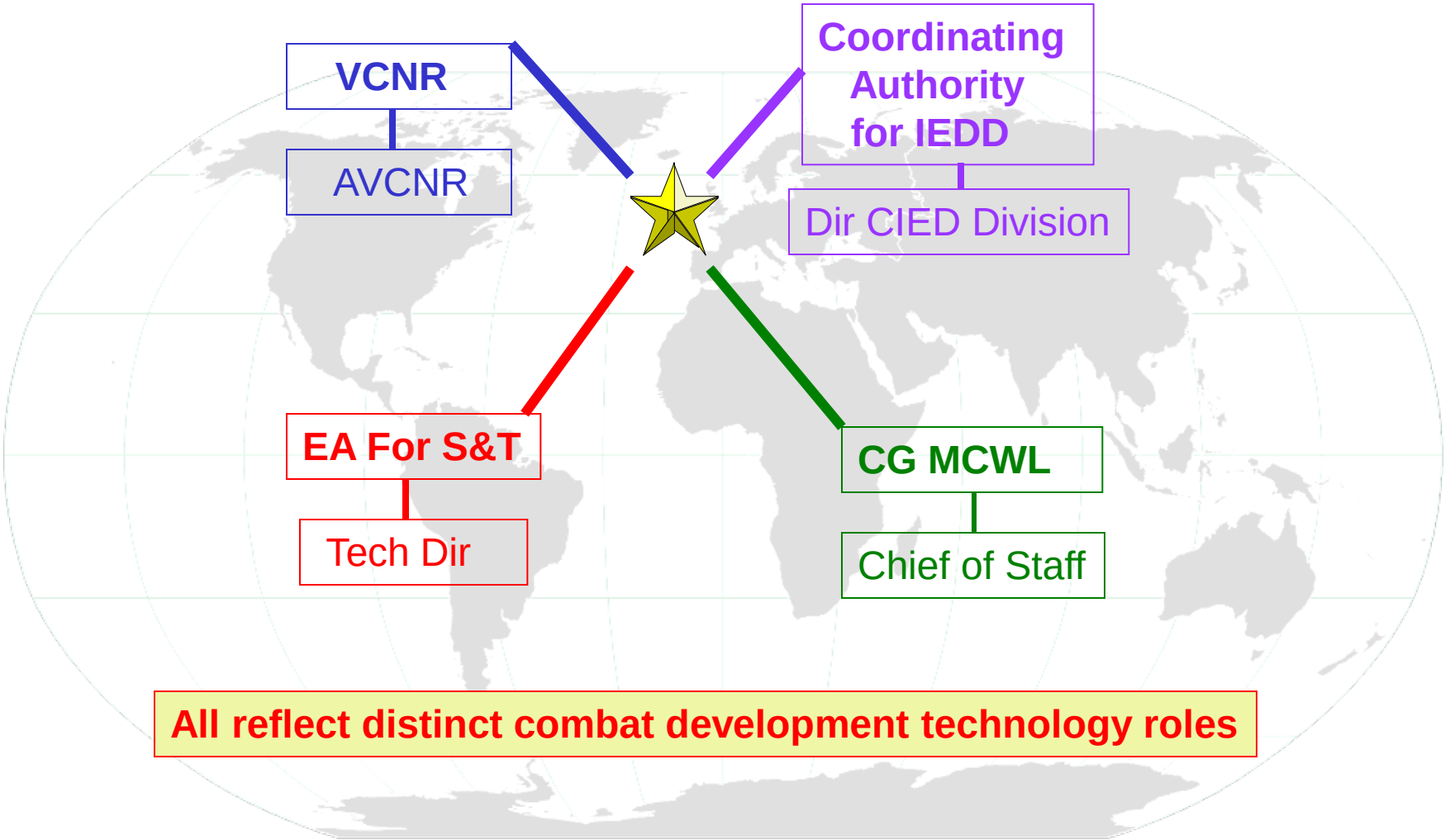
Experimental Forward Operating Base (ExFOB), Power and Energy

Jim Lasswell
Tech Director

7 April 2010

Four Assigned Responsibilities

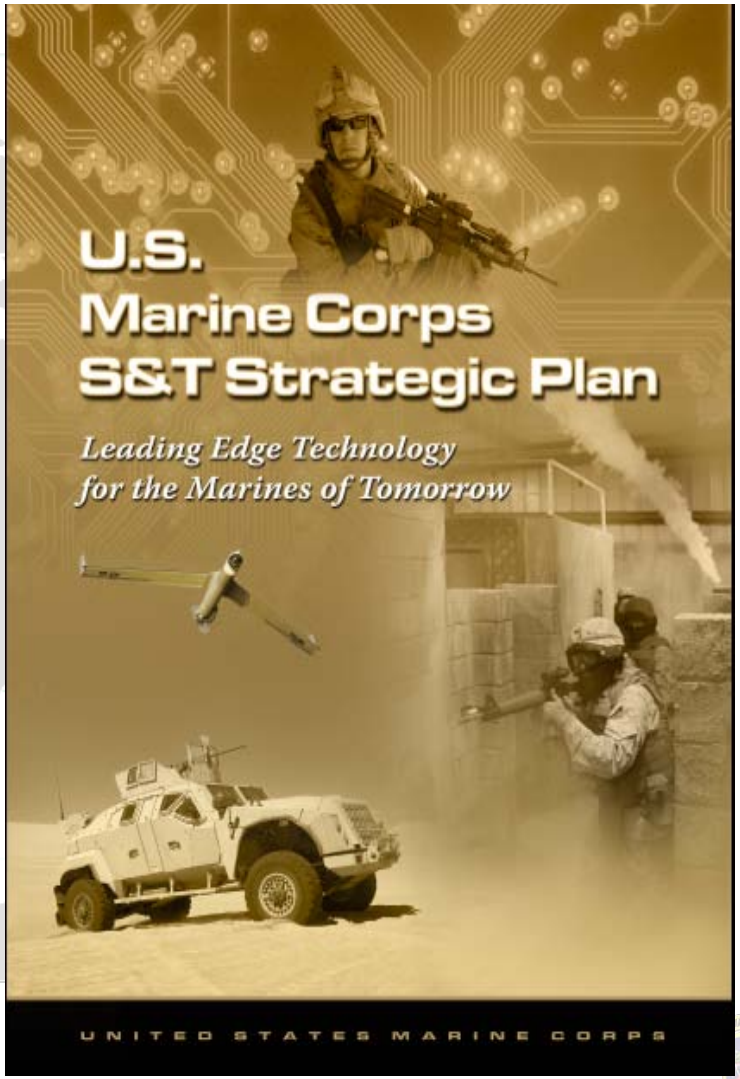


All reflect distinct combat development technology roles

Marine Corps S&T Strategic Plan

- **Expeditionary power issues**
- **Reducing Consumption**
- **Renewable Power Generation**
- **“Lightening the Load”**
- **Energy Efficient Installations and Facilities**

Current Plan Published: July 09



Issue: Increasing Power Consumers

Individual Marine Power Requirements

AN / PVS-17
AA Battery

AN / PVS-14
AA Battery

AN / PAS-13D
AA Battery

AN / PEQ-16A
DI-123A Battery

Hand-held flashlight
AA Battery

MIOX Water Purifier
AA Battery

AN / PSC-13 D-DACT
Unique or AA Battery

DAGR
AA Battery

AN / PRC - 148 or 152
Unique Batteries

AN / PRC-153
Unique Battery

Quiet Pro Headset
Unique Battery

Squad Digital Camera
Unique Battery

AN / PRC-117F
BA-5590 / BA-5390 / BB-2590 Batteries

Rugged Laptop
Unique Battery

Issue: Increasing Power Demands

Alternator Amperage Rating on HMMWV / MRAP at 28 VDC

MRAP II

OEF / OIF / Digitization / Networking kicking in

MRAP I

First Generation Vehicles Wearing-Out
Second Generation Vehicle Deliveries

RG-31 Upgrade

Initial Fielding – 60 Amps

COUGAR / JERRV

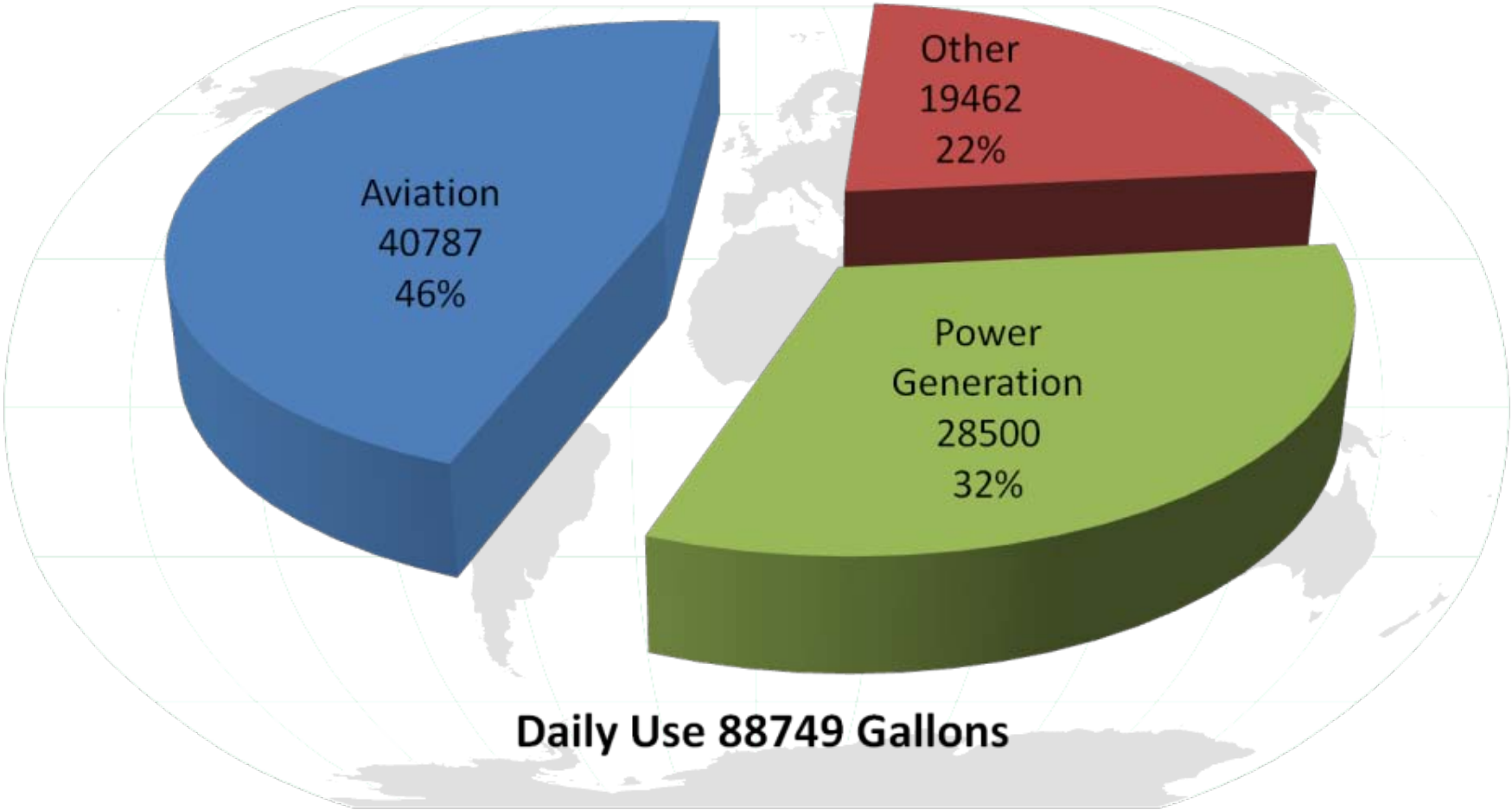
RG-31

Post Desert Storm – Start of Digitization

700
600
500
400
300
200
100
0

1980 1985 1990 1995 2000 2005 2010 2015 2020

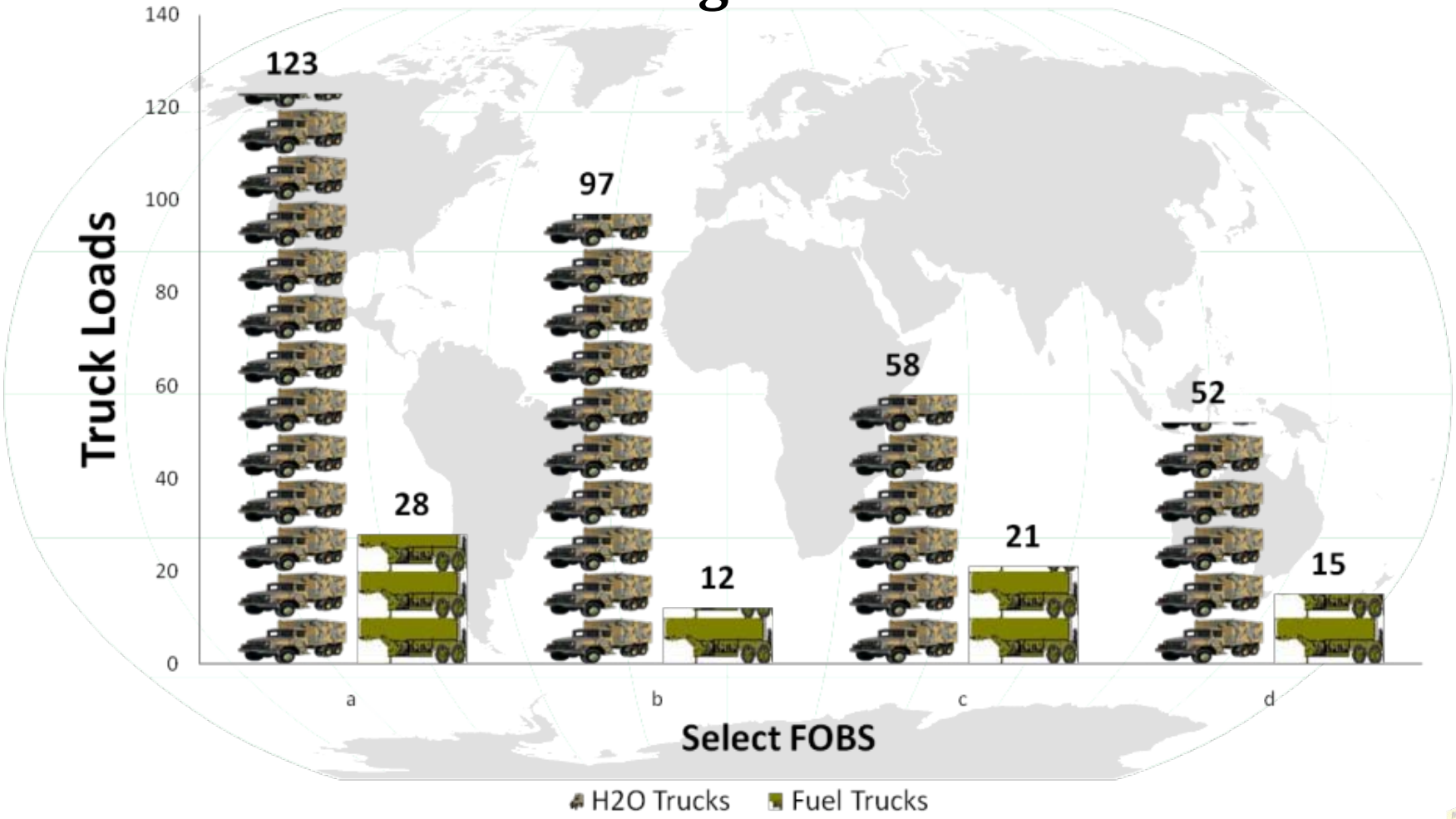
MEB-A Fuel Use in OEF



Source MEB-A Bulk Fuels Officer for August 2009

Issue: Cost of Water Movement

At the Tactical Edge Water is the Problem



Data Source CLB-8 period June 13 – September 11 2009

7

Immediate Cargo Unmanned Aerial System

Kaman Lockheed KMAX

Boeing: A160T Hummingbird

CONOPS


Total Movement: 24 Hr Period
110 nm Round Trip Distance
10 K Lbs (Threshold)
Optional Remote Delivery Capability
Terminal Controlled Drop (within 10 meters)
Remote Outpost
Target is Company & Platoon FOB/COP
Spokes
OB
OB
OB
HOGE 12,000 DA
Remote Terminal at each Spoke Operating Base (OB)
HUB @ FOB/COP
Cargo UAV
Main GCS
A/C
CARGO UAS OPERATIONS AREA
70 KTAS at full load
14,000 DA at Full Load (Enroute Cruising Altitude)
Enroute Reprogramming
• Night, All-weather (overt/covert lighting)
• Contractor-operated & maintained
• Marines integrated to pack, load and unload
• Launch from unimproved road field/helo LZ
• Remote terminal control
• Material retrograde from objective
• Integrate with control agencies
• Compatible with deployed C2 frequencies
Smallest Load
Std Wood Pallet
(48 X 40 X 67 stack)
750 lbs (Threshold)
67"
MOB

Energy

Dependent on Contractors

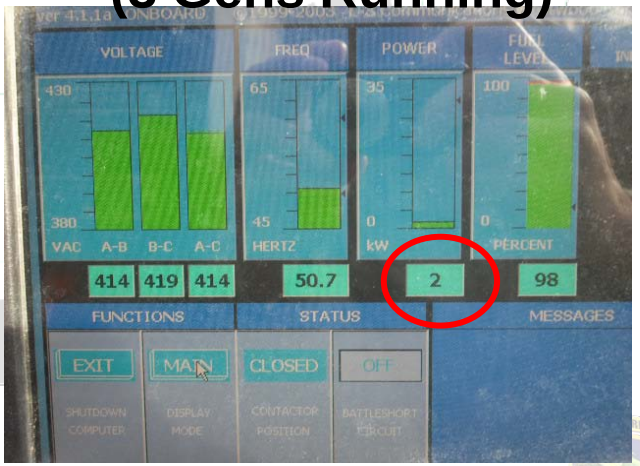
On the Job Training
(Note: Generator Manual)

Inefficient Use
(3 Gens Running)

Local Propane

Lack of Trained Generator Mechs

Afghan Solar



Water

Lake of Bottle Water

Well Installed On FOB by Local Afghans

Potable Water Available (Concern is Distribution)

Contract Drilling

Shelter

Using on hand solutions

Need Long Term Efficient Solutions

ExFOB Purpose

- **Optimize Forward Operating Base (FOB) Design**
  - Balance Functionally with Efficiency
  - Improve operations of USMC FOB tactics, techniques, and procedures
- **Provide Industry an Opportunity to Demonstrate**
  - Technology
  - Optimization Tools and System Design

ExFOB: Key Stakeholders

ExFOB Demonstrations

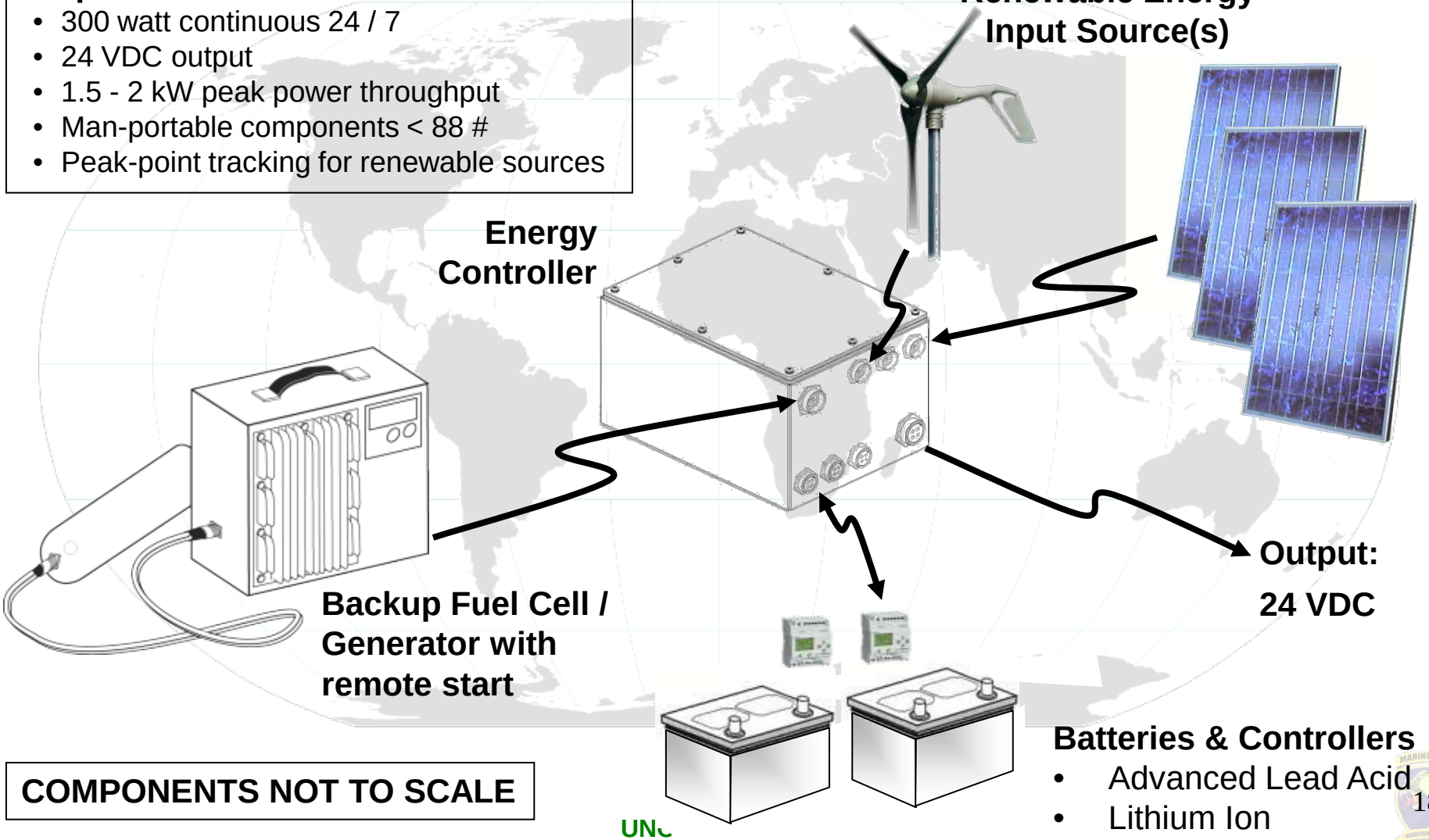
- **General Characteristics**
  - Transportable via Small Tactical Vehicle
  - Commercial Off the Shelve (ExFOB Phase-2)
  - Future Technology Demonstrations (ExFOB Phase-3)
- **Water**
  - Purification (75-125 gals/hr)
  - Distribution (Small Packaging Systems)
- **Energy**
  - Generation (2kW-100kW)
  - Distribution (Micro-Grid)
- **Energy Efficient Structures**
  - Mobile / Reusable
  - Energy Efficient

Solar Power Adaptor for Communication & Electronics Systems (SPACES)

Deployable Renewable Energy Alternative Module (DREAM)

Ground Renewable Expeditionary Energy Network (GREEN)

Capabilities:
- 300 watt continuous 24 / 7
- 24 VDC output
- 1.5 - 2 kW peak power throughput
- Man-portable components < 88 #
- Peak-point tracking for renewable sources



COMPONENTS NOT TO SCALE

ExFOB Timeline

- **15-19 Feb 10 - Phase-1**
  - USMC Only
  - Optimize USMC Equipment
- **22 Feb – 5 Mar – Phase-2**
  - Industry Demonstrations (COTS)
- **May – Phase-3**
  - Initial “Implementation Team” to OEF
- **2 – 13 Aug – Phase-4**
  - Industry Demonstration of technology other than COTS
  - RFI expected to be released in May

Questions?

Phase 4 ExFOB:
Cliff Anderson ONR 30
cliff.anderson@navy.mil

Technology Initiatives Screening Officer:
Dr Paul Muessig (TISO)
paul.muessig@usmc.mil
(703) 432-2066