Systems Engineering and Acquisition Excellence

Stephen Welby
Director, Systems Engineering
Office of the Under Secretary of Defense (AT&L)

Department of Defense

- *We are a nation at war*
- *Over 1.4 million active duty men and women*
- *Over 737,000 civilians*
- *Over 1.1 million Guard & Reserves*

Our Mission:

- ***Protect our National Security***
- ***Provide the military forces needed to deter war and prevail in conflict***

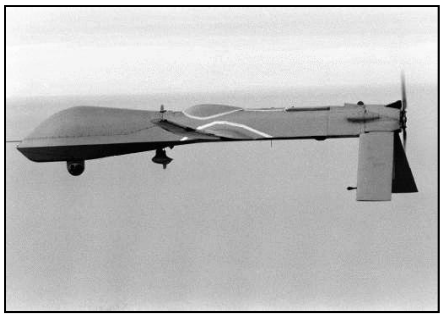
Systems Engineering in OSD

Weapon Systems Acquisition Reform Act May 2009

- Establishes the Director, Systems Engineering as principal systems engineering advisor to the SECDEF and the USD(AT&L)

OSD Systems Engineering

- Support and advocate for DoD Component Engineering initiatives
- Help program managers identify and mitigate risks
- Shape DoD technical planning and management
- Provide technical insight to OSD stakeholders
- Identify systemic issues for resolution above the program level




Program Engagement

- Engineering Assessment / Mentoring of Major Defense Programs
- Technical Reviews
- AT&L Decision Forums
- Systems Engineering Plans
- Systemic Root Cause Analysis
- Support Acquisition Leadership with Independent Engineering Analysis and Advice

Our Focus: Supporting Knowledge-Based Decision Making

Policy and Practice

- Supporting the Current Practice
  - Department-wide Systems Engineering Policy and Guidance
  - Specialty Engineering
    - System Safety, Reliability/Availability/ Maintainability, Quality, Manufacturing, Producibility, Human Systems Integration
- Addressing Emerging Challenges
  - Complex Systems/Systems of Systems
  - Program Protection/Acquisition Cyber-Security
  - University and Industry Engineering Research
  - Modeling and Simulation Support to Acquisition

Our Focus: Policy, People and Practice

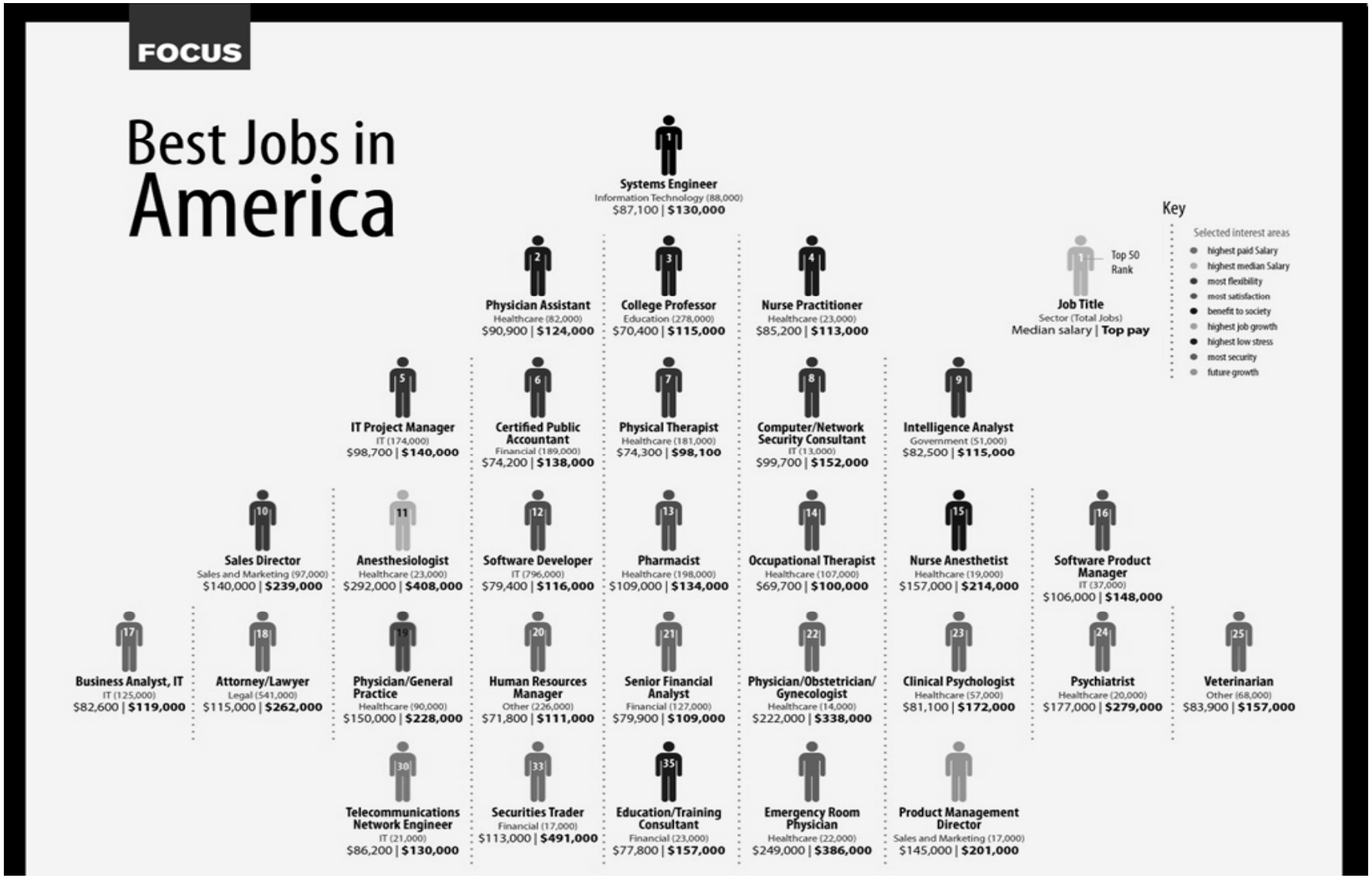
Acquisition Excellence through Systems Engineering

DEPARTMENT OF DEFENSE *SYSTEMS ENGINEERING*

Delivering Innovation, Agility, and Speed

Our Focus: Growing Engineering Capacity Across the Department

Best Job in America – Systems Engineer



Source: http://www.focus.com/fyi/human-resources/best-jobs/ c 2010 Focus - Used with permission.

Systems Engineering Workforce

- Breadth
  - Awareness of and appreciation for other functional areas
  - Understanding of system lifecycle and processes
  - Knowledge of other engineering disciplines and how they integrate into a system solution
  - Knowledge of product domains
- Depth
  - Extensive expertise and experience in one or more engineering disciplines and in one or more product domains
- Leadership
  - Ability to motivate and inspire individuals and teams
  - Comfort in dealing with complexity
  - Focus on underpinning decisions with data
  - Capability to make tough technical decisions

Acquisition Efficiency Initiatives

Acquisition Efficiency Guidance Roadmap

Target Affordability and Control Cost Growth

- Mandate affordability as a requirement
- Implement "should cost" based management
- Eliminate redundancy within warfighter portfolios
- Achieve Stable and economical production rates
- Manage program timelines

Promote Real Competition

- Emphasize competitive strategy at each program milestone
- Remove obstacles to competition
  - Allow reasonable time to bid
  - Require non-certified cost and pricing data on single offers
  - Enforce open system architectures and set rules for acquisition of technical data rights
- Increase small business role and opportunities

Incentivize Productivity & Innovation in Industry

- Reward contractors for successful supply chain and indirect expense management
- Increase Use of FPIF contract type
- Capitalize on progress payment structures
- Institute a preferred supplier program
- Reinvigorate industry's independent research and development

Improve Tradecraft in Acquisition of Services

- Assign senior managers for acquisition of services
- Adopt uniform services market segmentation (taxonomy)
- Address causes of poor tradecraft
  - Define requirements and prevent creep
  - Conduct market research
- Increase small business participation

Reduce Non-Productive Processes and Bureaucracy

- Reduce frequency of OSD level reviews
- Work with Congress to eliminate low value added statutory requirements
- Reduce the volume and cost of Congressional Reports
- Reduce non-value added requirements imposed on industry
- Align DCMA and DCAA processes to ensure work is complementary
- Increase use of Forward Pricing Rate Recommendations (FPRRs) to reduce administrative costs

Acquisition Efficiency Guidance

Target Affordability and Cost Growth

- Mandate affordability as a requirement
- Implement “should cost” based management
- Eliminate redundancy within warfighter portfolios
- Achieve stable and economical production rates
- Manage program timelines

Acquisition Efficiency Guidance
Incentivize Productivity & Innovation in Industry

- Reward contractors for successful supply chain and indirect expense management
- Increase use of FPIF contract type
- Capitalize on progress payment structures
- Institute a preferred supplier program
- Reinvigorate industry's independent research and development

Acquisition Efficiency Guidance
Promote Real Competition

- Emphasize competitive strategy at each program milestone
- Remove obstacles to competition
  - Allow reasonable time to bid
  - Require non-certified cost and pricing data on single offers
  - Enforce open system architectures and set rules for acquisition of technical data rights
- Increase small business role and opportunities

Acquisition Efficiency Guidance
Improve Tradecraft in Acquisition of Services

- Assign senior managers for acquisition of services
- Adopt uniform services market segmentation (taxonomy)
- Address causes of poor tradecraft
- Define requirements and prevent creep
- Conduct market research
- Increase small business participation

Acquisition Efficiency Guidance

Reduce Non-Productive Processes and Bureaucracy

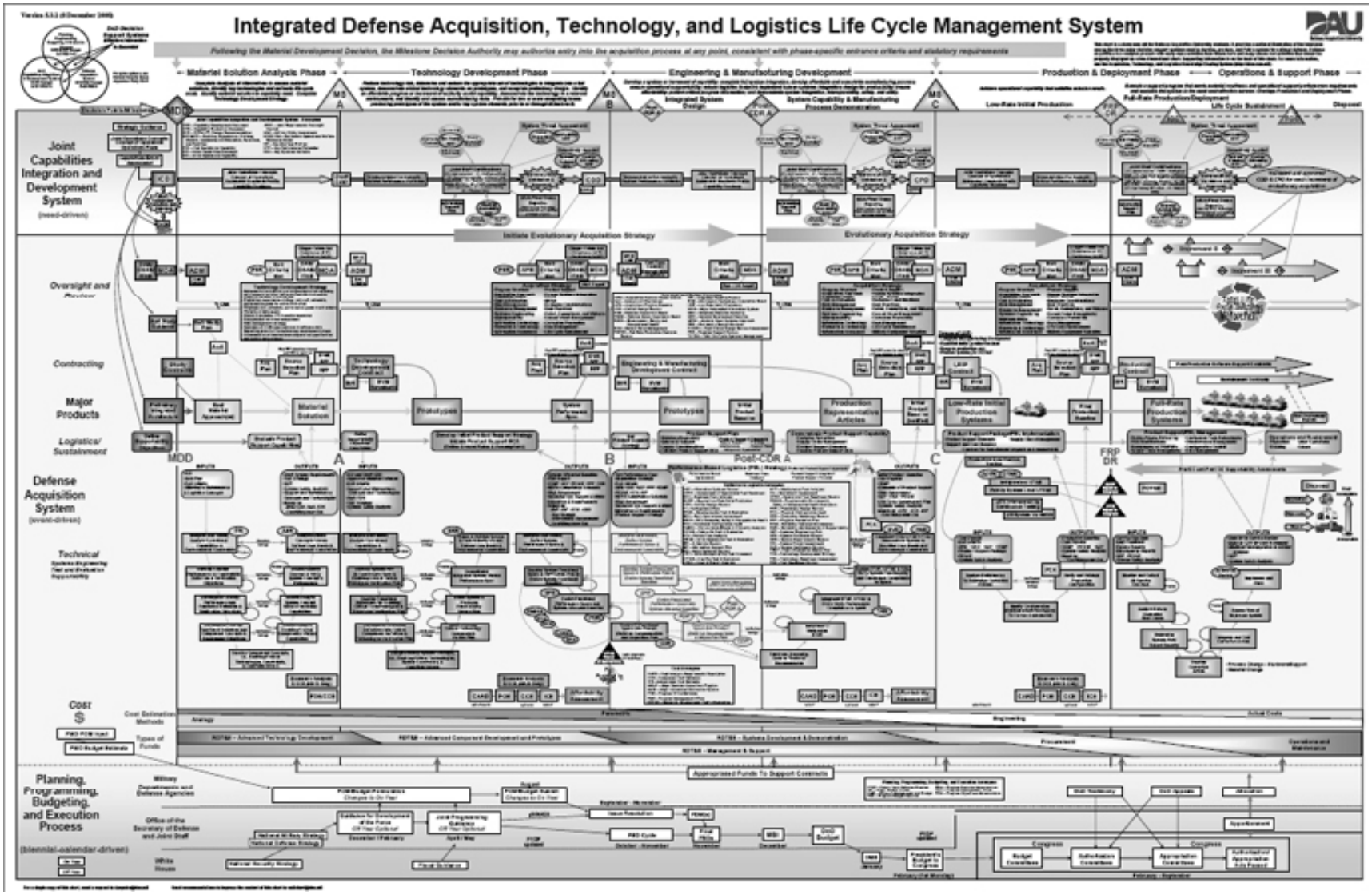
- Reduce frequency of OSD level reviews
- Work with Congress to eliminate low value added statutory requirements
- Reduce the volume and cost of Congressional Reports
- Reduce non-value added requirements imposed on industry
- Align DCMA and DCAA processes to ensure work is complementary
- Increase use of Forward Pricing Rate Recommendations (FPRRs) to reduce administrative costs

Systems Engineering and Acquisition Excellence

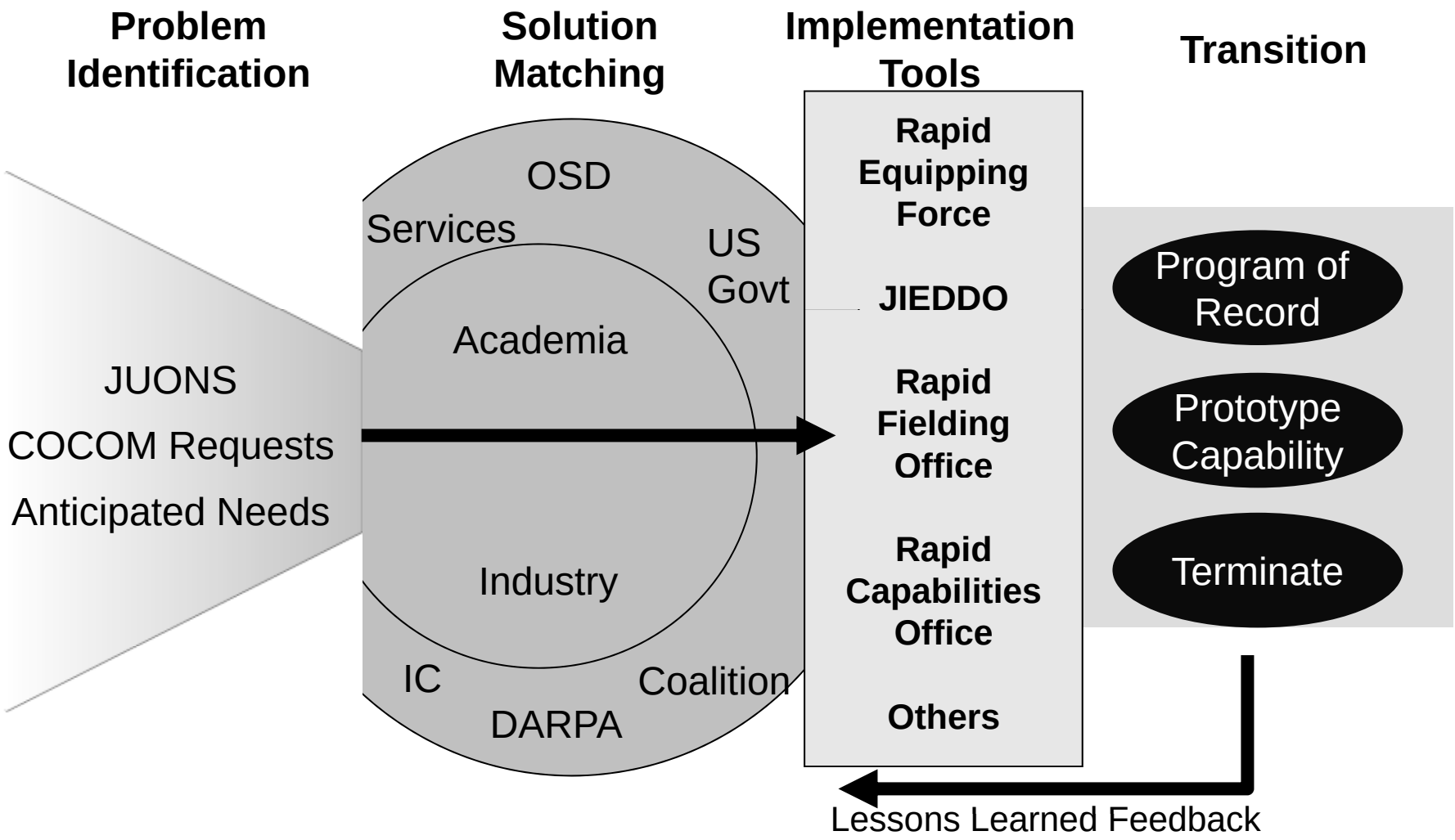
Systems Engineering Challenges

- Create the tools to enable Rapid Capability Delivery
  - Shorten the time to deliver life-saving and war-winning technologies – without compromising product integrity
- Expand the aperture of DoD Engineering practice to address 21st century technical challenges
  - Security, software-intensive, etc…
- Embrace complexity
  - Systems of Systems / Complex Adaptive Systems / Emergent behaviors
- Expand the human capital resource base
  - Reflect new insights in curricula to grow the next “crop” of technical leaders

The DoDI 5000.02 Process

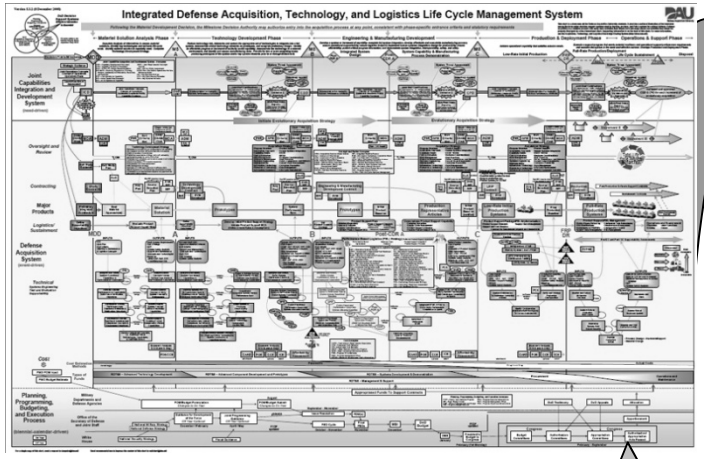


The Challenge of Rapid Fielding



Role of Systems Engineering in Rapid Fielding?

Rethinking How We Buy?

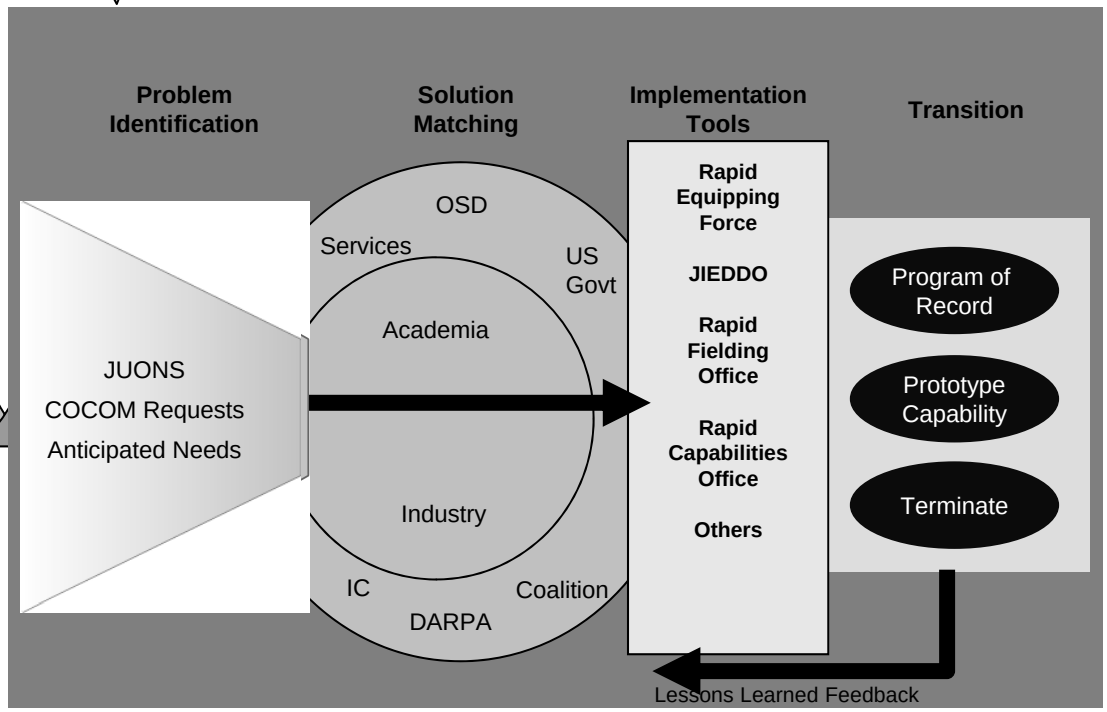


Balance Rigor & Repeatability w/ Speed & Effectiveness?

Can we increase the rigor of our rapid process?

Can we increase the speed of our rigorous process?

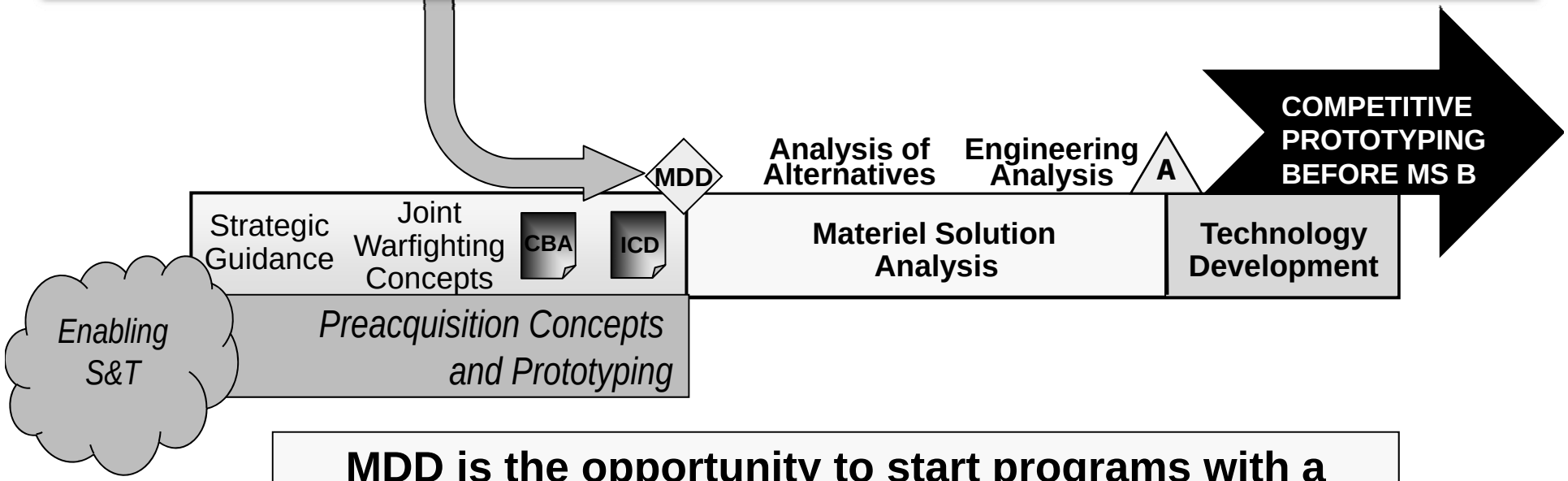
Adopt Commercial Deployment Models?



Major Initiatives:
Development Planning

Materiel Development Decision (MDD) – Formal entry into Acquisition

- Understanding of Need
- Understanding of Solution Space Feasibility
- Alternative Acquisition Models
- Resourced Plan for detailed Engineering Analysis



MDD is the opportunity to start programs with a strong early Systems Engineering foundation

Major Initiatives:

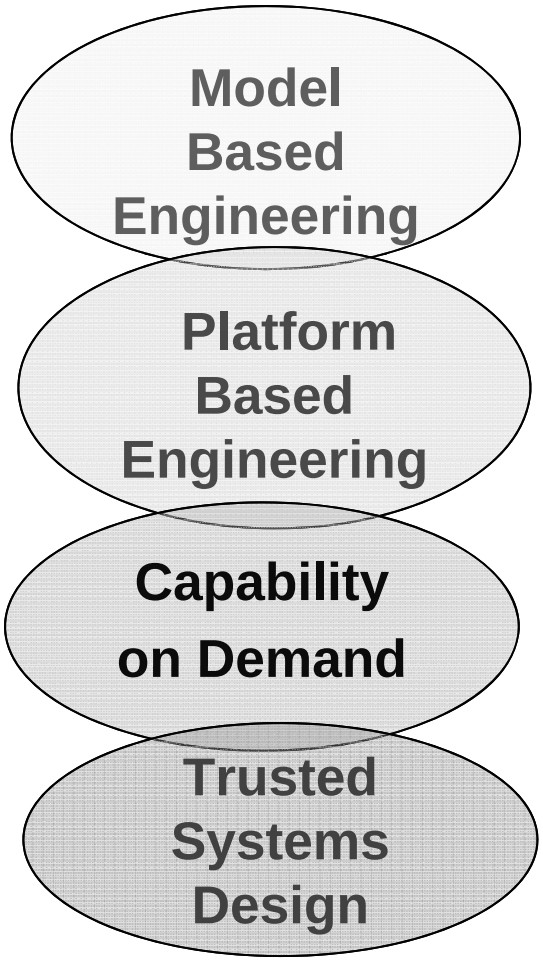
Reinvigorating Defense Standardization

- Service product centers are currently pursuing independent efforts to reinvigorate standards processes
- Opportunity for SE to advocate for and coordinate service efforts
- USD(AT&L) appointed the Director, Systems Engineering as the Defense Standardization Executive
  - Standards, DMSMS, GIDEP, Interagency Coordination

Opportunity to leverage our Standardization Processes and Products As a Key Engineering Tool in Promoting Acquisition Excellence

Major Initiatives:

Systems 2020 Research Areas



Modeling and simulation tools for concurrent design, development and manufacture

Architectural and automated design tools to rapidly insert new capabilities

Systems embedded with organic adaptation capabilities

Design methods and tools for system assurance that detect malice or enable self-awareness

Opportunities

- Acquisition reform efforts have recognized criticality of strong Systems Engineering focus for program success
  - ***Systems Engineering toolkit focused on identifying and managing risk – in development, production and life-cycle supportability***
- Growing focus on addressing "early-acquisition" phases
  - ***Leading to more informed decisions at MS B***
- Our development processes need to evolve to provide faster product cycles, more adaptable products and address emerging technical challenges
- Future US Defense capabilities depend on a capable US engineering workforce in and out of government
  - ***Need to create opportunities to grow future "Engineering Heroes"***

Systems Engineering:
Critical to Acquisition Success

Innovation, Speed, and Agility

http://www.acq.osd.mil/se