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.
“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”.

Dr. Ashton Carter, Secretary of Defense
Memorandum, June 9, 2016
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
Resignations, as a percentage of overall gains, continue to make up one-third of all losses.
Engineering (Non-Construction) Gains

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

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Industry</th>
<th>Recent College Grad</th>
<th>Government Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2010</td>
<td>42.5%</td>
<td>25.2%</td>
<td>32.3%</td>
</tr>
<tr>
<td>FY 2011</td>
<td>38.1%</td>
<td>21.8%</td>
<td>40.1%</td>
</tr>
<tr>
<td>FY 2012</td>
<td>36.3%</td>
<td>24.1%</td>
<td>39.6%</td>
</tr>
<tr>
<td>FY 2013</td>
<td>24.2%</td>
<td>32.0%</td>
<td>43.7%</td>
</tr>
<tr>
<td>FY 2014</td>
<td>31.0%</td>
<td>30.9%</td>
<td>38.1%</td>
</tr>
<tr>
<td>FY 2015</td>
<td>30.6%</td>
<td>33.0%</td>
<td>36.4%</td>
</tr>
</tbody>
</table>

Data Source: Defense Civilian Personnel Data System, January 2016
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
• 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?*
    o Only 41% positive
  – *How satisfied are you with the training you receive for your present job?*
    o Only 53% positive
  – *Senior leaders generate high levels of commitment?*
    o Only 38% positive

How can we continue to improve engineer engagement?
Strengthen DoD’s Organic Engineering Capabilities

- **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

USD(AT&L), BBP 3.0 Implementation Guidance
Technical Edge Project

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

Technical Edge

New or Emerging Technologies

Advanced Techniques

Novel Approaches
Engineering Demographic Concern

2015 Percent of Graduates with US Citizenship or Permanent Residency

<table>
<thead>
<tr>
<th>Degree Level</th>
<th>Percent [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.S.</td>
<td>90.9%</td>
</tr>
<tr>
<td>M.S.</td>
<td>53.0%</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>45.3%</td>
</tr>
</tbody>
</table>


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

**Workforce Percent with Advanced Degrees**
FY 2008 and FY 2016

<table>
<thead>
<tr>
<th>Year</th>
<th>ENG CIVILIANS</th>
<th>ENG MILITARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2008</td>
<td>36%</td>
<td>45%</td>
</tr>
<tr>
<td>FY 2016</td>
<td>42%</td>
<td>62%</td>
</tr>
<tr>
<td>FY 2008</td>
<td>32,385</td>
<td>2,116</td>
</tr>
<tr>
<td>FY 2016</td>
<td>39,417</td>
<td>1,602</td>
</tr>
</tbody>
</table>

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
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
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
• 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

Ms. Aileen Sedmak
ODASD, Systems Engineering
703-695-6364
aileen.g.sedmak.civ@mail.mil
Back-up
## FEVS: DoD Results Overview

### Department Of Defense

<table>
<thead>
<tr>
<th>Number of Employees:</th>
<th>676,060</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size Classification:</td>
<td>Large Agency</td>
</tr>
</tbody>
</table>

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

### Employee Engagement

<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA (78%)</td>
<td>DHS (53%)</td>
</tr>
</tbody>
</table>

**27th**

Agency Ranking (of 37 large agencies)

*RANKING TIED*

**65%**

Lastest Score (2015)

**+1%**

Change since last year

### Global Satisfaction

<table>
<thead>
<tr>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA (76%)</td>
<td>DHS (47%)</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Occupation</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>Change from 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>65%</td>
<td>63%</td>
<td>63%</td>
<td>64%</td>
<td>+1</td>
</tr>
<tr>
<td>Technology</td>
<td>65%</td>
<td>63%</td>
<td>63%</td>
<td>64%</td>
<td>+1</td>
</tr>
<tr>
<td>Engineering</td>
<td>69%</td>
<td>68%</td>
<td>67%</td>
<td>67%</td>
<td>0</td>
</tr>
<tr>
<td>Mathematics</td>
<td>69%</td>
<td>66%</td>
<td>68%</td>
<td>69%</td>
<td>+1</td>
</tr>
</tbody>
</table>

**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

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

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.)

<table>
<thead>
<tr>
<th>Employee Development</th>
<th>Science</th>
<th>Technology</th>
<th>Engineering</th>
<th>Mathematics</th>
<th>All STEM Occupations</th>
<th>Non-STEM Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am given opportunity to improve my skills</td>
<td>66%</td>
<td>61%</td>
<td>70%</td>
<td>71%</td>
<td>66%</td>
<td>60%</td>
</tr>
<tr>
<td>Supervisors support employee development</td>
<td>68%</td>
<td>66%</td>
<td>74%</td>
<td>74%</td>
<td>71%</td>
<td>63%</td>
</tr>
<tr>
<td>Satisfied with training received for present job</td>
<td>52%</td>
<td>46%</td>
<td>53%</td>
<td>55%</td>
<td>51%</td>
<td>52%</td>
</tr>
</tbody>
</table>

### Knowledge Management

<table>
<thead>
<tr>
<th></th>
<th>Science</th>
<th>Technology</th>
<th>Engineering</th>
<th>Mathematics</th>
<th>All STEM Occupations</th>
<th>Non-STEM Occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have enough information to do my job well</td>
<td>70%</td>
<td>64%</td>
<td>72%</td>
<td>70%</td>
<td>69%</td>
<td>70%</td>
</tr>
<tr>
<td>Coworkers share job knowledge with each other</td>
<td>77%</td>
<td>70%</td>
<td>79%</td>
<td>78%</td>
<td>76%</td>
<td>72%</td>
</tr>
<tr>
<td>Workforce has job-relevant knowledge and skills</td>
<td>70%</td>
<td>64%</td>
<td>71%</td>
<td>72%</td>
<td>69%</td>
<td>69%</td>
</tr>
</tbody>
</table>

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/