

Governor's Advisory Council on Connected and Automated Vehicles

September 25, 2020 Meeting Summary

1. **Welcome & Introductions** – Chairs Anderson Kelliher and Phil Magney welcomed the members.
 - a. **Members Present:** Amber Backhaus, Ryan Daniel, Michael Gorman, John Hauslauden, Myrna Peterson, Damien Riehl, Dan Chen, Bret Weiss, Patrick Weldon, Laurie McGinnis, Robin Hutcheson. **Not present:** Ed Reynosa, Vicky Rizzolo
 - b. **Ex-officio Members Present** - Jason Gadd, Alice Roberts-Davis, Tom Petersen, Kevin McKinnon, Mark Philips, Tim Lynaugh, Tina Folch, Cynthia Bauerly, Tarek Tomes, Wayne Sandberg, David Fenley, Rep Connie Bernardy, Rep. Steve Elkins, Sen. Scott Dibble, Charlie Zelle. **Not present:** Anne O'Connor, Courtney Whited, Todd Biewen, Sen. Scott Newman, Chairwoman Cathy Chavers
 - c. Other members and guests were in attendance, totaling 75 attendees
 - d. Chair Anderson Kelliher thanked Revenue Commissioner Cynthia Bauerly for all of her service at Department of Revenue.

2. **Recap of Events** – Deputy Director Tara Olds reminded the group of the Council's vision, mission and values. She gave an overview of the CAV Innovation Alliance Committees and goals.
 - a. **Safety** – Chaired by Mike Hansen of DPS and Amber Dallman of MnDOT Office of Transit and Active Transportation. We welcome members to this committee which will kick-off soon.
 - b. **Labor and Workforce Development** – Co-chaired by Chris Hadfield, of MnSCU's Technology Center of Excellence and Council member Patrick Weldon of Polaris. Reporting out today and at the December meeting. Co-chairs have formed a strong alliance over the last year so they're looking forward to sharing world-class expertise today.
 - c. **Data and Connectivity** – Co-chaired by Council member Damien Riehl and Frank Douma of the University of Minnesota. Vice-chaired by Eran Kahana. They have identified a short-term focus of looking at current and future state data needs. This group has reviewed national data perspectives, the Minnesota Government Data Practices Act and MnDOT's CAV data work. Discussing anonymization and de-anonymization and how public citizens can remain anonymous.
 - d. **Infrastructure Investment** – Co-chaired by MnDOT Assistant Commissioner Jay Hietpas and new Council member Bret Weiss of WSB. Will focus on how to invest in innovation, while also being required to operate and maintain our current system. Kick-off meeting is October 7th.
 - e. **Outreach and Education** – Co-chaired by Gina Baas of the Center for Transportation Studies and Katie Caskey of HDR, who is leading the state's comprehensive CAV survey. They've already developed a list of 11 deliverables to finalize this fall that support the CAV Strategic Plan's CAV communications and engagement goals. They are already collaborating with local, regional and national partners. They're working on a committee work plan, including how to advance the completion of the Statewide CAV Messaging and Engagement Plan.

Chair Anderson Kelliher recognized Joel Skelley and Lindsey Douglas, from Kansas DOT, and Adam Shell of Iowa DOT, of the Mid-America Association of State Transportation Officials (MAASTO) and AASHTO.

The Council approved the May 26th meeting minutes after moved by Ryan Daniel moved and seconded by Damien Riehl seconded

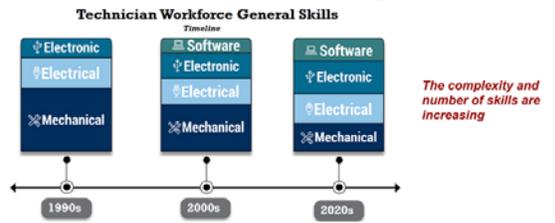
3. Labor and Workforce Development

- a. **Committee Updates**– Co-chairs of the Labor and Workforce Innovation Alliance committee, Chris Hadfield and Patrick Weldon provided an overview of the committee’s work. Members represent people across the state who have a vested interest in getting this right, from auto dealers to truckers, including workforce and data. Committee is looking at curriculum and STEM outreach, among other goals. The Committee is also looking at the “gig” economy workforce development. This addresses how CAVs need to be maintained and the training needed to skill that workforce. This is very important in the transition with conventional and automated vehicles. National certification and accreditation work is also being addressed, recognizing we need to leverage the other work that is taking place so we don’t “reinvent the wheel.”
- b. **Carnegie Mellon University (CMU) Robotics Training** – Vu Nguyen and Jesse Flot shared their “Stackable Micro-Credentials for Workforce Development” work with CMU/National Science Foundation to upskill veterans, low-income and displaced workers to develop automation and other technology skills. Their website is: www.cmu.edu/roboticsacademy. They study how robots can be used to teach computer science in K-12, vocational and higher ed.
- Working with 9 community organizations and 8 high tech employers, they’ve trained 3,500 teachers in a “train the trainer” model to reach diverse communities and to share knowledge and develop skills
 - Their research has led to “micro certifications” or “micro credentials” in 5 areas: mechanical, electrical, software, robotics, fabrication. They are also working on others including data, machine learning/vision, communications, and user interfaces. They worked directly with industry to identify these needs.
 - Their program is adaptable to impacts of Covid-19, by using remote facilitation, remote interviews, and sending hands-on kits to develop skills. To implement this work, they work with community organizations, curriculum certification and job interview training. Contact cmra@nrec.ri.cm.edu.
 - They work with K-12, vocational and other schools, but are targeting ages 18-24 who may not have been successful in traditional high school or 4-year educational path.
 - Curriculum is available for free. **CMU will follow-up with some of their resources. Their published findings are on their website.**
 - Certifications are awarded not through an exam, but by taking pictures of their work progress and final products. For example: video of the robot completing a task; software code; pictures of fabricated metal, with the goal to create a portfolio. Employers can directly view the portfolio thru a QR code.
 - This program can be scaled by a ‘train the trainer’ model, partnering with community organizations. Important to ensure trainers are well-equipped to train and teach effectively and be able to offer certifications.
 - They have 5 kits: (1) “Mechanical Foundations” uses a popular robotics kit with motors to learn “mechanical/mechanistic thinking” which is the most expensive; (2) “Fabrication Foundations” includes parts to cut robot parts and bend metal and a 3D printer to learn how to make parts; (3) the “Electrical Foundations” kit has an embedded systems micro-controller, crimpers wires and others to learn basics of electricity and electronics; (4) “Software Foundations” includes an inexpensive robotics kit that allows students to modify and update code to use sensors; (5) “Robotics Integration” uses basic camera and machine vision systems. All kits fit on a desk.
- c. **CAV Middle-Skill Workforce Report** –Sara Crane, Research Program Manager, University of Michigan’s Economic Growth Institute discussed the evolution of middle-skill jobs such as technicians in their new Report. Steve Wilson, Director of the Economic Growth Institute, also attended. A copy of the report is found here: <https://economicgrowth.umich.edu/research/workforce-connected-automated-vehicle/>

- Main takeaway: The complexity and number of skills is increasing (see figure).
- CAV technicians include technical and soft skills. These technicians have to be nimble and more flexible. Technicians need to understand the complexities within these vehicles.
- There are 6 key skill areas: mechanical, electrical, electronic, data, software and systems (shown below).
- New skills include “Mechatronics”: mechanical + electronics. This also includes mechanical, electronics, electrical, computers systems and more. Community colleges are starting to offer classes in: robotics, automated equipment, or a combination of mechanical, electrical fluid power and computer robotics classes.
- Industry wants more than 1 skill, shown in the figure below. Right now there are no technicians that have all these skills. Industry is building teams with multiple individuals that together have all these skills.
- Industry needs base skills like mechanical, electrical and electronic, and is missing skills like software and data.
- What do we need in the next 5 years? Base skills, enhanced, and emerging skills, as shown in the below figure.
- Soft skills are also vital: communications, task management, collaboration, problem-solving and passionate interest. Gaps in soft skills include: problem-solving, influencing others and diplomacy.
- Takeaways – Traditional skilled trades jobs are changing, no disappearing. Skillsets are increasingly complex, but can be acquired. This work may not require more schooling. Not feasible to get these skills in a 2-year degree, but can continue development and lifelong

Middle Skill Jobs

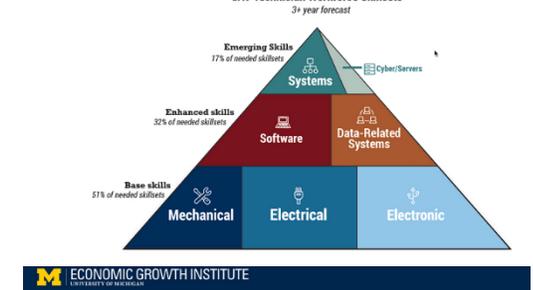
Technicians comprise the majority



Technical Skillsets

MECHANICAL <ul style="list-style-type: none"> Comprehensive understanding of vehicle Wrenches and other tools to assemble and disassemble vehicle Fabrication skills 	ELECTRICAL <ul style="list-style-type: none"> Electrification Batteries Inverters Boosters High-voltage Electromechanical Hybrid motors 	ELECTRONIC <ul style="list-style-type: none"> Sensors, extrinsic calibration Power control electronics Vision/Video systems EMC electromagnetic understanding
DATA-RELATED SYSTEMS <ul style="list-style-type: none"> Data acquisition A to D converters CAN Wireless, V2X, V2V, V2I Telematics 	SOFTWARE <ul style="list-style-type: none"> Understanding coding languages Ability to run and alter programs for testing, as needed Upload and download new software into the vehicle or component 	SYSTEMS <ul style="list-style-type: none"> Linkages between the systems Collaborative Components Inputs & Outputs Feedback loops Problem solving (soft skill)

CAV Technician Workforce Skillsets



d. **How States Can Leverage Workforce Data**– Dawn Thompson, Director of Strategy, Marketing and Programs, American Center for Mobility discussed how states can use this CAV workforce data to develop programs, and plan for the future.

- Michigan’s CAV Advisory Council now transitioned to a State Office, which focuses on 6 key objectives: investment, infrastructure, more mobility startups, workforce, accelerate adoption, bolster manufacturing.
- ACM is a start-up that works on **technology** development, **standardization** and policy, and **education** and workforce development.
- ACM plans to use this workforce data with its Workforce Advisory Board, which includes K-12, higher ed, industry, and academia. They are mapping programs.

- Members noted the importance of highlighting cybersecurity awareness as these threats are much larger than taking down websites or stealing data
- e. State of MN DEED CareerForce** – Jackie Buck, Director of Workforce Strategy, and Adesewa Adesiji, Workforce Strategy Consultant, shared how DEED develops workforce solutions and labor market data and research.
- This is Workforce Development Month, as declared by Gov. Walz.
 - 2019 job vacancy survey showed over 5,000 motor vehicle operator vacancies, with nearly half in the metro area.
 - Currently there is no “CAV” occupation, but DEED has reviewed other similar occupations, including auto service technical, bus operator, electronic engineers, mechanical engineers, electrical and electronic engineering, etc.
 - When DEED works with employers, it uses data job classification data to understand what organizations it should be working with to ensure employers recruit and retain talent.
 - DEED has several resources to support this work: (1) 5 Statewide workforce strategy consultants; (2) Coursera and online learning; (3) customized training programs through MnSCU (minnstate.edu/ws/index.html); (4) Minnesota Works; and (5) coordination with other agencies like MnIT. DEED also partners with the statewide Workforce Development Boards, nonprofits, Chamber of Commerce and industry associations. To move the MJSP forward, DEED simply needs one employer and one educator.
 - **Funding opportunities:** [Minnesota Job Skills Partnership](#) (MJSP), Job Training Incentive Program (JTIP), [Pathways to Prosperity grants](#), Dislocated Worker grants, local and community grants.
 - DEED is willing to join the CAV Innovation Alliance Workforce and Development Committee.
- 4. Council Discussion** – To preserve opportunities for the public to comment, the Council was asked to take notes from today and continue the conversation at the December meeting. The Labor and Workforce Committee will be hosting continued conversations.
- 5. Opportunity for Public Comment**
- Daryl Taavola, AECOM – AECOM is supporting White Bear Lake in a level 4 autonomous shuttle project, where they are collaborating with Century College, the University of Minnesota and White Bear Lake High School.
 - Tammy Meehan Russell, Plum Catalyst – Wants to meet with DEED and Workforce and Labor Committee to discuss a “gig economy” idea to create on-demand paid training for technicians.
 - Laurie McGinnis, University of Minnesota, CTS – University is seeking a grant on this topic.
- 6. Closing**
- CAV Office will add Michael Wenger (wengermich@gmail.com) and Jackie Buck to the Innovation Alliance Committee on Labor and Workforce Development.
 - MnDOT CAV Office announced their new partnership with California’s Contra Costa Transportation Authority with an MOU that will allow sharing of data and testing.
 - MAASSTO CAV eSummit held October 22-23, hosted by MnDOT. Contact Kristin White or Tara Olds for more meeting information.
 - Texas Mobility Summit is being held virtually next week.
 - Next council meeting is scheduled for December 16th, 2020 from 10.00-12.30 pm.
 - Chair Anderson Kelliher thanked the speakers and members for the energizing discussion and engagement.