AF Science and Technology
Game Changing Investments

Dr. Steven H. Walker
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AF S&T Vision

Create compelling air, space, and cyber capabilities for precise and reliable Global Vigilance, Reach and Power for our Nation
Air Force S&T Strategy

- Summarizes S&T vision, tenets and priorities
- Signed by SECAF and CSAF, Dec 2010
- To be updated in 2012 to reflect FY13 PB

AF S&T Program Priorities

1. Support the current fight while advancing breakthrough S&T
2. Execute a balanced, integrated S&T Program
3. Retain / shape the critical competencies
4. Address the highest priority capability needs of the Air Force
Air Force S&T Strategy

Priority #2: Execute Balanced, Integrated Prgm

Increase emphasis in S&T that will:

- Improve sustainment, affordability and availability of legacy weapon systems
- Reduce cyber vulnerabilities while emphasizing mission assurance
- Support nuclear enterprise
- Deliver autonomous systems and human performance augmentation technologies envisioned in Technology Horizons
- Provide robust situation awareness by improving ISR capabilities and data processing, exploitation and dissemination (PED)
- Enable long-range precision strike
- Reduce energy dependency

Where Air Force would put additional S&T funding
S&T Program Tenets

- Prepare for an Uncertain Future and *Investigate Game-Changers* to Shape the Art-of-the Possible into Military Capabilities
- Create Technology Options that Address Urgent Warfighter Needs and Provide New AF Service Core Function Capabilities in Support of the Joint Mission
- Maintain In-House Expertise to Support the Acquisition and Operational Communities and Modernize and Improve the Sustainability of Unique Research Facilities and Infrastructure
- Develop Future Air Force Leaders with an Appreciation for the Value of Technology as a Force-Multiplier
- Remain Vigilant Over and Leverage Global S&T Developments and Emerging Capabilities
Antti-Access/Area Denial (A2/AD) – Key Game Changers

**HIGH-SPEED**
- Hypersonic Cruise Missile Demo
- Supersonic Small Turbine
- Hypersonic Tech

**WEAPONS**
- CHAMP JCTD
- HPM
- Laser Technologies
- 5th Gen Weapons

**ENERGY EFFICIENT PLATFORMS**
- Adaptive Engine
- F-35 Thermal Mgt

**ELECTRONIC WARFARE**
- EW Plus
- EW System of Systems

**C4ISR**
- SCOTI Cyber
- Comm & C2
- Passive ISR Contested Environ
- PCPAD-X

**AUTONOMY**
- Autonomy

**SPACE**
- Ground SSA
- Rad-Hard Electronics

Distribution A (SAF/PA Case 2012-0263) Integrity - Service - Excellence
Adaptive Engine Technologies Enable Reduction in USAF Energy Burden and Costs while Increasing Capability

25% Fuel Efficiency Improvement

Increased Strike Radius
Fewer Tanker Sorties
Increased Thermal Margins
Increased Power Margins
Assured Energy Superiority

Efficient Engines Providing Increased Capability Across Multiple Mission Areas

Energy Horizons
United States Air Force Energy S&T Vision 2011-2026
AF/ST TR 11-01
31 January 2012

Distribution A (SAF/PA Case 2012-0263) Integrity - Service - Excellence
AF Energy RDT&E in FY13 PB Funding
High Speed Technology

High Speed Air Vehicle and Propulsion Technologies Enable Long Range at High Speed with Effective Payload

High Speed
Small Supersonic Turbine
Rocket-Boost Scramjet
Turbine-Based Combined Cycle

Variable Warhead Effects

Long Range

Aircraft Systems
Internal bombers
Internal/External fighters

Precision Strike

Net-Enabled
In-Flight Targetable

Large Ground Area Coverage

Rapid, Responsive Strike in Anti-Access/Access Denied (A2/AD) Environments
Electronic Warfare

Full Spectrum Electronic Warfare Enables Access with Increased Survivability

EW M&S

DE M&S

All Source Threats Database

Cyber M&S

Rapidly Fieldable Countermeasures, High Impact Effect

Enable US Operations in Anti-Access/Access Denied (A2/AD) Environments
Fifth Generation Weapons

Advanced Kinetic Weapons Create Lethal Effects Across the Full-Spectrum of Warfare

- Increased Weapons Loadout
- Selectable Effects
- Advanced PNT
- Reduced Collateral Damage
- Large Magazine
- Small Weapons

Kinetic Options for USAF Fifth Generation Platforms
Advances in Autonomy Enable Time-Domain Operational Advantages Over Adversaries at Lower Cost

Collaborative Control Mixed Manned & Unmanned All Unmanned

Supervisory Control and Decentralized Decision - Making with Limited Comm

Advanced Visualization

Decision-Aiding Tools

Trust in Automation

Analyst Augmentation Tools

Autonomous Systems Reduces Friendly Exposure in A2/AD Environments
Advanced C4ISR Enables USAF Decision Superiority Across Air, Space and Cyber Domains

Defensive Cyber

Offensive Cyber

Mission Assurance

C4ISR Technology Enabling Mission Assurance in A2/AD Environments
Space

Space Technology Supports the Full Range of Military Operations

Space-Based SSA

ID, Characterization, Health, and Attribution of Space Objects

Radiation Hardened Electronics

Ground-Based Optical SSA

Ensure Accurate Navigation and Communications

Geosynchronous Autonomous Proximity Operations and Characterization

Space Tech Provides Capabilities to Operate in Hazardous Natural/Man-Made Environments

Distribution A (SAF/PA Case 2012-0263) Integrity - Service - Excellence
Commissioned National Research Council Study to examine Air Force STEM workforce - Fall 2010

VCSAF established STEM Advisory Council, chaired by 3-star

Published *Bright Horizons* - STEM Workforce Strategic Roadmap - Signed by SECAF/CSAF - Mar 2011

Directed establishment of Air Force STEM Outreach Coordination Office (AFSOCO)

AFSOCO established - Sep 2011

“Strategic management of Airmen is the cornerstone of our future, and STEM Airmen will play an ever-increasing role in our success.”

*Michael B. Donley, Secretary of the Air Force*
Air Force Depends on the S&T Program to discover, develop, and demonstrate high-payoff technologies across all domains – *Tech Push*

S&T Program Priorities, Program Tenets, and Processes aligned to turn science and knowledge into militarily relevant capabilities – *Tech Pull*

AF S&T fared well in last budget round, now must deliver technology options to the warfighter in the near, mid, and far-term

*AF Game-changing investments are a critical component of technology options the warfighter may need in the future*