



# **Enabling Distributed Operational Tests**

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# Overview



- **Terms of Reference**
- **Approach**
- **Verification, Validation & Accreditation**
- **Summary**



# Terms of Reference



- **Distributed Operational Test** – an operational test that exploits LVC systems and operational environments in such a way as to produce an efficient test
- **Efficient Test** – a test that returns significant system performance information at a reasonable effort/cost
- **LVC Environment (LVCE)** – the overall enterprise of M&S resources within which LVC activities can take place
- **VV&A** – the meaning given these terms as found in DoD Instruction 5000.61



# Approach



- **Forging a distributed test culture**
- **Early influence of capability development & acquisition activities**
  - **Initiatives**
  - **Selection of acquisition programs**
  - **Standard process for using LVC capabilities**
- **Leverage LVC resources/services**
- **Exploit technology – continuous improvement**



# Forging a Culture



- **Benefits**
  - Time, money, security, realism
  - Mitigate test limitations; mission rehearsal; repeatability
- **M&S**
  - SMEs; Repositories (knowledge management); Outreach; Initiatives (education, training); professional societies & conferences
- **T&E**
  - Instructions and guides; policy memos; Communities of Practice; education/training sources
- **Integration**
  - Art and science; use experts (JMETC)
- **Barriers**
  - Cultural biases
  - Experience
  - “If you build it, they will come” is not a sustainable rationale



# Early Influence



- **Capabilities development & acquisition initiatives**
  - Development tester representation
  - Acquisition Improvement Plan
  - Design of experiments (DOE)
- **Program selection criteria (internal study)**
  - Will system operate in a distributed environment?
  - Is datalink interoperability a significant factor?
  - Does distributed test offer any test efficiencies?
  - Does distributed test mitigate any OPSEC issues associated with open air testing?
  - Will distributed test significantly increase test fidelity?



# Process Standardization

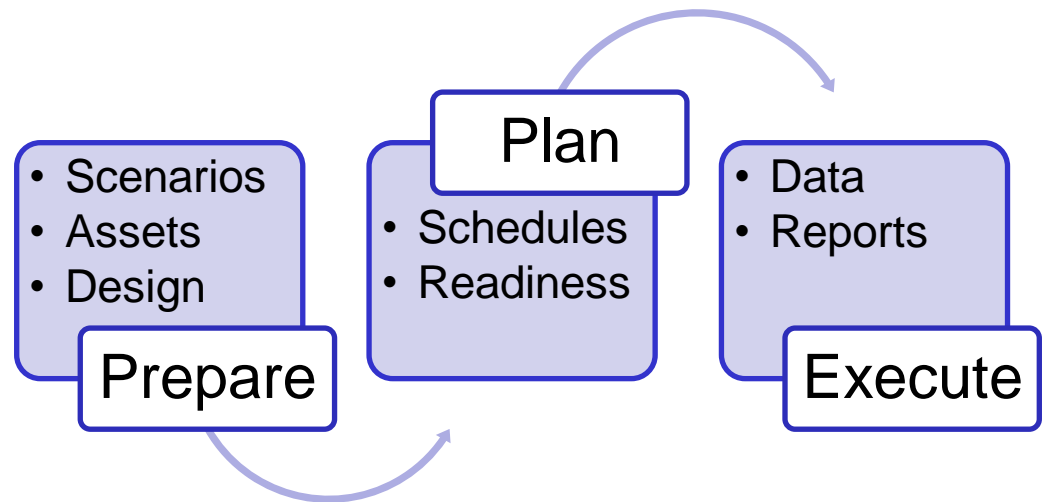


- **OT&E**

- Initial test design – complete (9 tasks)
- Test concept – complete (6 tasks)
- Test planning – in work
- Test execution – in work
- Test reporting & closeout – future work

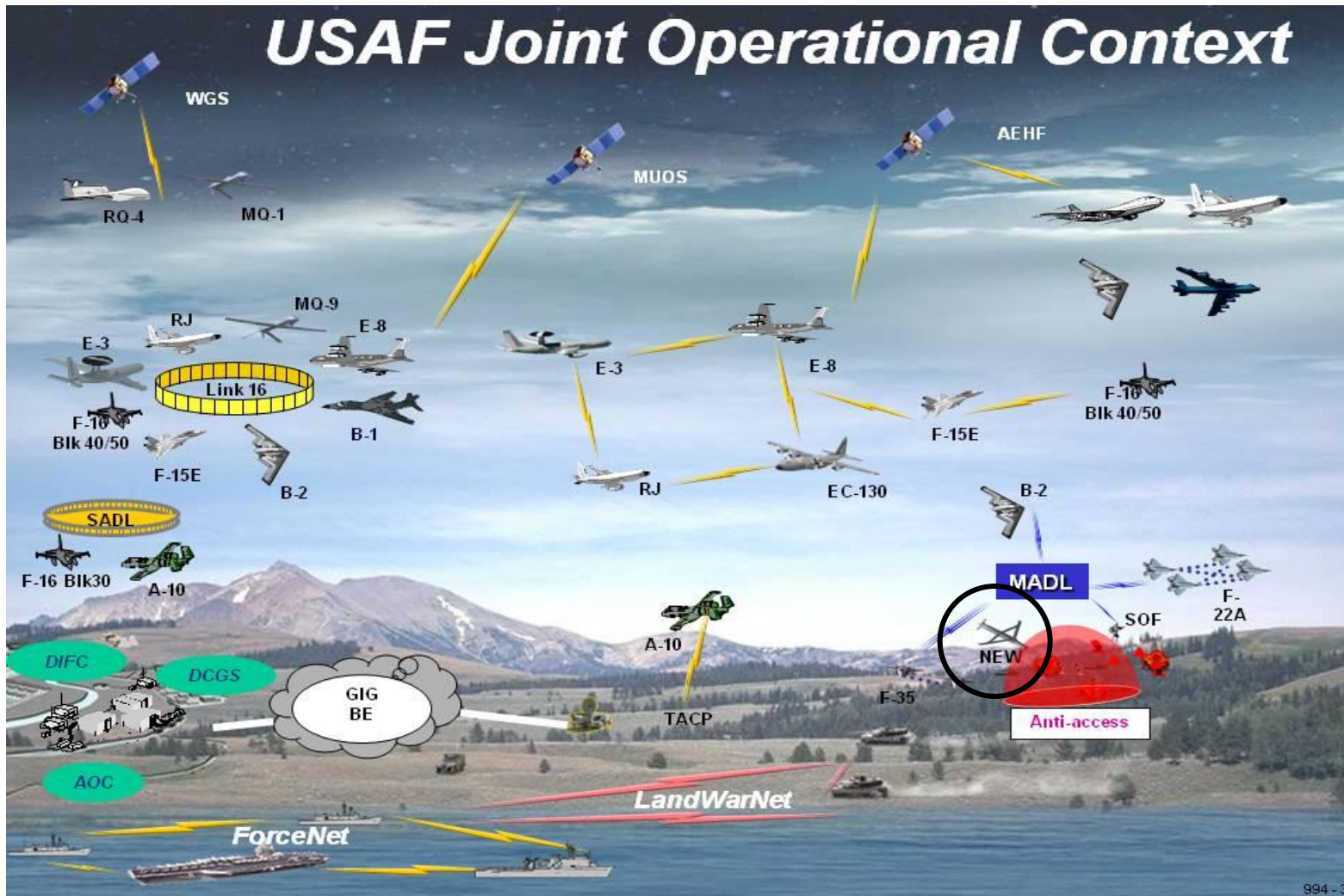
- **LVC Events**

- Planning – 3 tasks
- Preparation – 8 tasks
- Execution – 4 tasks
- Post test – 3 tasks
- Sustainment – 4 tasks





# Example







# Example (cont'd)



Option	SUT (new UAS)	Comm Net (MADL)	Aircraft (2)	Threats (2)	Relative Merit wrt realism
1	Live	Live	Live; Live	Constructive; Virtual	Most desirable
2	Live	Live	Live; Constructive	Live; Live	↑
3	Live	Live	Constructive; Live	Live; Live	
4	Live	Live	Live; Virtual	Virtual; Constructive	
5	Live	Live	Virtual; Live	Live; Constructive	
6	Live	Live	Virtual; Live	Virtual; Virtual	
7	Live	Live	Virtual; Virtual	Constructive; Live	
8	Live	Live	Constructive; Virtual	Live; Virtual	
9	Live	Live	Virtual; Constructive	Live; Virtual	
10	Live	Live	Virtual; Constructive	Virtual; Live	
11	Live	Live	Constructive; Constructive	Virtual; Virtual	
12	Live	Live	Constructive; Constructive	Constructive; Constructive	



# Leverage Resources



## Air Force LVC Sites





# Joint Mission Environment Test Capability (JMETC)

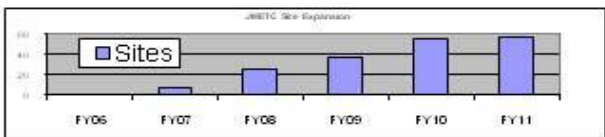
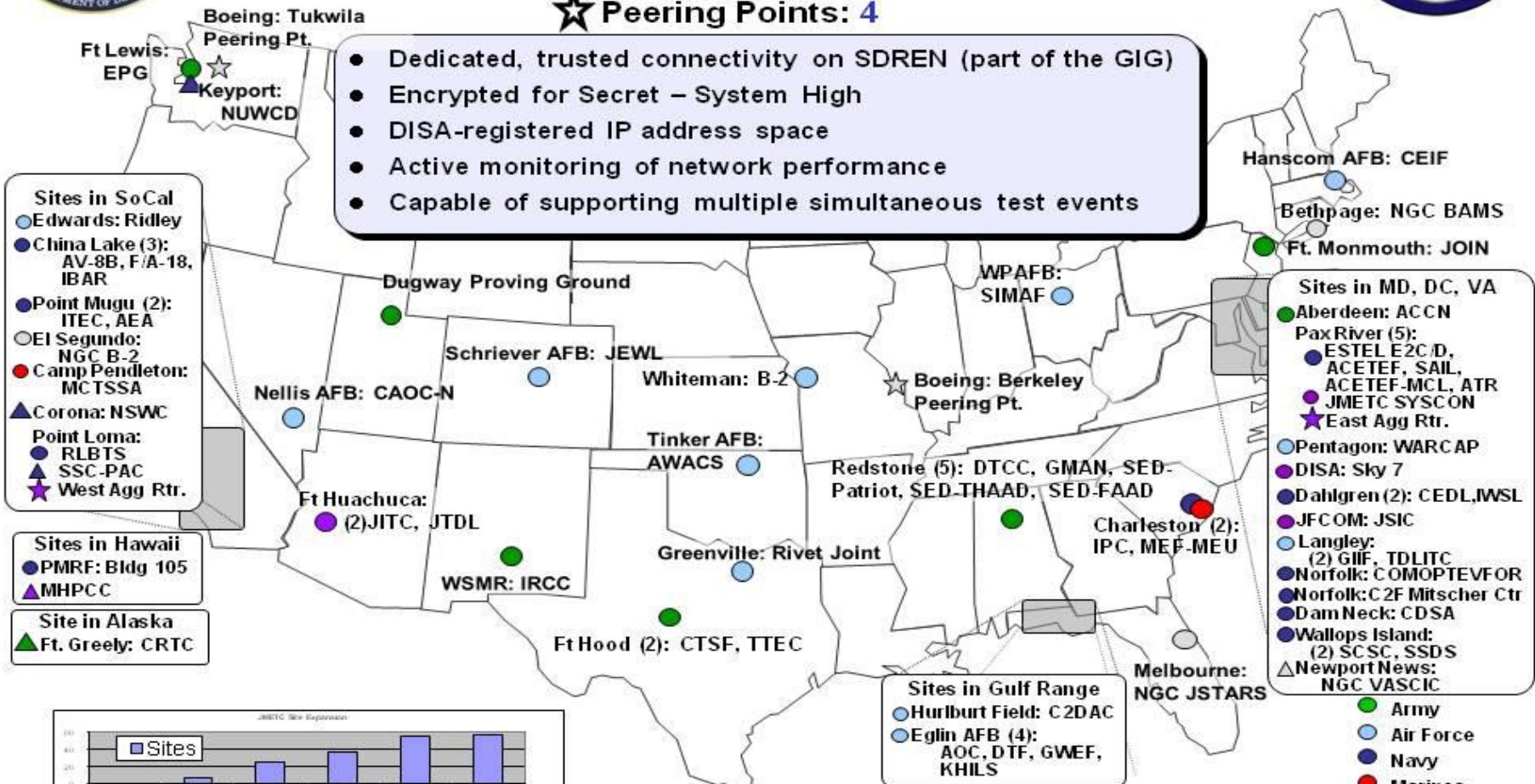


## JMETC Connectivity

- Functional Sites: 57
- △ New Sites Planned: 6
- ★ Peering Points: 4



- Dedicated, trusted connectivity on SDREN (part of the GIG)
- Encrypted for Secret – System High
- DISA-registered IP address space
- Active monitoring of network performance
- Capable of supporting multiple simultaneous test events



As of 14 Oct 2010

- Army
- Air Force
- Navy
- Marines
- Joint
- Industry



# Exploit Technology



- **AFOTEC Strategic Plan**

**“We must develop a strategy to exploit readily available technology, plan and program for resources, and place the tools in our Team’s hands to more efficiently and effectively accomplish our (core) mission”**

- **Mid-term initiative**

**“Develop a robust modeling and simulation capability to address assessment of capability and suitability of systems when time, schedule, or cost prevents evaluation of system in operationally realistic environments”**

**– AF-ICE; LVC-EA; JMETC**

**AFSO21 – Continuous Improvement**



# VV&A



- **Predominantly use capabilities already V&V'd**
  - Focus on accreditation
  - Accredit each LVC element, and LVCE as a single entity
- **Constructive – tailor Mil-Std 3022**
- **Virtual – rely on AF-ICE managers for V&V**
  - If documentation does not exist, develop using recommended practices guide, Navy's V&V framework, AF LVC-DE library, and other sources
    - CV-22 methods
    - Investigating risk-based V&V approach
- **Live and LVCE – AFMAN 63-119 (templates 17, 18, 24)**
  - Readiness for Test = LVCE accreditation



# Summary



- **Approach**
  - Forging a culture
  - Early influencing capabilities development & acquisition
    - Initiatives, program selection, standard processes
  - Leverage resources
  - Exploit technology
  
- **VV&A**
  - Constructive (experienced)
  - Virtual (researching methods)
  - Live & LVCE (automatic)