



Integrity ★ Service ★ Excellence

Sustainment Overview

8 April, 2014

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What is Sustainment

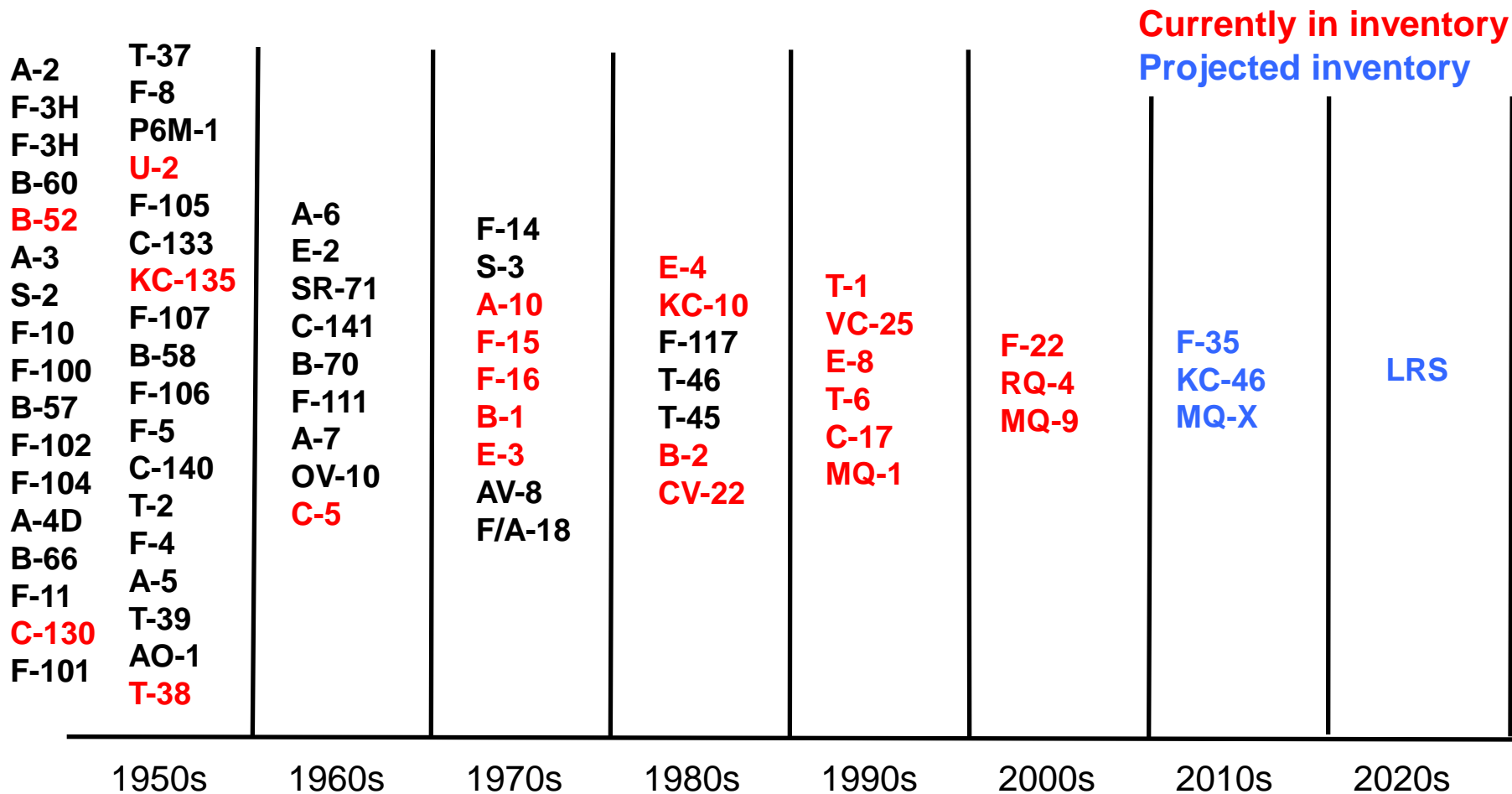


- **Joint Publication (JP) 3-0, Joint Operations**
 - **Sustainment:** The provision of logistics and personnel services necessary to maintain and prolong operations through mission accomplishment and redeployment of the force
 - **Logistics:** Supply, maintenance operations, deployment and distribution, 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



Source: AF/A4/A7

Average Aircraft Has Been In Service 25 Years





S&T Sustainment Products



Tools/Processes To Perform Sustainment Tasks Better



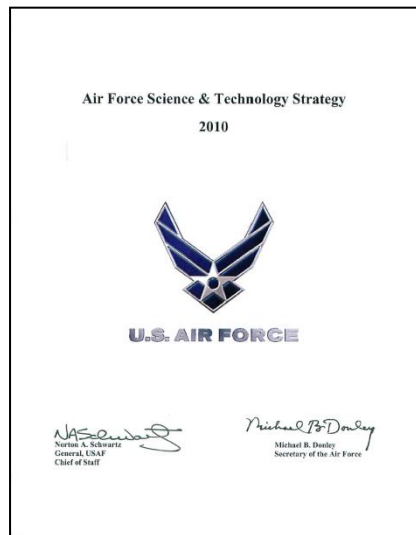
Technologies To Fundamentally Change USAF Sustainment



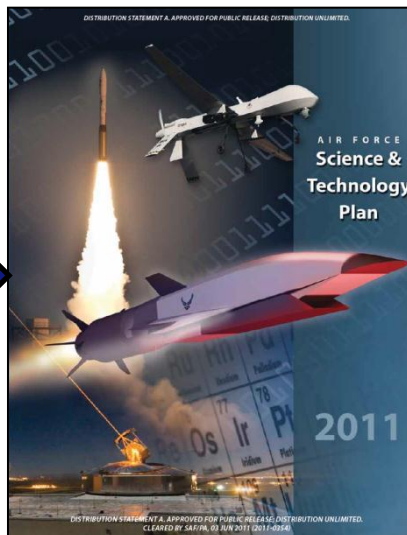
Sustainable Technologies for the Future Fleet



AFRL Sustainment S&T Vision



Signed 2010



Signed 2011

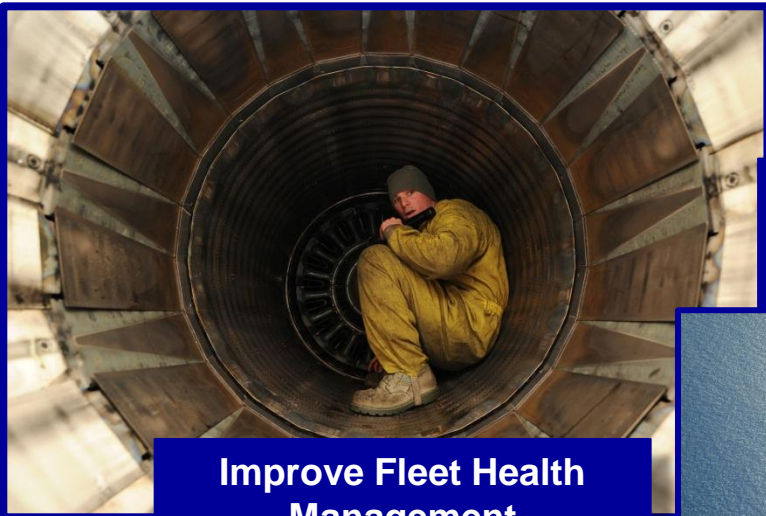


Draft 2014

Lead the Discovery, Development and Transition of Technology Solutions to Ensure Current and Future Fleets are Safe, Available and Affordable



Affordability & Sustainment Emphasis Areas



**Improve Fleet Health
Management**

**Support Sustainment of
Current AF Fleet (Field
and Depot)**

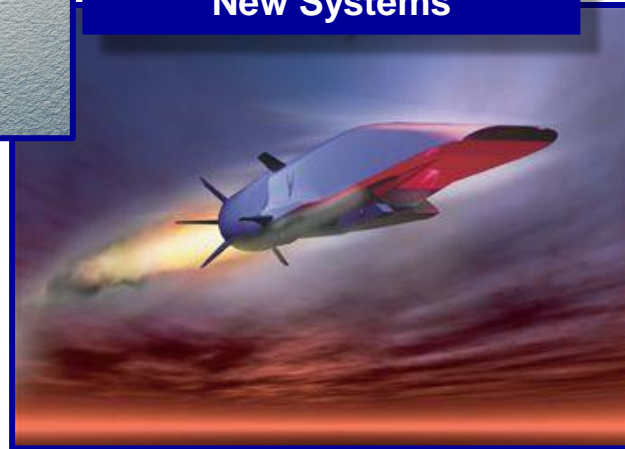
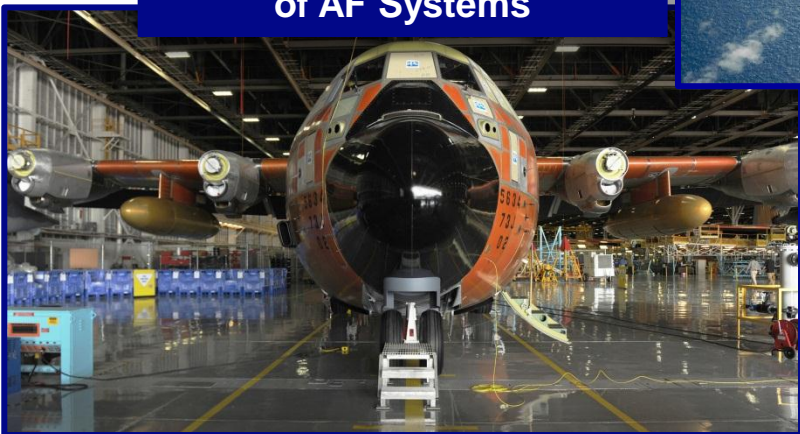


**Enable Longer Life, Lower
Life Cycle Cost Systems**



**Enable Robust Design of
New Systems**

**Improve Manufacturability
of AF 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

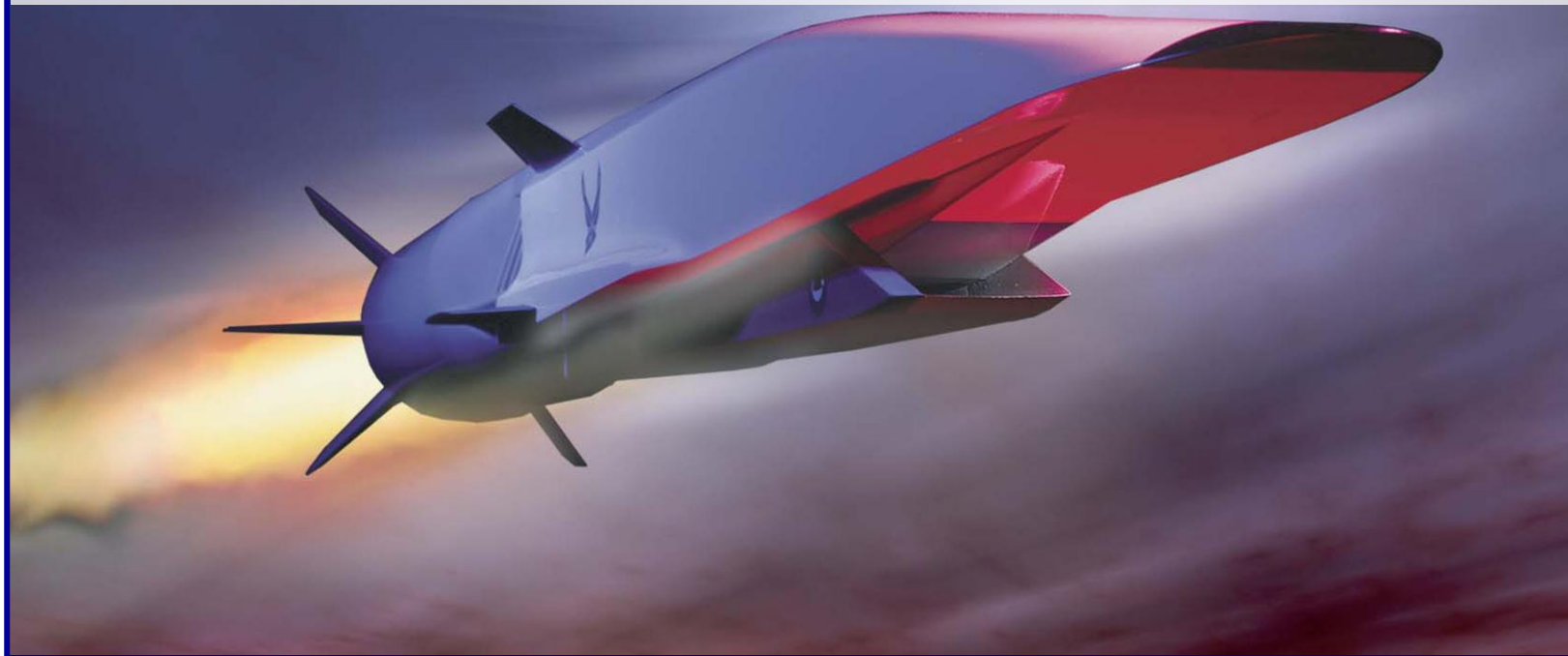




Enable Robust Design of New Systems



- 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





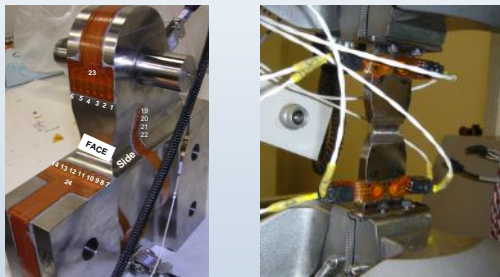
Partnering Opportunities



- **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

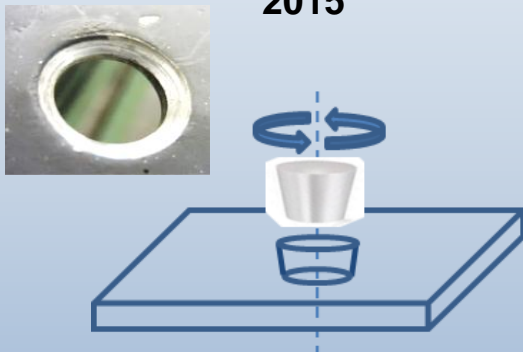


Sonic Infrared Nondestructive Evaluation

- Probability of Detection Evaluation May-June 2014

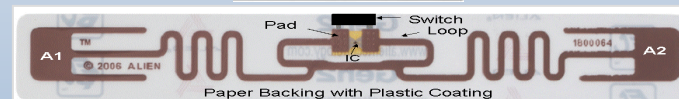
Friction Plug Welding for Panel Repair

- Full Scale Repair Demo June 2015



Rapid & Accurate Fuel Leak Detection

- RFID Tag Demo Complete





America Makes



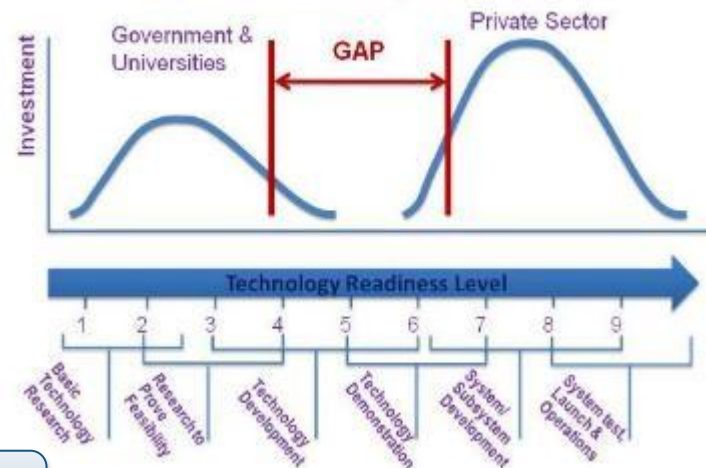
America Makes

- *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

Gap in Manufacturing Innovation



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

DEFENSE INNOVATION MARKETPLACE

HOME RESOURCES FAQs NEWS ABOUT IR&D CONTACT US

Connecting Industry with Government Customers

The Defense Innovation Marketplace is a centralized online resource to better connect industry with government customers to invigorate innovation.

For Industry, the Marketplace is the place to learn about Department of Defense investment priorities and capability needs, and comply with the new Defense Federal Acquisition Supplement (DFARS) rule.

For Government, the Marketplace will provide new search tools to assess and then leverage industry technology projects for current and future programs.

NEW IN THE MARKETPLACE

S&T Strategic Documents	Doing Business with DoD	News & Events
<ul style="list-style-type: none">• TRANSCOM 5 Year Strategy Plan• Capstone Concept for Joint Operations: Joint Force 2010• TRADOC 2028 Strategic Assessment• 2012 Conference - Air Force ISR• Army 2020 Update More...	<ul style="list-style-type: none">• 2013 Army Weapons System Handbook• FY12 AF Defense R&D Rapid Innovation Fund Broad Agency Announcement• 2012 Basic and Applied Research in Sea-Based Aviation Aircraft More...	<ul style="list-style-type: none">• Army Acquisition, Sustainment, and Tech Resources **NEW**• 2011 Rapid Innovation Fund Awards updated 9/26/12• Updated FAQs & Answers Added updated 9/28/12 More... <small>Updated Oct 22</small>

Resources
DoD Information for Business & Program Planning [here](#)

Industry
Market Your Innovation to DoD Customers [here](#)

Government
Find Details about Industry's Innovation Projects [here](#)

[Click Here to sign up for RSS feeds](#)

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<http://www.defenseinnovationmarketplace.mil/>

- 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?



