Sustainment Overview

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What is Sustainment

• Joint Publication (JP) 3-0, Joint Operations
  – Sustainment: The provision of logistics and personnel services necessary to maintain and prolong operations through mission accomplishment and redeployment of the force
  – Logistics: Supply, maintenance operations, deployment and distribution, health service support (HSS), logistic services, engineering, and operational contract support

• Joint Publication 4-0, Joint Logistics
  – Maintenance Operations: Depot maintenance operations, field maintenance operations and manage life cycle systems readiness
  – Supply: Manage supplies and equipment, inventory management and manage supplier networks

AFRL Sustainment Science Focus On Maintenance Operations & Supply
## Problem: Aging USAF Aircraft

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### Average Aircraft Has Been In Service 25 Years

Source: AF/A4/A7

Distribution A, Approved for Public Release (88ABW-2014-1455)
S&T Sustainment Products

Tools/Processes To Perform Sustainment Tasks Better

Technologies To Fundamentally Change USAF Sustainment

Sustainable Technologies for the Future Fleet
AFRL Sustainment S&T Vision

Lead the Discovery, Development and Transition of Technology Solutions to Ensure Current and Future Fleets are Safe, Available and Affordable
Affordability & Sustainment Emphasis Areas

Support Sustainment of Current AF Fleet (Field and Depot)

Improve Fleet Health Management

Improve Manufacturability of AF Systems

Enable Longer Life, Lower Life Cycle Cost Systems

Enable Robust Design of New Systems
Support Sustainment of Current AF Fleet (Field & Depot)

• Deliver Technologies To
  – Improve resolution of non-destructive inspections
  – Reduce component failure rate
  – Reduce hazardous materials usage
  – Provide technical expertise to support fielded systems
  – Develop material substitution and obsolescence solutions
Improve Fleet Health Management

• Develop Technologies That
  – Maximize useful life of engine components
  – Enable condition-based maintenance of aircraft structure
  – Characterize, model & test structural component damage
Enable Robust Design of New Systems

• Expand Engineering Tools To
  – Improved design tools for corrosion resistance
  – Utilize residual stress in structural design
  – Improve prediction of aircraft structural life
  – Demonstrate novel propulsion technologies
Improve Manufacturability of AF Systems

- Develop Manufacturing Technologies To
  - Reduce touch labor and cycle time to manufacture systems, sub-systems & components
  - Increase yield, integration and reliability
  - Ensure manufacturability of new technologies
Enable Longer Life, Lower Life-Cycle Cost Systems

• Create Technologies That
  – Enable earlier management of manufacturing risk
  – Integrate “cradle-to-cradle” digital environments
  – Allow production rate-independent assembly & fabrication
  – Reduce life-cycle cost of low observable systems
  – Integrate computational methods for discovery, design and manufacturing
Partnering Opportunities

• Wright Dialogue with Industry
  – 22-24 July at Wright-Patterson AFB

• Areas of Interest
  – Risk calculations and risk-based decision making
  – Composite materials and certification
  – Digital twin/digital thread concepts
  – Non-destructive inspection techniques (airframes, engines, satellites and weapons)
  – Manufacturing technologies
Sustainment Demonstrations

Durability of Embedded Sensors
- Ground Based Demo & Flight Demo Begin 2015

Sonic Infrared Nondestructive Evaluation
- Probability of Detection Evaluation May-June 2014

Friction Plug Welding for Panel Repair
- Full Scale Repair Demo June 2015

Rapid & Accurate Fuel Leak Detection
- RFID Tag Demo Complete
America Makes

- A Defense-wide Manufacturing S&T team-led, Multi-agency collaboration between industry, government and universities
- Public-private partnership

- Shared facilities open to industry
  - Especially attractive to small businesses
- Enabling technology transition and commercialization
- Addressing Technology Readiness Level (TRL) / Manufacturing Readiness Level (MRL) 4-7
  - Bridge the gap in Manufacturing Innovation
- Educational outreach and workforce development

A Model for Manufacturing Innovation Institutes
Advanced Power Technology Office

Priority #1
Improve Resiliency
- Reduce Mission Energy
- Improve Energy Delivery

Priority #2
Reduce Demand
- Advanced Technology Development
- Efficient Operations

Priority #3
Increase Supply
- Waste Energy Harvesting
- Renewable Energy Integration

Priority #4
Foster Energy Aware Culture
- Measure OE Consumption
- Analyze Energy Impacts

REPRESENTATIVE DEMONSTRATION PROJECTS

Cavalier AFS #1, 2, & 4

Next Generation Flightline #1, 2, & 4

Maui Advanced Energy Storage #1, 3, & 4
What We Want to Hear From Industry

- What are industries “Big Bets?” How is industry making decisions for IR&D?
- How can AFRL and industry achieve better alignment (road-mapping)?
- What are the current trends in S&T that AFRL may be missing?

http://www.defenseinnovationmarketplace.mil/