



# Developing the Department of Defense Engineering Workforce

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**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.**



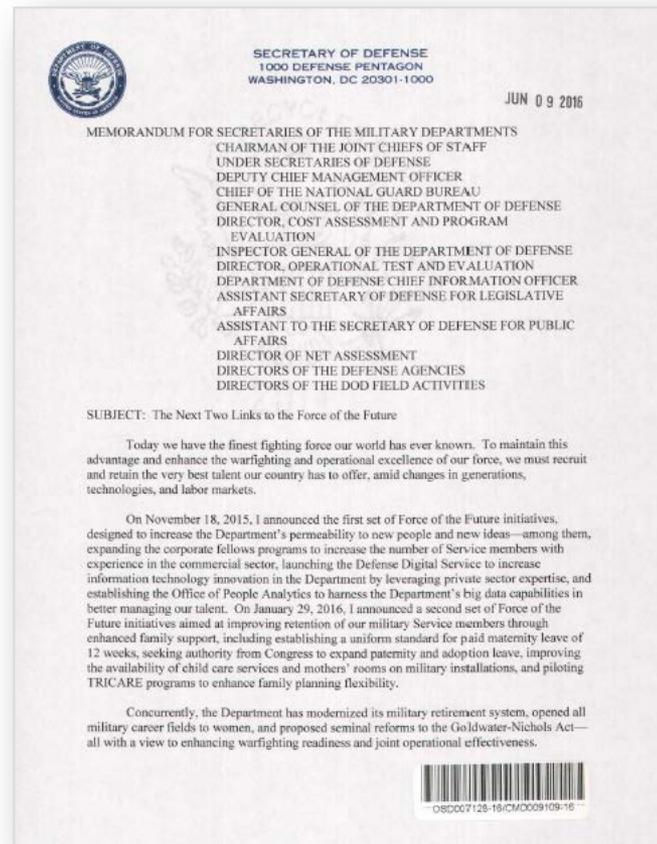
# Force of the Future (3<sup>rd</sup> Set)



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”.**



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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.



OSDC07128-18/CMO09109-16



# 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**

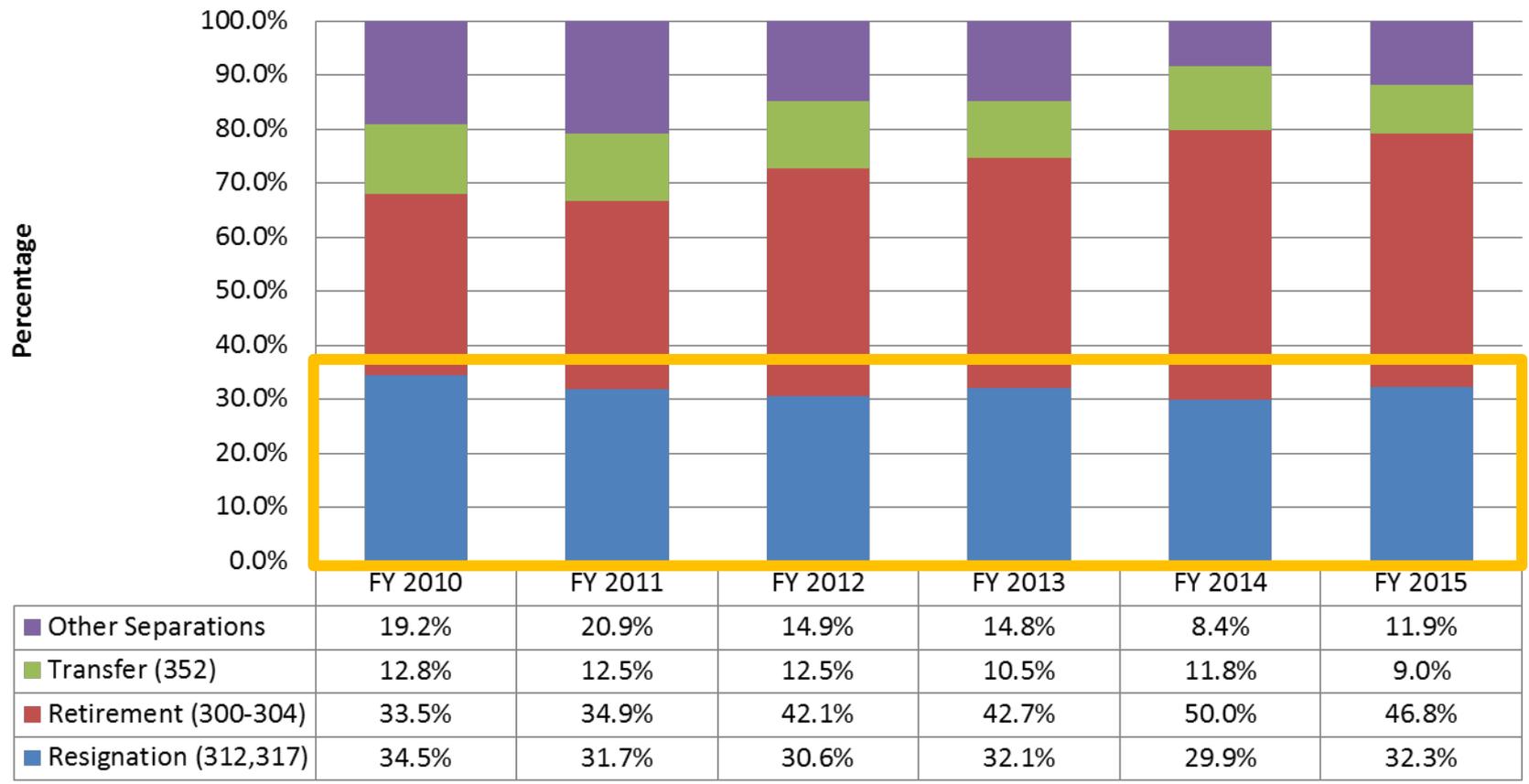
**“Generations change, technologies change, labor markets change. That’s why one of my responsibilities now -- and a job for all of us in the years ahead -- is to make sure that amid all this change DoD continues to recruit, develop and retain the most talented men and women America has to offer.” –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



# Engineering (Non-Construction) Losses



Engineering (Non-Construction) Losses by Fiscal Year



Data Source: Defense Civilian Personnel Data System, January 2016

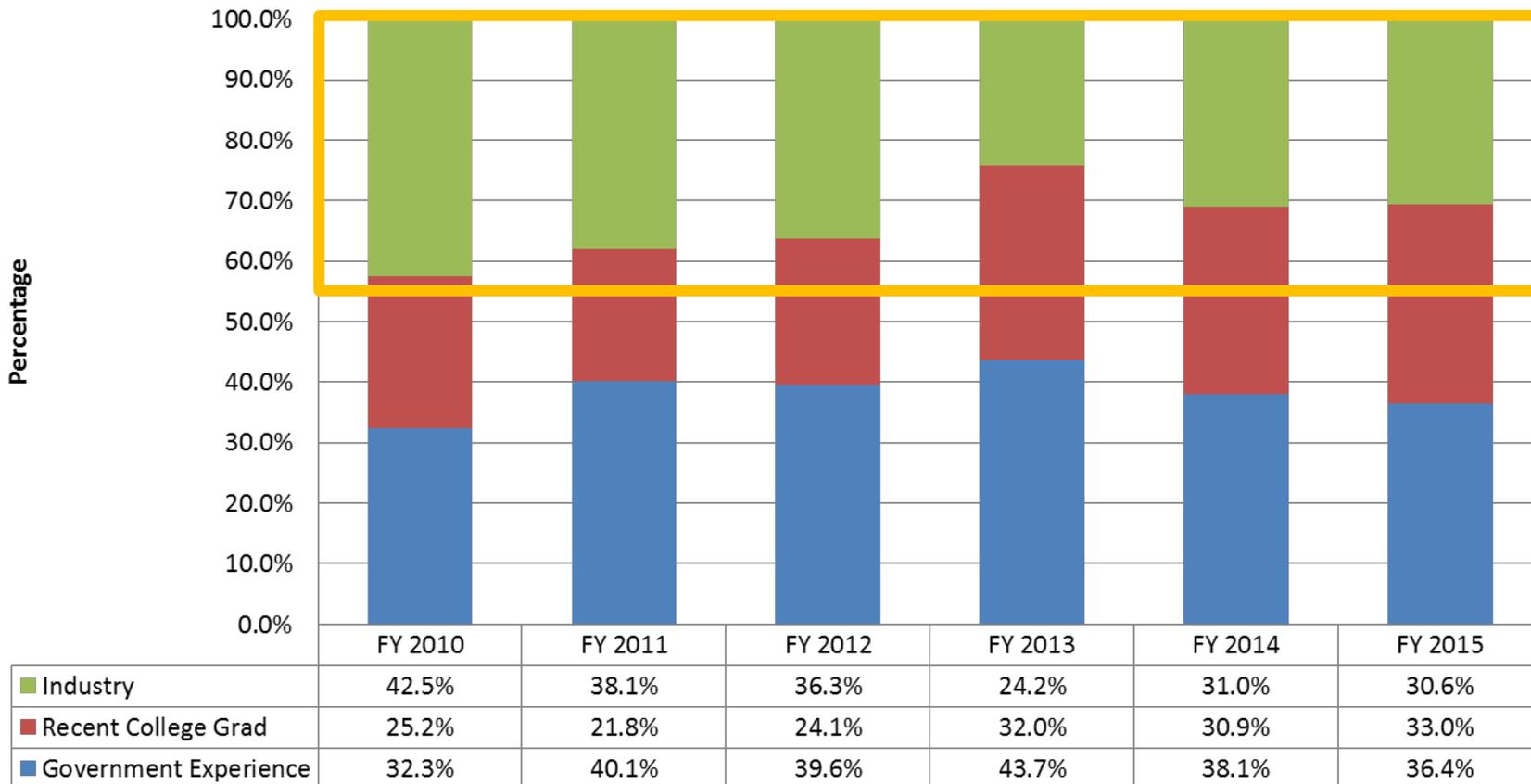
**Resignations, as a percentage of overall gains, continue to make up one-third of all losses**



# Engineering (Non-Construction) Gains



Engineering (Non-Construction) Gains by Fiscal Year



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

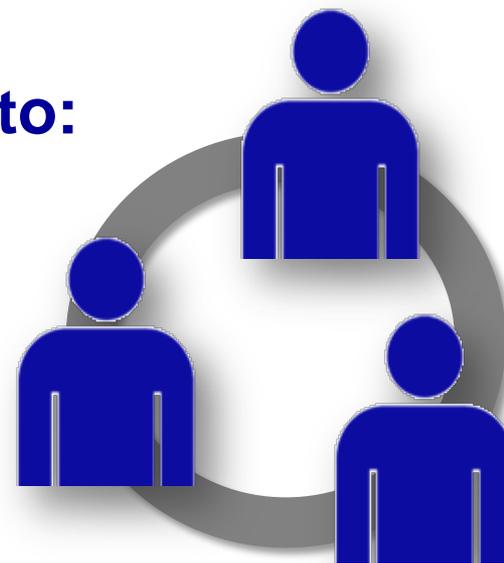


**Engagement:** An employee's sense of purpose that is evident in their display of dedication, persistence, and effort in their work or overall attachment to their organization and its mission

- (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**

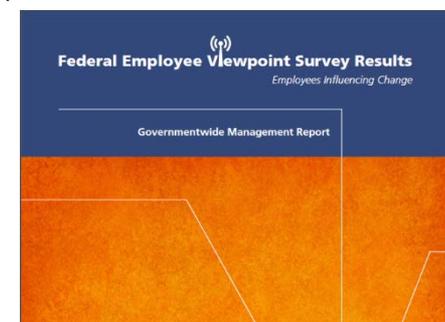


# Federal Employment Viewpoint Survey (FEVS)

## 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

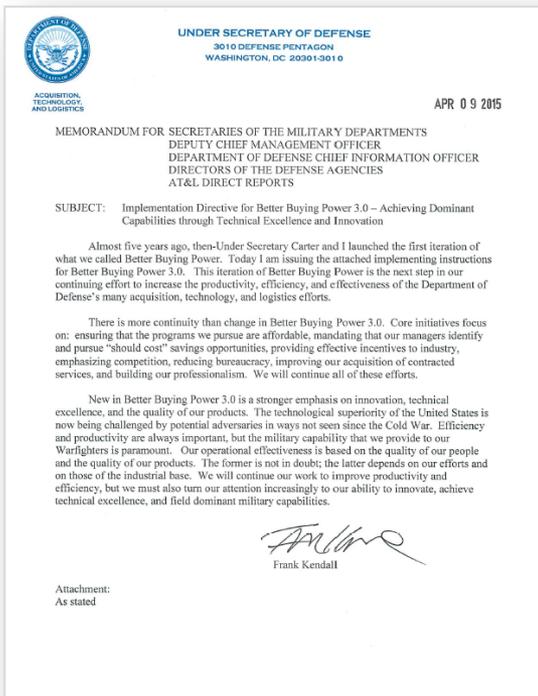


- **DoD Engineers have a higher average engagement score than the overall DoD**
  - Engagement score of 67% vs. 65%
- **3 areas of concern in the FEVS dealt directly with recruit and develop the workforce**
  - *My work unit is able to recruit people with the right skills?*
    - *Only 41% positive*
  - *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



## 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



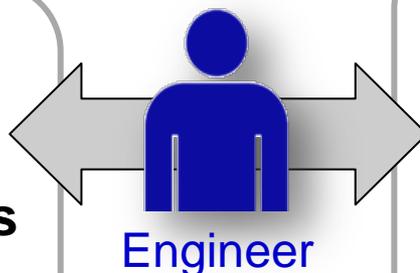
**New or Emerging Technologies**



**Advanced Techniques**



**Novel Approaches**



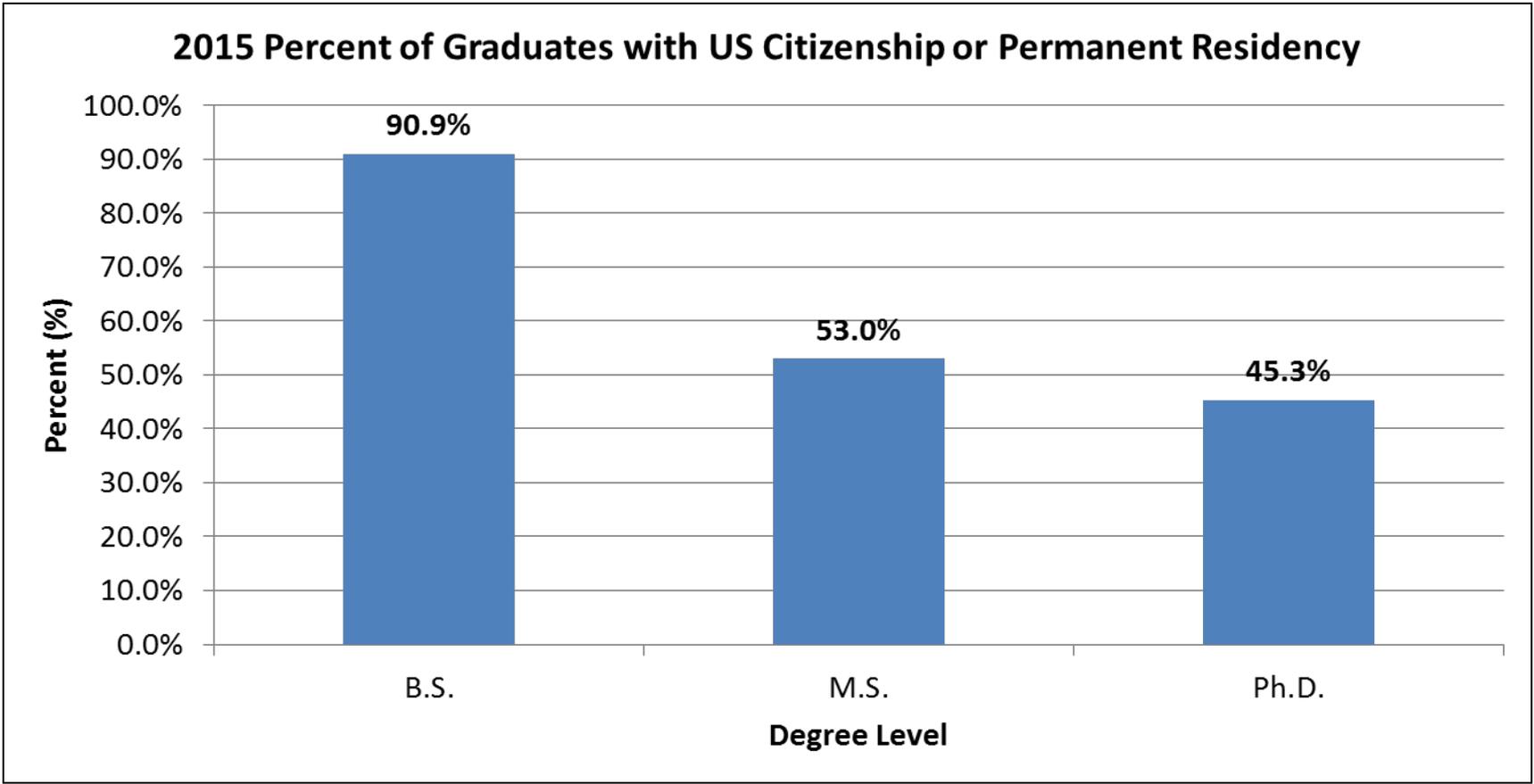
DoD systems to maintain technological superiority and military advantage

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>

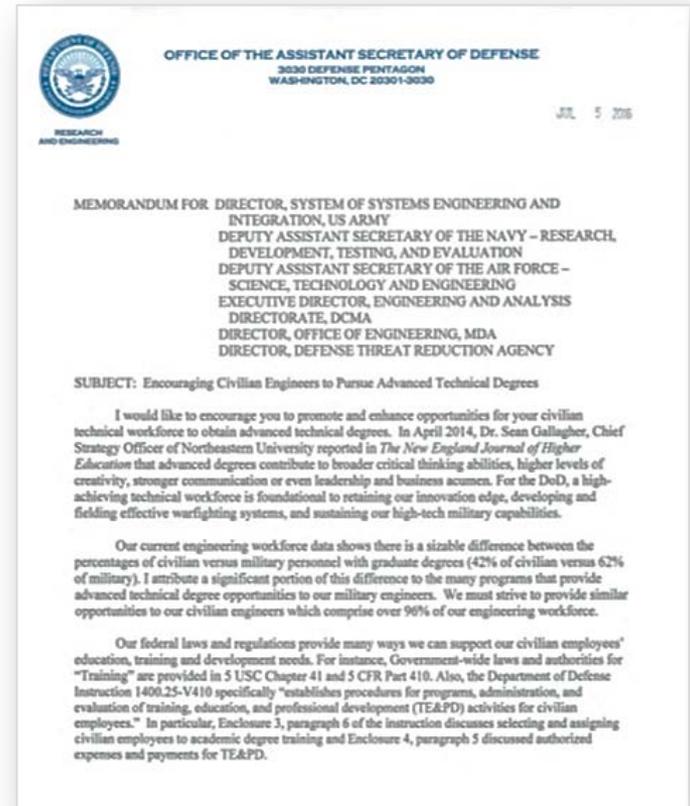
**Less than 60% of advanced degrees in engineering from top 25 US universities are awarded to US citizens**



# 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

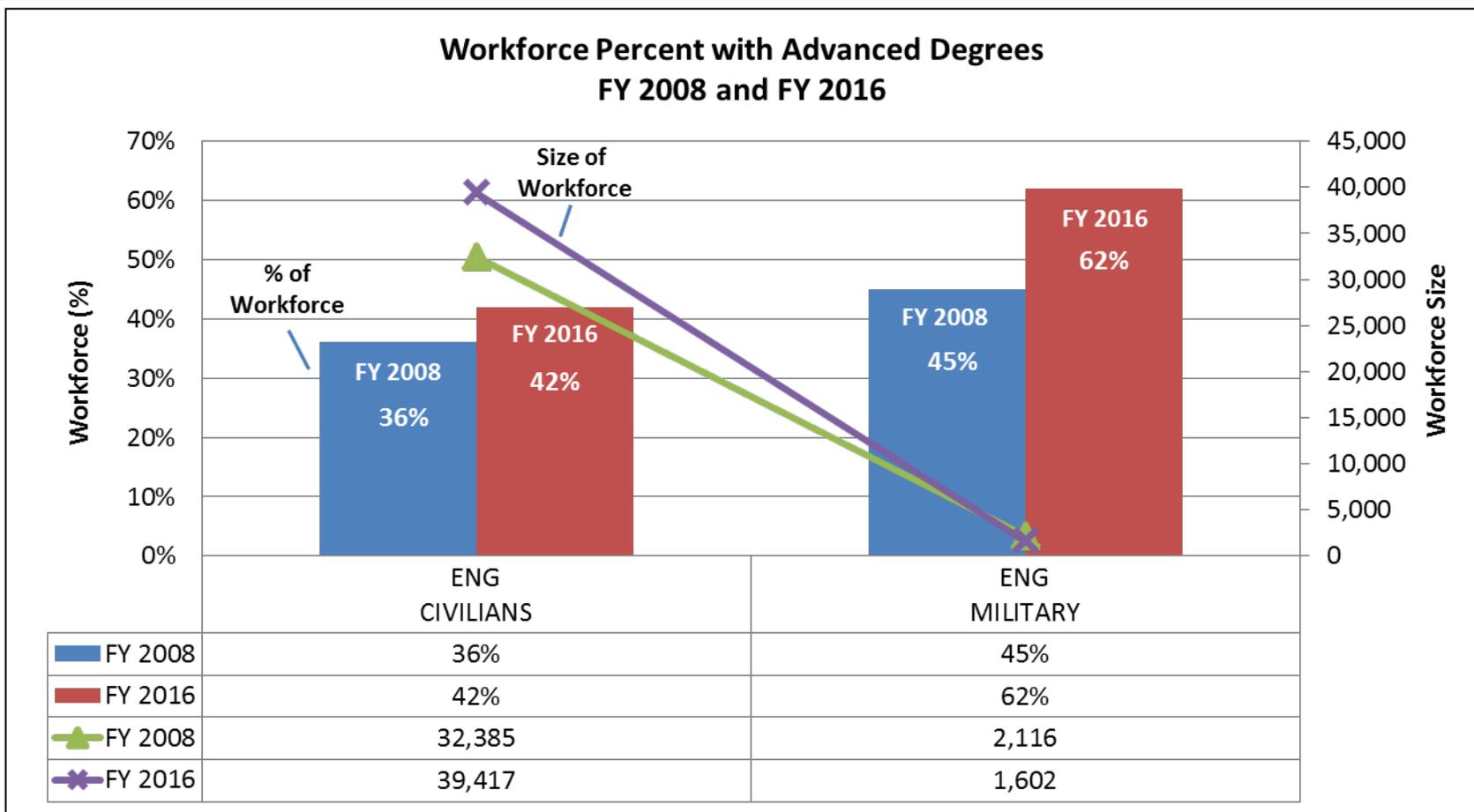


**Dr. Sean Gallagher, Chief Strategy Officer, Northeastern University reported in *The New England Journal of Higher Education* (Aug. 2014) that advanced degrees contribute to broader critical thinking abilities, higher levels of creativity, stronger communication or even leadership and business acumen.**



# Advanced Degrees

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



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



# FEVS Issue Areas for ENG Workforce



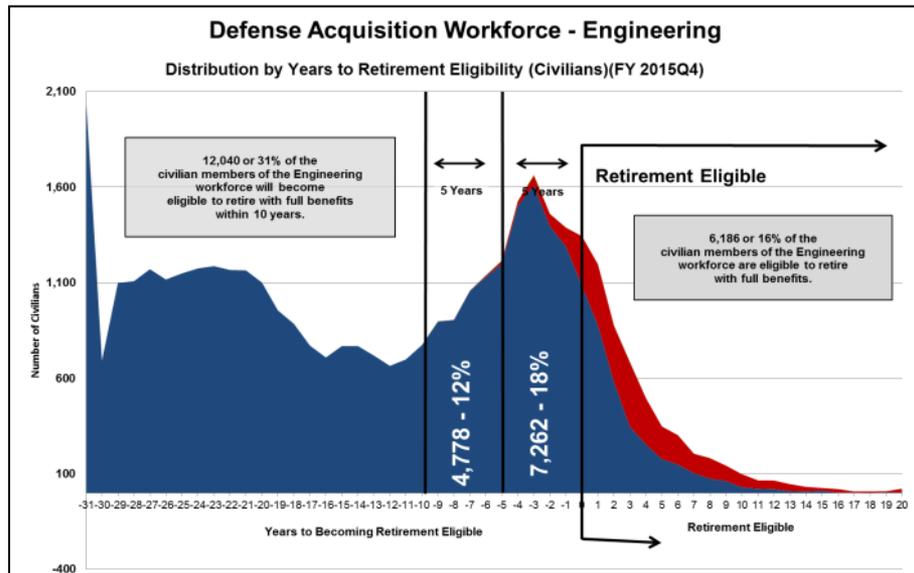
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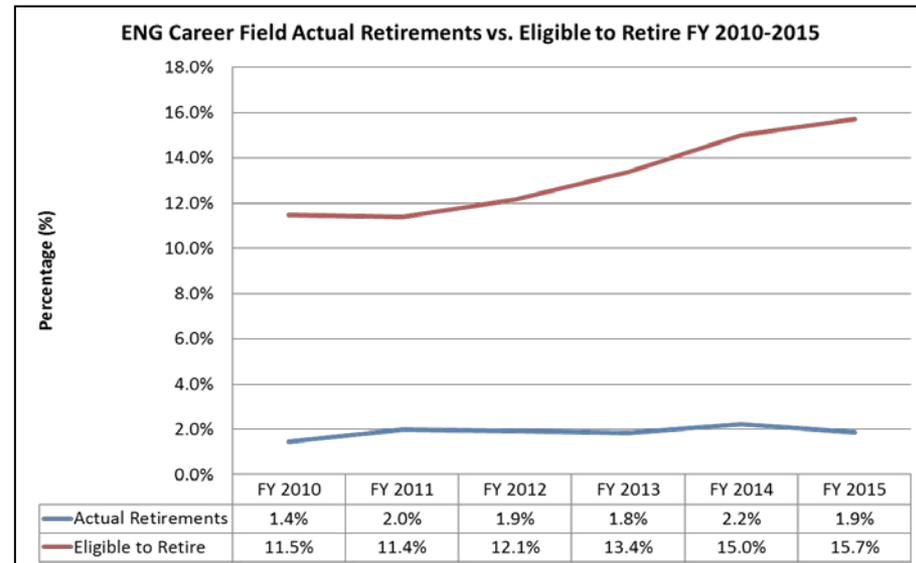
# Engineering Civilian Distribution by Years to Retirement Eligibility



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



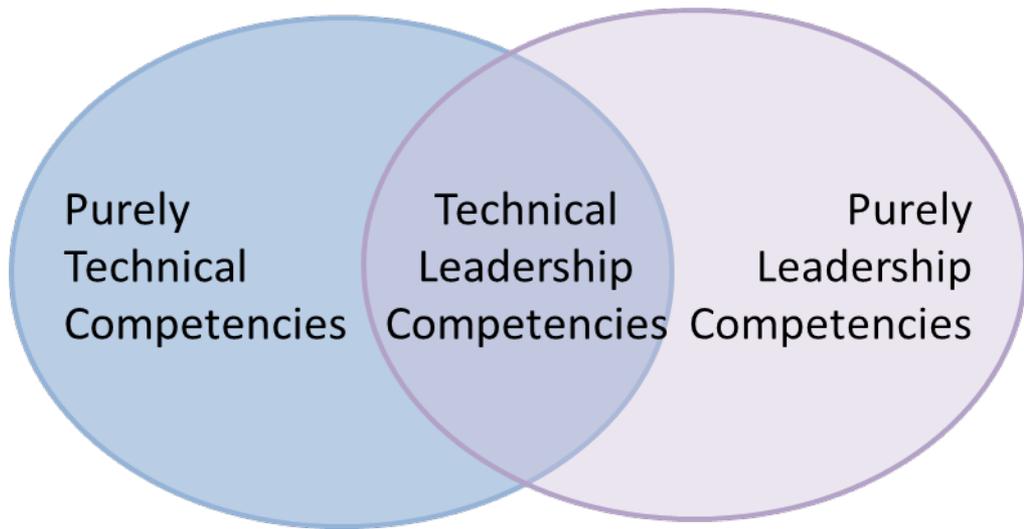
Data Source: USD(AT&L) Defense Acquisition Workforce Data Mart, 30 SEP 15

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



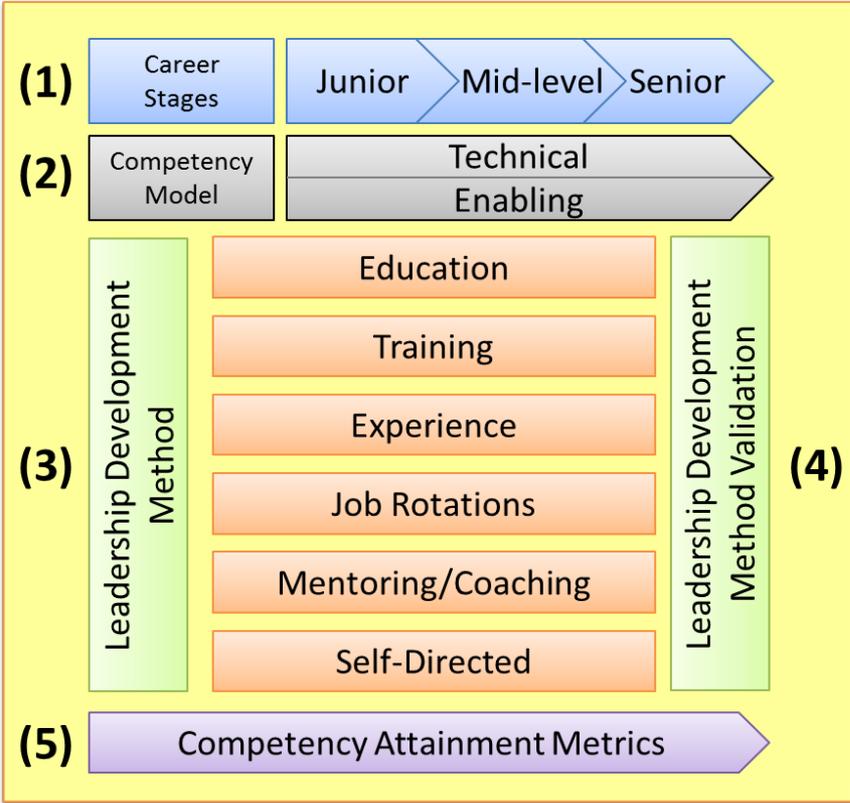


# Technical Leadership



- 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

AGENCY RANKING  
(OF 37 LARGE  
AGENCIES)  
  
\*RANKING TIED

65%

LASTEST SCORE  
(2015)

+1%

CHANGE SINCE  
LAST YEAR

### GLOBAL SATISFACTION

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

25th

AGENCY RANKING  
(OF 37 LARGE  
AGENCIES)

61%

LASTEST SCORE  
(2015)

+2%

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
<b>Recruitment</b>						
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%
<b>Retention</b>						
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
<b>Employee Development</b>						
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%
<b>Knowledge Management</b>						
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/>