Joint Committee on Tactical Shelters- Update
19 May 2015

Sustainability/ Logistics-Basing, Science & Technology Objective- Demonstration (SLB-STO-D)

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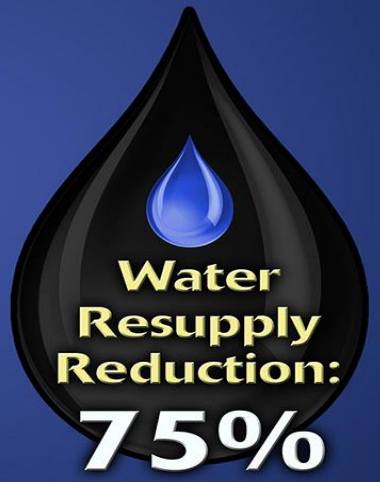
Sustainability Logistics Basing -
Science & Technology Objectives - Demonstration

Objectives:



Integrated Model Based **SYSTEMS ENGINEERING APPROACH** to Demonstrate a Significant Reduction in Sustainment Resupply…

…While Maintaining **QUALITY OF LIFE** and Increasing Self Sufficiency at Extra-Small/Small Base Camps.

Bottom Line Up Front (BLUF)
25% Fuel and 75% Water reduction realized

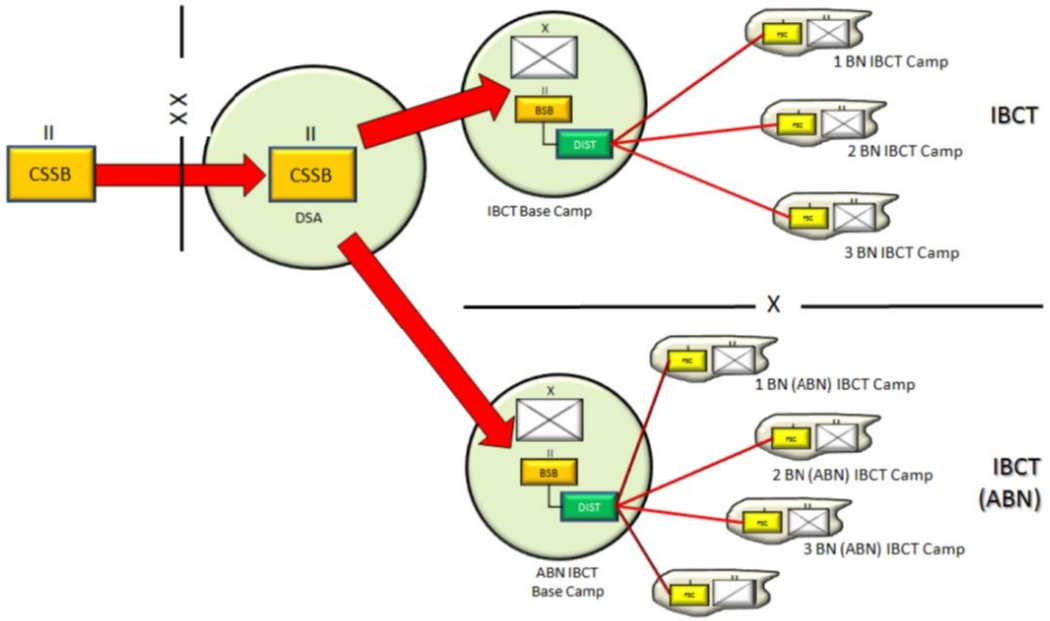


Figure 2: Commodity flow from DSA to BN Base Camps

Key Inputs:

- 180 Day Scenario
- 3-Day resupply frequency
- JP-8: $3.17 (DLA –Energy)
- Bulk Water: $0.16/gal (LIA FBC tool)
- **NOTE: 50% reduction of Waste back hauled not included in existing Models**

Operational effectiveness analysis articulates impacts to Army based on SLB-STO- D success – GAMEX Example.

- The Maneuver Support Battle Lab – Provided Unified Challenge experiment as overarching use case and analysis framework.
- SCoE/CASCOM provided OPLOG Planner to develop convoy structure to resupply all classes of supply to all base camps in this cluster.
- G-4, LIA provided the FBC tool for preliminary results of Analysis. Augments OPLOG results with fuel consumption of convoy and protection consideration and other refinements

Bottom Line Up Front (BLUF) Cont'd
25% Fuel and 75% Water reduction realized

Unified Challenge GAMEX experiment 180 Day Scenario - Entire Task force				
	Base Case	Improved Case	Difference	% Diffenerce
# of Resupply Convoys	2,160	1,320	840	39%
# of Total Truckloads - Fuel, Water, Other, Ground and Air Protection	60,240	34,860	25,380	42%
Threat (Hours) - Total Resupply, Ground and Air Protection	905,901	417,894	488,007	54%
CO2 (pounds) emmisions - Unit and Convoy	412,757,980	345,390,576	67,367,404	16%
Fuel Consumption (Gallons) - Unit and Convoy	19,202,471	16,068,381	3,134,090	16%
Bulk Water Consumption (Gallons) - Unit	47,098,778	11,774,695	35,324,083	75%
Fully Burdened Cost Estimate ($) - Fuel	72,140,437	65,912,725	6,227,712	9%
Fully Burdened Cost Estimate ($) - Bulk Water	74,608,113	23,606,144	51,001,969	68%
Fully Burdened Cost Estimate ($) - Fuel and Bulk Water	$146,748,550	$89,518,869	$57,229,681	39%

JP8:$3.17/g
H_2O:$0.16/g

$312,488 Saved Per Day

$5,550 Saved Per Soldier

Sustainability & Logistics-Basing Concept – 0V1

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

Extra Small (50 – 299 PAX) | Small (300 – 1999 PAX)

50-149 Pax

- *Highly Mobile, Easy to Establish*
- *Initial Entry Operations*
- *Tailorable, Mission Specific*
- *All Organic Capabilities*
- *Basic Functions, Services and QOL – Improvement Options Available*
- *Small Unit Leaders Trained to Operate a Base (PSG, 1SG)*

XS - 64 PAX

150-599 Pax

- *Highly Adaptable, Mobile & Scaleable*
- *Stand Alone & Integrated Capabilities*
- *Organic with possible Contractor Support /Maintenance*
- *Expanded Functions, Services and QOL Beyond Unit Capabilities*
- *Small Unit Leaders Trained to Manage Base Efficiency Efforts & Objectives*

S - 312

600-1000 Pax

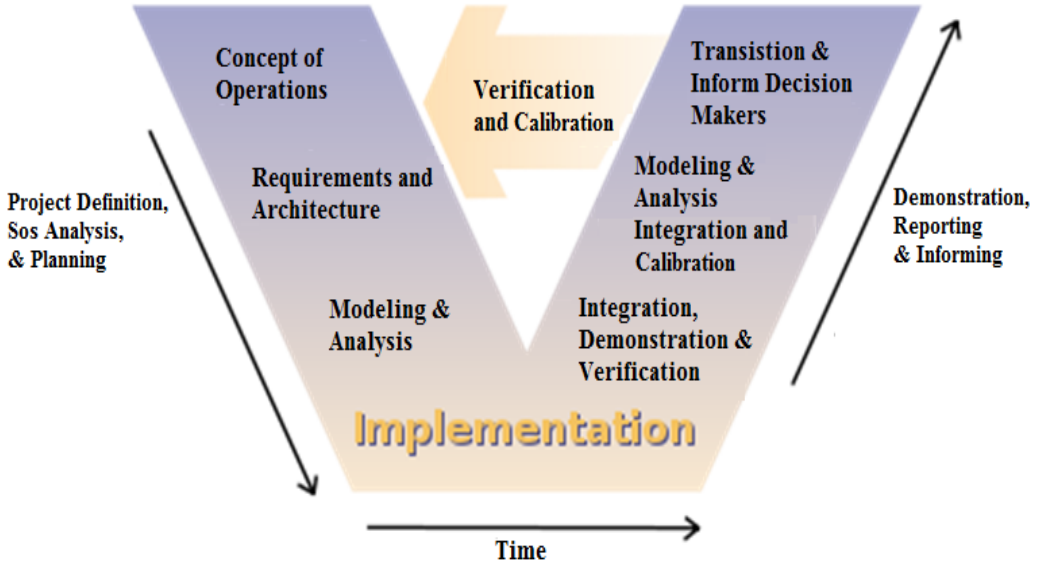
- *Fixed Integrated Systems*
- *Adaptable to Existing Infrastructure & Utilities*
- *Organic and Contractor Support /Maintenance*
- *Expanded QOL is Standard*
- *Established Base Management Infrastructure*

S- 1160

Vision For Success: Sustainability/Logistics-Basing

Model Based ***Systems Engineering*** (MBSE) Approach

- Analysis will show how we will meet our objectives



Operationally Relevant ***Demonstrations***

- Both systems and components
- Materiel and non-materiel solutions

Integrated Solution ***Architectures*** that address ICD Capability Gaps

Modeling and Simulation Capabilities and Analytical Results will be critical components of our Demonstrations

Knowledge and Technology Transition, a key measure of success

Quality of Life (Q of L)

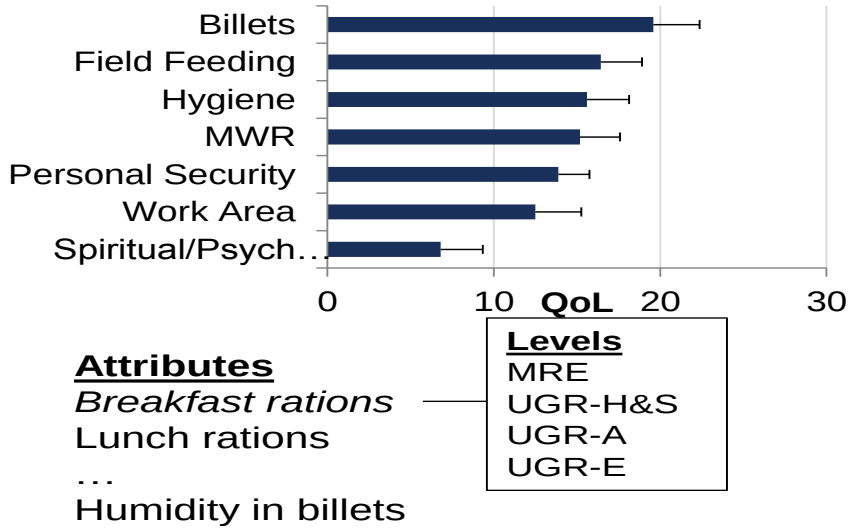
Develop a quantitative framework to measure, baseline and model basecamp quality of life (QoL) as an enabler of Soldier readiness

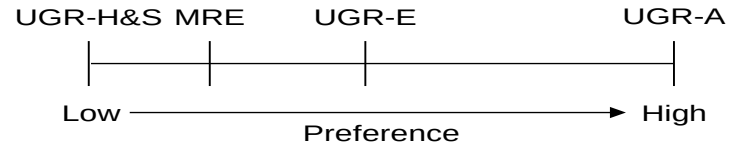
Captures the “voice of the Soldier” by identifying how they prioritize QoL-related base camp services

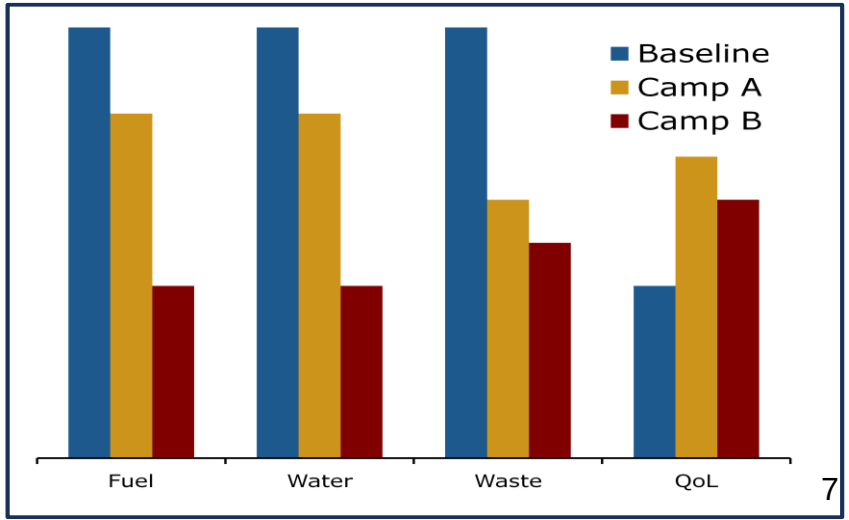
- Attributes/levels defined through Soldier focus groups, SME interviews, review of doctrine and regulations
- Model scores QoL for a camp profile using a utility model based on discrete choice data collected from over 1,200 Soldiers.
- QoL attributes/levels have been mapped to SLB-STO-D baselines and candidate technologies, enabling tradespace analysis.

Enables SLB-STO-D to assess progress against objective of reducing the fuel, water, and waste burden of expeditionary basecamps while maintaining Soldier QoL

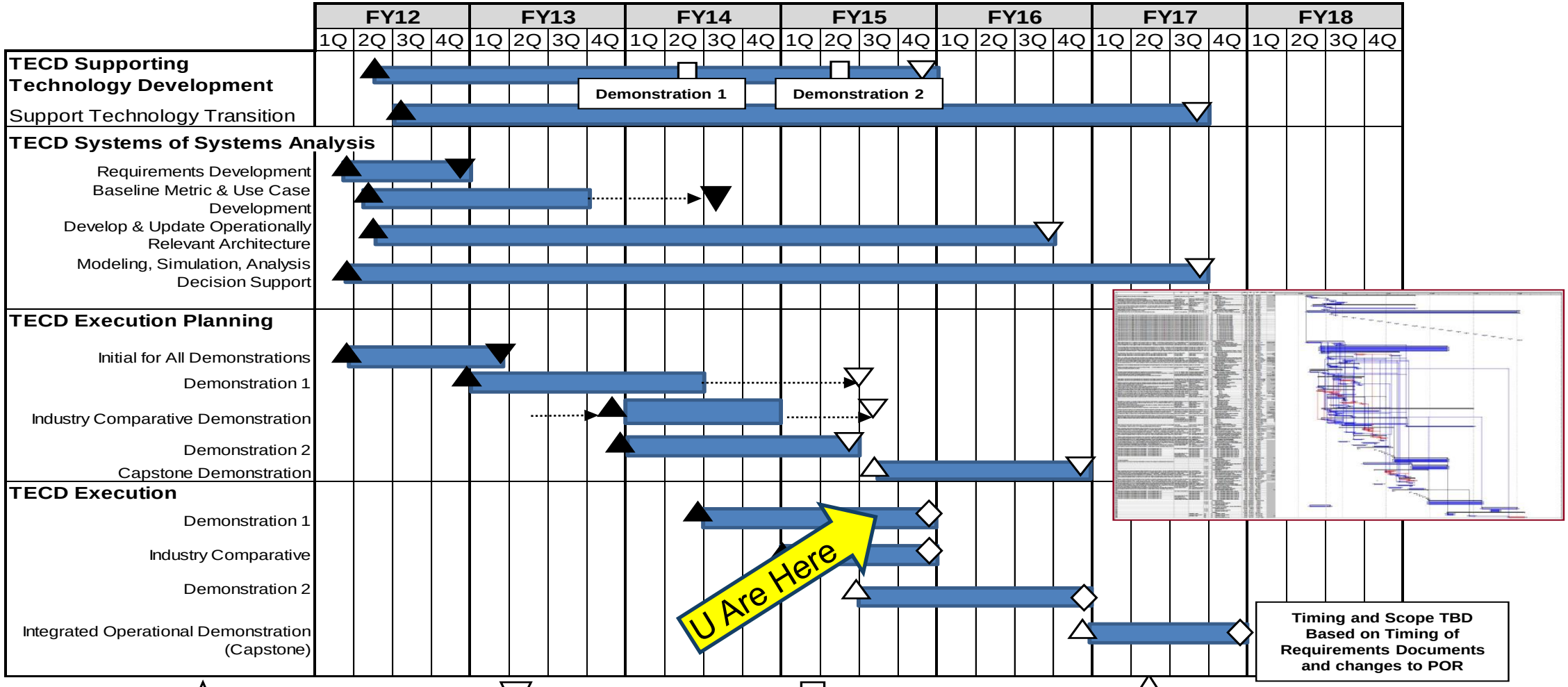
Interim Report in technical editing







SLB-STO-D Critical Path – You Are Here

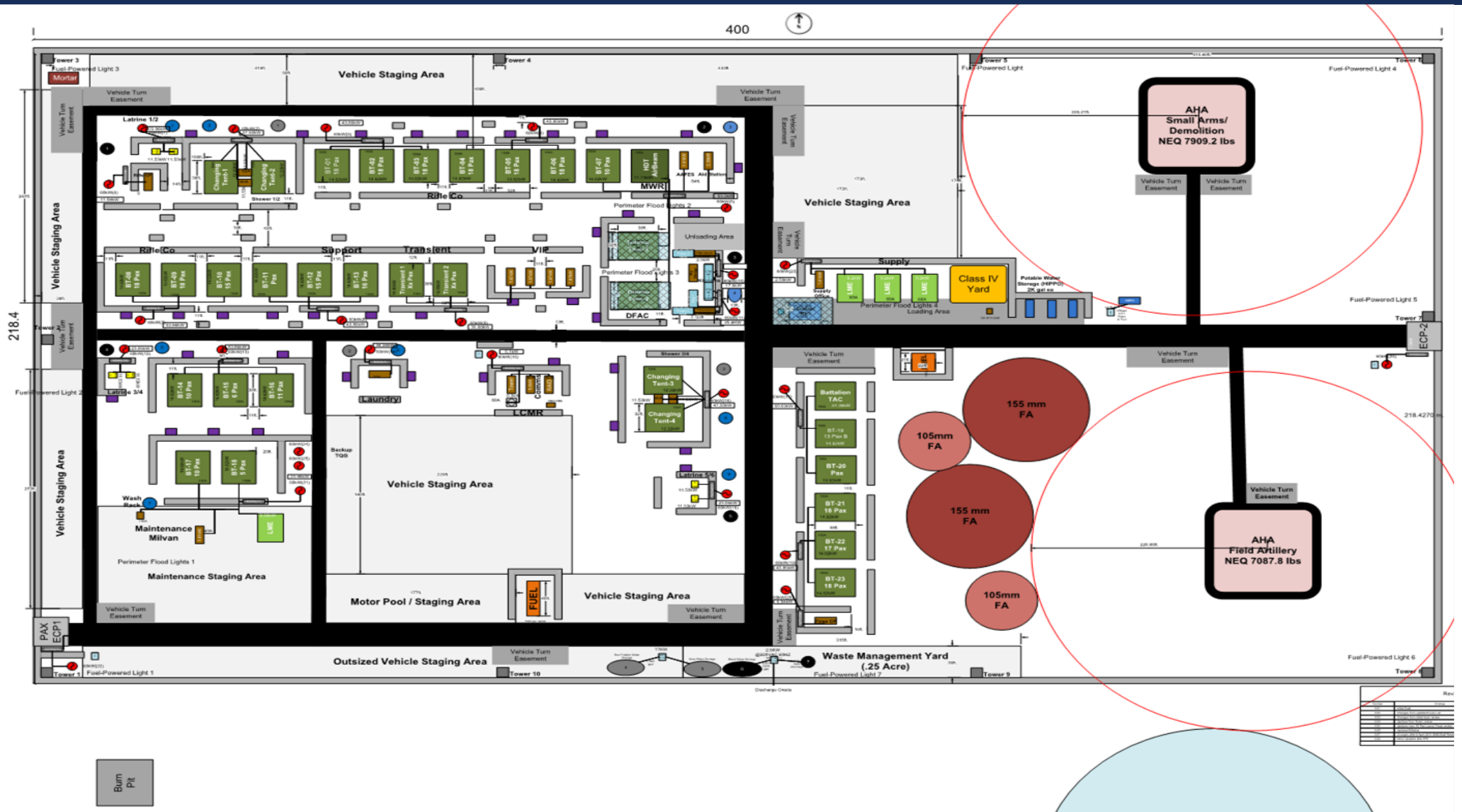


Legend:

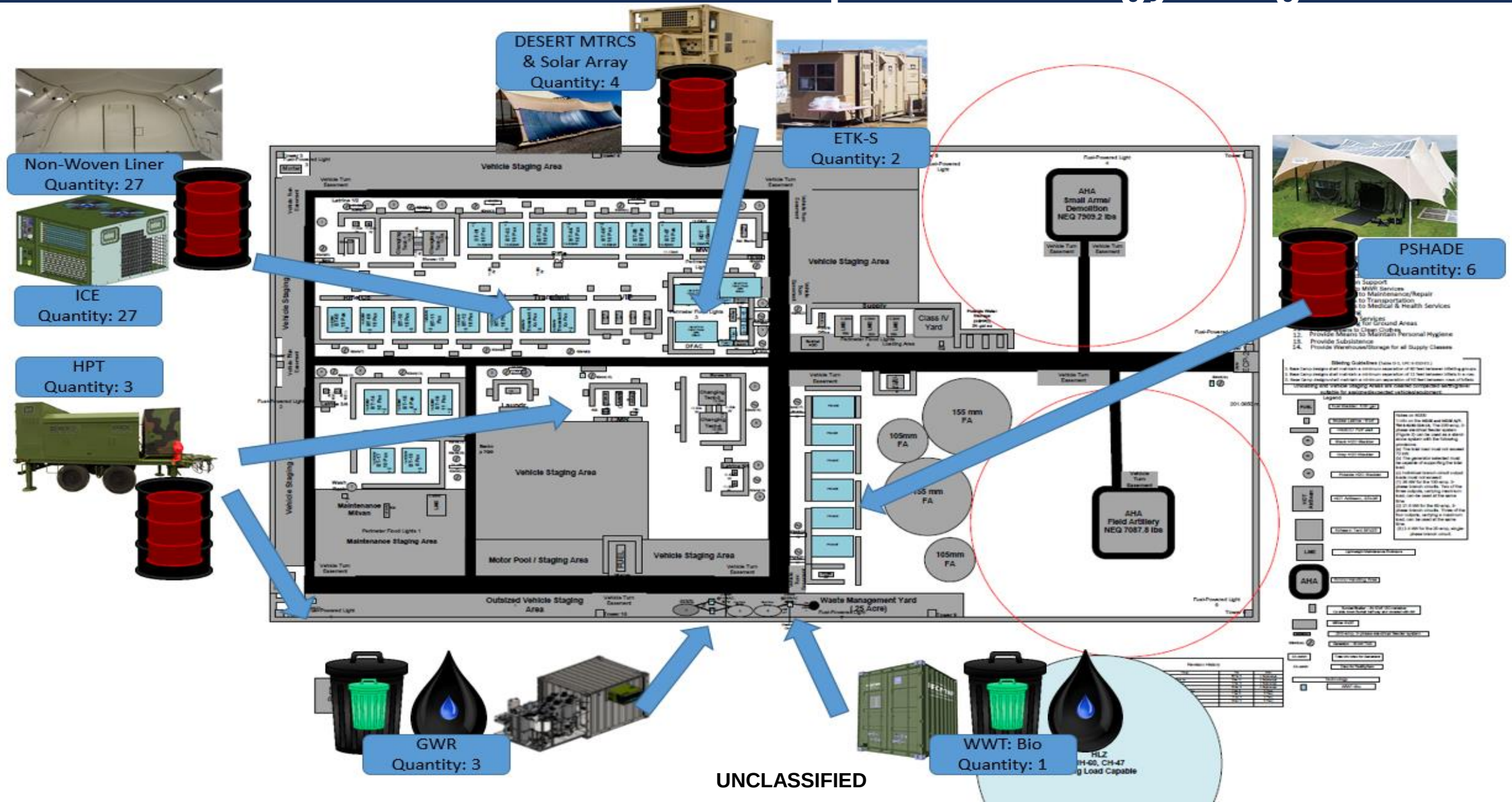
Planned Start | Planned End | Planned Milestone | Planned Significant Milestone

Schedule Slip | Actual Start | Actual End | Actual Milestone | Actual Significant Milestone

Sample Analysis Results - 300 PAX Example
300 PAX Baseline Diagram

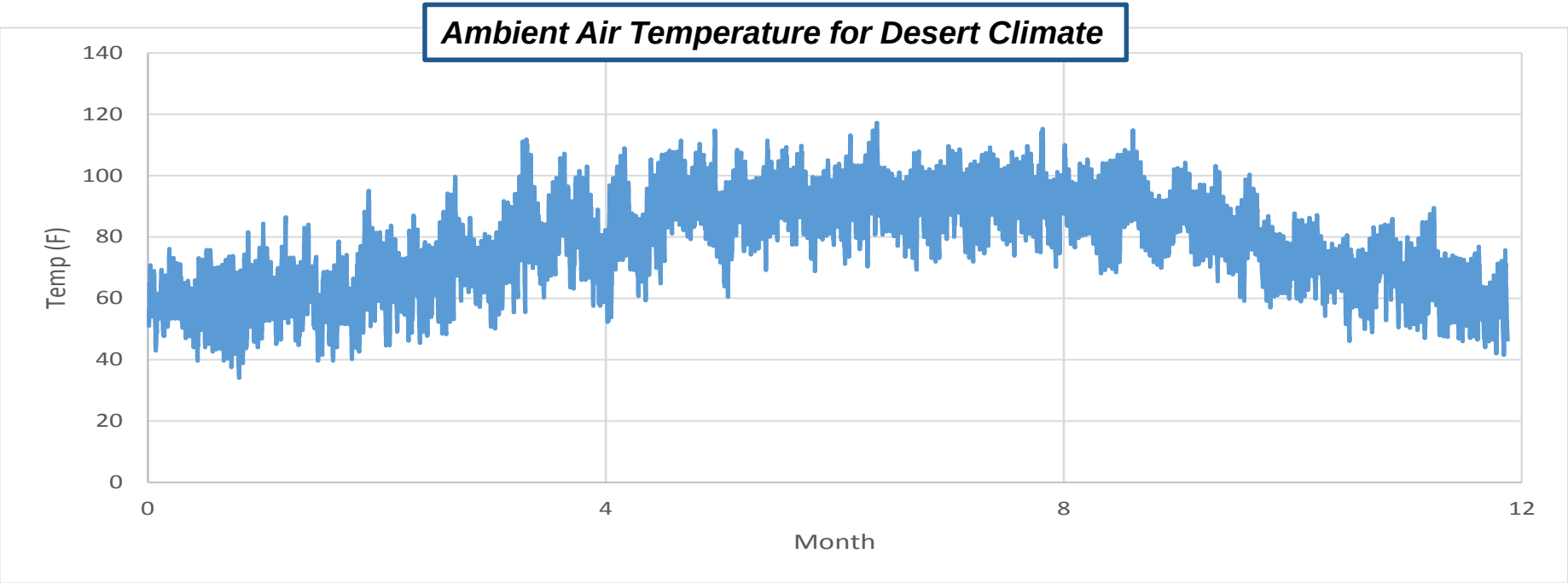


Sample Analysis Results - 300 PAX Example
300 PAX Baseline with Example Technology Integration

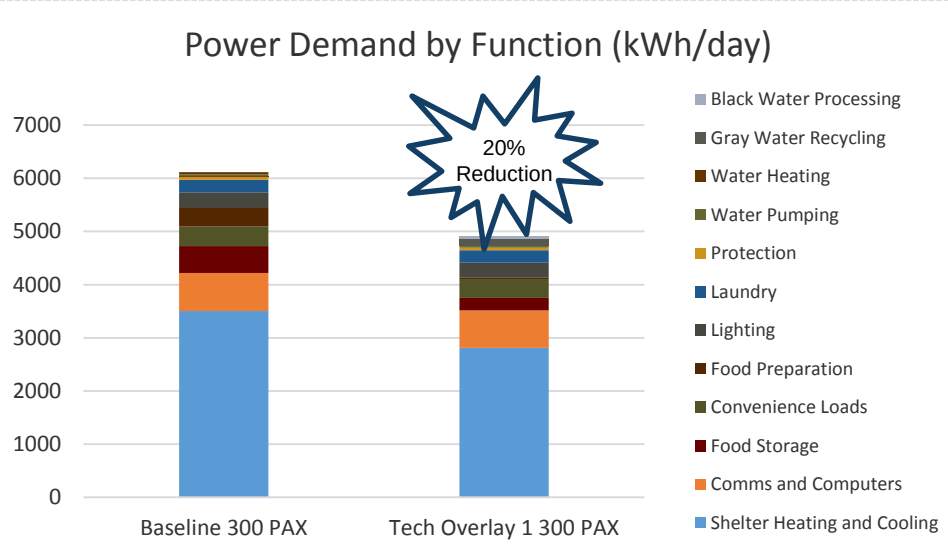


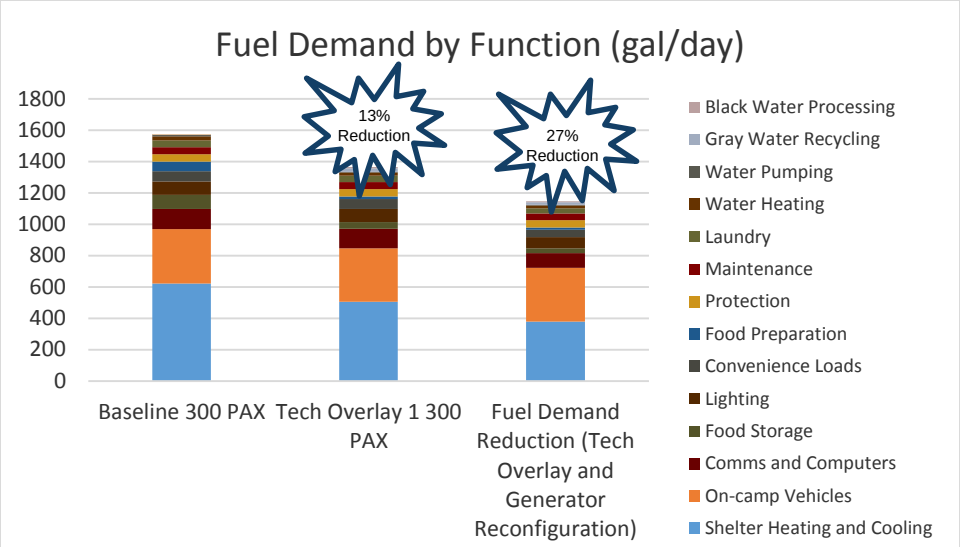
Sample Analysis Results - 300 PAX Example
Modeling and Simulation Results Notes

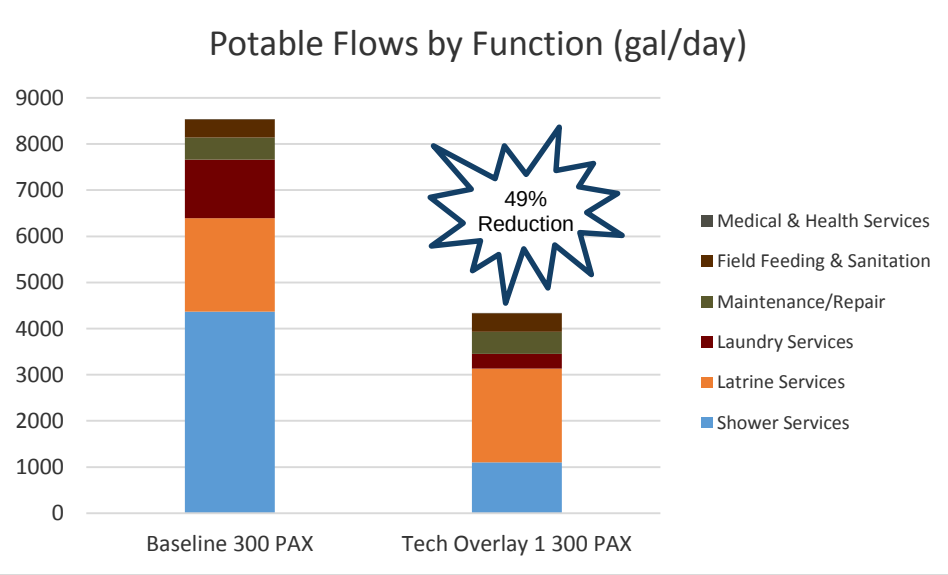
- Simulated **hourly** for **365 days** using **TMY3 weather data** from Kharga, Egypt ("Desert" region), using VFOB's Analysis Engine, Detailed Component Analysis Model (**DCAM v2.0**). AirBeam shelter configurations assessed using AMSAA's Shelter Thermal Energy Model (**STEM**)
- Supporting technology data are as accurate as we have available now, but supporting data and resulting simulation output are **subject to change.** ***This physical demonstration event yields data that will be used to further calibrate models***

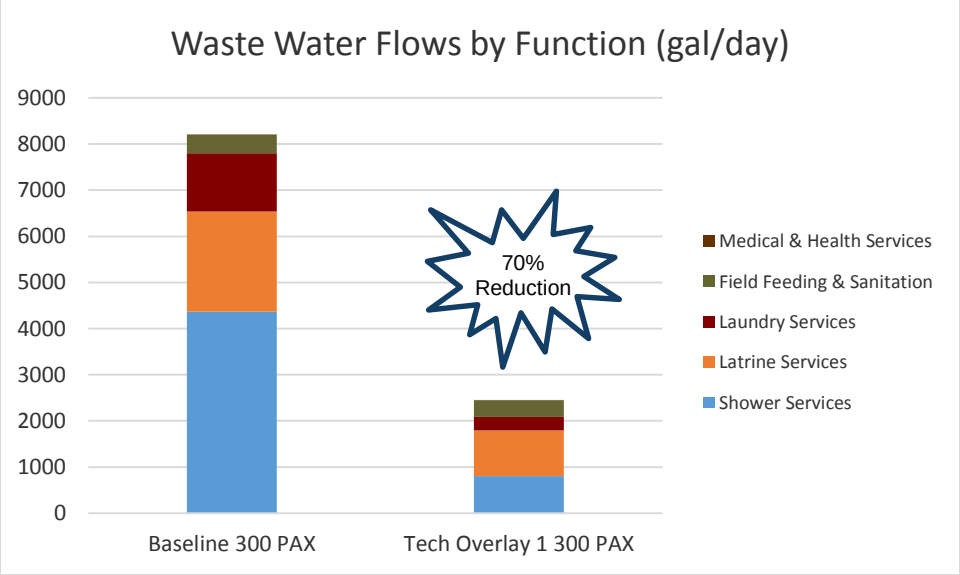


300 PAX Example Power, Fuel, Potable Water, and Waste Water Results*



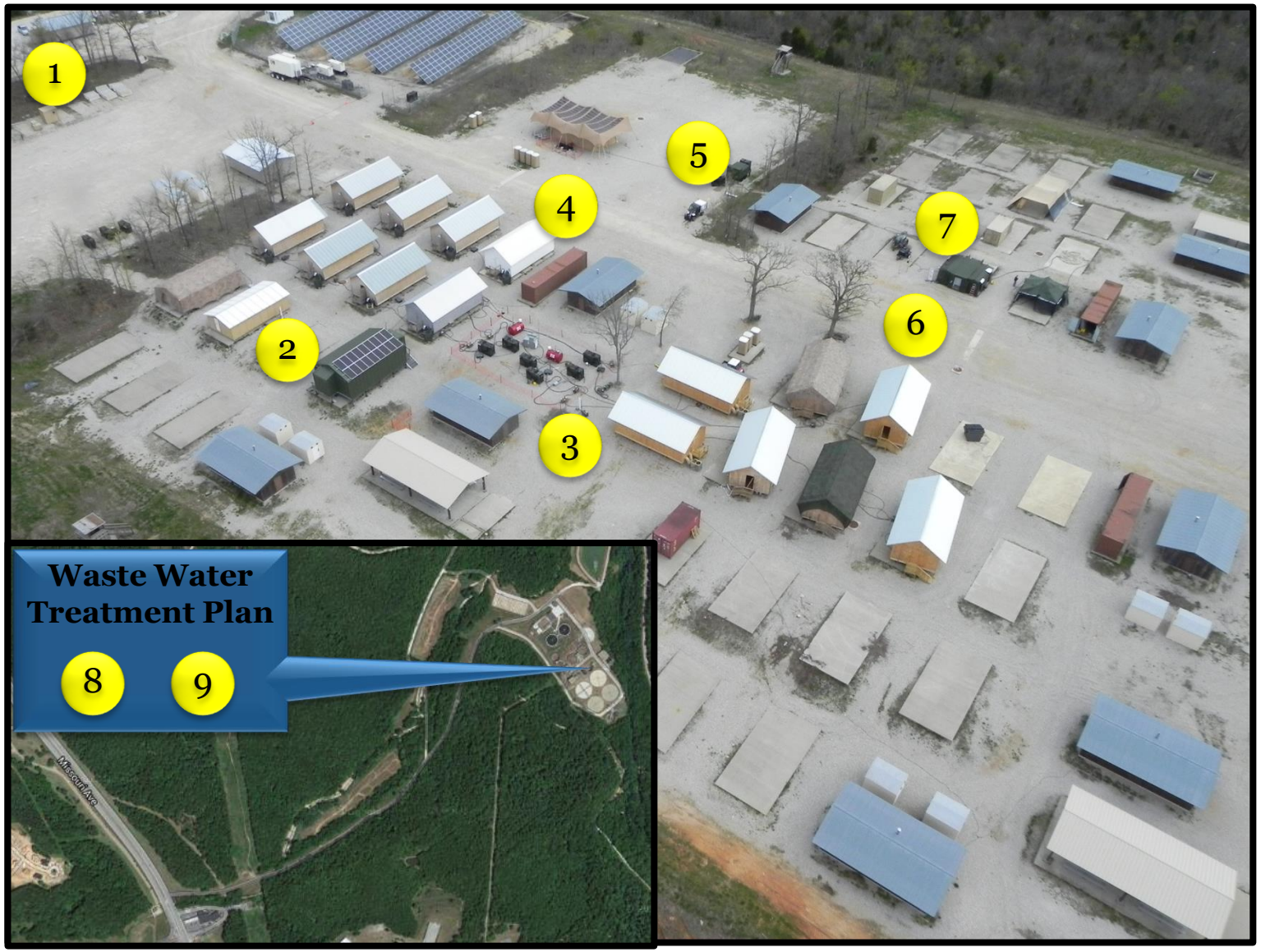






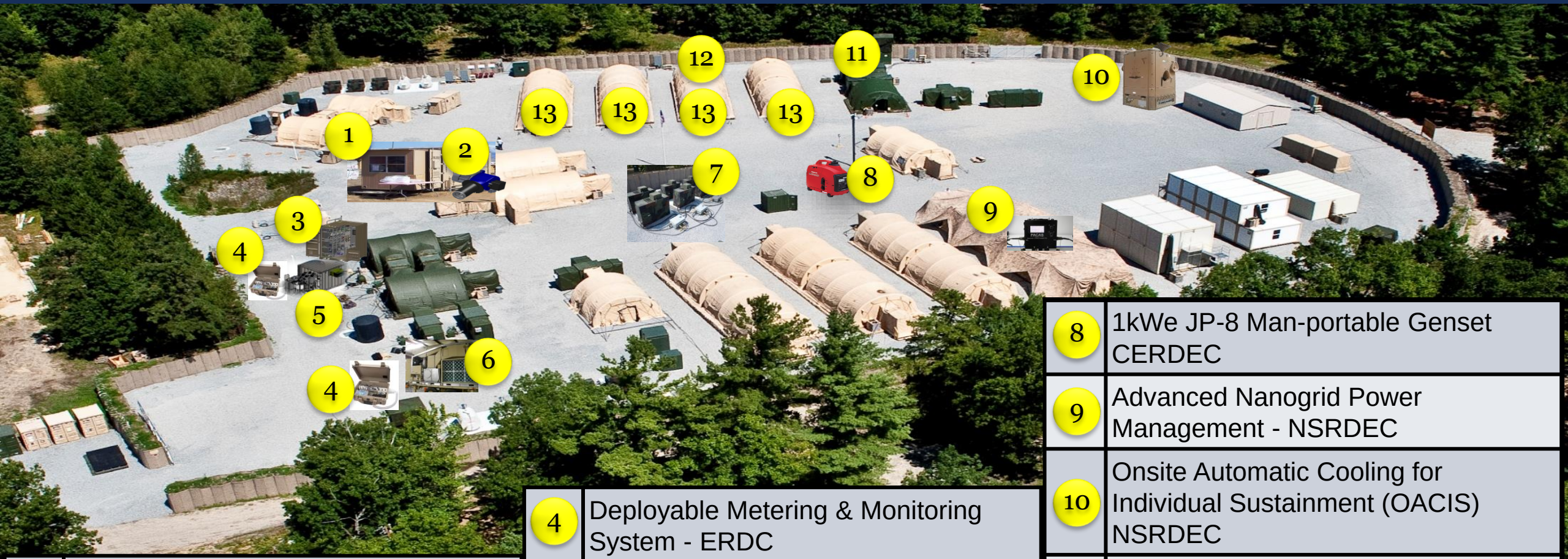
* These are actual simulation results, meant to illustrate the interactions between fuel, water and waste. Values will be updated as many possible technology combinations are simulated and demonstration data is collected and authenticated.

1000 PAX Demonstration, CBITEC 6 April – 2 May



1	Deployable Metering & Monitoring System – ERDC
2	Structural Insulated Panel Hut – ERDC
3	Energy Informed Operations – Central CERDEC
4	PowerShade Cost Reduction – NSRDEC
5	Hybrid Power Trailer – ERDC
6	Modular Appliances for Configurable Kitchens – NSRDEC
7	Desert Environment Sustainable Efficient Refrigeration Technology - NSRDEC
8	Real Time Inline Diagnostic Technology for Water Monitoring - TARDEC
9	Waste Water Treatment – Biological TARDEC

300 PAX Demonstration, July 2015



1	Expeditionary TRICON Kitchen (ETK) NSRDEC
2	Joint Inter-service Field Feeding (JIFF) Burner - NSRDEC
3	Waste Water Treatment – Electro Chemical - TARDEC
4	Deployable Metering & Monitoring System - ERDC
5	Grey Water Reuse - TARDEC
6	Water from Air - TARDEC
7	Energy Informed Operations – Central CERDEC
8	1kWe JP-8 Man-portable Genset CERDEC
9	Advanced Nanogrid Power Management - NSRDEC
10	Onsite Automatic Cooling for Individual Sustainment (OACIS) NSRDEC
11	Energy Efficiency (E2) Optimization of Command Post
12	Innovative Cooling Equipment (ICE) - CERDEC
13	Energy Efficient Expedient Shelters with Non-Woven Composite Liners

TECD 4a Demo 2 Technologies (1/2)

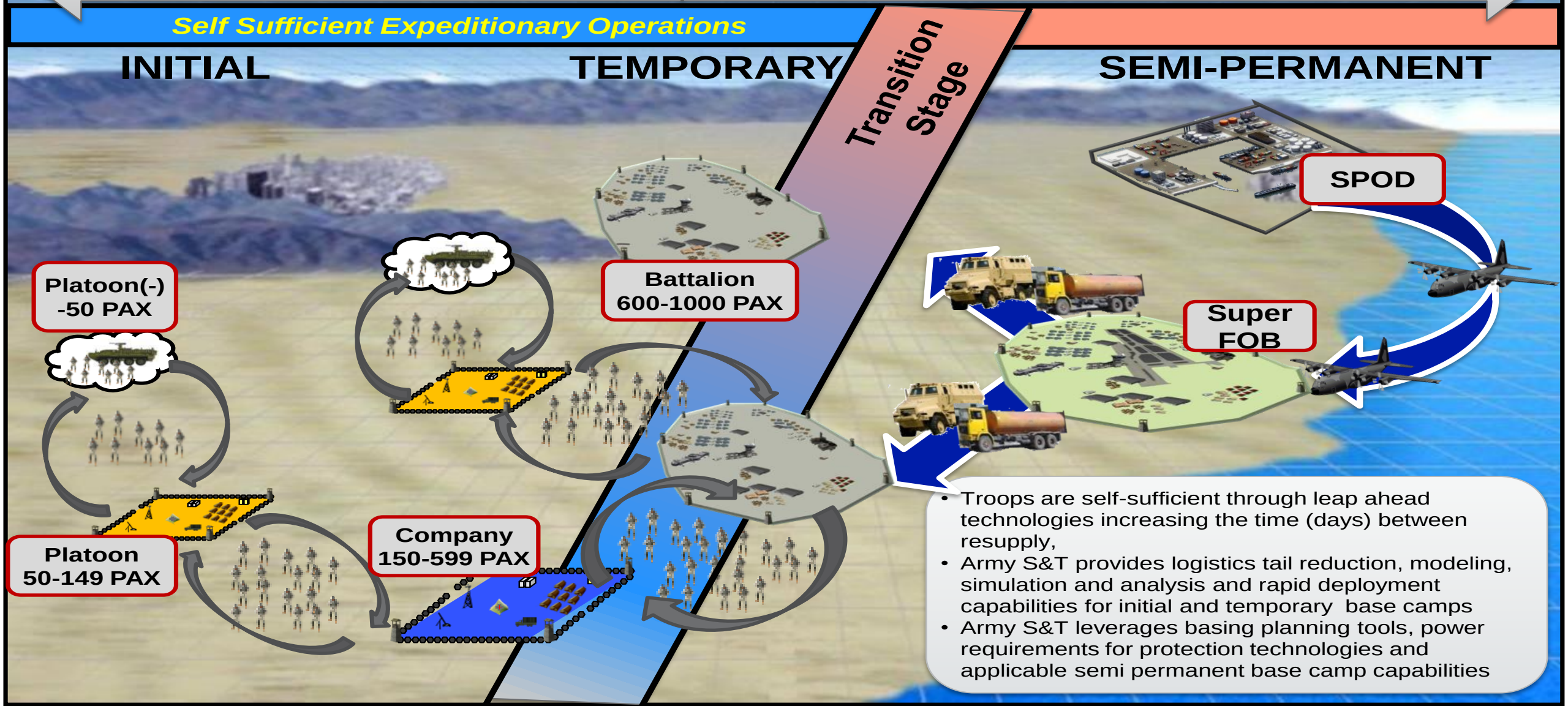
#	Technology	Lab/RDEC	Ready
2-03	Expeditionary Mobile Base Camp Demo (S2) - Small Unit Sustainment System (SUSS)	NSRDEC	4Q15
2-04	Advanced, Energy Efficient Shelter Systems	NSRDEC	1Q16
2-05	Smart Energy Efficient Deployable Shelters (SEEDS)	ERDC	4Q15
2-07	Containerized Ice Making Technologies (CIMT)	NSRDEC	2Q16
2-09	Material Development for Water Purification (AARID)	ARDEC	1Q16
2-11	Water Recycling for Mobile Kitchens and Sanitation Centers	NSRDEC	3Q15
2-13	Solid Waste Destruction System (SWDS) for Small Contingency Base Camps	NSRDEC	2Q16
2-16	Quiet, Multi-Fuel MCC Engine & Generator	CERDEC	2Q15
2-17	Efficient Water Reuse Technologies for COBs	ERDC	2Q16
2-18	Sustainable Technologies for Ration Packaging Systems	NSRDEC	4Q15
2-19	Ration Packaging Reconfiguration	NSRDEC	2Q15
2-20	Exploration of Water Demand Reduction Technologies for FOB Organizational Equipment	NSRDEC	4Q15

TECD 4a Demo 2 Technologies (2/2)

#	Technology Name	Lab/RDEC	Ready
2-21a	Self-Sustaining Living Module (SLiM) - Leidos	NSRDEC	3Q15
2-21b	MInimized Logistics Habitat UniT (MILHUT) - TPI	NSRDEC	1Q16
2-22	Nanoparticle-polymer Composite for Soldier Power and Energy	NSRDEC	1Q16
2-23	Rapidly Deployable Lightweight Shelters for Austere Environments	NSRDEC	1Q16
2-24	Gray Water Reuse (FO/RO)	TARDEC	4Q15
2-26	Tactical V2G and V2V Demonstration (OBVP Demo 2)	TARDEC	3Q16
2-27	Self-Powered Water Treatment for Forward Operating Bases (Cambrian Innovation)	TARDEC	3Q15
2-28	Shelter Radiant Heating System (SRHS)	NSRDEC	2Q15
2-29	Expeditionary Black Waste Treatment Technologies	NSRDEC	2Q16?
2-32	Water Quality Monitoring (Pathogen Monitor)	TARDEC	4Q15
2-33	HMMWV Towable Load Following 100 kW Power Unit	CERDEC	
2-35	Self-powered Solar Water Heater	NSRDEC	3Q15

Self Sufficient Operational Concept (draft)

DOTmLPF Solutions across Full Spectrum Operations, Supports Army Challenge No. 16, Set the Theater, Sustain Operations, and Maintain Freedom of Movement



- Troops are self-sufficient through leap ahead technologies increasing the time (days) between resupply,
- Army S&T provides logistics tail reduction, modeling, simulation and analysis and rapid deployment capabilities for initial and temporary base camps
- Army S&T leverages basing planning tools, power requirements for protection technologies and applicable semi permanent base camp capabilities

Questions