Government-University-Industry Research Roundtable Meeting

DDR&E Research Perspective

22 February 2010

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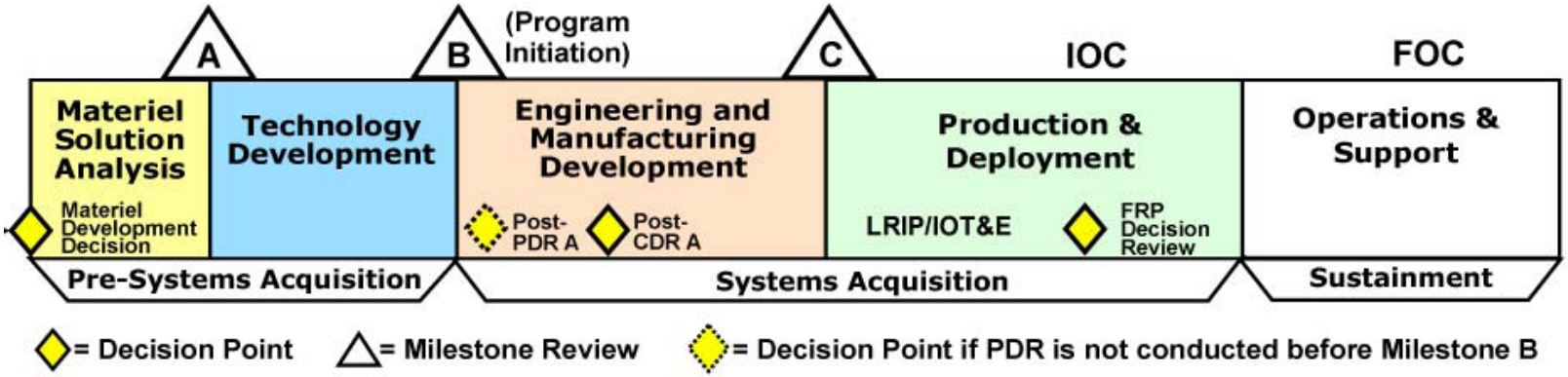
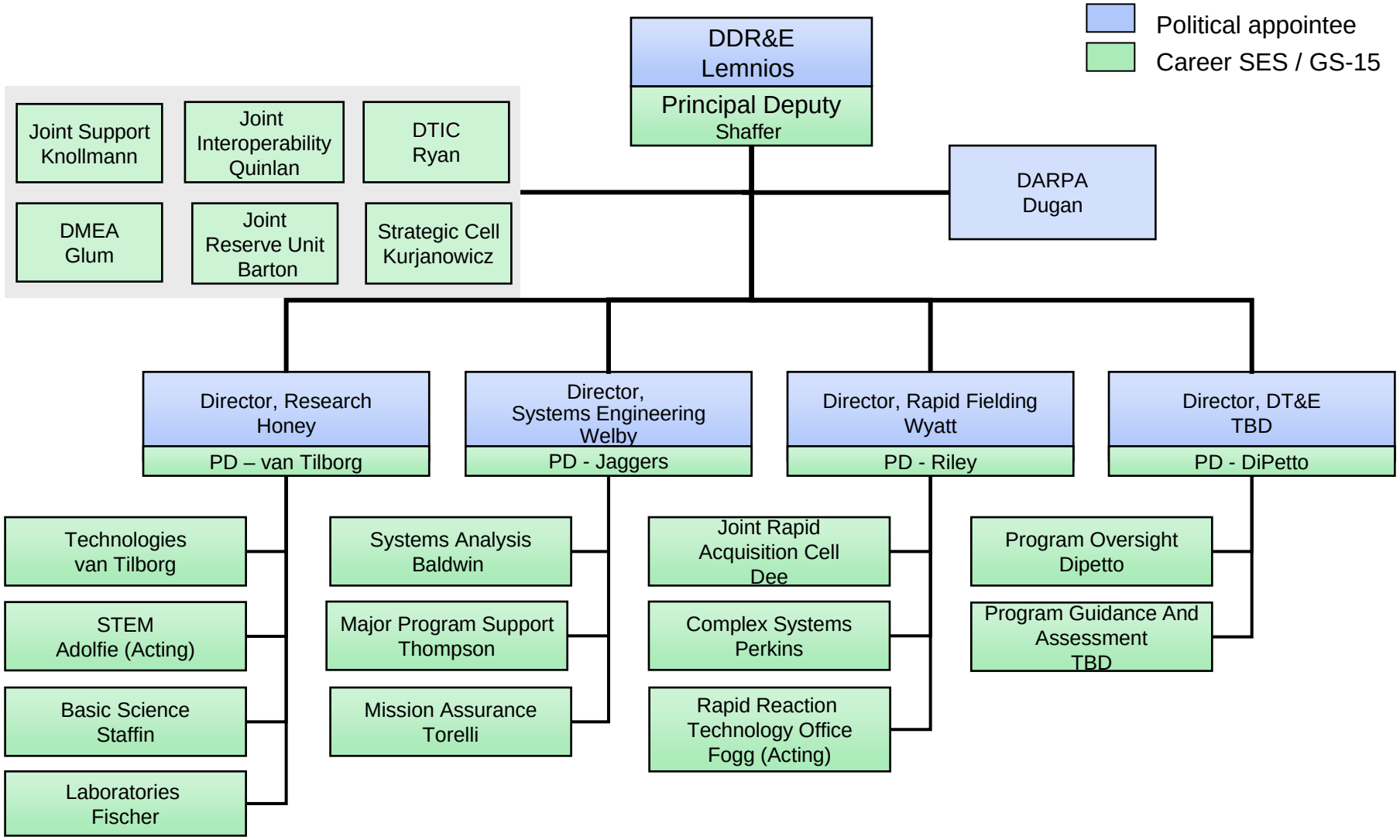
DDR&E

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

The DDR&E is **the principal staff advisor** to the Under Secretary of Defense (Acquisition, Technology, and Logistics (AT&L)) and to the Secretary and Deputy Secretary of Defense for research and engineering matters. The DDR&E serves as the **Chief Technology Officer for the Department of Defense**.



DDR&E Organization



Direction from Secretary Gates

Innovation

- "Institutionalize and enhance our capabilities to fight the wars we are in today and the scenarios we are most likely to face in the years ahead." (April 2009)

Speed

- "I want to see a defense establishment that can make and implement decisions quickly in support of those on the battlefield." (January 2009)

Agility

- "What is needed is a portfolio of military capabilities with maximum versatility across the widest possible spectrum of conflict." (July 2009)
- "..the key is getting control of this acquisition process. It's imperative that programs are being executed according to the budgets that have been established for them, and on the timelines established." (September 2009)

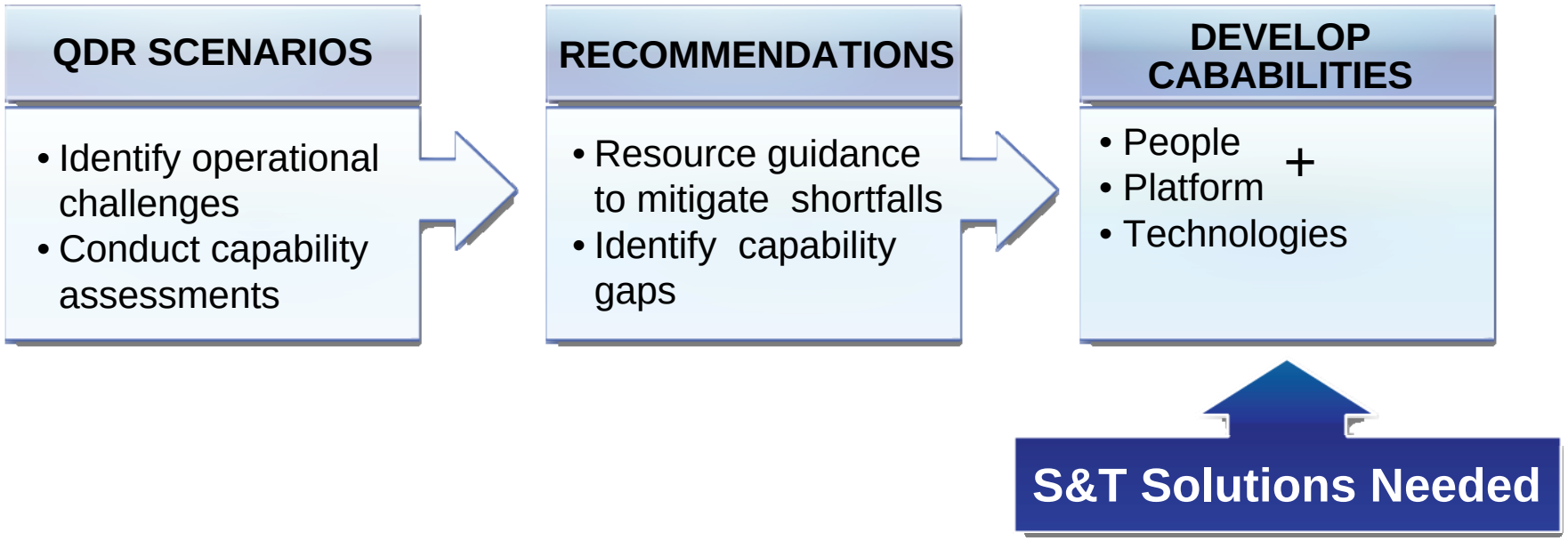
Strategic Defense Reviews

http://www.defense.gov/DefenseReviews/

The Department of Defense has undertaken four distinct, yet closely-coordinated, major defense reviews, each of which focuses on a unique dimension of our national security priorities.

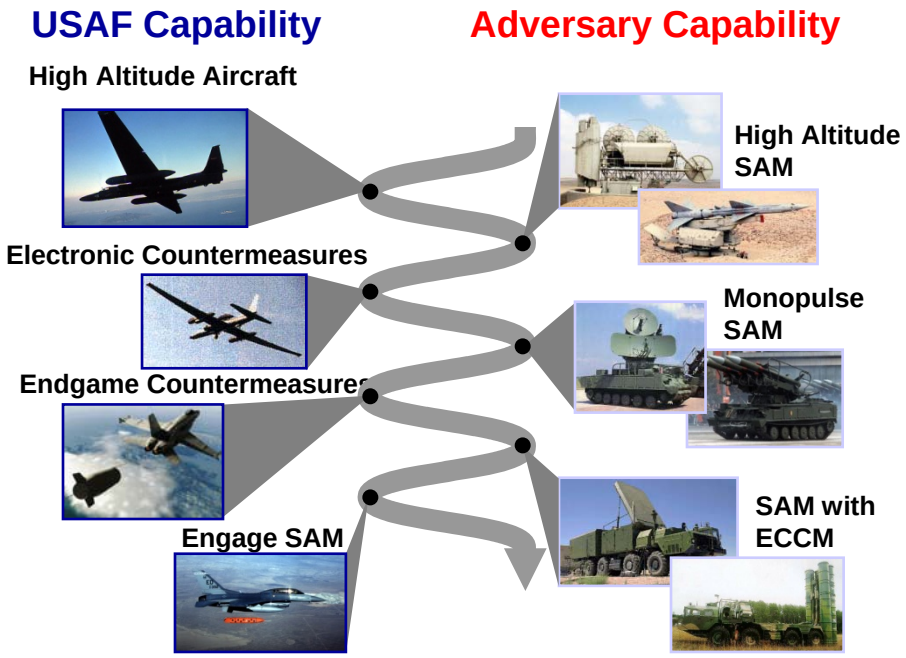
Shaping the S&T Portfolio to address the QDR Missions

- **Defend the United States and support civil authorities at home**
- **Conduct counterinsurgency, stability, and counterterrorist operations**
- **Build partnership capacity**
- **Deter and defeat aggression in anti-access environments**
- **Impede proliferation and counter weapons of mass destruction**
- **Operate effectively in cyberspace**



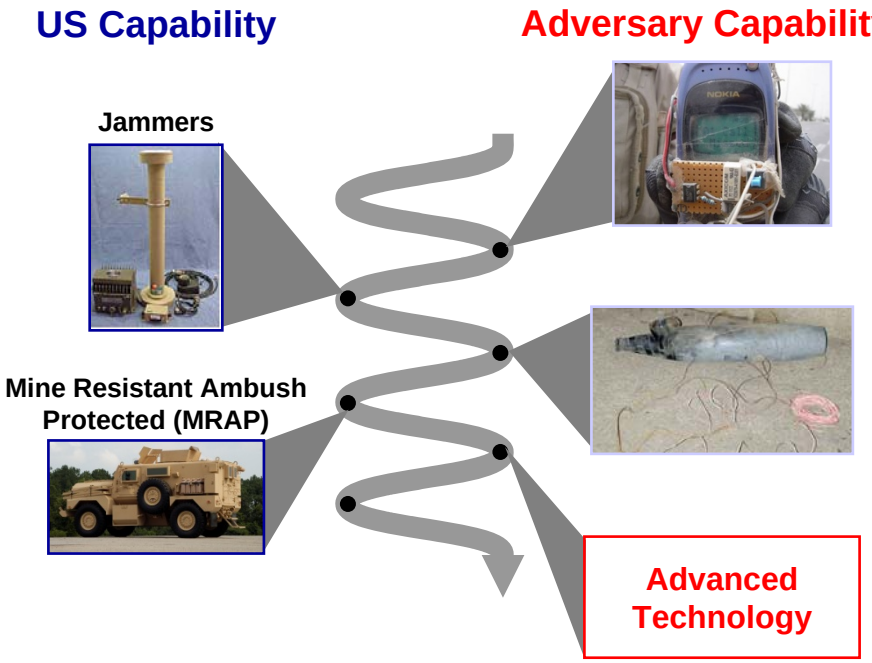
The Timeline has Collapsed!

Conventional Warfare



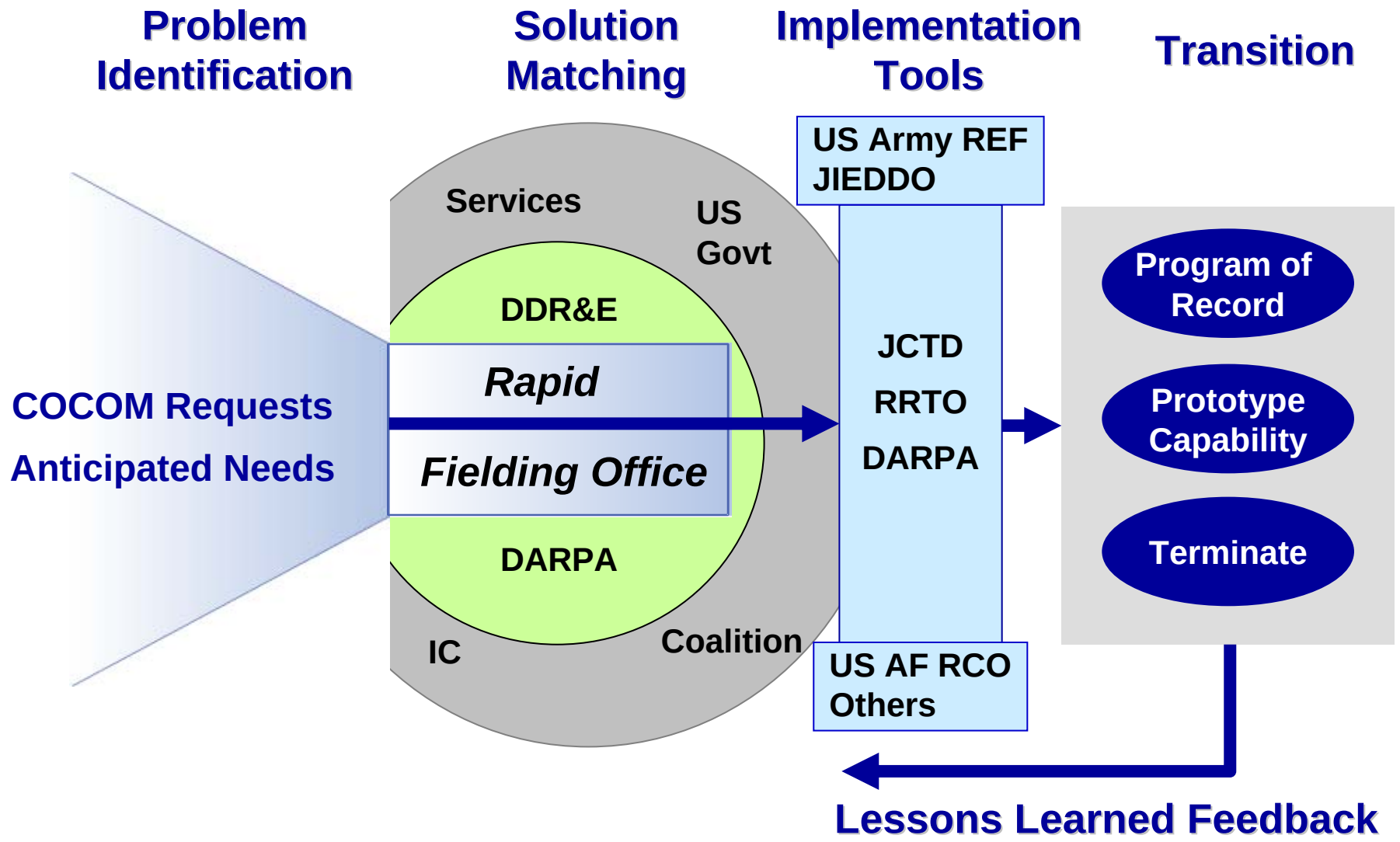
Response loop measured in years

Counter-Insurgency Warfare



Response loop measured in months or weeks

Accelerate Delivery of Capabilities: 6-12 months from concept to capability



Shaping the DOD S&T Portfolio

Future Threats

- Net Assessment,
- **QDR**, Intel,
- Advisory Boards

Current Fight

- JUONs, IPLs,
- Lessons Learned,
- COCOMs

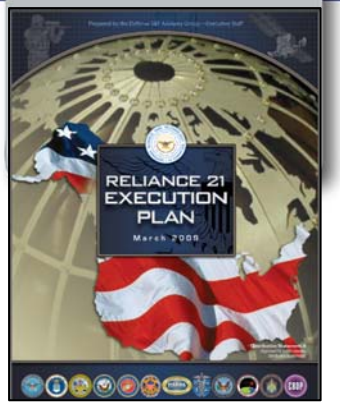
Emerging Research

- Publications
- Grand Challenge,
- University Initiative,
- Studies, Global,
- Private sector,

S&T Approaches

S&T Prioritization

- Opportunity
- Impact
- Strategy
- Transition
- Budget



Reliance-21
DSTAG

Tech Surprise

- Transform the operational battlespace

Tech Readiness

- Technical implementation
- Successful acquisition programs

Core Technologies

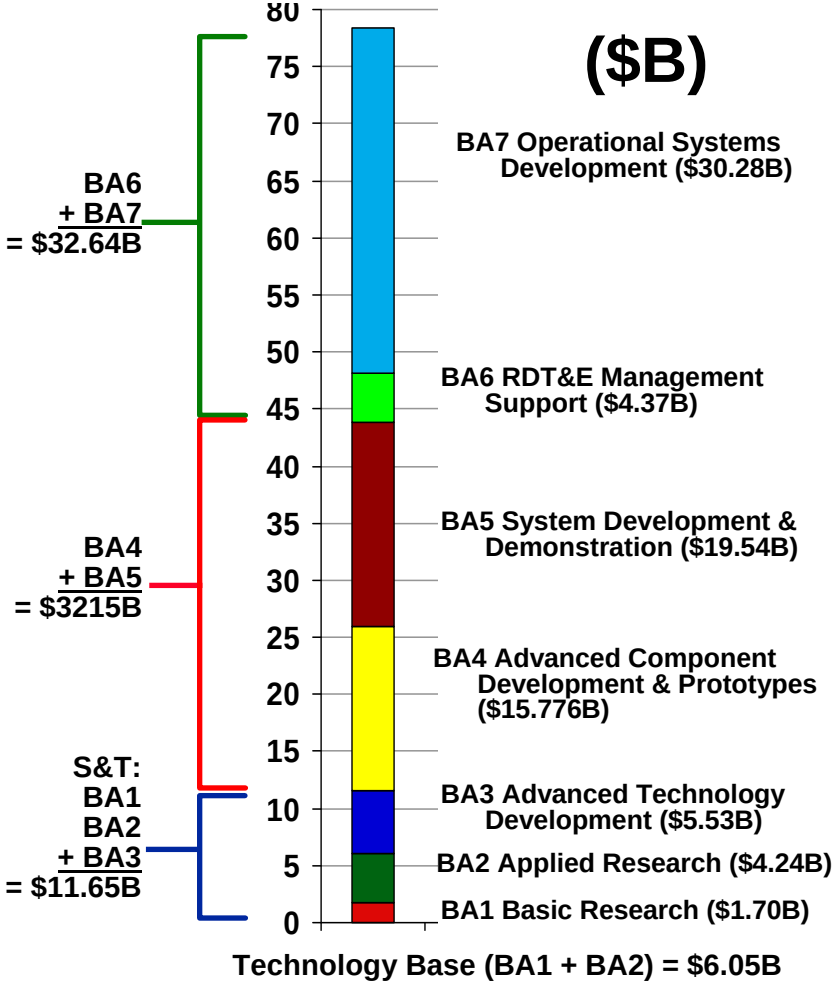
- Research Triple (government, university, industry)
- World class, engaged scientific workforce

FY10 and FY11 RDT&E Budget Request Comparison

- in Then Year Dollars -

Updated 22 Jan 10

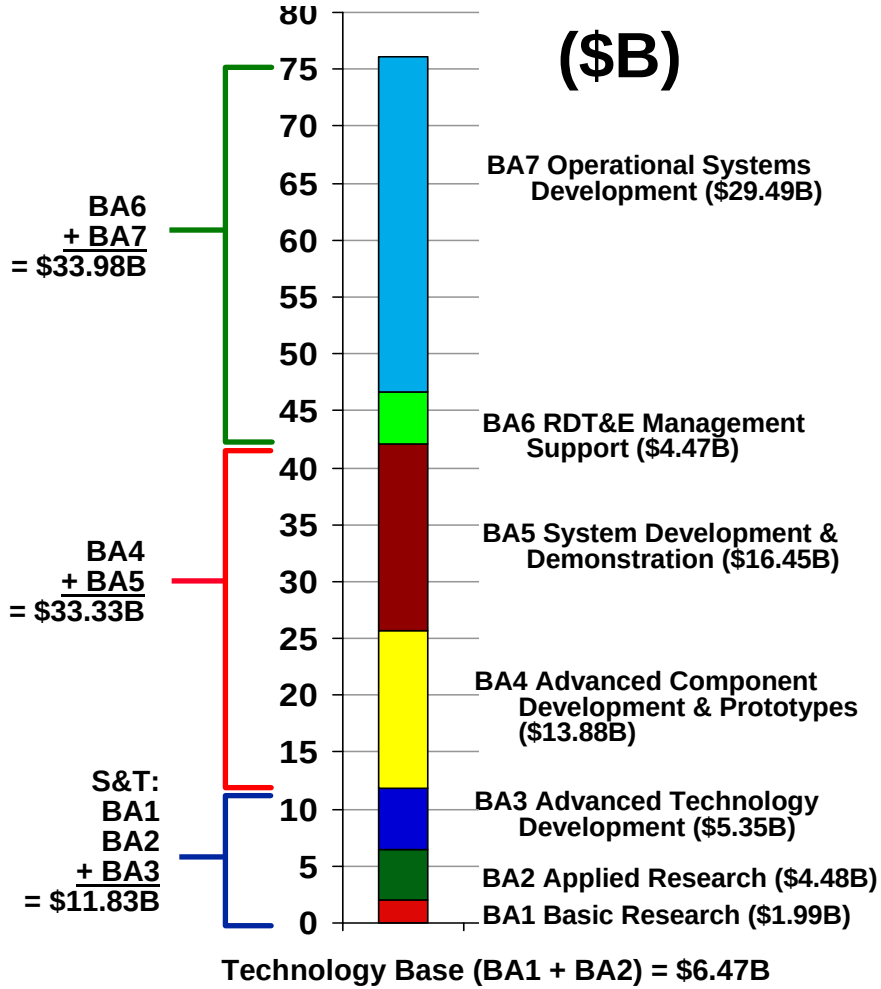
FY10 RDT&E request = $78.44B (Budget Activities 1-7)



Technology Base (BA1 + BA2) = $6.05B

PBR09 S&T is 15.0% of RDT&E

FY11 RDT&E request = $76.13B (Budget Activities 1-7)



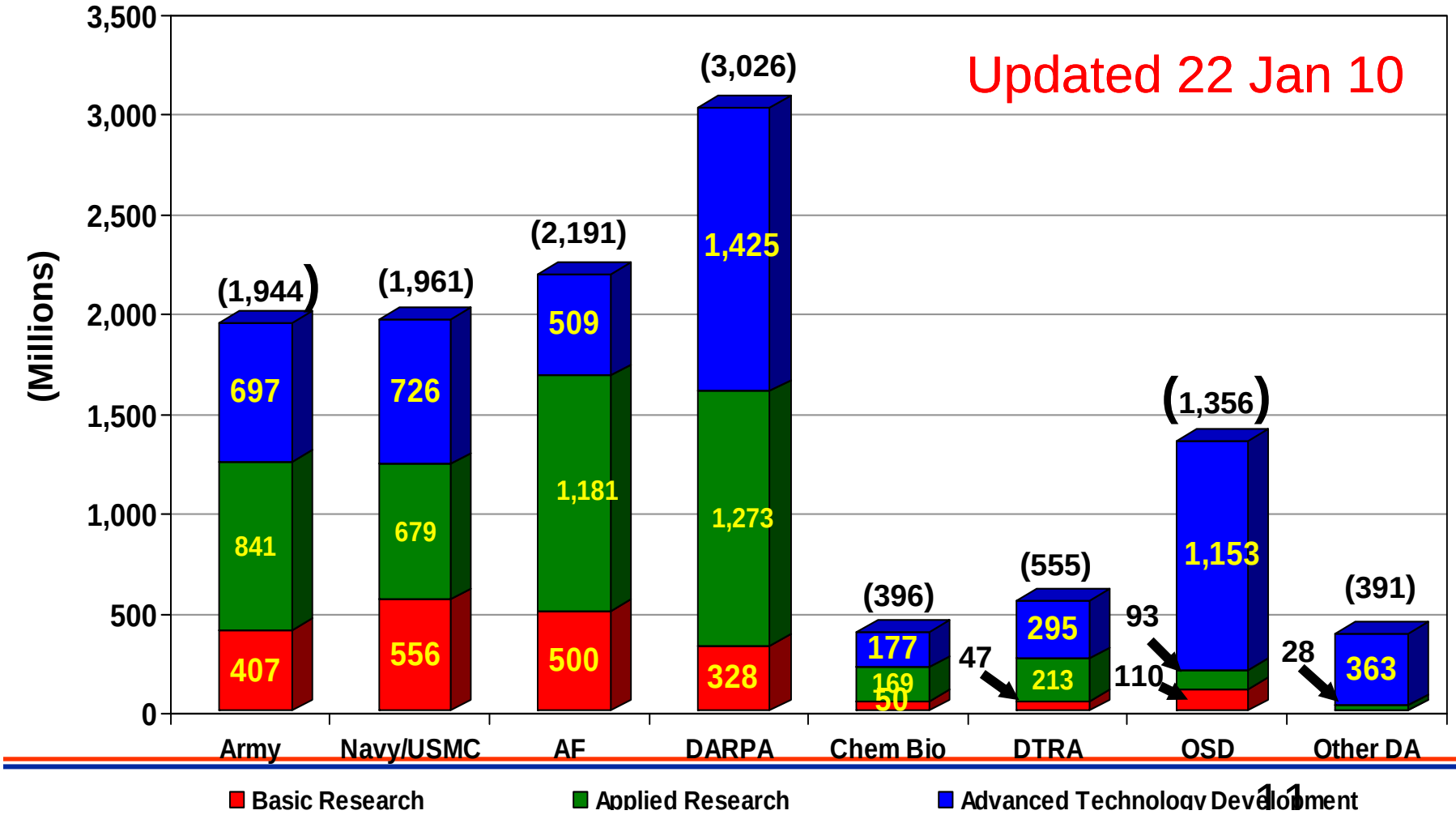
Technology Base (BA1 + BA2) = $6.47B

PBR10 S&T is 16.0% of RDT&E

FY11 DoD S&T Budget Request

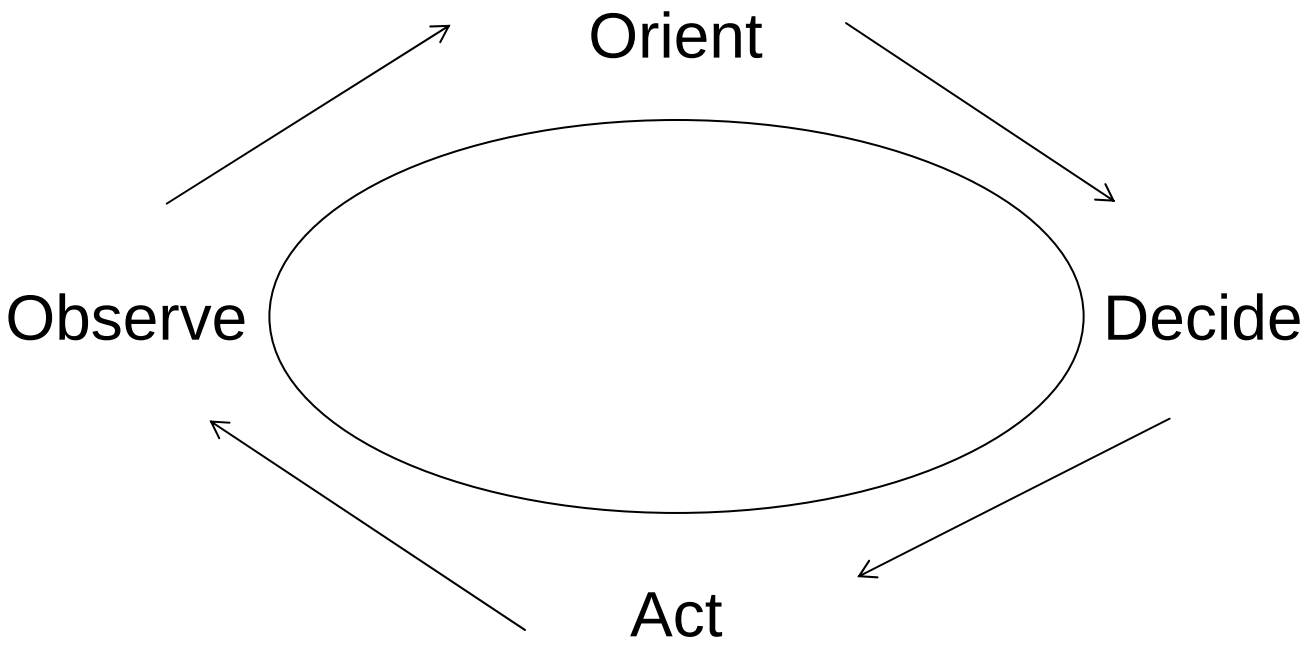
Total FY11 S&T request = $11.82B

Total FY10 S&T Request = 11.65B
Army = 1,854 Navy = 1,846 AF = 2,179 DARPA = 3,102 ChemBio = 554 DTRA = 501 OSD = 1,352 Other DA = 261



So, what does this mean for sensing?

1st – What do users do?



The OODA Loop

Air Force Technology Investment Areas

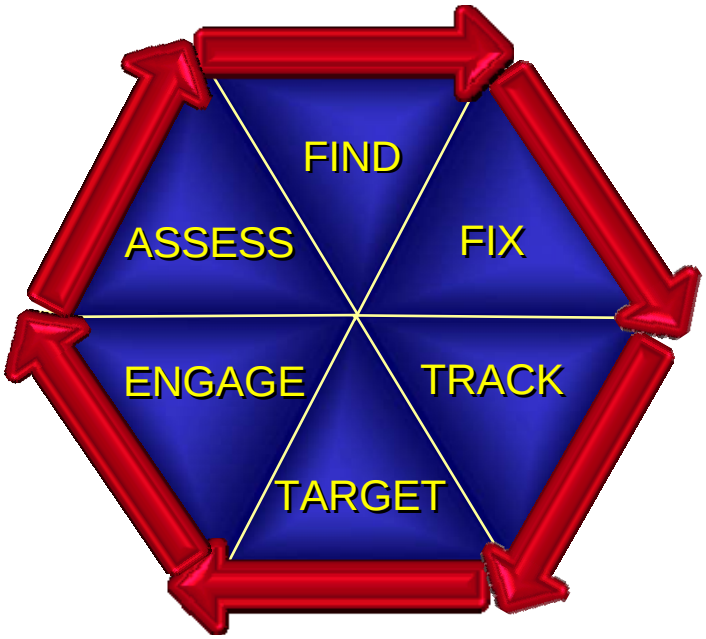
Focused Long Term Challenges

- Anticipatory C2I
- Unprecedented Proactive ISR
- Dominant Difficult Surface Target Engagement &Defeat
- Persistent & Responsive Precision Engagement
- Assured Operations in High-Threat Environments
- Dominant Offensive Cyber Engagement
- On-Demand Force Projection, Anywhere
- Affordable Mission Generation & Sustainment

FY09 $2.18B

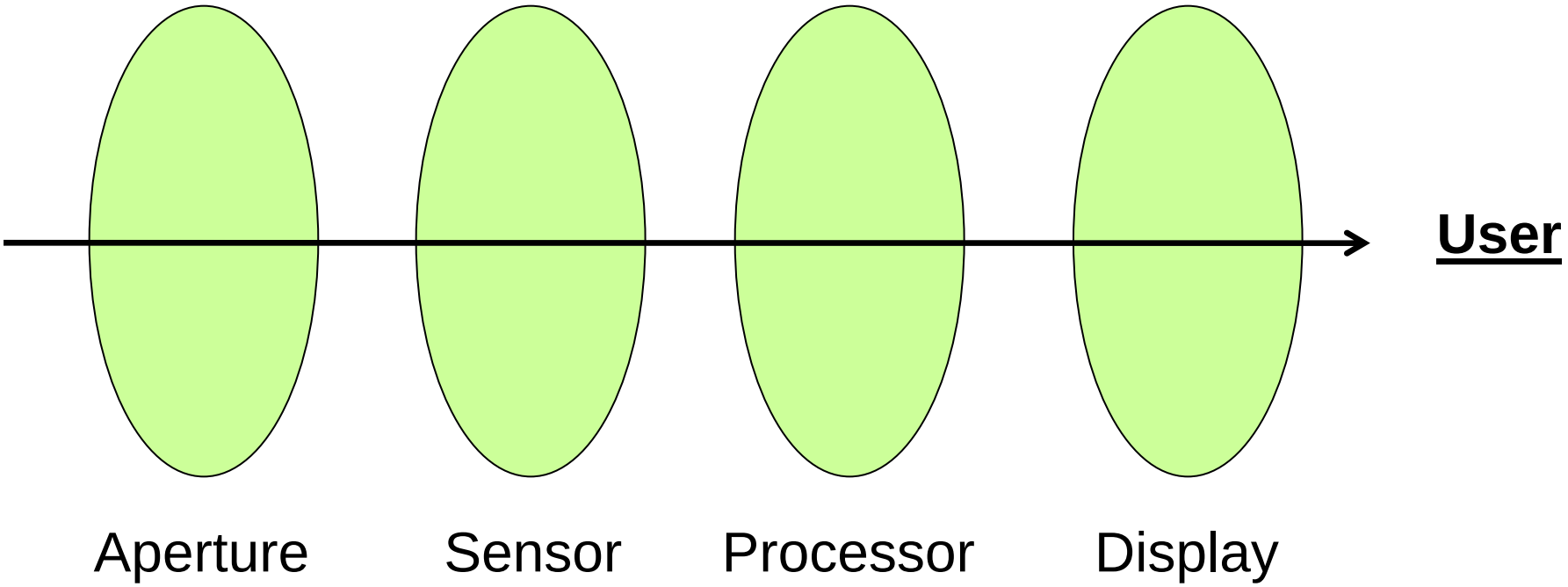
AF S&T Vision

ANTICIPATE



ANYTHING, ANYTIME, ANYWHERE

2nd – How do they do it?



System Architecture

Does the user like your ROC curve?

Challenges & Issues

- **Bandwidth Reduction**
  - Improved on board processing
  - Compressive Sensing: preprocessing sparse information in the analog domain prior to digitization
- **Increased resolution/more pixels**
  - Better standoff range
- **Dismount Intent & Understanding**
  - Combatant vs. non-combatant
  - Armed vs. unarmed
  - Threat vs. non-threat activity
- **Wide Area Persistent Surveillance**
  - Imaging, tracking
  - All weather, smoke/haze/clutter

Challenges & Issues

- **Environmental Pollution of Military Sites**
  - Unexploded ordinance on land: discriminate UXO from harmless scrap
  - Unexploded ordinance under water: we need sensors and platforms that can cost effectively cover wide areas and detect UXO buried in sediment
  - Ground water contamination: replacing traditional laboratory based anylitic sensors with in-situ miniature low cost sensors
  - Remediation Assessment: sensors that will allow direct assessment of the impact and potential options for remediating contaminates in soils, sediments and water
- **Sensor System Employment Concepts**
  - Sensor Nets: optimal configurations (cost vs. benefits)
  - Multi Sensor Data Fusion: improved ROC curve performance
  - Adaptive: changing environment and threat base

Questions?