Systems Engineering Workforce Development Update

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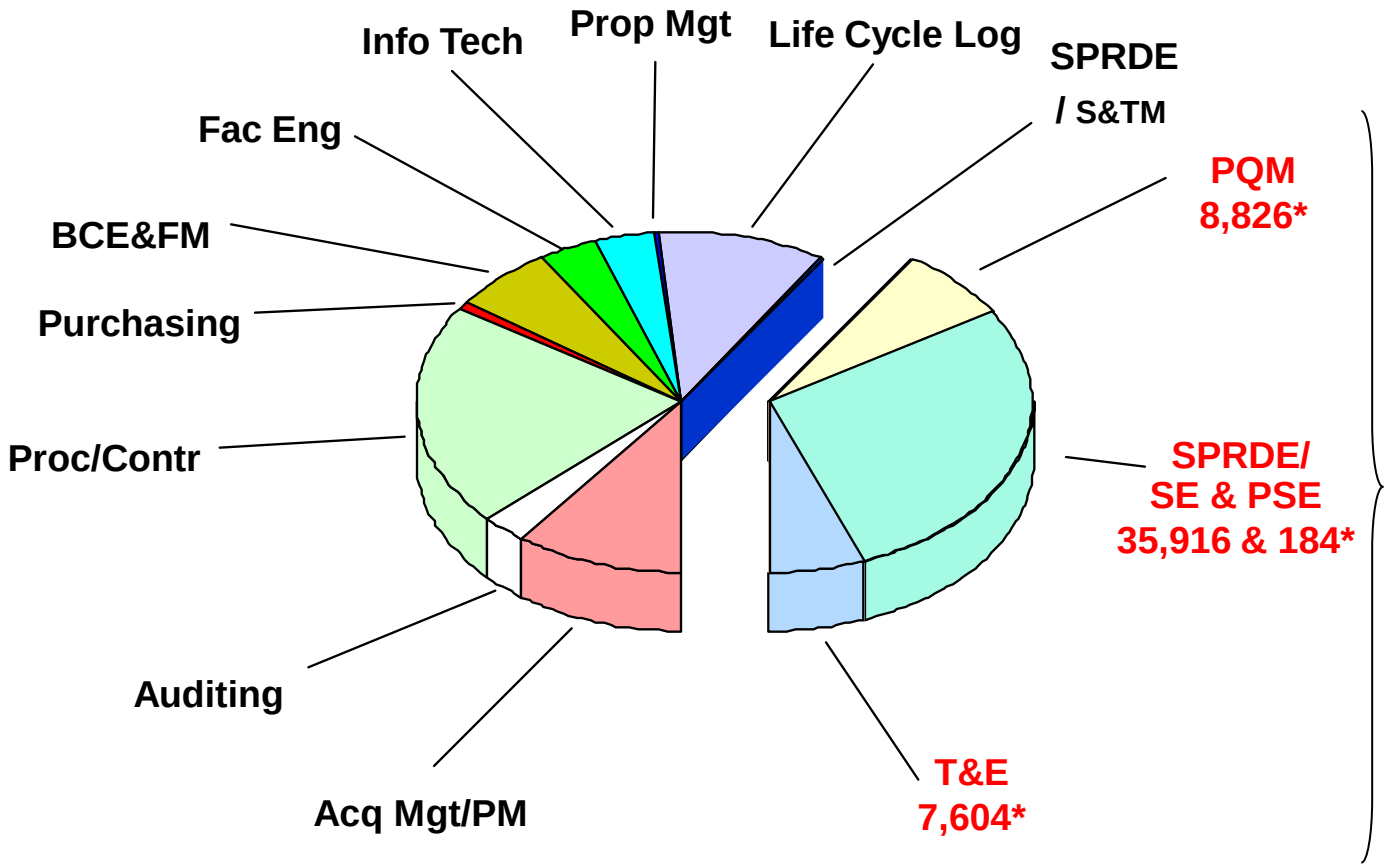
Acquisition Workforce Challenges / Opportunities

- **To increase the success rate of our acquisition programs, we need to:**
  - Better equip / support / enable the workforce to perform successfully and meet all demands
  - Mitigate loss of skilled / experienced workforce
  - Successfully compete for, hire and retain talent
  - Transfer knowledge / expertise to new generation
  - Return “inherently governmental” and other appropriate work from contractors to the government workforce
  - Integrate acquisition workforce planning with DoD Total Force Human Capital Planning
  - Strategically plan and resource human capital initiatives – develop and execute a workforce development roadmap

Technical Management Workforce Population

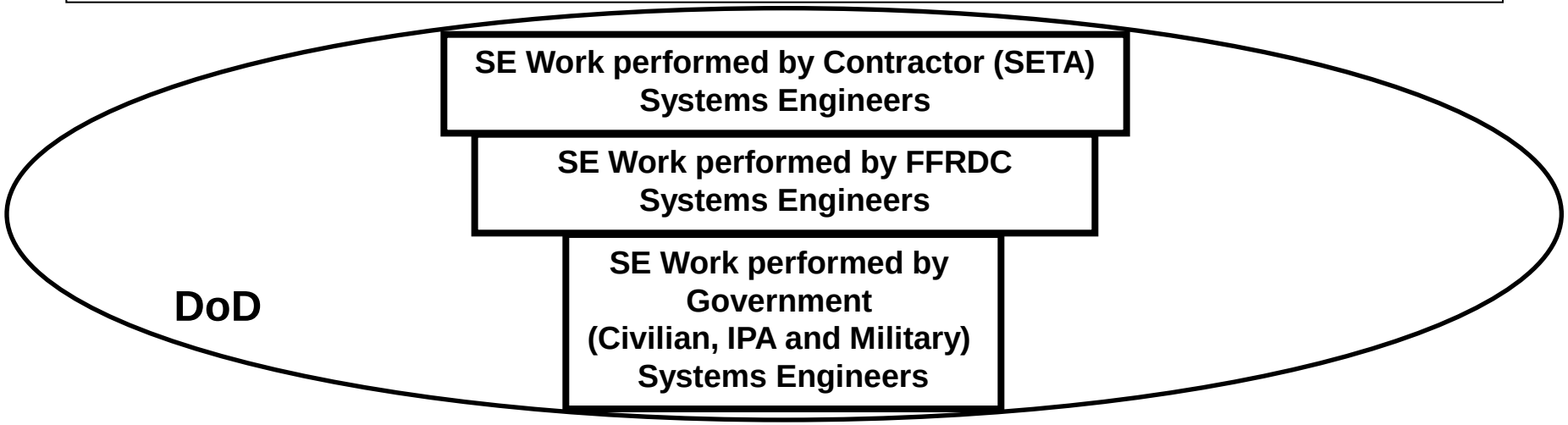


The Defense Acquisition Community
125,047* Government and Military Certified Professionals
Over 50,000 DoD Professionals in SE, T&E and PQM
500,000+ Defense Industry Personnel

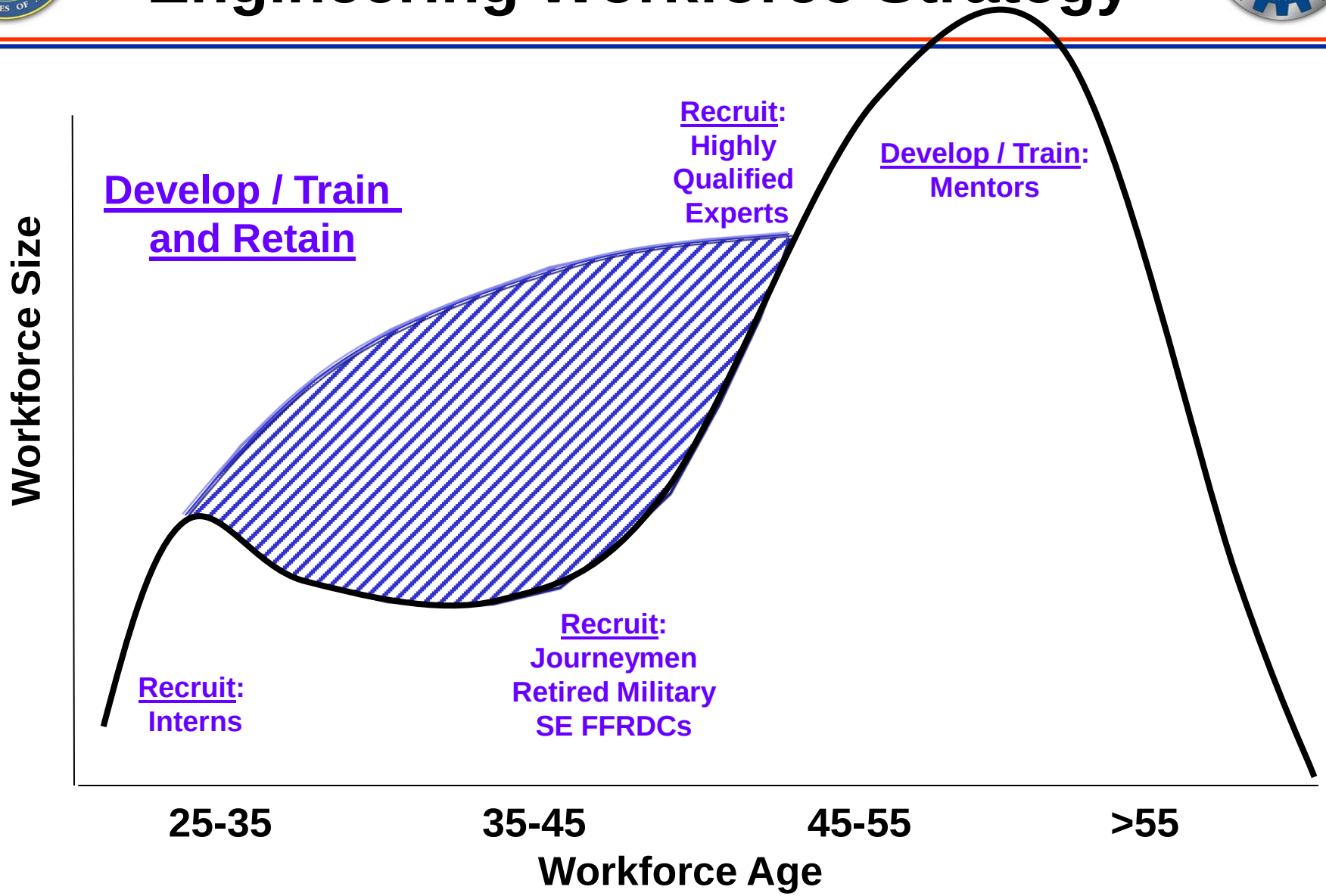
*** DAU Data Mart a/o 30 Jun 09**

Systems Engineering Workforce Layers

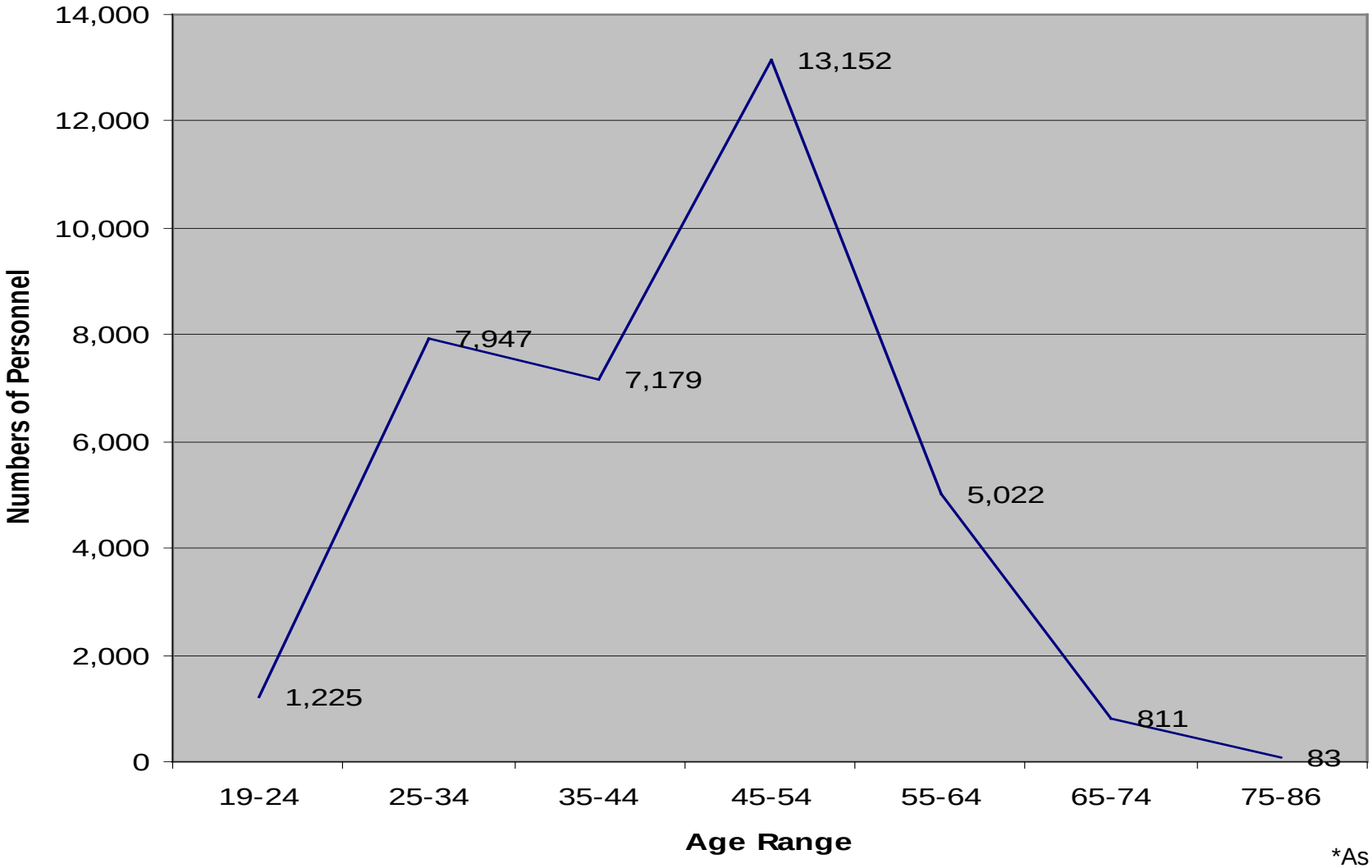
Systems Engineering (SE) Work performed by Defense Prime / Sub Contractors in development and execution of Acquisition Programs



Notional DoD Systems Engineering Workforce Strategy

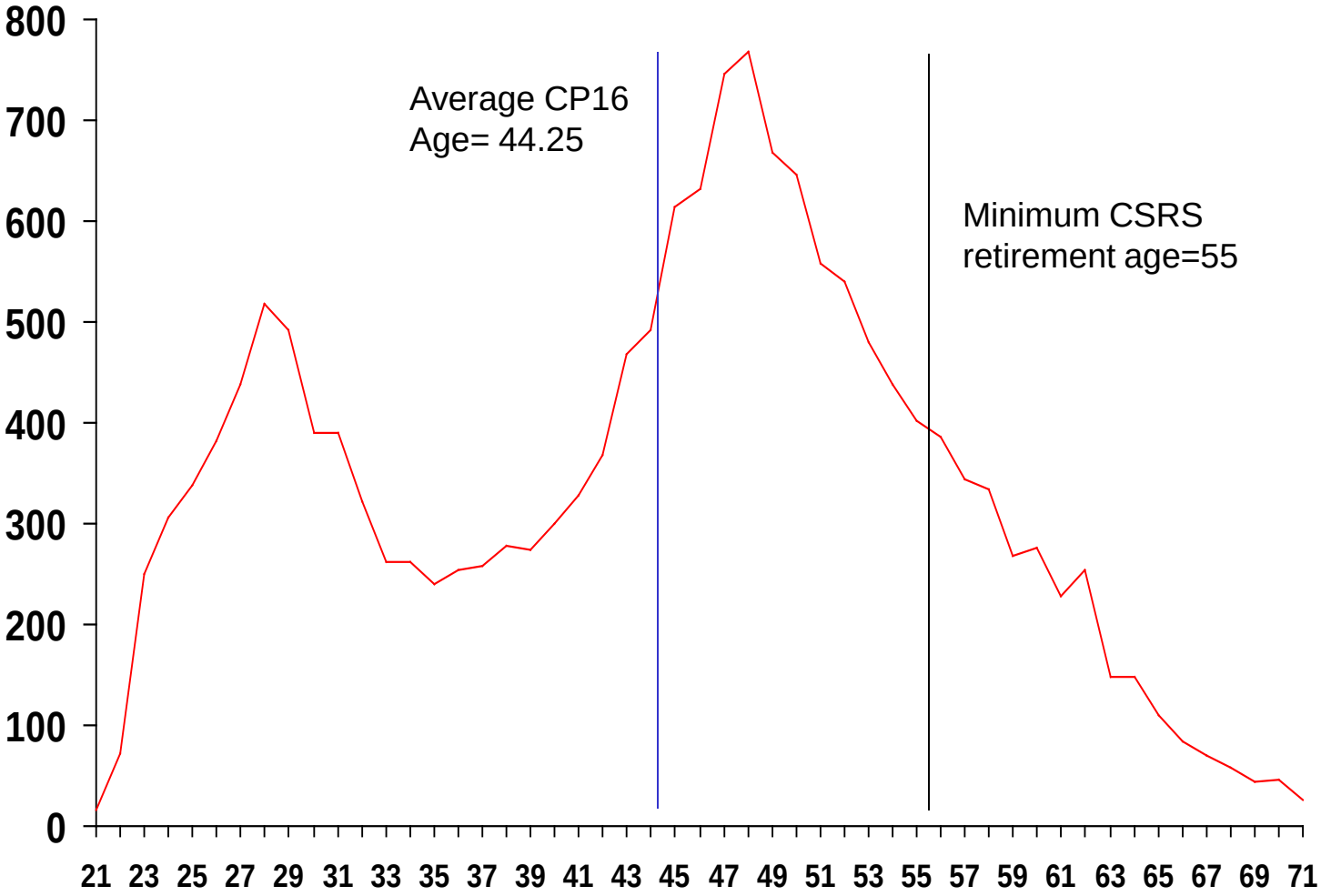


SE Acquisition Workforce Age Demographic* and Notional Strategy



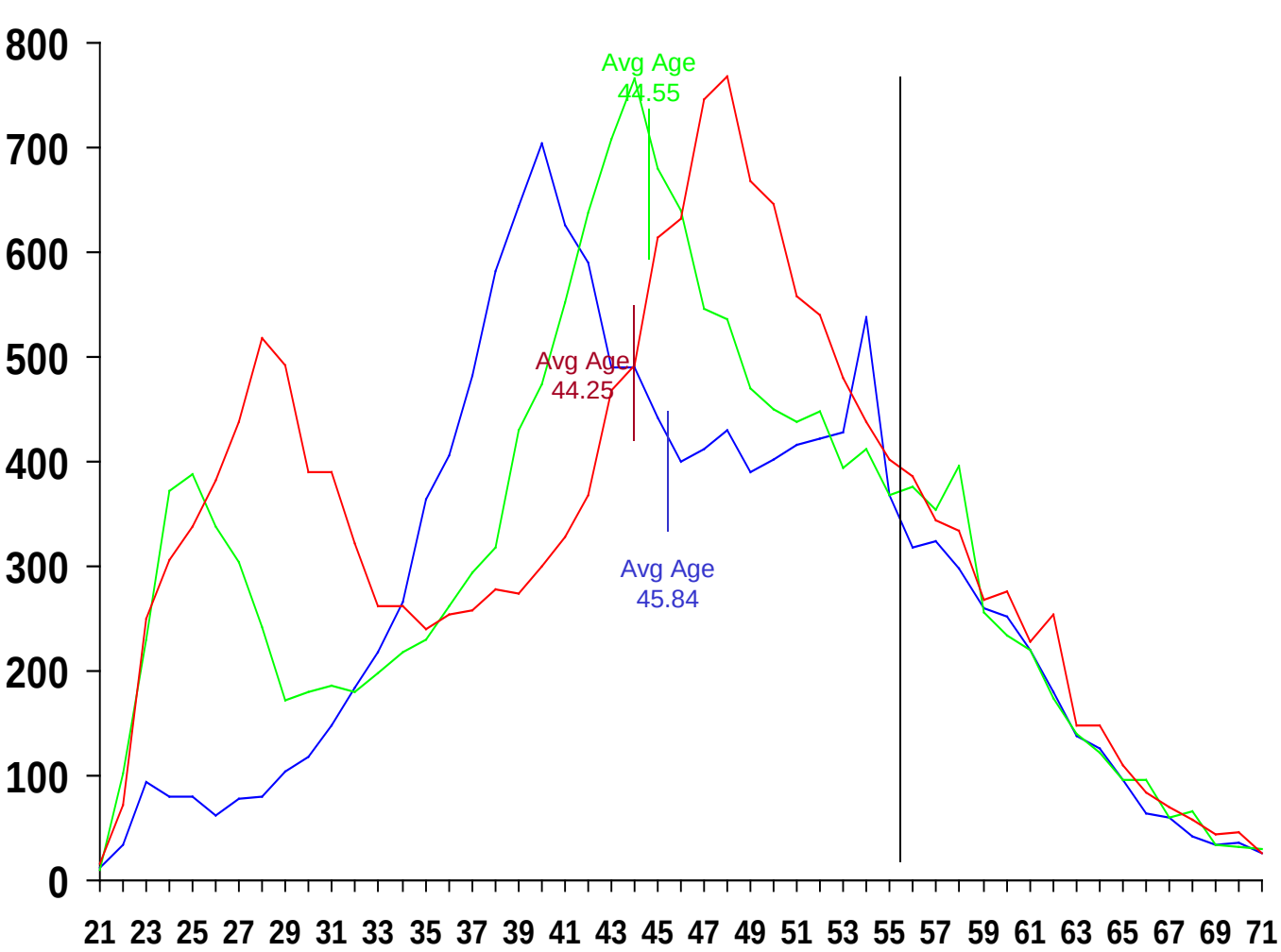
*As of July 2009

US Army RDECOM Career Program 16*
Age Distribution Ages 21-71 only – 2009



* CP 16 includes all Army research and development engineers

US Army RDECOM Career Program 16
Age Distribution Ages 21-71 only – Trend



Percent of population who are military retirees
2001- 1.0%
2005- 1.5%
2009- 2.2%

Projected FY10-15 New Acquisition Government Workforce Distribution

- **20,000 new government billets:**
  - Contractor Conversions to Government = 11,000*
  - New Hires = 9,000
- **Projected Career Field Distribution:**
  - Contracting = 9,500
  - PM, SPRDE/SE&PSE, PQM, LCL, BCEFM, etc. = 10,500
- **Future Workforce Total: 126K + 20K = 146K**
- **Future Contractor Support = 40K (vice 51K currently)**

* Projected at 14 Apr 08 DAU Workforce Conference

Current Systems Engineering (SE) Workforce Picture

- Recent Congressional and GAO reports cite evidence of lack of disciplined systems engineering – indicates gaps in competencies
- Systemic Root Cause Analysis efforts to date indicate lack of systems engineering skills and numbers in the SE workforce
- No clear picture of what competencies are available in the current SE workforce
- SE workforce members may work on a single component for entire career or may work in only one area across several programs
- SE experience standards for certification levels are only specified as number of years spent in coded acquisition positions in specific career fields – not an indication of real experience
- Number of years of experience for current certification levels is too low when compared to industry

Current DoD SE Certification Picture

- **Separate functional career fields/paths with little integration of competencies – SE, PSE, T&E, PQM**
- **Stove-piped approach to certification => less agile workforce**
- **SE & PSE paths allow for other career field experience; T&E and PQM do not**
- **Job rotational assignments are not often utilized / emphasized**
- **Certification is often seen as a check-off list; no real meat behind what a certification means**
- **SE/PSE and T&E require degrees**

What do we want certification to mean?

SE Workforce Challenges / Opportunities

- **What competencies are needed now and in the future and what gaps exist or will exist?**
  - **What kinds of Systems Engineers do we need?**
  - **What is the difference between Systems Engineers and other domain engineers?**
- **What workforce capacity do we need now and in the future?**
  - **What is the right SE workforce size?**
  - **How many SEs are needed on any particular program?**
- **What is the near-term and long-term workforce capability risk?**
  - **How can we manage and mitigate this risk?**
- **What key information will help us make sound Systems Engineering human capital strategy / initiative decisions?**
- **How do we leverage NDAA 852 funding?**
  - **What should we do in terms of Recruiting?**
  - **What should we do in terms of Training / Development?**
  - **What should we do in terms of Retention?**

Workforce Development Initiatives

- These initiatives constitute our workforce development roadmap
- Initiatives can be grouped under government, industry and academia categories
- All initiatives are interdependent – each initiative complements, leverages and affects many other initiatives
- Each initiative supports one or more efforts under recruit, train/develop, and retain

Workforce Development Initiatives: Government

- Competency Assessments for Systems Planning, Research, Development and Engineering (SPRDE-SE) and Production, Quality, and Manufacturing (PQM) Career Fields
- New Four Level Certification Standards for SPRDE-SE
- Science, Technology, Engineering, and Mathematics (STEM) Strategic Plan Working Group
- SE Executive Technical Leadership Course (SERC Research Topic)
- Mentoring Workshop/Tutorial at NDIA SE Conference October 26, 2009
- Systems Engineering (SE) Defense Acquisition Workforce Development Fund (DAWDF) Initiative
- Government-to-Government Workshops with Singapore on SE Competency Models
- Occupational Career Code for Systems Engineering (with DAU)

Workforce Development Initiatives: Industry

- International Council on SE (INCOSE) Certified SE Professional-Acquisition (CSEP-Acq) and Future Extensions
- National Defense Industrial Association (NDIA) SE Division Education and Training (E&T) Committee Comparison of Acquisition and Developer Competency Models
- Others?

Workforce Development Initiatives: Academia

- Body of Knowledge and Curriculum for Advanced SE – BKCASE (SERC Research Topic)
- Defense Acquisition Workforce Certification Equivalency with Naval Postgraduate School, Air Force Institute of Technology and Air Force Academy for DAU SYS Courses
- Air Force Academy Preparation Course for INCOSE Associate SE Professional (ASEP) Certification
- SE Education Symposium April 2010 (Co-sponsored with Air Force Academy)
- SE Education and Training Summit 2010
- Working with DAU on SPRDE-SE and PQM Curriculum Currency
- Collaboration with Civilian Universities

Benefits

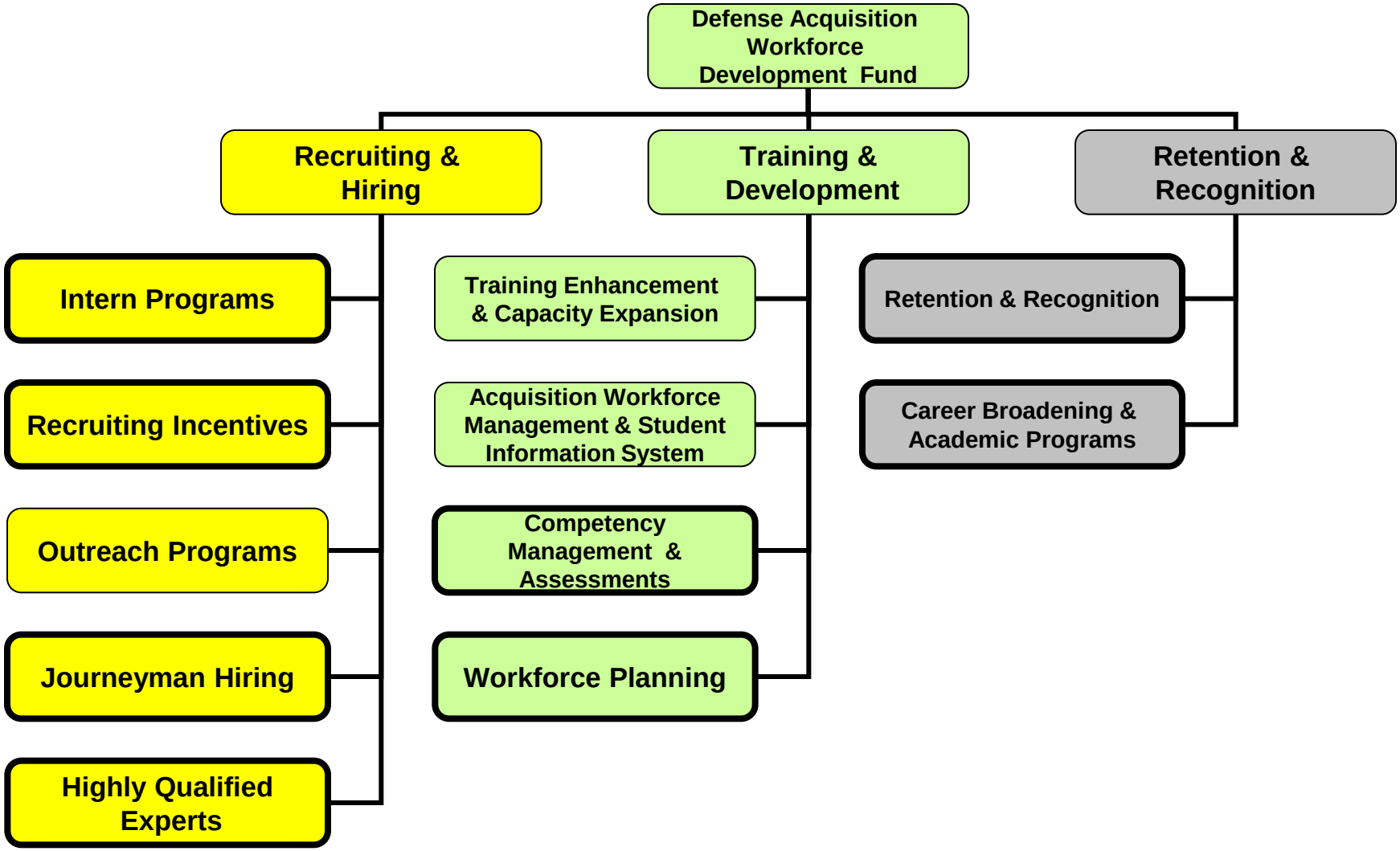
- **All of these initiatives directly contribute to "raising the bar" for Systems Engineering across the board by:**
  - **Enabling us to assess the entire DoD Systems Engineering workforce across critical competencies**
  - **Enabling us to better determine shortfalls in both competencies and workforce size at all levels**
  - **Enabling us to better manage workforce development requirements and certification standards**
  - **Enabling us to make better decisions about human capital strategy and initiatives for the Systems Engineering workforce**
  - **Enabling us to provide acquisition programs with the quantity and quality of Systems Engineers they need for success**

Questions?

BACKUP

Human Capital Initiatives

(Defense Acquisition Workforce Development Fund [1])



[1] Based on NDAA Section 852, Defense Acquisition Workforce Development Act

Draft Science, Technology, Engineering and Mathematics (STEM) Education and Outreach Strategic Plan

U.S. DEPARTMENT OF DEFENSE
DEFENSE RESEARCH AND ENGINEERING

SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS (STEM) EDUCATION AND OUTREACH STRATEGIC PLAN

VISION

A diverse world-class STEM talent pool with the creativity and agility to meet national defense needs

MISSION

Inspire, develop and attract the STEM talent essential to create innovative solutions for the Nation's current and future challenges

INSPIRE	DEVELOP	ATTRACT	DELIVER
A Nation of students, parents, teachers and the public inspired to engage in STEM discovery and innovation	A future world-class STEM workforce talent pool	A dynamic and innovative work environment in the DoD that attracts and retains world-class STEM talent	A coordinated, collaborative and cohesive set of DoD STEM programs
OBJECTIVES • Increase the awareness and importance of STEM to foster discovery and innovation. • Provide opportunities and resources for learning and personal growth that stress academics, knowledge, skills and attributes required for STEM discovery and innovation. • Strengthen, expand and enable communities of stakeholders to provide a continuum of formal and informal education programs and opportunities. • Directly engage populations underrepresented in STEM fields.	**OBJECTIVES** • Identify current and future workforce needs. • Increase the diversity of participants in STEM programs. • Build a portfolio of DoD STEM programs to develop the desired competencies of the talent pool.	**OBJECTIVES** • Identify programs and best practices that attract and retain world-class STEM talent. • Ensure a DoD workplace environment that attracts and retains world-class STEM talent. • Strengthen and promote the awareness of STEM-relevant opportunities within DoD.	**OBJECTIVES** • Develop a systematic approach to identify STEM education and outreach programs across the DoD components and agencies. • STEM Development Office will provide and maintain a publicly-accessible inventory of DoD STEM programs. • Develop a STEM inventory communication strategy.

DoD STEM Development Office

DoD DDR&E STEM DEVELOPMENT OFFICE – 10/21/09 - Dr. Laura Adolfie – 703-588-1479

Science, Technology, Engineering and Mathematics (STEM) Education and Outreach Strategic Plan

- **Vision: A diverse world-class STEM talent pool with the creativity and agility to meet national defense needs.**
- **Mission: Inspire, develop and attract the STEM talent essential to create innovative solutions for the nation's current and future challenges.**
- **Goals:**
  - **INSPIRE: A nation of students, parents, teachers and the public inspired to engage in STEM discovery and innovation**
  - **DEVELOP: A future world-class STEM workforce talent pool**
  - **ATTRACT: A dynamic and innovative work environment in the DoD that attracts and retains world-class STEM talent**
  - **DELIVER: A coordinated, collaborative and cohesive set of DoD STEM programs**

Professional Growth to Program Management