Developing the Department of Defense Engineering Workforce

Ms. Aileen Sedmak

Office of the Deputy Assistant Secretary of Defense for Systems Engineering

19th Annual NDIA Systems Engineering Conference

Springfield, VA | October 24, 2016

Objective

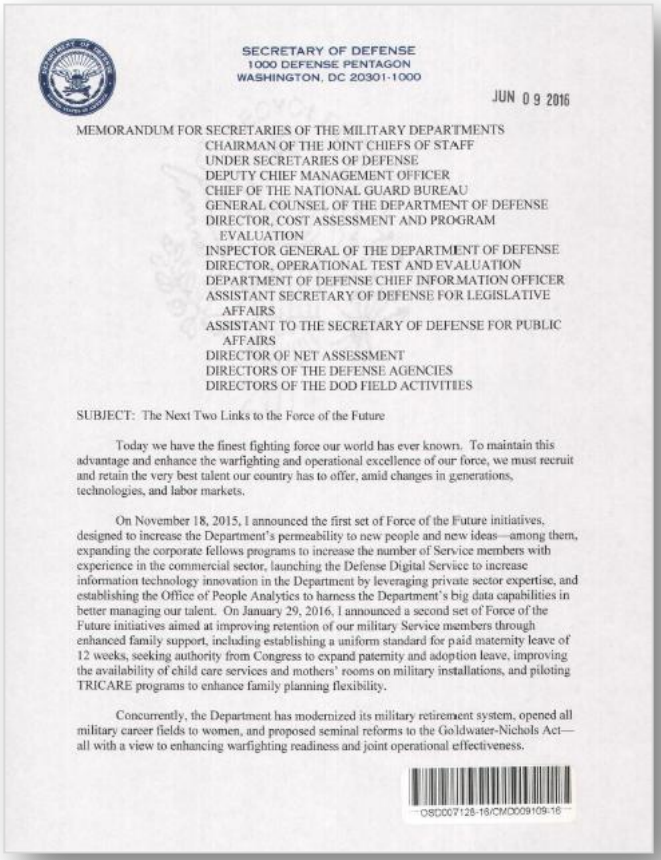
- **Discuss data DoD uses to identify and monitor acquisition Engineering (ENG) workforce trends.**
- **Provide insights into DoD ENG workforce initiatives to address gaps/issues.**
- **Foster dialogue with our SE partners (industry and government) on aligned areas of interest and challenges.**

Force of the Future (3rd Set)

Dr. Ashton Carter, Secretary of Defense
Memorandum, June 9, 2016

"Today we have the finest fighting force our world has ever known. To maintain this advantage and enhance the warfighting and operational excellence of our force, we must recruit and retain the very best talent our country has to offer, amid changes in generations, technologies, and labor markets.

We can and must do more to ensure that our military continues to be as ready to meet the challenges of the future as it is to meet the challenges of today. For this reason, I am pleased to announce the next two links in our Force of the Future initiative—one focused on making common sense improvements to the Defense Officer Personnel Management Act (DOPMA) system and the other on developing our more than 700,000-strong DoD civilian workforce—in tandem, reflecting our staunch commitment to the principle of "one-team-one-fight".



SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, DC 20301-1000

JUN 09 2016

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
DEPUTY CHIEF MANAGEMENT OFFICER
CHIEF OF THE NATIONAL GUARD BUREAU
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
DIRECTOR, COST ASSESSMENT AND PROGRAM EVALUATION
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTOR, OPERATIONAL TEST AND EVALUATION
DEPARTMENT OF DEFENSE CHIEF INFORMATION OFFICER
ASSISTANT SECRETARY OF DEFENSE FOR LEGISLATIVE AFFAIRS
ASSISTANT TO THE SECRETARY OF DEFENSE FOR PUBLIC AFFAIRS
DIRECTOR OF NET ASSESSMENT
DIRECTORS OF THE DEFENSE AGENCIES
DIRECTORS OF THE DOD FIELD ACTIVITIES

SUBJECT: The Next Two Links to the Force of the Future

Today we have the finest fighting force our world has ever known. To maintain this advantage and enhance the warfighting and operational excellence of our force, we must recruit and retain the very best talent our country has to offer, amid changes in generations, technologies, and labor markets.

On November 18, 2015, I announced the first set of Force of the Future initiatives, designed to increase the Department's permeability to new people and new ideas—among them, expanding the corporate fellows programs to increase the number of Service members with experience in the commercial sector, launching the Defense Digital Service to increase information technology innovation in the Department by leveraging private sector expertise, and establishing the Office of People Analytics to harness the Department's big data capabilities in better managing our talent. On January 29, 2016, I announced a second set of Force of the Future initiatives aimed at improving retention of our military Service members through enhanced family support, including establishing a uniform standard for paid maternity leave of 12 weeks, seeking authority from Congress to expand paternity and adoption leave, improving the availability of child care services and mothers' rooms on military installations, and piloting TRICARE programs to enhance family planning flexibility.

Concurrently, the Department has modernized its military retirement system, opened all military career fields to women, and proposed seminal reforms to the Goldwater-Nichols Act—all with a view to enhancing warfighting readiness and joint operational effectiveness.

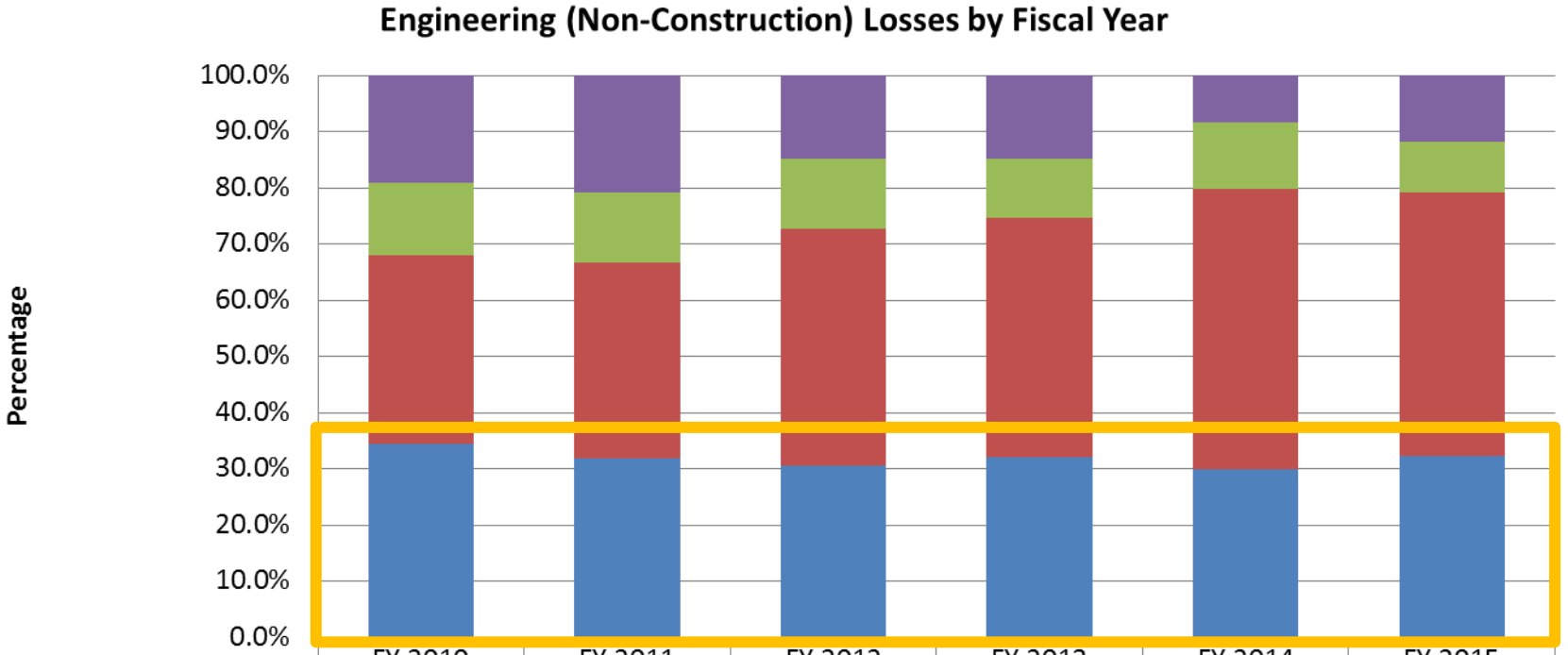
OSD007128-16/CMD009109-16

FotF Civilian Workforce Initiatives

- Enable direct hiring of students and recent graduates
- ➢ **Establish a public-private talent exchange**
- Leverage authority to employ highly qualified experts
- ➢ **Leverage career broadening rotational programs**
- Increase use of science, mathematics and research for transformation (SMART) defense scholarships
- Expand the use of the student training and academic recruitment (STAR) program
- **Better leverage civilian employee training funds**
- **Remove barriers to mobility between civilian jobs and different DoD components**

"Generations change, technologies change, labor markets change. That's why one of my responsibilities now -- and a job for all of us in the years ahead -- is to make sure that amid all this change DoD continues to recruit, develop and retain the most talented men and women America has to offer." – Dr. Carter

Engineering (Non-Construction) Losses

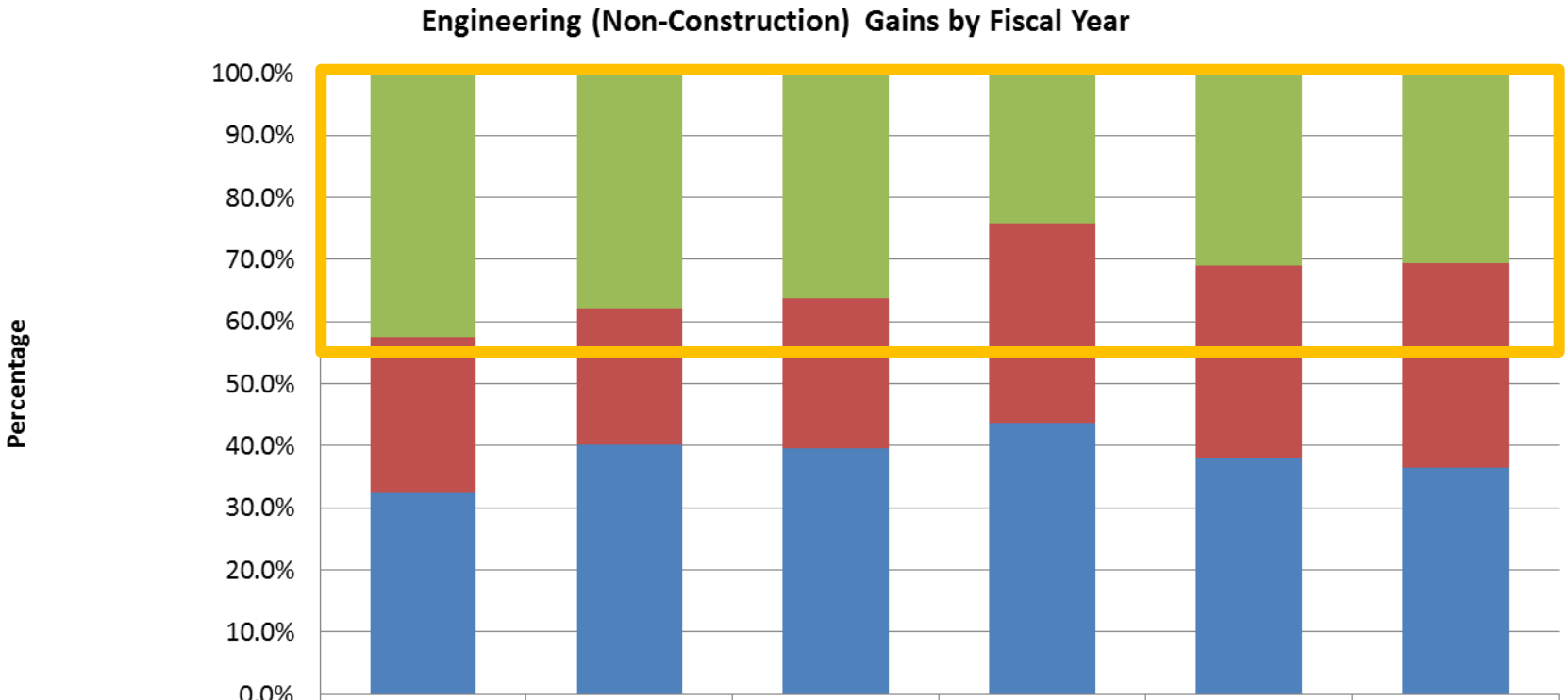


	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Other Separations	19.2%	20.9%	14.9%	14.8%	8.4%	11.9%
Transfer (352)	12.8%	12.5%	12.5%	10.5%	11.8%	9.0%
Retirement (300-304)	33.5%	34.9%	42.1%	42.7%	50.0%	46.8%
Resignation (312,317)	34.5%	31.7%	30.6%	32.1%	29.9%	32.3%

Data Source: Defense Civilian Personnel Data System, January 2016

Resignations, as a percentage of overall gains, continue to make up one-third of all losses

Engineering (Non-Construction) Gains



	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Industry	42.5%	38.1%	36.3%	24.2%	31.0%	30.6%
Recent College Grad	25.2%	21.8%	24.1%	32.0%	30.9%	33.0%
Government Experience	32.3%	40.1%	39.6%	43.7%	38.1%	36.4%

Data Source: Defense Civilian Personnel Data System, January 2016

Industry hires, as a percentage of overall gains, make up approximately one-third of all gains in FY2015

Importance of Engagement

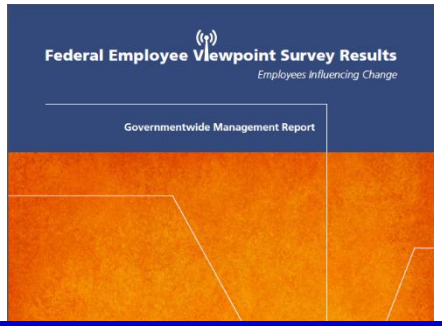
Engagement: An employee's sense of purpose that is evident in their display of dedication, persistence, and effort in their work or overall attachment to their organization and its mission
- (U.S. Office of Personnel Management)

- **Engaged employees are more likely to:**
  - Refer potential hires
  - Champion organization as a great place to work
  - Be career-oriented
  - Be loyal to organization

Engagement is key to recruitment and retention

Federal Employment Viewpoint Survey (FEVS) 2015 Executive Summary

- **Overall Federal Engagement and Satisfaction Scores increased by 1% from 2014, up to 60%.**
- **A good sign for DoD, the "Leaders Lead" category (which measures Senior Leaders perceived integrity, leadership behavior, communication and motivation) increased in each Military Service and OSD.**
- **Government-wide response rate = 50% (up from 2014, 46.8%)**
  - Largest population to respond were ages 40-59
  - GS 7-15 made up 83% of respondents; GS 7-12 with largest number of responders (167k)
  - 65% of respondents were Non-Supervisor (compared to 66% in 2014)
  - Senior leaders made up 2% of respondents (consistent with past years)
- **Response rates by Component:**
  - Army = 37% (up 1 point)
  - Navy = 34% (up 4 points)
  - Air Force = 28% (down 2 points)
  - OSD & 4th Estate Agencies = 47% (up 2 points)



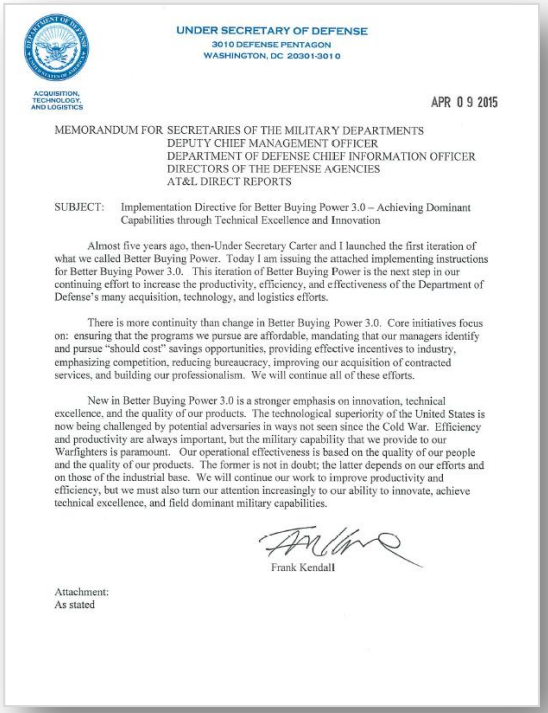
FEVS measures employees' perceptions of whether, and to what extent, conditions characterizing successful organizations are present in their agencies. Survey results provide valuable insight into the challenges agency leaders face in ensuring the Federal Government has an effective civilian workforce and how well they are responding. – OPM.gov

FEVS Insights into the ENG Workforce

- **DoD Engineers have a higher average engagement score than the overall DoD**
  - Engagement score of 67% vs. 65%
- **3 areas of concern in the FEVS dealt directly with recruit and develop the workforce**
  - ***My work unit is able to recruit people with the right skills?***
    - ***Only 41% positive***
  - ***How satisfied are you with the training you receive for your present job?***
    - ***Only 53% positive***
  - *Senior leaders generate high levels of commitment?*
    - *Only 38% positive*

How can we continue to improve engineer engagement?

Strengthen DoD's Organic Engineering Capabilities



UNDER SECRETARY OF DEFENSE
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ACQUISITION, TECHNOLOGY, AND LOGISTICS

APR 09 2015

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
DEPUTY CHIEF MANAGEMENT OFFICER
DEPARTMENT OF DEFENSE CHIEF INFORMATION OFFICER
DIRECTORS OF THE DEFENSE AGENCIES
AT&L DIRECT REPORTS

SUBJECT: Implementation Directive for Better Buying Power 3.0 – Achieving Dominant Capabilities through Technical Excellence and Innovation

Almost five years ago, then-Under Secretary Carter and I launched the first iteration of what we called Better Buying Power. Today I am issuing the attached implementing instructions for Better Buying Power 3.0. This iteration of Better Buying Power is the next step in our continuing effort to increase the productivity, efficiency, and effectiveness of the Department of Defense's many acquisition, technology, and logistics efforts.

There is more continuity than change in Better Buying Power 3.0. Core initiatives focus on: ensuring that the programs we pursue are affordable, mandating that our managers identify and pursue "should cost" savings opportunities, providing effective incentives to industry, emphasizing competition, reducing bureaucracy, improving our acquisition of contracted services, and building our professionalism. We will continue all of these efforts.

New in Better Buying Power 3.0 is a stronger emphasis on innovation, technical excellence, and the quality of our products. The technological superiority of the United States is now being challenged by potential adversaries in ways not seen since the Cold War. Efficiency and productivity are always important, but the military capability that we provide to our Warfighters is paramount. Our operational effectiveness is based on the quality of our people and the quality of our products. The former is not in doubt; the latter depends on our efforts and on those of the industrial base. We will continue our work to improve productivity and efficiency, but we must also turn our attention increasingly to our ability to innovate, achieve technical excellence, and field dominant military capabilities.

Frank Kendall

Attachment:
As stated

USD(AT&L), BBP 3.0 Implementation Guidance

- **Strengthen organic engineering capability by:**
  - Equipping the technical workforce with essential education, training, and job experiences
  - Providing necessary physics-based tools, models, data and engineering facilities
- **Ensures better understanding and management of program technical risks**
- **Objectives of this BBP 3.0 Initiative are:**
  - Identify and manage the specific engineering skill/expertise areas required to effectively manage DoD's portfolio of programs
  - Prioritize any uncovered skill/expertise gaps or shortfalls
  - Develop mitigation strategies to close the gaps

Proactively manage the DoD's organic engineering capability and resources to effectively support the Warfighter and retain DoD's technological superiority

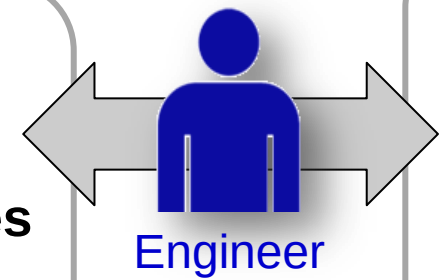
Technical Edge Project

Technical Edge

New or Emerging Technologies

Advanced Techniques

Novel Approaches



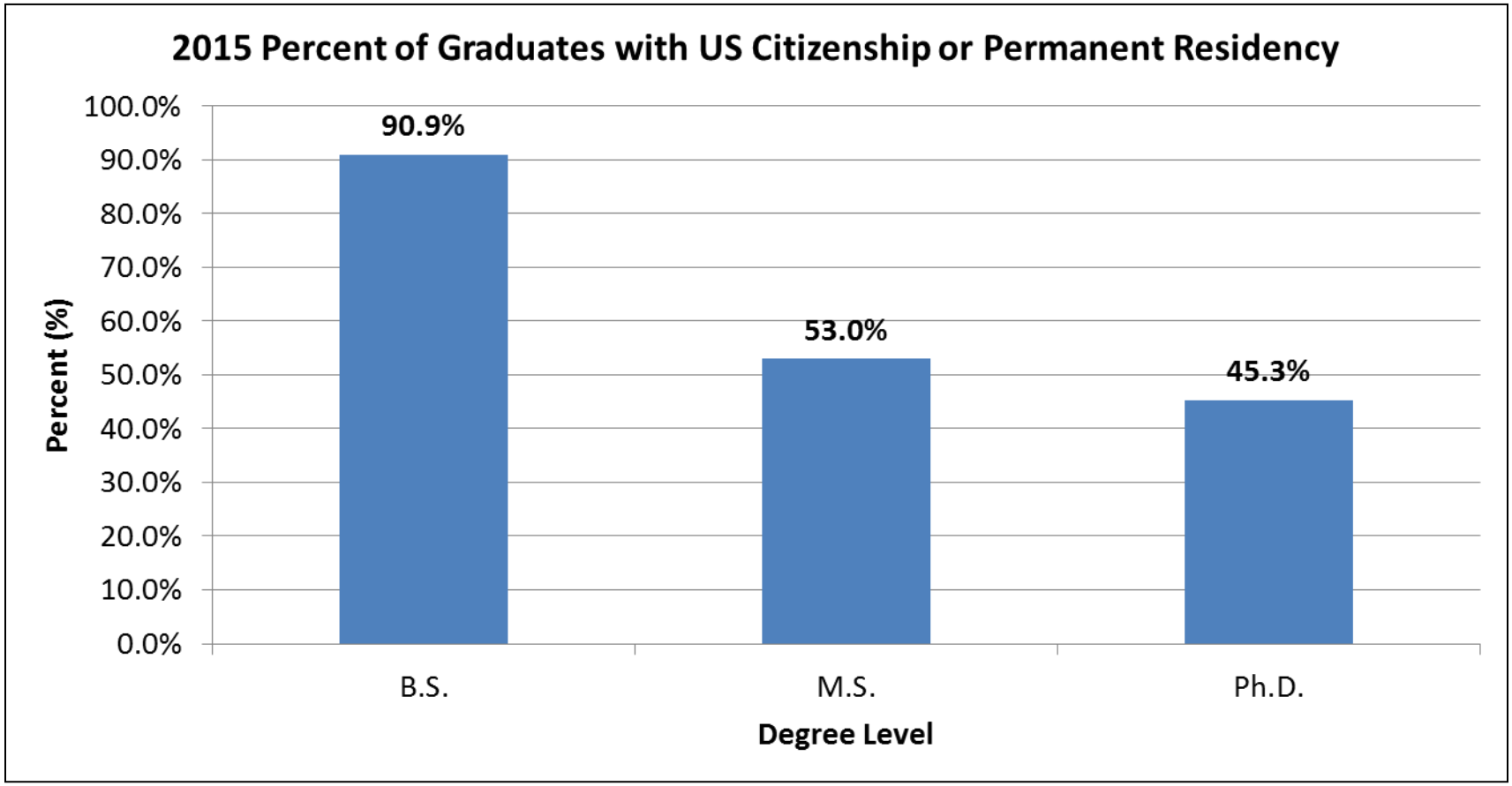
Engineer

DoD systems to maintain technological superiority and military advantage

Working with Center for Naval Analyses to proactively manage engineering workforce:

- Identify emerging technologies, techniques, approaches
- Determine engineering skills and competence needed to implement the “Technical Edge”
- Assess whether DoD has appropriate expertise
- Identify how to educate/train our engineers to fill expertise needs and avoid gaps

Engineering Demographic Concern

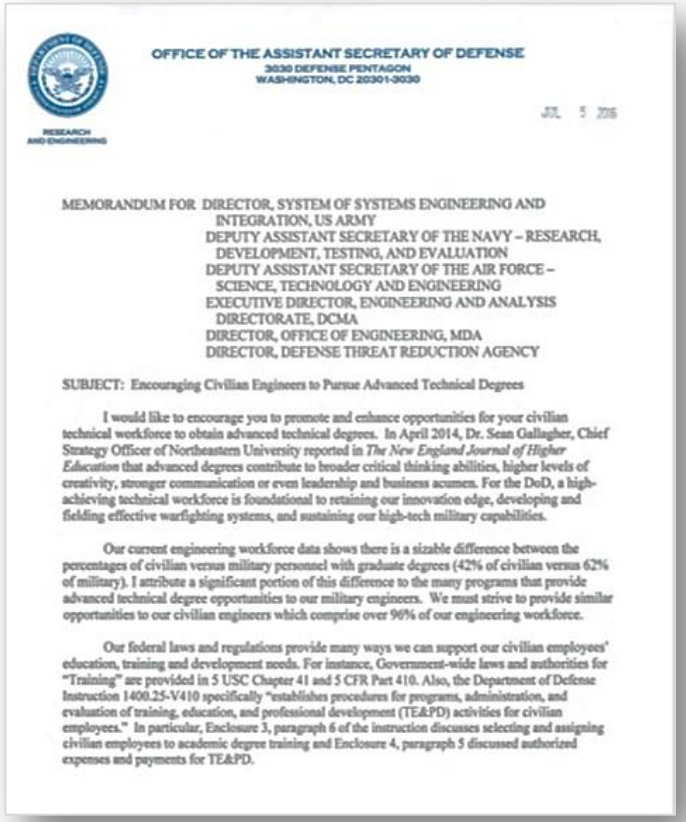


Source: Yoder, Brian L., Ph.D.. "Engineering by the Numbers". American Society for Engineering Education, 2015. Available at: https://www.asee.org/papers-and-publications/publications/college-profiles/15EngineeringbytheNumbersPart1.pdf

Less than 60% of advanced degrees in engineering from top 25 US universities are awarded to US citizens

Advanced Degrees

- **Encouraging civilian engineers pursue advanced technical degrees**
  - Promote a path to a high-achieving workforce
- **Utilizing DAWDF to developing an Advanced Degree Guidebook:**
  - Help civilian employees navigate DoD opportunities by identifying centralized programs as well as potential sources of scholarships/subsidies



OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
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WASHINGTON, DC 20301-3030

RESEARCH AND ENGINEERING

JUL 5 2016

MEMORANDUM FOR DIRECTOR, SYSTEM OF SYSTEMS ENGINEERING AND INTEGRATION, US ARMY
DEPUTY ASSISTANT SECRETARY OF THE NAVY – RESEARCH, DEVELOPMENT, TESTING, AND EVALUATION
DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE – SCIENCE, TECHNOLOGY AND ENGINEERING
EXECUTIVE DIRECTOR, ENGINEERING AND ANALYSIS DIRECTORATE, DCMA
DIRECTOR, OFFICE OF ENGINEERING, MDA
DIRECTOR, DEFENSE THREAT REDUCTION AGENCY

SUBJECT: Encouraging Civilian Engineers to Pursue Advanced Technical Degrees

I would like to encourage you to promote and enhance opportunities for your civilian technical workforce to obtain advanced technical degrees. In April 2014, Dr. Sean Gallagher, Chief Strategy Officer of Northeastern University reported in *The New England Journal of Higher Education* that advanced degrees contribute to broader critical thinking abilities, higher levels of creativity, stronger communication or even leadership and business acumen. For the DoD, a high-achieving technical workforce is foundational to retaining our innovation edge, developing and fielding effective warfighting systems, and sustaining our high-tech military capabilities.

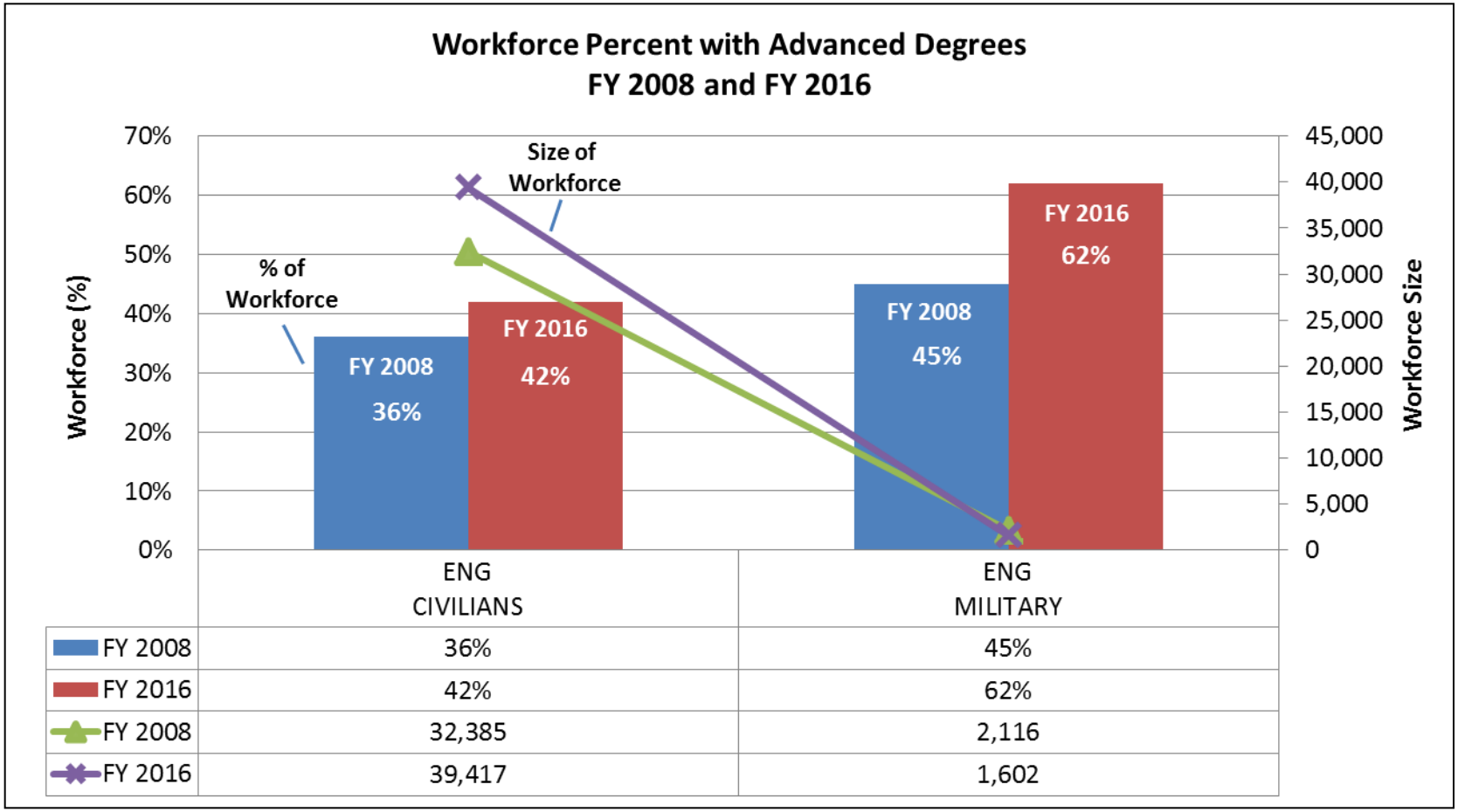
Our current engineering workforce data shows there is a sizable difference between the percentages of civilian versus military personnel with graduate degrees (42% of civilian versus 62% of military). I attribute a significant portion of this difference to the many programs that provide advanced technical degree opportunities to our military engineers. We must strive to provide similar opportunities to our civilian engineers which comprise over 90% of our engineering workforce.

Our federal laws and regulations provide many ways we can support our civilian employees' education, training and development needs. For instance, Government-wide laws and authorities for "Training" are provided in 5 USC Chapter 41 and 5 CFR Part 410. Also, the Department of Defense Instruction 1400.25-V410 specifically "establishes procedures for programs, administration, and evaluation of training, education, and professional development (TE&PD) activities for civilian employees." In particular, Enclosure 3, paragraph 6 of the instruction discusses selecting and assigning civilian employees to academic degree training and Enclosure 4, paragraph 5 discussed authorized expenses and payments for TE&PD.

Dr. Sean Gallagher, Chief Strategy Officer, Northeastern University reported in The New England Journal of Higher Education (Aug. 2014) that advanced degrees contribute to broader critical thinking abilities, higher levels of creativity, stronger communication or even leadership and business acumen.

Advanced Degrees

Many more programs exist to assist military personnel in obtaining an advanced degree then available for civilian employees



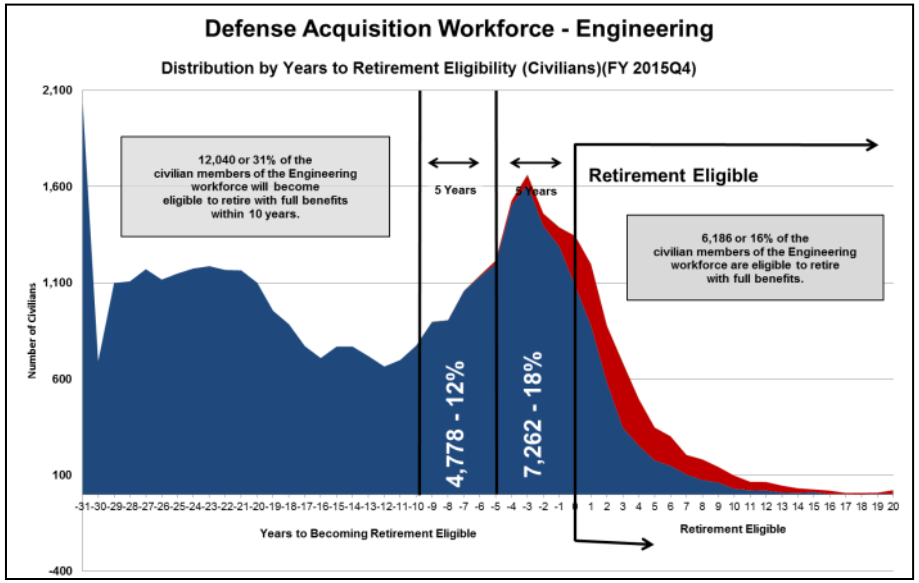
Data Source: USD(AT&L) Defense Acquisition Workforce Data Mart

FEVS Issue Areas for ENG Workforce

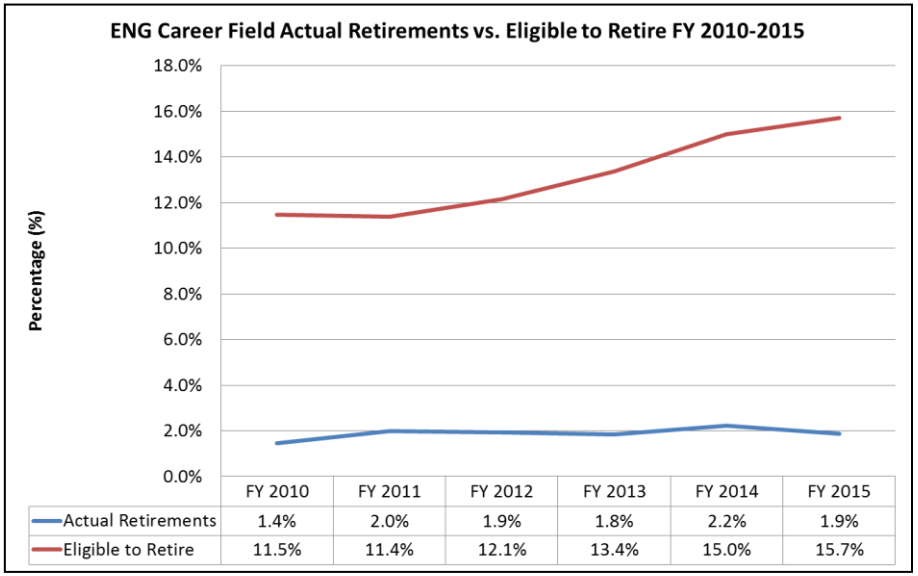
- **3 areas of concern in the FEVS dealt directly with recruit and develop the workforce**
  - *My work unit is able to recruit people with the right skills?*
    - *Only 41% positive*
  - *How satisfied are you with the training you receive for your present job?*
    - *Only 53% positive*
  - ***Senior leaders generate high levels of commitment?***
    - ***Only 38% positive***

Engineering Civilian Distribution by Years to Retirement Eligibility

Still an aging workforce; however, rates of actual retirements have remained steady as the percent of retirement eligible personnel has increased



Data Source: RAND NDRI Forces and Resources Policy Center, 30 SEP 15



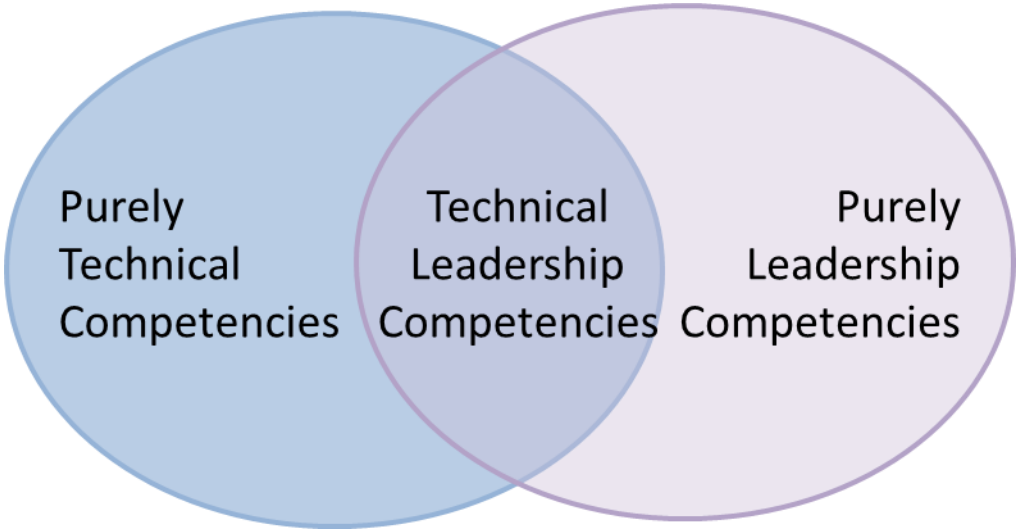
	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Actual Retirements	1.4%	2.0%	1.9%	1.8%	2.2%	1.9%
Eligible to Retire	11.5%	11.4%	12.1%	13.4%	15.0%	15.7%

Data Source: USD(AT&L) Defense Acquisition Workforce Data Mart, 30 SEP 15

Technical Leaders are part of an aging workforce and we need to address this potential gap

Technical Leadership

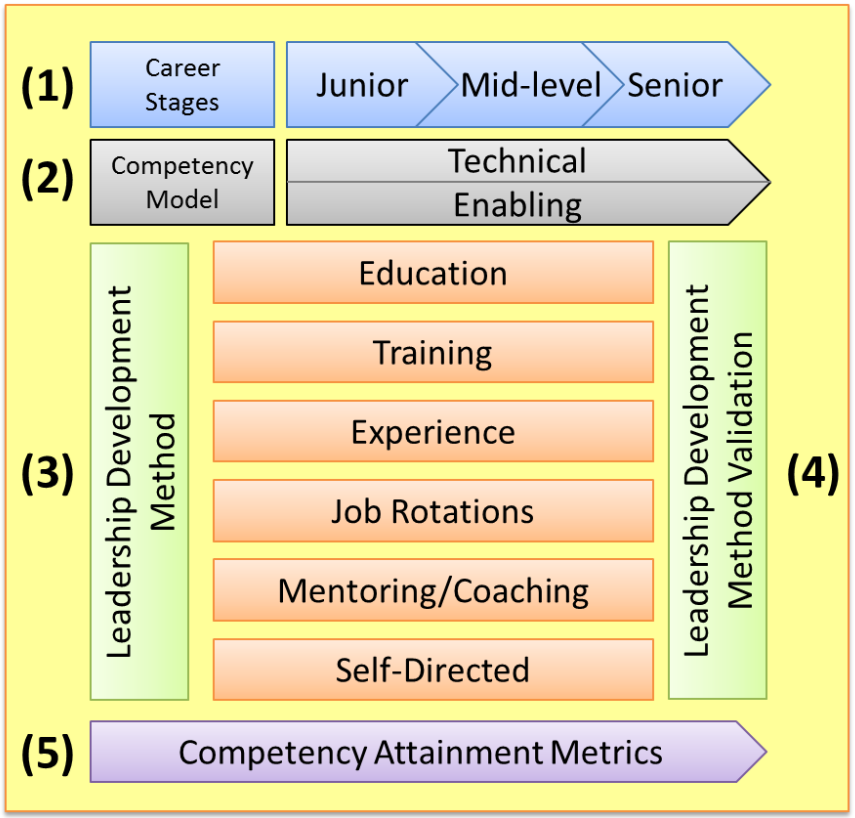
- **Working with the Systems Engineering Research Center (SERC)**
- **Identified 24 Technical Leadership Competencies:**
  - 12 technical in nature
  - 12 enabling competencies reflecting general leadership traits



Technical Leadership

- **Identifying methods to develop these competencies**
- **Developing a career framework and workforce guide to help facilitate the development of technical leaders**

Technical Leadership Development Framework



Potential Next Steps

- **Identify common skill gap areas**
- **Identify the government and industry skillsets needed for talent exchange**
- **Identify similar jobs in government and industry that require the same skill sets and experiences**
- **Understand the capability and capacity of the integrated—Government and Industry—workforce**

Is this an opportunity to jointly work towards maintaining DoD's technological superiority?

Systems Engineering: Critical to Defense Acquisition










Defense Innovation Marketplace
http://www.defenseinnovationmarketplace.mil

DASD, Systems Engineering
http://www.acq.osd.mil/se

Data sources

- Federal Employee Viewpoint Survey, 2015. Available at: https://www.fedview.opm.gov/
- Defense Civilian Personnel Data System, January 2016
- Yoder, Brian L., Ph.D.. “Engineering by the Numbers”. American Society for Engineering Education, 2015. Available at: https://www.asee.org/papers-and-publications/publications/college-profiles/15EngineeringbytheNumbersPart1.pdf
- USD(AT&L) Defense Acquisition Workforce Data Mart, 30 September 2015
- RAND National Defense Research Institute Forces and Resources Policy Center, 30 September 2015

For Additional Information

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Back-up

FEVS: DoD Results Overview

Department Of Defense

35% response rate

Lower than Federal Government average response rate of 50%

However response rate consistent for DoD in past years so comparative sampling of data

Number of Employees: **676,060**

Size Classification: **Large Agency**

EMPLOYEE ENGAGEMENT

High = NASA (78%)
Low = DHS (53%)

27th	65%	+1%
AGENCY RANKING (OF 37 LARGE AGENCIES)	LASTEST SCORE (2015)	CHANGE SINCE LAST YEAR

*RANKING TIED

GLOBAL SATISFACTION

High = NASA (76%)
Low = DHS (47%)

25th	61%	+2%
AGENCY RANKING (OF 37 LARGE AGENCIES)	LASTEST SCORE (2015)	CHANGE SINCE LAST YEAR

Data Source: Federal Employee Viewpoint Survey, 2015. Available at: https://www.fedview.opm.gov/

FEVS: STEM Engagement Scores

Engagement Scores by STEM Occupations

	2012	2013	2014	2015	Change from 2014
Science	65%	63%	63%	64%	+1
Technology	65%	63%	63%	64%	+1
Engineering	69%	68%	67%	67%	0
Mathematics	69%	66%	68%	69%	+1

Engagement: An employee's sense of purpose that is evident in their display of dedication, persistence, and effort in their work or overall attachment to their organization and its mission. (U.S. Office of Personnel Management)

What opportunities exist to further increase engineering engagement scores?

Data Source: Federal Employee Viewpoint Survey, 2015. Available at: https://www.fedview.opm.gov/

FEVS: Engineering Feedback

	Science	Technology	Engineering	Mathematics	All STEM Occupations	Non-STEM Occupations
Recruitment						
Work unit is able to recruit people with the right skills	40%	37%	41%	47%	40%	42%
Policies and programs promote diversity	62%	59%	65%	66%	63%	55%
Prohibited Personnel Practices are not tolerated	73%	67%	77%	77%	73%	64%
Retention						
I recommend my organization as a good place to work	66%	60%	67%	67%	65%	62%
Senior leaders generate high levels of commitment	32%	40%	38%	44%	38%	39%
Planning to stay with their organization	72%	63%	71%	70%	69%	66%

Values shown are the percent positive for each category.
Highest percent positive score for each item shown in orange.

Do you currently use a 'stay interview' survey method to assess workforce satisfaction?

Data Source: Federal Employee Viewpoint Survey, 2015. Available at: https://www.fedview.opm.gov/

FEVS: Engineering Feedback (cont.)

	Science	Technology	Engineering	Mathematics	All STEM Occupations	Non-STEM Occupations
Employee Development						
I am given opportunity to improve my skills	66%	61%	70%	71%	66%	60%
Supervisors support employee development	68%	66%	74%	74%	71%	63%
Satisfied with training received for present job	52%	46%	53%	55%	51%	52%
Knowledge Management						
I have enough information to do my job well	70%	64%	72%	70%	69%	70%
Coworkers share job knowledge with each other	77%	70%	79%	78%	76%	72%
Workforce has job-relevant knowledge and skills	70%	64%	71%	72%	69%	69%

Values shown are the percent positive for each category.
Highest percent positive score for each item shown in orange.

Data Source: Federal Employee Viewpoint Survey, 2015. Available at: https://www.fedview.opm.gov/