Air Force Research Laboratory

Integrity ★ Service ★ Excellence

Addressing Air Force Capability Requirements with Emerging Technology Options

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United States Air Force Mission

The Mission of the United States Air Force is to Fly, Fight, and Win…

In *Air, Space, and Cyberspace*

What We Do – Core Missions

- Air and space superiority, cyber assurance
  - Air superiority foundational to joint operations & American way of war
  - Domains likely to be most contested in future
- Intelligence, surveillance, reconnaissance (ISR)
  - Maximizing battlespace awareness
  - ~60 RPA patrols, ~1,200 hrs full-motion video per day
- Rapid global mobility
  - 1M+ airlift & tanker sorties in support of Mideast ops
  - One airlift sortie every two minutes, 24/7/365
  - 97% aeromedical evacuation survival rate
- Global strike
  - Hold any target on planet at risk
  - Two-thirds of America's nuclear triad
- Command & control
  - Integrates them all

Global Vigilance, Global Reach, Global Power for the Joint Team

Air Force Core Functions

What We Bring to the Fight

- Nuclear Deterrence Operations
- Air Superiority
- Space Superiority
- Cyberspace Superiority
- Command and Control
- Global Integrated ISR
- Global Precision Attack
- Special Operations
- Rapid Global Mobility
- Personnel Recovery Operations
- Agile Combat Support
- Building Partnerships
- Education and Training

Each Core Function led by AF 4-Star

AFMC Mission Goals

Continue to Strengthen AFMC's Role in the Nuclear Enterprise

Advance Today's & Tomorrow's Combat Capabilities through Leading-Edge Technology

Acquire and Support War-Winning Capabilities

Perform World-Class Test and Evaluation

Sustain Air Force Capabilities through World-Class Depot Maintenance & Supply

AFRL Mission

Leading the discovery, development, and integration of affordable warfighting technologies for our air, space, and cyberspace force.

AFRL Headquarters

711th Human Performance Wing

Materials & Manufacturing

Aerospace Systems

Sensors

Information
Rome Research Site, NY

AF Office of Scientific Research
Arlington, VA

Edwards AFB, CA

Space Vehicles
Directed Energy
Kirtland Air Force Base, NM

Ft Sam Houston, TX

Munitions
Eglin Air Force Base, FL

Maui Research Site, HI

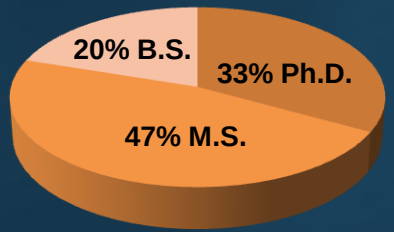
London, UK

Tokyo, Japan

Santiago, Chile

	Employees	Civilian	Military
Total	5,746	4,603	1,143
S&Es	3,429	2,770	659

S&E Education



Data as of Feb 2014

Warfighter Focused Innovation

Appropriated S&T Funds

CFLI and CFMP Demand Signals

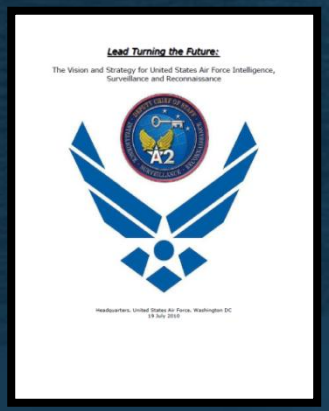
Congressional Interest

Product and Sustainment Center Demand Signals

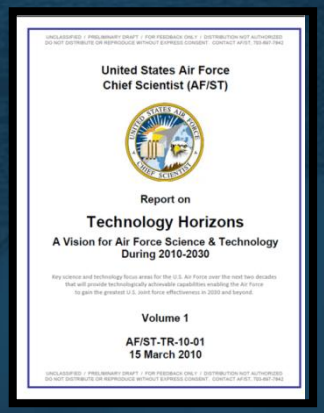
PROGRAM OF RECORD EVOLUTION

AIR FORCE RESEARCH LABORATORY

AF S&T Strategy



AF Core Function Master Plans



AF/ST Tech Horizons

DoD S&T Policy and Priorities

Collaboration with Government and Coalition Labs

Long Term S&T Technology Possibilities

Air Force S&T Planning Process

Identifying Highest Priority Capability Needs

S&T Drivers
NMS, QDR, DPG,
CSAF Vision docs,
AF Strategy,
Operating Concepts,
CFMPs,
Global Horizons,
Wargaming

S&T Collaborative Needs/Solutions Process
(MAJCOMs – Centers – AFRL)

Identify S&T Needs & Propose Technology Solutions

MAJCOM S&T Governance

ACC
AMC
AFSOC
AFSPC
AFMC
AFGSC
AETC

AF S&T Group

AF S&T Board

AFROC

VCSAF

Solutions Responsive to Needs
FCCs
JCTDs
Adv Tech Demos
Hi-Viz S&T Programs
S&T Base Program

- Core Function Master Plans: AF-level planning
  - COCOM needs are represented in CFMPs
- Capability Collaboration Teams: MAJCOMs, Centers, AFRL
- Applied Tech Councils: MAJCOM-level S&T Governance
- S&T Group/Board and AFROC: AF-level S&T Governance

Align Air Force S&T with Air Force Priorities

Technology Focus Areas

$624M — **Next Gen Aerospace Systems**


Advanced Turbine Materials


Turbine Sustainment

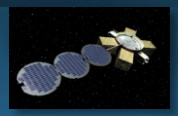

Adaptive Engines


Hypersonics

$339M — **Space and Nuclear Deterrence**


Space Access


Payloads


Space Platforms


Advanced Experiments

$318M — **Weapons**


DE Counter-Electronics

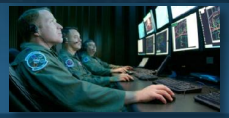

High Speed Strike


High Velocity Penetrating Munitions


Flexible Weapons

$274M — **Command & Control, Cyber, Communications (C^4)**


Processing, Exploitation, and Dissemination (PED)


Cyber


Space Communications

$262M — **Intelligence, Surveillance, & Reconnaissance (ISR)**

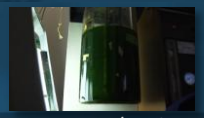
Human-Centered ISR


Synchronized Operations

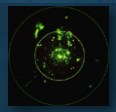
$135M — **Affordability & Sustainment**


Manufacturing Technology


Sustainment


Energy/Fuels

$102M — **Electronic Warfare / Electronic Protection (EW/EP)**

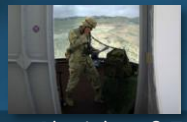

EW Plus

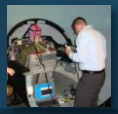

Distributed EW


Infrared countermeasures

$61M — **Human Performance**


Autonomy


Aerospace Physiology & Toxicology


Training & Decision Making Tech

Total: ~$2.5B, FY14 Appropriation

Cutting-Edge Research Facilities

Compressor Research Facility

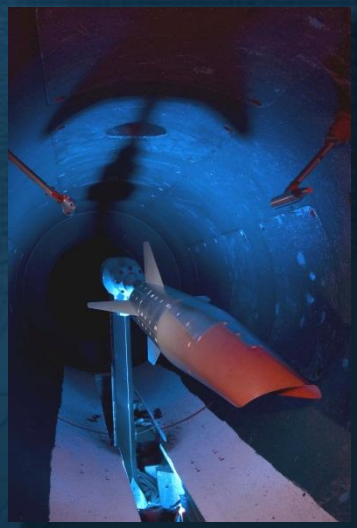
Fuels Research

Full Scale Antenna Evaluation

Optical Range

Human Centrifuge

Supercomputing



Advanced Wind Tunnels

Munitions Test Ranges

Clean Rooms

Rocket Test

Contested Environments & Future Battlefields

The U.S. is facing increasing global R&D competition

- Resource limitations becoming more apparent - Partnerships becoming even more important
- Budget contested, represents the “new normal”

Cyberspace & EM Spectrum

- Information dominance is a must (battlespace awareness, assured C2, resilient & reliable communications, ability to synchronize ops)

Less Freedom of Movement in Space

- Other nations, private industry, all pushing forward in space
- Space situational awareness is key

Growing Sophistication in A2/AD Threats

- Access challenges require integrated technologies
- Longer distances require next gen rapid response capabilities

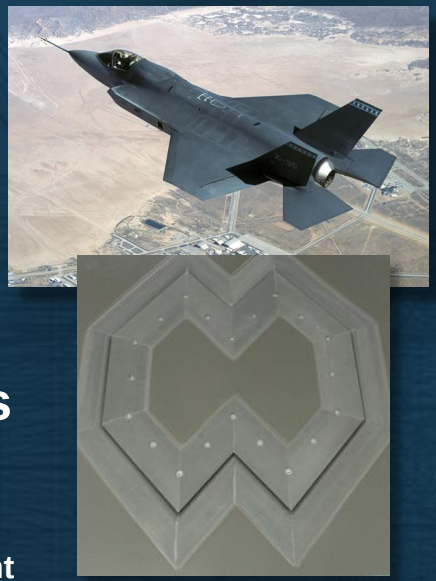
Priorities

Push Innovation

- Leverage existing technologies (“tech push”) to create new and better capabilities for tomorrow’s warfighter
- Collaboration across the Air Force’s S&T Enterprise

More Advanced Technology Demos

- Higher TRL levels
- “Tech Push” - Not all Demos must come from a defined demand signal or requirement



Affordability

- “Baked in” to what we do across the entire S&T Enterprise

Engagement & Partnership

- Focus our nation’s economic engine on USAF S&T problems
- A healthy Tech Base provides big future payoff
- International Partnership

Air Force SBIR/STTR Programs

The Air Force Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs are mission-oriented programs that integrate the needs and requirements of the Air Force through research and development topics that have military and commercial potential.

www.AFsbirsttr.com

<u>Next Air Force Opportunities</u>:

SBIR 2014.1 solicitation

- **Closed 1/22/2014, Proposals currently being evaluated**

STTR 2014.A solicitation

- **Proposal submission currently open; closes 4/9/2014**

Air Force Independent Research and Development (IR&D) Program

The Air Force IR&D Program leads the use of the Defense Innovation Marketplace as primary communication tool to inform industry's IR&D portfolio planners.

http://www.defenseinnovationmarketplace.mil/

Next Air Force IR&D Technical Interchanges:

- **Aero Enterprise: 14-18 April, WPAFB, OH**
- **Nuclear Enterprise: 28 April – 2 May, Kirtland AFB, NM**
- **C4ISR: 19-23 May, Hanscom AFB, MA**

Broad Agency Announcements Included on the Defense Innovation Marketplace

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?

QUESTIONS?

Legacy of War-Winning Technology Development

Early Flight | Space Age | Modern Flight | Cyber Domain | Future