Strategic Planning
For
Precision Engagement

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AFRL/RWPB
Vision: Global leader in advancing weapons science and technology

Mission: Lead the discovery, development, integration, and transition of affordable weapons technology, enabling the warfighter to win across all domains
Time For Change

“If you are not changing more internally than the external environment is changing, then you are moving backwards. If you don’t like change, you are going to like irrelevancy even less!” — Dr. John Daly

Question: Are we willing to accept the system of the past as the way ahead into an uncertain future?
A Requirement to Innovate

- Emerging strategies & systems represent a disruptive innovation directly targeted against the free world

- To remain effective, partners in the Weapons S&T Enterprise must continue to change, adapt, and innovate by:
  - Collaborating and leveraging technology investments … and …
  - Shaping the “enterprise” to conceptualize the next generation(s) of weapons … and …
  - Be the oracle of core weapon technologies and operational access capabilities

- Prepare for an uncertain future and investigate game-changing technologies to affordably transition the art-of-the possible into military capabilities …

Create technology options that address urgent warfighter needs and provide new capabilities in support of Air Force Service Core Functions

2011 Air Force S&T Plan
Strategy to Task Approach

- OSD S&T Priorities for FY13-17 "Magnificent 7"
- ACC AFSOC AFGSC Core Function Master Plan (Needs List) (S&T Annex)

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Weapons S&T Enterprise
Integration Spectrum

AFRL/XP Customer Engagement

Core Function Master Plan
AFRL/XP-led Capability Working Groups

Needs

Solutions

Capability Area Lead IPTs
“Need Decomposition … Drive S&T Formulation”

AFRL Core Technical Competencies

Weapons S&T Enterprise

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### Mapping Weapon Capability Area IPTs to the AF Service Core Functions

<table>
<thead>
<tr>
<th>Service Core Function</th>
<th>Air Superiority</th>
<th>NDO</th>
<th>Global Precision Attack</th>
<th>Special Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational Capability Area</strong></td>
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<tr>
<td>Air-to-Air Superiority</td>
<td>Suppression of Enemy AD</td>
<td>Electronic Attack</td>
<td>Global Strike</td>
<td>Close-Controlled Strike</td>
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<tr>
<td>Air Superiority SEAD/DEAD IPT</td>
<td></td>
<td></td>
<td>Long-Range Strike</td>
<td>Intra-Theater Strike</td>
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<tr>
<td><strong>High Interest Challenges</strong></td>
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<td>Close Controlled Strike/Intra-Theater Strike IPT</td>
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<td>Counter HDBT IPT</td>
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<td></td>
<td>Counter CBRNE / WMD IPT</td>
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<td>Operational Access - “Implement Air-Sea Battle” IPT</td>
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5th & 6th Generation S&T Drivers

- Increased Capability / Capacity Focus with Future Threat Aware Approach – Peer Technology Focus
- Highly Contested Airspace – Anti Access / Area Denial
- Optimizing 5th/4th Generation Mixed Capabilities
- GPS Denied Environments
- Understanding with the Warfighter the Value of Speed in all Airspace
- Sensors Forward Optimization for Targeting
- Modular Bay Concepts for LRS-B
- Directed Energy / Non-Kinetic Effects for F-X & LRS-B
- Enhanced Lethality Warheads & Effects
- Cooperative Effects
Weapons to Enable 5th/6th Gen Aircraft

- Emerging A2AD strategies & systems represent a disruptive innovation directly targeted against the American way of war…
  - “… the most difficult operational challenge US forces will face…”
  - “A military that cannot gain operational access … loses utility as an instrument of national power.” --JOAC, 22 Nov 2011

<table>
<thead>
<tr>
<th>2010</th>
<th>2020</th>
<th>2035</th>
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<tbody>
<tr>
<td><strong>USAF</strong></td>
<td><strong>USAF</strong></td>
<td><strong>USAF</strong></td>
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<tr>
<td>F-22</td>
<td>F-22</td>
<td>F-22 (fewer #) / F-X</td>
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<tr>
<td>B-2</td>
<td>F-35</td>
<td>F-35</td>
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<tr>
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<td>B-2</td>
<td>LRS-B</td>
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**Threat**
- 4th + Gen Adv Fighters
- Advanced EA
- Capable, mobile, Double Digit IADS with embedded self-protection
- 5th Gen Adv Fighters (PAK-FA, XXJ)
- Advanced EA
- Dense, Networked, Double/Triple Digit IADS with embedded self-protection
- 5th + Gen Adv Fighter (+#s)
- Next Gen Advanced EA
- Sophisticated, Dense, Networked, Triple Digit IADS, passive detection, embedded self-protection, DE, and Cyber

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Future Weapons will be Complex
Air Vehicles

Layered Sensing

Cooperative
Control/C2

Seeker
Integrated
Multi-Function Sensors

Aerodynamic / GN&C

Datalink

Guidance
Integrated
Fuzing

Effects Payload

Propulsion

Thermal / Material
Sciences

Survivability

All AFRL TDs INVOLVED
M&S and Systems Engineering Underpins the Enterprise
Strategic Steps
Embrace “Enterprise” in our Roadmaps

Strategy
• Decompose Needs
• Study Operations
• Structured Capability Development
• Analyze & Help Shape Industry IRAD
• Balance In-House capability vs. capacity
• Enterprise capability vs. capacity
• Leverage partnerships with government, industry, academic and international partners

Enterprise S&T Roadmap And Research Plans

Capability Pull
6.3 / 6.2
(IPT Led)

Tech Push & Discovery
6.2
(CTC Led)

Basic Research Focus
6.1
(CTC Led)
Addressing the Challenge
Leveraging Investments

The Enterprise “Battlespace” has a multiplicative impact on the value of a dollar invested in weapons S&T

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Speed ... Innovation ... Solutions

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Questions
MUNITIONS DIRECTORATE CORE TECHNICAL COMPETENCIES

- Physical Effects Sim
- Fuze Technologies Sim
- Virtual Environment Sim
- Weapon/Target Interaction
- Munitions Aero, GN&C
- Energy Conservation
- Applied Munition Systems
- Physical Effects
- Applied Munition Systems
- Terminal Seekers
- Computational Physics
- Theoretical Energetics & Design
- Munitions Systems Effects
- Damage Mechanisms
- Fuze Technologies
- Energetic Materials
- Terminal Seekers