Addressing Air Force Capability Requirements with Emerging Technology Options

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Integrity ★ Service ★ Excellence
AFRL Mission

**LEADING** the discovery, development, and integration of affordable warfighting technologies for our **air**, **space**, and **cyberspace** force.
AFRL Strategic Plan

- Shape and guide AFRL’s action for the next 3 to 5 years
- Focus organizational resources
- Ensure AFRL continues to provide the right technology, at the right time, and at an affordable cost
- Available on the Defense Innovation Marketplace

http://www.defenseinnovationmarketplace.mil/AF
AFRL Snapshot

Employees: 5,787
- Civilian: 81%
- Military: 19%

S&E Education:
- 19% B.S.
- 34% Ph.D.
- 47% M.S.
FY16 PBR Funding
(Includes FY14 and FY15 Appropriations)

- 6.1 Basic Research
- 6.2 Applied Research
- 6.3 Advanced Technology Development

%AF Blue TOA

$/M

FY14 FY15 FY16 FY17 FY18 FY19 FY20

1.92% 1.89% 1.95% 1.85% 1.88% 1.90% 1.92%

0.00% 0.50% 1.00% 1.50% 2.00%
AFRL’s 3 Lines of Operation

Advancing **REVOLUTIONARY** game-changers

*Technology to make and keep the fight unfair*

Maturing **RELEVANT** S&T for MAJCOMS

*S&T Support to Service Core Functions*

**RESPONSIVE** to warfighter’s time-critical needs

*Technology to fill “right-now” needs*
S&T Planning & Programming

Align Air Force S&T with Air Force Near, Mid, & Far Priorities

Congressional and OSD Interest Items

Air Force S&T POM Development Process

MAJCOMs
• Mission Capability Gaps
• Future Force Structure
• CONOPS

Centers
• Concepts
• Industrial Capability
• Development Planning

PEOs
• System Acquisition
• System Engineering

AFRL
• State-of-the-Art
• Realm of the Possible
• Innovation

MAJCOMs

Core Function Lead
Air Superiority
Global Precision Attack
Personnel Recovery
Command & Control
Global Integrated ISR

Cyberspace Superiority
Space Superiority
Special Operations
Rapid Global Mobility
Nuclear Deterrence Operations
Agile Combat Support
Education and Training

DoD Strategic Priorities
A Call to the Future
AF S&T Strategy
Tech Horizons

Core Function Support Plan
Congressional and OSD Interest Items

Align Air Force S&T with Air Force Near, Mid, & Far Priorities
Roadmap: Hypersonics

- **High Speed Strike Weapons**
  - Rapid strike from standoff
  - Deep strike of high value targets

- **Tactical Strike/ISR**
- **Reusable/Persistent**
  - Penetrating, persistent reusable ISR & strike

**Hypersonics S&T Disciplines**
- Aerodynamics
- Aerothermodynamics
- Materials & Structures
- Propulsion
- Guidance, Navigation & Control
- Ordnance & Payloads
- Configuration & Integration

**Timeline**
- 2020+
- 2030+
- 2040+

Ensure rapid and survivable strike in contested environments
Roadmap: Laser Weapons

Pod-based System for Legacy A/C

Mid Level Capability on legacy A/C

• Increased range & lethality

Full Capability on Next Gen Fighter

• A/C & hard ground targets

Laser System S&T Disciplines
• Laser sources
• Beam control
• Acquisition tracking & pointing
• Power & thermal management
• Target effects & numerical analysis

2018 2020+ 2030+

Reducing SWaP and increasing capability for A2/AD Environment
Roadmap: Autonomy

Autonomy S&T Challenges
- Artificial Intelligence
- Cognitive & Computer Science
- Data Analytics
- Machine & Human Learning
- Guidance, Navigation & Control
- Human Factors Engineering
- Operations Research

Operating Safely & Efficiently
- Air Collision Avoidance
- Work-centered PED cell

Machine-Assisted Ops compressing the kill chain
- Defensive system mgr ids threats & recommends actions
- Intelligence analytic system fuzes INT data & cues analyst of threats

Mission Continues thru A2/AD
- Optimized platform operations delivering integrated ISR and weapon effects

Facilitates Decisions at the Speed of Computing

Today 2020 2030+
Upcoming AFRL Solicitations

• FY15 Armament Technology BAA
  – Estimated Amount: $200M
  – BAA Number: BAA-AFLR-RWK-15-0001 (Issued 12 Mar 15)
  – Contracting Officer: Mr. Kevin Miller, (850) 882-4296

• Warfighter Readiness and Training BAA
  – Estimated Amount: $200M
  – Estimated BAA issue Date: Jun - Sep 15
  – Contracting Officer: Ms. Helen Williams, (937) 713-9871

• Beam Control BAA – Supersonic Turret Research in Aero Effects
  – Estimated Amount: $60M
  – BAA Number: BAA-RVKD-2015-002 (Estimate: Jul - Sep 15)
  – Contracting Officer: Ms. Susan Thorpe, (505) 846-3404

• Laser Pod Research and Development BAA
  – Estimated Amount: $80M
  – Contracting Officer: Mr. John Nolan, (505) 846-2240
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.

Next Air Force Opportunities:
- SBIR 2015.1 solicitation – Closed 25 Feb 2015, Proposals under evaluation
- SBIR 2016.1 solicitation – January 2016 (Tentative)
- STTR 2015.A solicitation – Closed 25 Feb 2015, Proposals under evaluation
Air Force Independent Research & 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:

- Weapons COI: 20-24 April, IDA – Alexandria, VA
- Human Systems COI: 22-26 June 2015, Washington DC Area (TBD)
- Air force Space Enterprise: 3-7 August 2015, LA AFS, CA

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