Systems Engineering Principles in Air Force IR&D Process

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Mr Jorge Erazo
Plans & Programs Engineer
Plans and Programs Directorate
Air Force Research Laboratory
Overview

• Alignment of Air Force S&T Program
• AF S&T customer engagement
• IR&D is worth our attention
• Air Force IR&D engagements
• 3 Step workshop approach
• Adapting process toward Service Core Functions
Turning Science Into Capability

Air Force Strategy Technology Horizons + Center Needs + MAJCOM Needs

Science Knowledge & Discovery → Technologies → Capability Concepts → Service Core Function Capabilities

Outputs:
- New technologies
- “The realm of the possible…”
- Tech Transfer/Tech Transition

Outputs:
- Mature Technologies
- New Capability Concepts
- Tech Transfer/Tech Transition

Outputs:
- Mature Capability Concepts
- Tech Transfer/Tech Transition

Initial Operating Capability

25 years → 10 years → 5 years → 1 year
# Customer Engagement

## SCF Ties – MAJCOM, PCs, AFRL

<table>
<thead>
<tr>
<th>Service Core Functions</th>
<th>MAJCOMs/Capability Working Groups</th>
<th>Product Centers</th>
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<tbody>
<tr>
<td>Rapid Global Mobility</td>
<td>AMC</td>
<td>ASC/ESC</td>
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<td>Agile Combat Support</td>
<td>AFMC</td>
<td>ALCs/ASC/NWC</td>
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<td>Building Partnerships</td>
<td>AETC</td>
<td>As Required</td>
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<td>Nuclear Deterrence Operations</td>
<td>GSC</td>
<td>NWC/ASC/SMC</td>
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<td>AFSPC - Space</td>
<td>SMC</td>
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<td>ESC</td>
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Capability Working Group

SCF(MAJCOM) (SES/GO-level)

AFRL CWG

Capability Leader

Deputy CL

Needs Lead

Integration Leads

Needs

Solutions

MAJCOM/Center (Working level)

TD Senior Planners & SMEs
Customer Engagement Strategy

1. Gather MAJCOMs’ S&T Guidance & Master Plan
2. MAJCOMs/Centers/AFRL develop S&T solutions
3. AFRL adds far-term S&T
4. MAJCOMs, Centers, prioritize portfolio
5. Formal S&T Guidance & SCF Master Plan from MAJCOMs
6. AFRL adjusts current S&T investments
7. AFRL submits Capabilities Investment to POM

IR&D Informs the S&T Needs and Solutions Process
IR&D is Worth our Attention

~$5 Billion of R&D Investment

Contractor Spending

Accepted Allowable IR&D

IR&D Recovered from DoD (thru billing rates)
AF/Industry IR&D Workshop

2 Year Cycle

AF Transmits Tech Needs/Gaps To Industry

Gov → Ind

Understanding Industry’s IR&D

Ind → Gov

Coordinated with Major AF & Industry Events

Partnering Opportunities

Ind & Gov Assess/Align Investment Strategies
• AF S&T POM
• Industry IR&D

Step 1
Step 2
Step 3

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Step 1: Topic Selection

Workshop Planning Team

Needs

Solutions & Gaps
Step 2: Focused Industry Response

Needs

Solutions & Gaps

Candidate Topics & Presentations

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Step 3: Low Hanging Fruit

Tweaked 4 contract bids based on Step 1 info & won all 4.

“These workshops help us focus our IR&D projects to our customer.”

“I’m lead in this tech area and was not aware your company was doing that!”
Space Technology Interchange Workshop

- **Key Technology Areas Covered**
  - Launch Detection
  - MILSATCOM
  - Operationally Responsive Space
  - Spacecraft Power
  - Space Situational Awareness/Command & Control
  - Routine Launch: Pathfinder Demo
  - Spacecraft Propulsion
  - Pervasive Tech - Rad Hard Electronics

- **9 Major Defense Contractors Participated**
- **102 IR&D abstracts submitted**
- **68 industry IR&D projects briefed**
  - 25% of Space IR&D investments ($281M) apply to Step 1 needs
  - “Well aligned with SMC needs … real potential to add value to SMC acquisition.”
• Topic areas pursued
  – Standardized SSA modeling & simulation
    • 5 KTRs interested
    • Drafting CRADA template
  – Communications (RF, SAT)
    • Discussion with KTR on collaboration
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<th>AF Tech Needs Briefings</th>
<th>Industry IR&amp;D Briefings</th>
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<td>6-8 Oct 2010</td>
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<tr>
<td>Electronic Systems</td>
<td>22-24 Jun 2010</td>
<td>7-9 Dec 2010</td>
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<td>Nuclear Weapons</td>
<td>2-3 Aug 2011</td>
<td>Dec 2011</td>
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<tr>
<td>Air and Sustainment</td>
<td>1-3 Nov 2011</td>
<td>Apr 2012</td>
</tr>
<tr>
<td>Air Armament</td>
<td>Mar 2012</td>
<td>Jul 2012</td>
</tr>
<tr>
<td>Space</td>
<td>May 2012</td>
<td>Sep 2012</td>
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IR&D Schedule FYs 11-12

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Summary

• Industry is a key partner in meeting Air Force S&T needs . . . IR&D is essential

• IR&D Workshop approach is proven to be an effective interchange forum
  - Single Air Force voice on vetted needs
  - Focused industry response
  - Closer coordination and/or collaboration is win-win

• Challenges of aligning IR&D engagements toward SCFs
  - Complexity of product center, MAJCOM, and SCF relationship
  - Classified information

Linking IR&D to Air Force Service Core Functions helps achieve strategic priorities for National Defense
Questions?

For additional information please contact:
Mr Giovanni Pagán
IR&D Program Manager
Plans and Programs Directorate
Air Force Research Laboratory
giovanni.pagan@us.af.mil