RAND ARROYO CENTER

Assessing Contingency Basing Shelter Energy Consumption

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Outline

- **Present an Overview of the RAND Contingency Basing (CB) Study**
- **Discuss Shelter Research to Date (FY 2014)**
- **Discuss Planned Research (FY 2015)**
- **Next Steps**

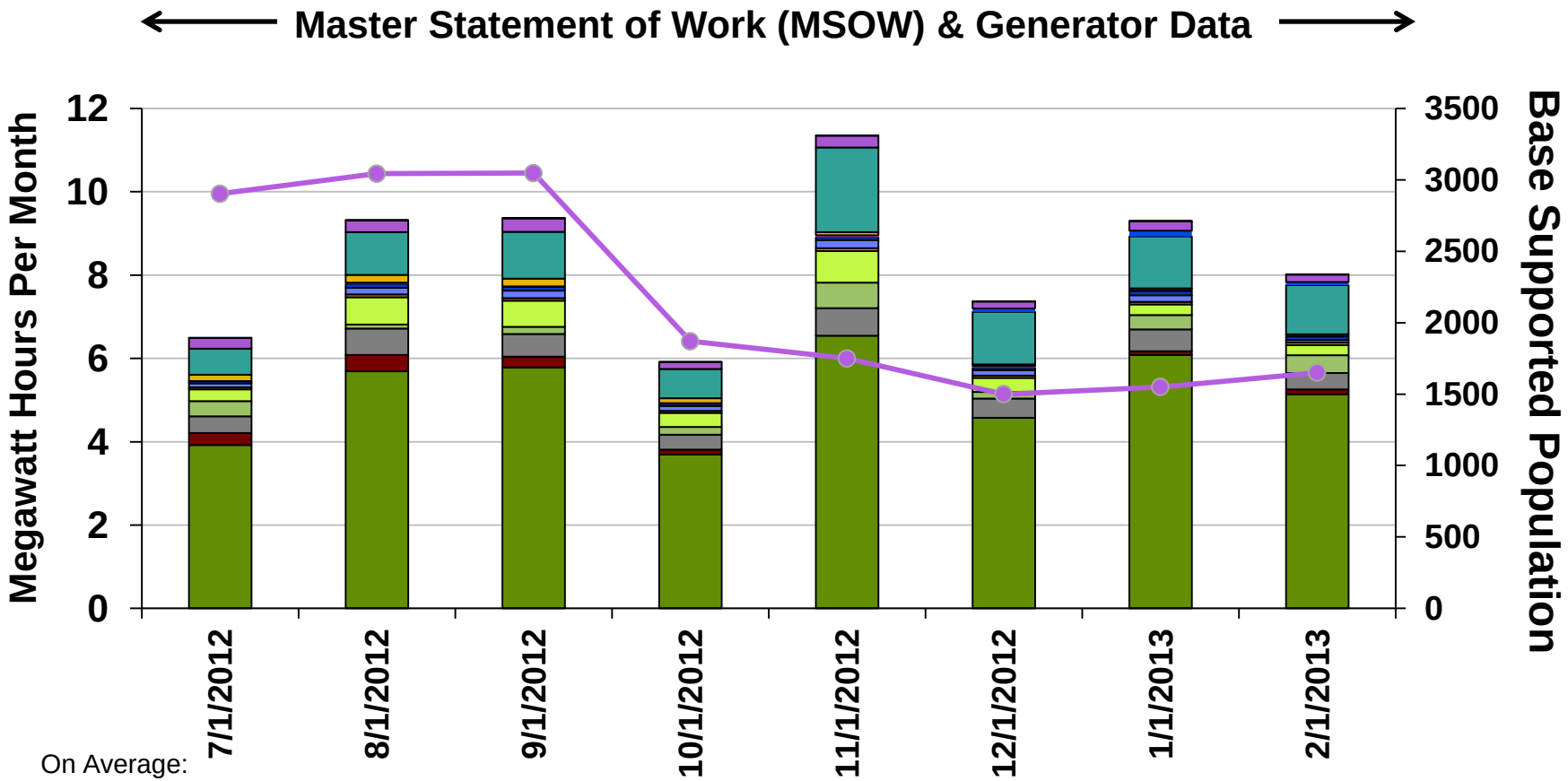
About RAND

- **RAND: a nonprofit, nonpartisan corporation performing research and analysis in the interest of national security and the United States**
- **Within RAND is the Arroyo Center**
  - **The Army's only Federally Funded Research and Development Center (FFRDC) for studies and analysis; represents one of the Army's major investments for analysis of Army policy issues**
  - **Army Regulation 5-21 defines policies and responsibilities for the Arroyo Center**
    - **Deputy Chief of Staff, G-8 "oversees all responsibilities for the RAND Arroyo Center…serves as lead agency."**
    - **Deputy Chief of Staff, G-4 is a member of the RAND Arroyo Center Policy Committee (ACPC)**
  - **Maintains analytic expertise across full range of Army policy issues, allowing for both long-term analysis and short-term assistance for urgent problems**
- ***Bottom line: RAND Arroyo and the Army exist in a partnership***

FY 2014 Study – CB Sustainment Lessons Learned from Afghanistan

- **Inefficiencies drive fuel consumption and increase number of required convoys:**
  - **Shelter energy efficiency varies greatly by structure type**
  - **Power generation was inefficiently delivered—many models of generators were used and many were not used efficiently**
- **CB planning guidance and tools ad hoc at best**

FY 2014 Study - Highest Energy Consumers at Spin Boldak: Billeting, Food Services, Laundry



On Average:

62 %

5 %

1 %

14% Military-related

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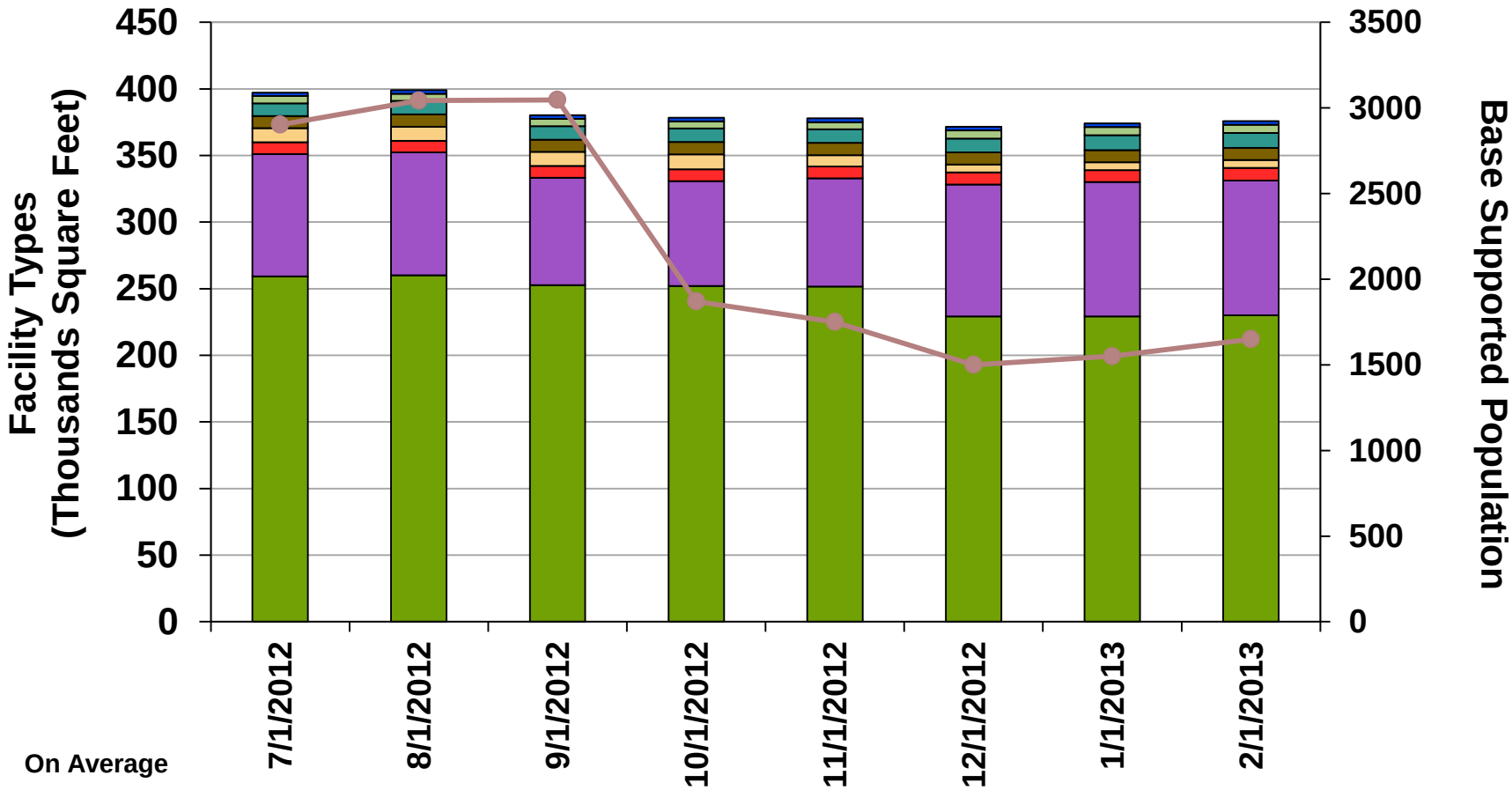
IR&D-5 09/11

FY 2014 Study - Space Usage at Spin Boldak: Billeting, Other Structures



On Average

64 % billeting

24 % other

2 % food service

personal services

gym

latrine shower shave

other recreation

1 % laundry

BSP

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FY 2014 Recommendations: Options to Improve CB Energy Efficiency

- **Focus on highest energy consumption areas to:**
  - **Assess shelter energy efficiency for the most common structure options**
  - **Identify power generation requirements associated with Army building options**
  - **Estimate the logistics requirements and develop "menu of options" with associated logistics impacts**
- **Develop and publish contingency basing life-cycle planning guidance for building and power generation**
  - **Extend to OCS contracts**
- **Raise MILCON construction funding threshold for energy efficient contingency construction**
- **Support acquisition strategies for efficient power generation**

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FY 2015 – CB Project Objectives and Tasks

- **Identify and develop key policies that enable sustainment community to support contingency bases on a cost-effective basis**
- **Tasks**
  - **Identify stakeholders and their interests**
  - **Develop billeting shelter cost scenarios**
  - **Identify timeframes and key decision points for which coordination of programs is important**
  - **Recommend process for coordinating policy involving key stakeholders at OSD, service, and theater levels**
  - **Recommend specific policies and necessary authorities for the supervision and regulation of costs**

FY 2015 - Billeting Shelter Analysis to Estimate Lifecycle Costs of Select Options

- **Broad range of expeditionary billeting structures to be analyzed**
- **Lifecycle phases are cradle to grave**
  - **Acquisition and storage**
  - **Deployment and set up**
  - **Sustainment**
  - **Tear down and retrograde**
- **Annual energy consumption costs to be estimated for several climates (desert, tropical, temperate)**
  - **Base case is FP, desert, 300 PAX camp**
  - **"Right size" ECU/generator equipment to shelter type and climate**
- **Total costs to be estimated and compared as a function of mission duration**

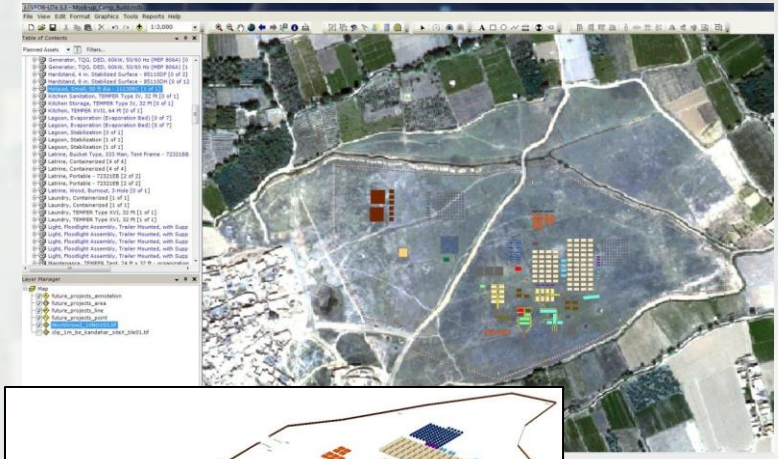
PRELIMINARY RESEARCH

By Billeting Type Drill Down to Logistics Requirements Across All Phases of Operation

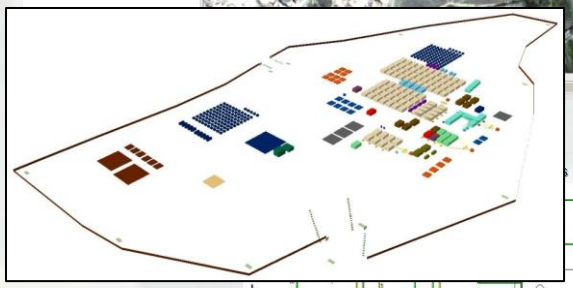
		Force Provider (Airbeam Tent)	Alaska Tent	Marine Expeditionary Tent	B-Hut (Plywood, Insulated)	Sea Hut	CHU	SIP Hut
Capital Costs	Initial cost							
	# of personnel per structure							
Deployment Costs	Weight/ shipping weight							
	# of containers							
	# C-17 requirements/sea containers							
	# of personnel							
	# of days							
Sustainment Costs	Duration							
	Energy profile	Step 1: Use FP generator and fill in the matrix						
	Fuel requirement by structure by time	2: Via DCAM, analyze alternative power generation sources and						
	# trucks, convoys, containers	efficiencies						
	# of personnel to support	Spot, AMMP, Micro-Grid generators						
	# casualties							
	maintenance							
Retrograde costs (similar to deployment)								

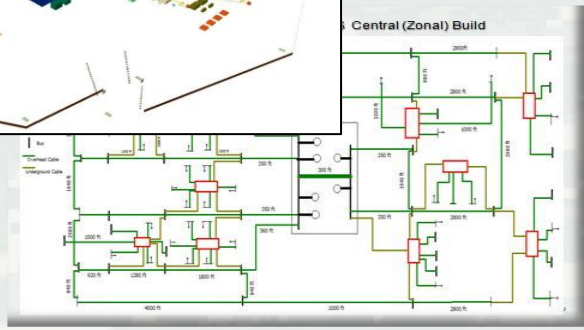
Virtual Forward Operating Base (VFOB)

- **Intuitive virtual environment to design and lay out a Contingency base from scratch or from existing templates**
  - Reconfigurable/scalable model for the camp
  - Software architecture, which enables the development and easy integration of contingency base models information by other organizations (JCMS, VBSII, WSTAT, etc).



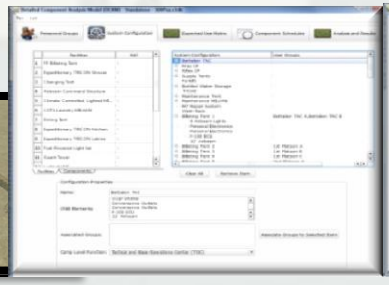
- **Operational analysis**
  - Resource loads: Fuel, Water, Waste, Manpower
  - Camp design effectiveness: requirements analysis for Force Projection, Sustainability, and Unit Readiness
  - Cost
  - Integrated Base Defense (IBD)
  - Compare actual camp (fielded, built, metered) to virtual camp (modeled in VFOB)
  - Plan resource requirements surges, cuts, and logistics interrupts

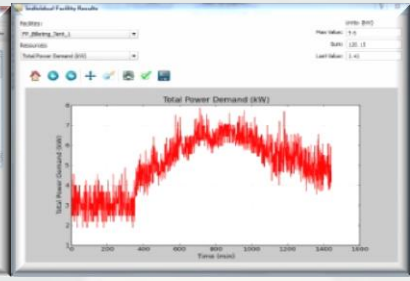




- **Construction scheduling and bill of materials (facilities and list of equipment)**
  - Time and phasing, how long and when for construction
  - Phasing from MTOE to Equipment Sets /TPE

- **Training tool for personnel assigned to contingency base design, planning, operations or management activities**





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Takeaways

- **Shelters and similar structures consume the most energy on a contingency base**
  - **JOCOTAS Implication – Increased consideration of more energy efficient solutions**
- **Base camp life-cycle planning guidance and tools should be more comprehensive**
  - **JOCOTAS Implication - Contingency Basing Army Regulation will address this**
- **Energy efficiency improvements outpace acquisition cycles**
  - **JOCOTAS Implication - Extend evaluation time horizon to include emerging technology, assess current acquisition processes**

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