Addressing Air Force Capability Requirements with Emerging Technology Options

08 April 2014

Mr. Jack Blackhurst, SES
Director, Plans and Programs
Air Force Research Laboratory
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

**Nuclear**
Continue to Strengthen AFMC’s Role in the Nuclear Enterprise

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

**Life Cycle Management**
Acquire and Support War-Winning Capabilities

**Test & Evaluation**
Perform World-Class Test and Evaluation

**Sustainment**
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.
Warfighter Focused Innovation
Appropriated S&T Funds

Congressional Interest

DoD S&T Policy and Priorities

Collaboration with Government and Coalition Labs

Long Term S&T Technology Possibilities

AF S&T Strategy

AF Core Function Master Plans

AF/ST Tech Horizons

CFLI and CFMP Demand Signals

Product and Sustainment Center Demand Signals

PROGRAM OF RECORD EVOLUTION

DISTRIBUTION STATEMENT A: Approved for public release; distribution unlimited (88ABW-2014-1413)
Air Force S&T Planning Process

Identifying Highest Priority Capability Needs

- 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

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
- ACC
- AMC
- AFSOC
- AFSPC
- AFMC
- AFGSC
- AETC

S&T Programs
- FCCs
- JCTDs
- Adv Tech Demos
- Hi-Viz S&T Programs
- S&T Base Program

AF S&T Group
AF S&T Board
AFROCC
VCSAF

DISTRIBUTION STATEMENT A: Approved for public release; distribution unlimited (88ABW-2014-1413)
Technology Focus Areas

- Next Gen Aerospace Systems
  - Advanced Turbine Materials
  - Adaptive Engines
  - Hypersonics
  - Turbine Sustainment
  - $624M

- Space and Nuclear Deterrence
  - Space Access
  - Space Platforms
  - Advanced Experiments
  - $339M

- Weapons
  - DE Counter-Electronics
  - High Speed Strike
  - High Velocity Penetrating Munitions
  - Flexible Weapons
  - $318M

- Command & Control, Cyber, Communications (C^3)
  - Processing, Exploitation, and Dissemination (PED)
  - Cyber
  - Space Communications
  - $274M

- Intelligence, Surveillance, & Reconnaissance (ISR)
  - Human-Centered ISR
  - Synchronized Operations
  - $262M

- Affordability & Sustainment
  - Manufacturing Technology
  - Sustainment
  - Energy/Fuels
  - $135M

- Electronic Warfare / Electronic Protection (EW/EP)
  - EW Plus
  - Distributed EW
  - Infrared countermeasures
  - $102M

- Human Performance
  - Autonomy
  - Aerospace Physiology & Toxicology
  - Training & Decision Making Tech
  - $61M

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
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

Priorities
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.

Next Air Force Opportunities:

SBIR 2014.1 solicitation
- Closed 1/22/2014, Proposals currently being evaluated

STTR 2014.A solicitation
- Proposal submission currently open; closes 4/9/2014

www.AFsbirsttr.com
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