
# Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS) Joint Capability Technology Demonstration (JCTD)

## *Industry Day*

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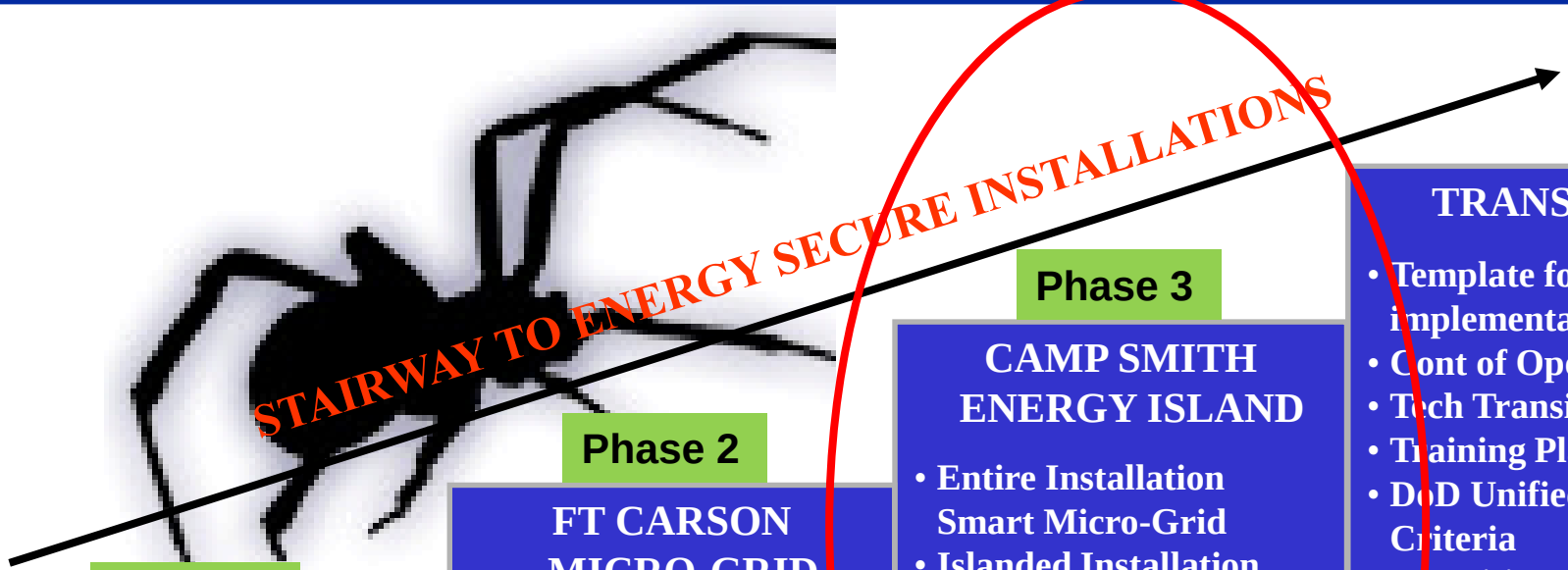
# SPIDERS Overview and Objectives

## Program Objectives:

- Energy Security (measured by off-grid mission endurance)*
- Increase Renewable Energy Contribution during contingency
- Reduce Environmental Impact of Facility Operations
- Increase Cyber Security of Facility Operations

** Remember, in DoD its "Mission, Mission, Mission!"*

# Where We Are Today




**Phase 1**

## PEARL-HICKAM CIRCUIT LVL DEMO

- Renewables (8-9%)
- Two Diesel Gens
- Energy Management
- VSE SCADA Test at Idaho National Lab

**Phase 2**

## FT CARSON MICRO-GRID

- Large Scale Renewables (35-50%)
- Vehicle-to-Grid
- Smart Micro-Grid
- Four Gens
- Cyber Security
- Critical Assets
- COOP Exercise

**Phase 3**

## CAMP SMITH ENERGY ISLAND

- Entire Installation Smart Micro-Grid
- Islanded Installation
- High Penetration of Renewables
- Demand Response for Economic Benefit
- Redundant Backup Power
- Clean, Dedicated Tier 4I Generation

## TRANSITION

- Template for DoD-wide implementation
- Cont of Operations
- Tech Transitions Plans
- Training Plans
- DoD Unified Facilities Criteria
- Transition to Industry
- Transition to Federal Sector and Utilities
- System Architecture
- Cyber-Security

**CYBER SECURITY BEST PRACTICES**

**RIGOROUS ASSESSMENT WITH RED TEAMING IN EACH PHASE**

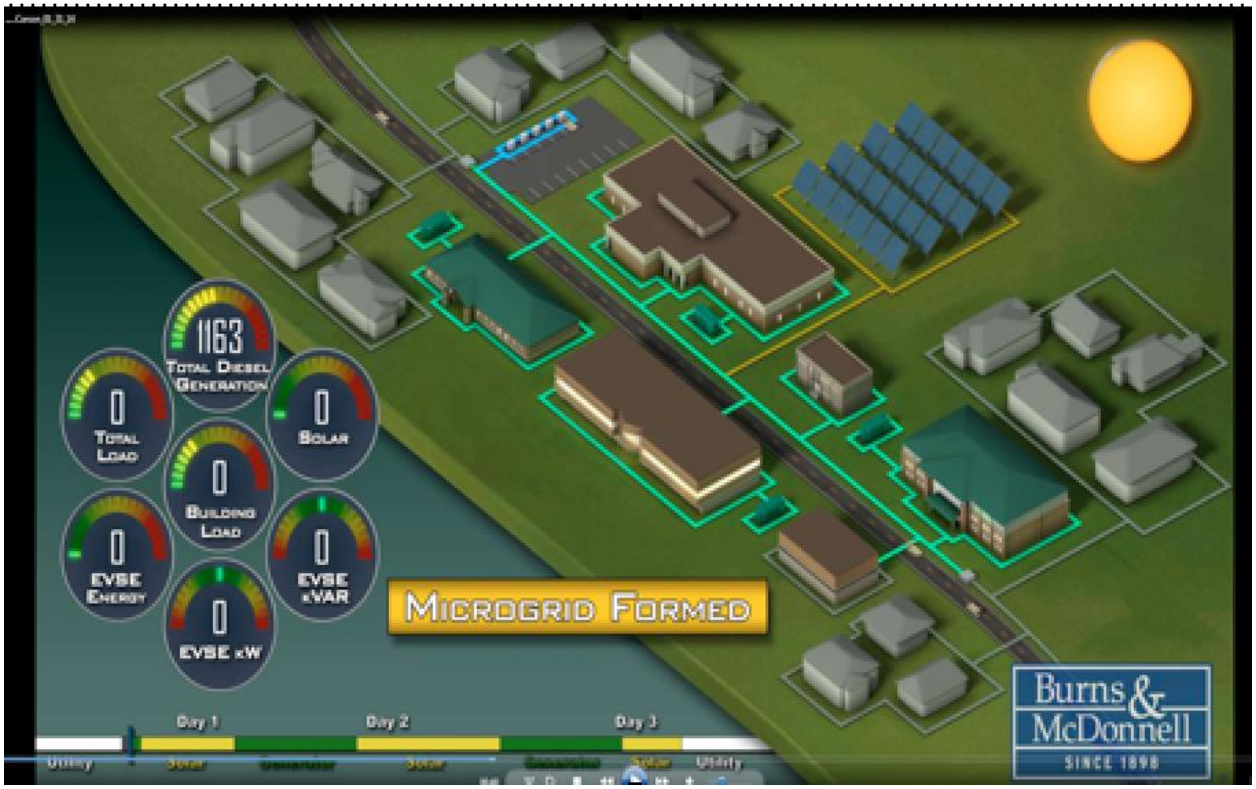
# SPIDERS Camp Smith

- **SPIDERS Camp Smith is a watershed energy infrastructure initiative for DoD**

- **SPIDERS Camp Smith represents many "firsts"**
  - First DoD ***Installation Scale*** Microgrid
  - " " OSD/COCOM sponsored Microgrid
  - " " DoD Microgrid with ***EPA Tier 4I*** Generation
  - " " Microgrid with ***Blinkless*** Energy Storage
  - " " ***fully DoD Information Assurance accredited*** Microgrid with rigorous USPACOM cyber experimentation
  - " " first installation JCTD to ***combine Research Development and Military Construction*** Investments
  - " " DoD Microgrid with ***aggressive demand response*** to defer utility costs and support Hawaiian Electric Co

# The SPIDERS Notional Concept

**The SPIDERS Notional Design Concept is a representative model of the SPIDERS system to used to help conceptualize design principles and system operations**




A notional microgrid model incorporates features similar to the fielded SPIDERS microgrid. This diagram depicts the buildings acting as (consumers) loads on the system, a loss of primary utility power, diesel generators supplying power to the microgrid, as well as renewable energy from Photovoltaic and stored energy

# What are the Operational Benefits of SPIDERS?

- **Operational Visibility** - Significant Improvement to Energy System Visibility and Control via secure, real-time GUIs
- **Operational Flexibility** - Seamless isolation of critical operations and optimization to maximize off-grid mission endurance
- **Operational Redundancy** - Critical energy consumers are supported with redundant generation
- **Operational Sustainability** - Cleaner, EPA Certified generation is controlled using state-of-the art distributed controls and energy storage to improve system efficiency

# SPIDERS Stakeholders

- **USPACOM, USNORTHCOM DOE, and DHS**
- **Naval Facilities Engineering CMD**
- **Military Services**
- **Army Engineer Research Development Center (ERDC)**
- **DOE - Nat'l Labs**
- **Local Utility Companies**
- **States of Hawaii & Colorado**

# Special Thanks to Key Contributors

## Naval Facilities Engineering Command (NAVFAC)

**SPIDERS Camp Smith required Close Interagency Coordination and planning across Gov't and Military Components – NAVFAC has demonstrated leadership and meticulous engineering, program management and transition (NAVFAC will also oversee system operations and sustainment).**

## Burns McDonnell

**Technical capability and Design Ingenuity; BMcD effectively integrated disparate technologies and delivered a seamless final design that identifies many important design considerations for future microgrid efforts**