What are the Workforce Impacts of New Transportation Technology?

- Moderator:
  - J. Bryan Nicol, Managing Director, Infrastructure and Capital Projects, Deloitte

- Speakers:
  - Finch Fulton, Deputy Assistant Secretary for Policy, U.S. Department of Transportation
  - Stephen Brich, Commissioner, Virginia Department of Transportation
  - Jessica Nigro, General Manager and Head of Technology and Innovation Policy, Daimler
What are the Workforce Impacts of New Transportation Technology?
Transportation accounted for 8.9% of U.S. GDP in 2016

Figure 5-2 Gross Domestic Product (GDP) Attributed to Transportation by Mode: 2016 (billions of dollars)

Enhanced GDP = $19.0 trillion
Total transportation = $1,066.9 billion

- Truck: $147.2 billion
- Rail: $42.7 billion
- Water: $16 billion
- Household: $332.2 billion
- Total in-house: $34.0 billion
- Total for-hire: $552.6 billion
- All other US GDP: 94.4%

NOTES: For information on the methodology behind the Transportation Satellite Accounts (TSAs), see https://www.bts.gov/satellite-accounts. The GDP value in the TSAs (referred to as enhanced GDP) is larger than the GDP value published in the National Accounts, because it includes the contribution of household transportation. “Household transportation” covers transportation that households provide for themselves with vehicles. “Other” includes: pipeline, transit, and ground passenger transportation, including State and local government passenger transit; sightseeing transportation and transportation support; courier and messenger services; and warehousing and storage. Enhanced GDP = U.S. GDP $18,624.5 billion + contribution of household transportation $332.2 billion. 2016 data are latest available.

Transportation and transportation-related industries employ over 13.3 million people, accounting for 9.1 percent of workers in the United States.

**FIGURE 5-7** Transportation-Related Labor Force Employment in the United States: 1990–2017

- **Percent of total U.S. labor force**
- **Employment in transportation-related industries**
- **Employment in transportation and warehousing**

**NOTE:** Shaded areas indicate economic recessions.

Workforce and Labor

1. U.S. DOT recognizes emerging concerns and uncertainty around potential impacts of ADS on the existing workforce.

2. U.S. DOT is working with other cabinet agencies on a comprehensive analysis of the employment and workforce impacts of automated vehicles.

3. ADS developers and deployers may want to consider how to assess potential workforce effects, future needs for new skills and capabilities, and how the workforce will transition into new roles over time.
DOT / DOL Workforce Impacts Study

- The workforce study focuses on four general areas:
  1. Labor Force Transformation/Displacement
  2. Labor Force Training Needs
  3. Technology Operational Safety Issues
  4. Quality of Life Effects Due to Automation

- The first phase of the workforce study focuses on the long-haul trucking and transit bus sectors. The second phase will be expanded to include a broader set of driving occupations and potentially impacts to ancillary job categories.

- DOT held an event on March 20, 2019, to receive stakeholder input into the development of the upcoming study on Automation and the Workforce and an accompanying Report to Congress, expected summer 2019. The workforce event will convene key stakeholders representing industry (vehicle, ADS technology, and trucking), labor, the public sector, academia, and research to provide input into the automation adoption scenarios that will underpin the analysis.
Learning from the History of Automation in the Aviation Workforce

1. The aviation industry developed technological solutions to help airline pilots manage factors such as high workload, distractions, and abnormal situations.

2. Automation has undeniably made flying safer by supporting pilots. The characteristics that have improved trust in and effectiveness of these systems include:
   a) Reliable, robust systems that minimize false or missed alarms/reports
   b) Pilot interfaces that are easy to understand and enhance awareness.
   c) Training to understand how the systems work (and how to operate them).
   d) avoidance of skill degradation by encouraging pilots to practice manual flight and basic skills.
• Vehicle automation is likely to make the movement of people and goods safer, cheaper, and more convenient.

• It remains extremely difficult to predict the exact nature and extent of impacts on the professional driving workforce.

• The specific ways in which these jobs will change may vary significantly across market segments and operating environments and will be influenced by contemporaneous changes in related industries.
Preparing for
THE FUTURE OF TRANSPORTATION
Automated Vehicles 3.0

October 2018
https://www.transportation.gov/av
VDOT OF TOMORROW
Building the agency for the future

VDOT Commissioner Stephen Brich, P.E.
June 2019
Virginia: A Leading state + DOT

- Virginia is 7th in the nation for the number of Fortune 1000 companies
- Virginia is ranked 7th by U.S. News & World Report for Best States
- Home to more than 60 colleges and universities
- 8.5 million citizens
- Virginia is the 3rd largest state DOT
# Key People Trends at VDOT

<table>
<thead>
<tr>
<th>RETIREMENT</th>
<th>VACANCY</th>
<th>RETENTION</th>
<th>TELEWORKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retirement eligibility is high</td>
<td>Vacancies have seen a slight uptick from normal, specifically in positions in rural areas</td>
<td>Technical job retention is lower than other positions in VDOT</td>
<td>Teleworking is only used by 22% of those that are eligible</td>
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<table>
<thead>
<tr>
<th><strong>49</strong></th>
<th><strong>15</strong></th>
<th><strong>17%</strong></th>
<th><strong>34%</strong></th>
<th><strong>71%</strong></th>
<th><strong>50%</strong></th>
</tr>
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<tbody>
<tr>
<td>AVERAGE AGE OF EMPLOYEES</td>
<td>AVERAGE YEARS OF SERVICE</td>
<td>ARE MORE THAN 60 YEARS OLD</td>
<td>HAVE COLLEGE DEGREE</td>
<td>EMPLOYEES HAVE NETWORK ACCESS</td>
<td>DISTRICT EMPLOYEES HAVE NETWORK ACCESS</td>
</tr>
</tbody>
</table>

- Average age of employees: 49 years
- Average years of service: 15 years
- 17% are more than 60 years old
- 34% have a college degree
- 71% of employees have network access
- 50% of district employees have network access

Data effective April 1, 2019
VDOT’s Vision of the Future

A future transportation system delivers mobility safer, faster and more efficient.

- Frictionless, automated, personalized travel in Urban Areas
- Connected, resilient Rural Areas across the Commonwealth of Virginia
- Interconnected highways, bridges, tunnels, waterways and transit hubs through Smart Infrastructure
- Innovation through connected, electric, and Autonomous Vehicles and shifting attitudes toward mobility
- New Funding Streams through dynamic user charging and new monetization strategies
Focus groups conducted across VDOT’s districts and directorates with 80+ participants.

Interviews conducted to gather leadership perspective.

Non-traditional competitors analyzed to gather insights on how they are recruiting the key talent that VDOT needs.

Key HR data metrics reviewed.

Technical and human skills identified as critical to VDOT’s future.

Diverse voices from across VDOT came together to prioritize the work and workforce initiatives that VDOT – and this project – should focus on first.
How We Get There

1. PREPARE OUR PEOPLE
   - Development
   - Strategic hiring
   - Training
   - Mentoring

2. EMPOWER INNOVATION
   - Challenge the norm
   - Create
   - Adapt
   - Think differently

3. MODERNIZE OUR METHODS
   - Improve processes
   - Create efficiencies
   - Modernize procedures
   - Update strategies
Quick Wins

1. Enhance tech fluency across VDOT’s workforce
2. Promote cyber risk awareness through a comprehensive cyber education strategy
3. Establish two-way mentorship program
4. Create and implement interactive scenario-based learning for field operations
5. Build bot management capacity with a Digital Worker Implementation Team

Momentum Makers

6. Conduct technical skills assessment, workforce planning, and recruitment analysis for prioritized workforce segments
7. Build an agency-wide information technology (IT) strategy
8. Scale innovation capacity across VDOT through a strategic, coordinated approach
9. Consolidate VDOT’s data science expertise through a “hub and spoke” nerve center model
10. Develop future workplace strategy to support recruitment & retention

Ongoing change management and communications activities to ensure employee engagement, excitement, and understanding of the VDOT of Tomorrow project
DRIVING THE WORKFORCE OF THE FUTURE.

Presentation by Jessica Nigro
Founding Member + Secretary, PTIO
General Manager + Head of Technology and Innovation Policy, Daimler
Innovation Drives Opportunity

The Partnership for Transportation Innovation and Opportunity includes leading companies and associations committed to advancing autonomous vehicle technology in ways that improve quality of life and economic opportunity for all Americans.
EXAMINING THE IMPACT OF AVS

• Benefits for Society:
  • Safer roadways
  • Greater access to mobility
  • Reduced gridlock
  • Improved environment
  • Increased productivity
IDENTIFYING WORKFORCE IMPACT

• Opportunities for Workers:
  • Greater efficiency
  • Economic gains
  • Enhanced career opportunities
Understanding Transition Timeline

- **Near Term:** Recent research from SAFE projects measurable impacts begin to occur in 2030s, with most occurring in 2040s
  - Partial automation of trucks may actually increase employment
- **Long Term:** SAFE projects that more advanced levels of automation will create opportunities in the AV industry and supply chain, as well as other transportation careers
  - Questions to consider:
    - What skills will be needed?
    - Where will new jobs be located?
ENGAGING FEDERAL POLICYMAKERS

- Conducting Outreach, Providing Information + Seeking Collaboration
  - 80+ House and Senate Meetings
  - DOT Ongoing Analysis on AVs + Workforce
  - Presentations + Briefings, including:
    - Congressional Black Caucus Annual Legislative Forum
    - Senate Auto Caucus
    - Third Way Transportation Panel
ENGAGING STATE/LOCAL STAKEHOLDERS

- Soliciting State/Local Perspective is a Top Priority
  - Nationwide Community Listening Sessions
    - D.C. – 30+ organizations, presentation by Indiana Sec. of Career Development and Connection Blair Milo
    - Indiana – 40+ participants from Indiana State government, academia, workforce development + local business communities
    - Missouri – 60+ participants from St. Louis government, academia, workforce development + local business communities
    - Upcoming: Ohio + Michigan

- Engaging Directly with Government Officials, Stakeholders Is Equally Important
  - Rhode Island DOT
  - California DOT
  - New York State Legislature
  - DriveOhio (a project of Ohio DOT)
  - Michigan Mobility Institute/Detroit Mobility Lab
PREPARING FOR OUR AV FUTURE

- PTIO Identifies Outstanding Questions In Its Research Priorities:
  
  - How will AV technology impact the workforce? What new workforce opportunities may arise when AVs are deployed, and how may impacts vary by region?
  
  - What workforce training is needed to ensure a smooth transition to AVs and how should it be delivered? Which training programs will be most effective and what deters people from taking advantage of training programs that are already available to them today?
  
  - How will AV technology improve quality of life? How will AV technology improve working conditions in existing occupations and benefit people whose career opportunities are limited by lack of transportation?
To connect with PTIO and its members, email us at PTIO@OurAVFuture.org.

To learn more about PTIO, visit our website www.OurAVFuture.org and follow us on social media:

twitter.com/OurAVFuture

linkedin.com/company/our-av-future/