater Dewatering
Sustainability & Logistics-Basing 4a
Program Summary

Purpose: To demonstrate an integrated approach to reducing sustainment requirements for small contingency base operations via a suite of capabilities that reduce the need to deliver water and fuel to the base and the burden of having to collect, manage, and dispose of solid and liquid waste.

Results/Products (Demonstration of Integrated Capabilities That):
- Reduce power requirements to environmentally condition habitation spaces (heat and cool)
- Increase power sourcing efficiency via more effective power generation and management
- Increase water use efficiency via water sourcing, recycling, repurposing, and management
- Reduce creation of solid and liquid waste products and optimize waste management
- Increase waste disposal efficiency via energy conversion and waste mitigation strategies

Warfighter Payoff:
- Small unit leaders have greater flexibility in positioning Contingency Bases based on mission need rather than sustainment convenience
- Sustainment management task reductions result in greater troop availability for mission operations
- Warfighters experience reduced exposure to threats during logistics operations & convoy

MILESTONES

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<thead>
<tr>
<th>MILESTONES</th>
<th>FY12</th>
<th>FY13</th>
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Milestone Indicators: TRL

~$200M
Sustainability & Logistics-Basing 4a
Metrics and Measures of Success

Technical Domain

Performance Data

- XX% Decrease in Total watt/hrs Demanded
- XX% Increase in Power Generation Efficiency
- XX% Increase in Available Load Usage
- XX% Increase in Water Produced per Gallon of Fuel Required
- XX% Decrease in Blackwater Generated on Base

Metrics

- 25% Reduction in Fuel Demand
- 75% Reduction in Water Demand
- 50% Reduction in Waste

TeCD Challenge Objectives (Point of Departure)

Experimentation & Demonstration

Operational Domain

Metrics

- XX% Increase in Base Self Sufficiency (days between resupply)
- XX% Decrease in Fuel & Water Convoys Required for a Base overtime

Measures of Enabled Operational Capability

Measures

- XX% Decrease in Fuel O&S Costs
- XX% Decrease in Water O&S Costs
- XX% Decrease in Fuel & Water Related Convoy Incidents

Modeling & Simulation

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## Sustainability & Logistics-Basing 4a

### Timeline

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**Transition Partners (T):** PEO CS/CSS (PM FSS, PM PAWS) & PEO C3T (PM MEP)
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