

Headquarters U.S. Air Force

Integrity - Service - Excellence

NDIA SE Conference ***Engineering Resilient Systems***



Mr. Jeff Stanley
SAF/AQR
28 October 2015

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USAF Activities

- **Owning the Technical Baseline**
- **Open System Acquisition**
- **Acquisition Cyber Resiliency**
- **Air Force Strategy and Developmental Planning**
- **Experimentation Campaign**
- **Modeling and Simulation Efforts**

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SAF/AQ Priority

Own the Technical Baseline

...we must design systems up front to be constantly modified, perhaps in ways that we may not be able to anticipate...we must embrace adaptability as a basic precept of how we develop, procure and sustain

Dr. LaPlante, AF SAE

Owning the Technical Baseline
—a Key Enabler
Agility as the Counterweight to Uncertainty and Change
William A. LaPlante, Ph.D.

The basic acquisition environment involves constant change. The threat to United States interests is going to change, technology is going to change and warfighters will discover different ways to use their equipment. In order for weapon systems to accommodate these certain yet—in specific terms—often unpredicted future changes, we must design systems up front to be constantly modified, perhaps in ways that we may not be able to anticipate now but will discover in the future. This fundamentally means we must embrace adaptability as a basic precept for how we develop, procure and sustain our weapons systems to be effective for the warfighter over their life cycles.

The underlying metric for such agility and adaptability is speed. When we can develop and field capabilities fast, we must do so. Furthermore, agility and adaptability can be enabled by designing systems with modularity, well-designed standards and open-system architectures and protocols. Developing systems this way allows the

LaPlante is the Assistant Secretary of the Air Force (Acquisition). Mr. LaPlante oversees a research and development, test, production and modernization program portfolio of more than \$32 billion annually. He also is responsible for development and execution of policies and procedures in support of the Air Force acquisition system. He has more than 29 years of experience in diverse technology including positions at the MITRE Corporation and the Johns Hopkins University Applied Physics Laboratory. He holds a doctorate in mechanical engineering.

Defense AT&L: July-August 2015

- OTB allows the government to function as an able and informed customer
- Manage technical risks and produce agile and adaptable capabilities



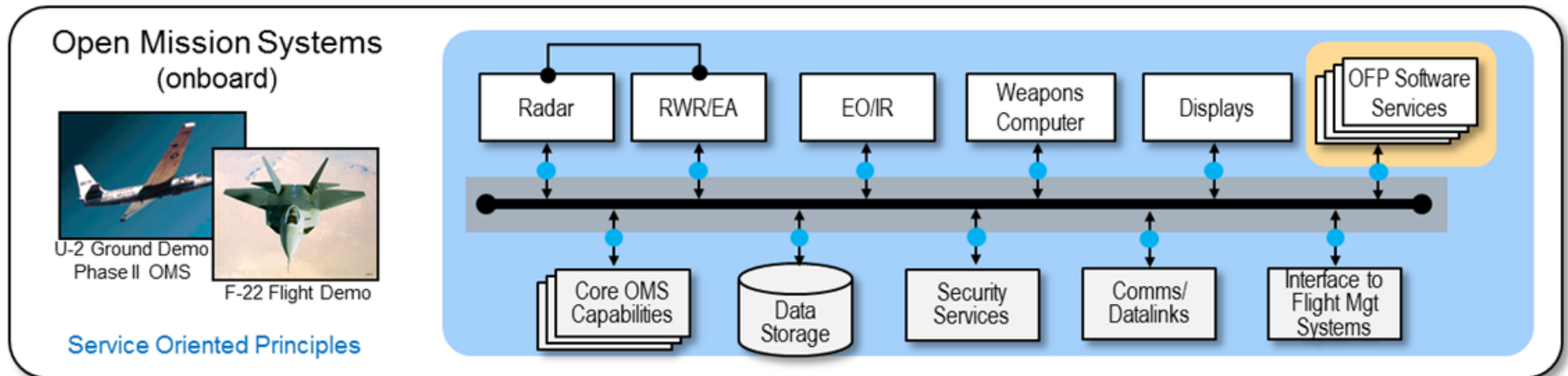
Open Mission Systems

Air Force Initiative

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- **Develop industry consensus, non-proprietary mission system architectural standard**
 - Enable affordable capability evolution
 - Sustained competition across the life cycle
 - Simplify mission system integration
 - Isolate the effects of change
 - Do not stifle innovation
 - Options for legacy a/c & NDI
- **Build OMS ecosystem to enable Family-of-Systems enterprise-level acquisition strategies**

OMS Architecture



Key-interface + common composition rules = "System Resilience"

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Open System Acquisition

SAF/AQ OTI Initiative

- **OSA Other Transactions vehicle open for business Nov 2015**
 - Intended for prototyping, competing, and quickly awarding/implementing new technology solutions
 - Rapid acquisition: RFP to Award in <30 days
 - Pulls from not-for-profit consortium
 - Low barrier to entry
 - Incentivizes participation by traditional and non-traditional firms
 - Demonstration-based solicitation with clearly defined test environment, interface definitions, and measurable performance objectives
 - Goal to introduce as many AF-wide Open System initiatives to this contract vehicle as possible
 - OMS adopters, agile SW development, subsystem modernization, etc.



Acquisition Cyber Resiliency Campaign Plan

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SMC



AFLGMC



NWC

LOA 1: Mission Thread Analysis	LOA 2: Integrate into SE Process	LOA 3: Cyber Workforce Development	LOA 4: Enhance Adaptability	LOA 5: Develop Common Security Environment	LOA 6: Assess and Fix Legacy Systems	LOA 7: Intelligence for Cyber Security
End-to-end operational process supporting a mission	Incorporates systems security engineering into all phases of the acquisition life cycle	A cyber-savvy workforce capable of integrating cyber security measures into all phases of the acquisition process	Vigorously enhances the adaptability of our weapon systems to rapidly respond to threats	Facilitates the integration of cyber security measures into all phases of the acquisition process	Prioritizes legacy systems to fix existing and future cyber vulnerabilities	Strengthen acquisition cyber security through improved intelligence collection, analysis, and application

Mission Assurance End State

Resilient Systems

Common Processes

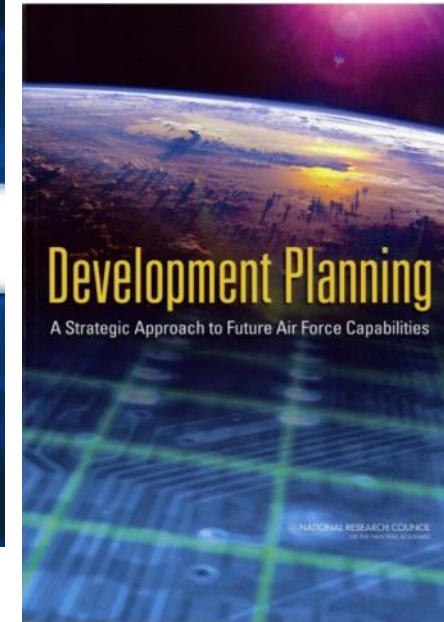
Educated Workforce

High Confidence Missions

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AF Strategy & Development Planning



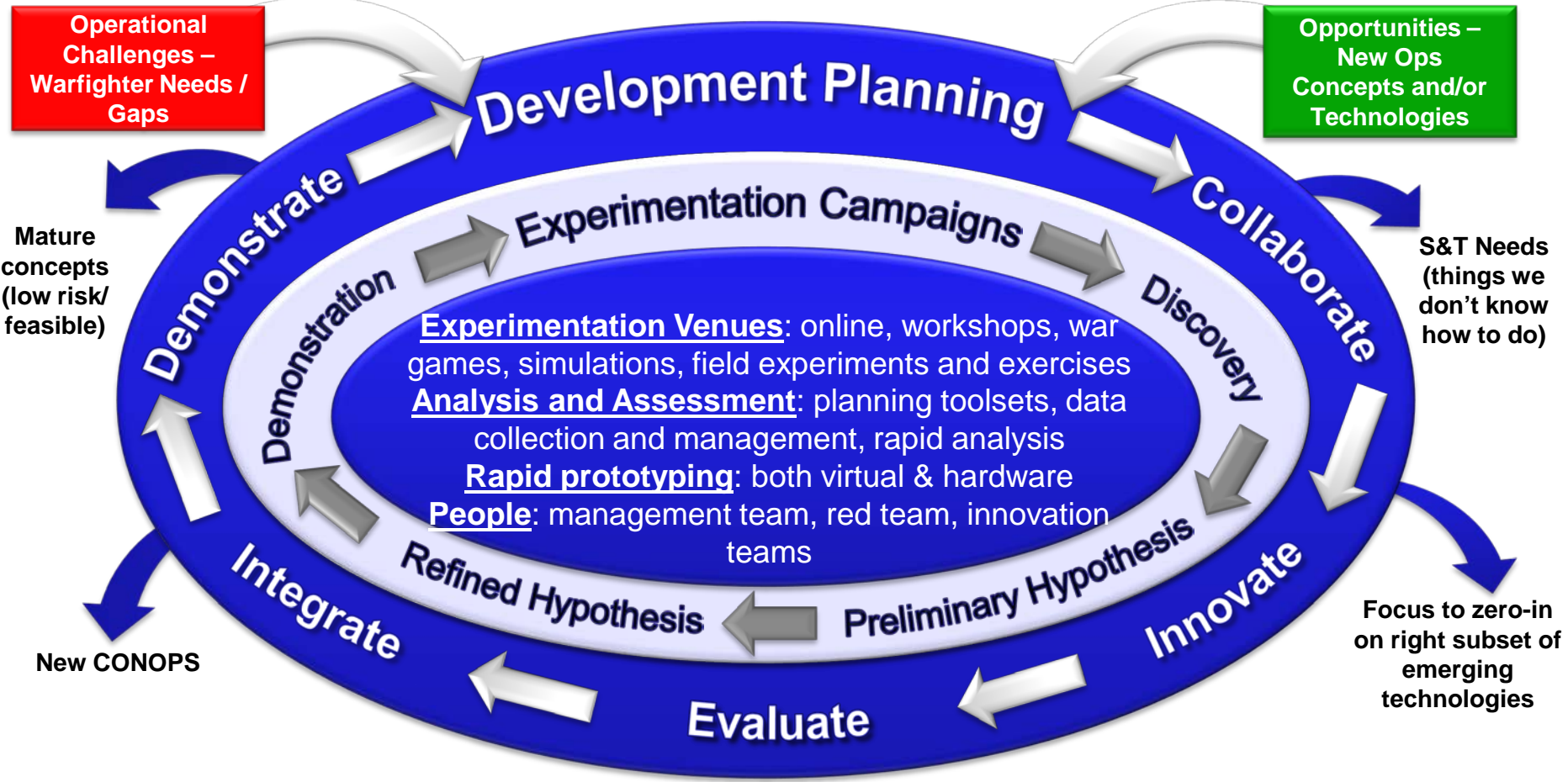
Purpose and value of DP and Experimentation, to include best practices, outlined in AF Studies Board DP Study (Oct 2014) and DSB report (Oct 2013) – Being implemented to support vision, goals, and objectives of AFS and SMP

DP and Experimentation provide analytic foundation to properly inform SECAF and CSAF strategic investment decisions



Experimentation Enabling Development Planning

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Digital Thread / Digital Twin

The Analytical Framework

- **Digital Thread** - An extensible, configurable and enterprise-level framework that seamlessly expedites the controlled interplay of authoritative data, information, and knowledge to inform decisions during a system's life cycle by providing the capability to access, integrate and transform disparate data into actionable information.
- **Digital Twin** - An integrated multi-physics, multi-scale, probabilistic simulation of an as-built system that uses the best available physical models, sensor information, and input data from the Digital Thread and a Digital System Model to mirror the life of its corresponding physical twin.

**Complementary and Integrated Concepts
that put Engineering Back Into Systems Engineering**



AF M&S Relationships

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AF M&S Tri-Chair (HAF/A9, SAF/AQ, HAF/A3)

Strategic Focus: Modeling & Simulation Infrastructure Support & Development

RDT&E TECHNOLOGY DEVELOPMENT
AFRL

Analytic Pillar
(Force Structure)
Analytics Focus

PROGRAM DEVELOPMENT:
HAF/A2 & AQ & A5/8 & A9 and AFMC, AFSPC

Acquisition Pillar
Analytic & LVC Focus

TEST:
AF TEST & AFMC/AFSPC

Training Pillar
LVC for Training Focus

TRAINING:
AF/A3, CAF/MAF DMO

Research/Tech Dev. AFRL, DARPA...	Dev. Planning Center XZ's...	AQ, PEOs, Programs Industry & AF Org	Test (DT/OT/IOT&E) AFMC, AF/TE, AFOTEC...	Sustainment/Training AFMC, AFSPC, COCOMS...
- Engineering Models - AFSIM, BRAWLER... - Embedded H/W & S/W	- COVART, BRAWLER, SUPPRESSOR, THUNDER, STORM, AFSIM, EAAGLES - Embedded H/W & S/W, MT/SL, ITASE		- DIADS, MT/SL TMAP - F-22 Air Combat Simulator - F-35 Verification Simulator	- NGTS, XCITE, EADSIM - F-22 FMT - F-35 FMS/DMRT

INTELLIGENCE MS&A SUPPORT (Data, MT/SL, TMAP, & ITASE)



Unique Engineering Level tools
- *Technology/Phenomenology Specific*
Engagement Level: BRAWLER
Mission Level Models: EADSIM, SUPPRESSOR, OPPRESSOR
Campaign: THUNDER, STORM

Unique Engineering Level tools
- *"ility" Specific, Contractor tools*
Engagement Level: BRAWLER
Mission Level Models: EADSIM, SUPPRESSOR, OPPRESSOR, EAAGLES
Campaign: THUNDER, STORM

Unique Engineering Level tools
- *DT Specific, Contractor tools*
Engagement Level: F-22 ACS...
Mission Level Models: DIADS, System Specific (F-22 ACS, F-35 VSIM), SUPPRESSOR
Campaign: THUNDER, STORM

Unique Engineering Level tools
- *Training, Logistics Specific*
Part Time Task Trainers
System Mission Trainers
- F-22 FMT or F-35 FMS/MRT
- Models like NGTS or XCITE
Distributed Mission Operations
- CAF DMO or LVC-OT



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Questions?

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