

CONNECTED AND AUTOMATED VEHICLES TASK FORCE REPORT

Overview

The Connected and Automated Vehicles (CAV) Task Force is a forum for dialogue and collaboration among transportation agencies, regulators, businesses, academics and industry organizations. Its purpose is to help TAC members respond to and benefit from the development and application of connected vehicle (CV) and automated vehicle (AV) technologies, with an emphasis on optimizing outcomes for public health and safety, mobility, economic prosperity and environmental sustainability in both urban and rural environments.

The Task Force's roster (see Appendix A) includes up to 34 voting members representing TAC councils (5), federal/provincial/territorial governments (14), municipal/regional transportation authorities (10) and business/academia (5), plus up to 15 non-voting members representing invited partner organizations. A small number of seats are currently vacant.

The Task Force's Terms of Reference (see Appendix B) were approved by the Board in October 2018.

Activities

The CAV Task Force held its inaugural meeting on Friday, April 5 at TAC's 2019 Spring Technical Meetings in Ottawa. Since that date, Task Force members have worked with the Secretariat on the initiatives described below.

CAV Discussion Paper

In late 2018, TAC issued a request for proposals to prepare a Connected and Automated Vehicles Discussion Paper, enabled by the Board's allocation of reserve funds. Seven proposals were received, and IBI Group was selected as the preferred consultant. IBI's project leader presented some preliminary findings to the CAV Task Force meeting in April 2018. TAC recently made IBI's full report available through the "Publications and Resources" page of its website, and a bilingual Executive Summary has been provided to Board members with respect to meeting agenda item 6(e).

The discussion paper's principal audience is internal—TAC's Board of Directors, CAV Task Force, councils and committees. It will build their awareness of key issues, help them understand their respective roles and relationships, and inform the development and implementation of technical work over the next three to five years. The report addresses two overarching issues:

- *What is TAC's overall role within the CV/AV ecosystem?* The answer to this question is informed by stakeholder interviews, a literature scan, and an examination of comparable jurisdictions. It considers the roles and interests of TAC's key partners and stakeholders, TAC's vision and mission as identified in its *Strategic Plan*, and the needs of TAC members.
- *What are the most important technical issues to be addressed by TAC, and what are the associated responsibilities of TAC's internal bodies?* The answer considers TAC's role in the CV/AV ecosystem, the state of CV/AV technology development and application, technical concerns of TAC councils and committees, TAC's *Strategic Plan*, and the established roles of TAC bodies.

The CAV Discussion Paper provides a detailed description of Canada's CAV ecosystem, which comprises many stakeholders (governments, standards development organizations, technical organizations and businesses) that are actively developing vehicle, infrastructure, and road user systems. The discussion paper suggests that TAC has two major roles (helping TAC members enable the operation of CVs and AVs; and

helping TAC members manage the use of CVs and AVs) and it suggests almost 40 possible actions within the realms of oversight, providing guidance, or collaborating and sharing with partners.

CAV Resource Development

In addition to the CAV Discussion Paper, TAC is developing three important CAV resources that will be made available through its website:

- A lexicon of terms that will help non-specialists to understand and apply common CAV technical terms
- A concise list of important CAV publications and information hubs that are relevant to Canadian practitioners
- A detailed, descriptive inventory of almost 100 CAV initiatives in Canada, initially created by the Federal/Provincial/Territorial Coordinating Council on Automated and Connected Vehicles (which reports to the Council of Deputy Ministers Responsible for Transportation and Highway Safety, and which has agreed to let TAC publish and maintain the inventory)

Project Development Subcommittee

This volunteer subcommittee was formed after the CAV Task Force meeting in April, and is developing a list of possible projects for consideration by the Task Force; it is worth noting that such projects would be undertaken by the Task Force only when they lie outside the scope and mandate of TAC's current councils and committees.

Fall Technical Meetings

The CAV Task Force will hold its second meeting in Halifax on the afternoon of Friday, September 20, 2019. Major agenda items will include:

- An overview of the CAV Discussion Paper
- A presentation on the Ontario Ministry of Transportation's GTHA and Waterloo Corridor CAV Readiness Project
- A presentation from the Ville de Montréal on its smart corridor and autonomous shuttle pilot project
- Updating the Task Force's work plan, including the addition of a monitoring tool to track key technical issues within TAC's mandate, lead councils/committees, and actions taken
- Roundtable updates and discussion among members

TAC-ITS Canada Joint Conference Sessions

The conference will include several presentation sessions, panel discussions and a workshop on CV/AV topics. ITS Canada's CAV Technical Committee, which includes members of the CAV Task Force, has led planning work.

- Preparing for CAVs, Part 1: Technical Challenges and Developments
- Preparing for CAVs, Part 2: Readiness Planning and Pilot Projects
- Road Authority Consultation Workshop for Connected Vehicle Infrastructure
- Federal Initiatives to Support ITS Research, Development and Deployment
- Results from AV/CV Testing and Trials in Canada
- Connected Vehicle: The Future of the Mobility

APPENDIX A – ROSTER: CONNECTED AND AUTOMATED VEHICLES TASK FORCE**EXECUTIVE**

- Chair – Garreth Rempel, MORR Transportation Consulting
- Vice-Chair – Kenedee Ludwar, British Columbia Ministry of Transportation and Infrastructure
- Board Liaison – Garreth Rempel, MORR Transportation Consulting
- Secretary – Geoff Noxon, TAC

VOTING MEMBERS**TAC Councils**

- Chief Engineers' Council – Chris Brinkmann, City of Ottawa
- Urban Transportation Council – Anna Mori, IBI Group
- Environment Council – Darren Carter, Alberta Transportation
- Education & Human Resources Development Council – Carl Clayton, IBI Group
- Small Municipalities Task Force – Mark Hearson, Stantec Consulting

Federal/Provincial/Territorial Governments

- Alberta Transportation – Walter Espinoza
- British Columbia Ministry of Transportation and Infrastructure – Kenedee Ludwar
- Manitoba Infrastructure – Nicole Fleury
- Ministère des Transports du Québec – David Johnson
- New Brunswick Department of Transportation – Ahmed Dassouki
- Newfoundland and Labrador Transportation and Works – Bill Hillier
- Northwest Territories Department of Infrastructure – Binay Yadav
- Nova Scotia Transportation and Infrastructure Renewal – Mike Croft
- Ontario Ministry of Transportation – Sheri Graham
- Prince Edward Island Transportation, Infrastructure and Energy – Stephen Yeo
- Saskatchewan Highways and Infrastructure – Len Frass
- Transport Canada – Ken Moshi
- Yukon Department of Highways and Public Works – Sandra MacDougall

Municipal/Regional Transportation Authorities (*1 vacant seat*)

- Autorité régionale de transport métropolitain de Montréal – Faegheh Amirarfaei
- City of Calgary – Andrew Sedor
- City of Hamilton – Chris King
- Ville de Montréal – Hugues Bessette
- City of Ottawa – Kornel Mucsi
- Region of Peel – Sabbir Saiyed
- City of Toronto – Ryan Lanyon
- TransLink – Andrew McCurran
- City of Vancouver – Geoffrey Keyworth

Business/Academia

- AECOM – Edward Stubbing
- MORR Transportation Consulting – Garreth Rempel
- Morrison Hershfield – Bassam Hamwi
- Polytechnique Montréal – Nicolas Saunier
- WSP – Geoff Knapp

NON-VOTING MEMBERS**Invited Organizations** *(5 vacant seats)*

- Canadian Council of Motor Transport Administrators (CCMTA) – Allison Fradette
- Canadian Institute of Planners (CIP) – Harry Burchill
- Canadian Institute of Transportation Engineers (CITE) – Steven Kemp
- Canadian Urban Transit Association (CUTA) – Wendy Reuter
- CSA Group – Peter Glowacki
- Federation of Canadian Municipalities (FCM) – Jean Lawson
- FPInnovations – Édouard Proust
- Global Automakers of Canada (GAC) – David Adams
- ITS Canada – David Michelson
- National Research Council (NRC) – Barry Pekilis

APPENDIX B – TERMS OF REFERENCE: CONNECTED AND AUTOMATED VEHICLES TASK FORCE

MANDATE

The Connected and Automated Vehicles (CAV) Task Force is a forum for dialogue and collaboration among transportation system owner-operators, regulatory bodies, private businesses, industry organizations, and academia. Its overarching purpose is to help TAC members respond to and benefit from the development and application of connected vehicle and automated vehicle (CV/AV) technologies, with an emphasis on optimizing outcomes for public health and safety, mobility, economic prosperity and environmental sustainability in urban and rural communities.

The CAV Task Force embodies the determination of TAC's councils, committees and members to meet several substantial challenges posed by the emergence of CV/AVs:

- Wide-ranging impacts on the mandates of TAC members, combined with a rapid pace of change and broad uncertainty in many areas
- Shared interests between many TAC councils and committees, and new issues arising outside their conventional scope of interest
- Shared interests between TAC and many external organizations that could require the development of new or closer relationships

ROLES AND OBJECTIVES

Role #1: Connect

- Provide a forum for TAC councils and committees to share perspectives on CV/AVs
- Help TAC councils and committees to identify collective concerns, gaps and opportunities

Role #2: Inform

- Collect and share information on CV/AV activities of TAC councils and committees
- Collect and share information on CV/AV activities of external organizations

Role #3: Guide

- Identify critical gaps for TAC members to address through collaboration
- Encourage TAC councils and committees to integrate CV/AV issues in their work plans and projects

Role #4: Represent

- Liaise with external organizations to inform them about TAC activities, learn about their activities, and identify shared or divergent interests
- Encourage involvement and membership in TAC by CV/AV industry stakeholders (e.g. automakers, software companies, telecommunications providers)
- Collaborate with external organizations on joint initiatives or events

SCOPE AND ACTIVITIES

The technical topics within the scope of the CAV Task Force may include the implications of CV/AV implementation for:

- Transportation infrastructure planning, design, construction, operation, maintenance and financing, including cross-border issues
- Vulnerable road user safety, accessibility and levels of service

- Transit, parking, goods movement and land use
- Electric vehicles and shared mobility services
- Information and communication technologies
- Data collection, management and access
- Cyber security and privacy
- Personnel training and development

Where responsibility for a topic falls within the mandate of a TAC council or committee, the CAV Task Force works with that body to ensure appropriate consideration. Note that the CAV Task Force may monitor policy to determine technical implications, and may support policy development by illuminating technical requirements; however, it does not make policy recommendations.

Deliverables and activities conducted or sponsored by the CAV Task Force may include:

- Reports to TAC councils and committees, TAC members, and external organizations describing CAV Task Force discussions and initiatives
- Reports to TAC members describing CV/AV-related activities of external organizations
- Reports to external organizations describing CV/AV-related activities of TAC councils and committees
- Volunteer or pooled-fund projects such as white papers, best practice syntheses, technical guidelines, or inventories of CV/AV activities (e.g. research projects, pilot tests, legislation)
- TAC learning events such as conference sessions, webinars and seminars
- Meetings, projects or events conducted in collaboration with external organizations

SUPPORTING COMMITTEES

The CAV Task Force may establish subcommittees by approving terms of reference. Supporting committee chairs attend Task Force meetings to report on progress and receive direction. Subcommittees are expected to have mandates that focus on administrative or functional issues, rather than technical or substantive areas, and may provide support in areas such as:

- Sharing knowledge—by directing TAC stakeholders to helpful information sources, drafting TAC News articles, identifying webinar topics and speakers, suggesting or organizing conference sessions
- Creating knowledge—by identifying possible volunteer or pooled-fund technical projects, and supporting or leading the development technical project descriptions
- Building and maintaining relationships—by liaising with TAC councils and committees (e.g. surveying members to identify key issues), and with external organizations (e.g. attending CV/AV-related meetings, gathering information on their activities, sharing information on TAC's activities)

REPORTING

The Task Force reports to the TAC Board of Directors, and contributes to the formulation of TAC programs and strategic directions by submitting a semi-annual written report to the Board, and by delivering a verbal report to the Board on Task Force priorities, activities and recommendations during TAC's spring and fall technical meetings.

The Task Force also provides a semi-annual written report to TAC councils and committees, and may make in-person presentations to councils as warranted and feasible.

MEMBERSHIP

CAV Task Force voting and non-voting members are invited and confirmed by the Executive.

Voting members

CAV Task Force voting members have the right and responsibility to vote on Task Force matters; a voting member who cannot attend a meeting may delegate their vote to another representative of their organization. The Task Force has up to 34 voting members who are employees of TAC member organizations:

- Standing members (one representative each; no term limit)
 - TAC councils and the Small Municipalities Task Force (5)
 - Federal/provincial/territorial transportation departments (up to 14)
- Rotating members (one representative each; two-year term renewable at the Executive's discretion)
 - Municipal/regional transportation authorities (up to 10)
 - Private businesses or academic institutions (up to 5)

Non-voting members

The CAV Task Force also has a number of non-voting individual and organizational members who may not be employees of TAC member organizations:

- Invited advisors (one-year term renewable at the Executive's discretion)
 - Individual experts (up to 5)
- Invited organizations (one representative each; no term limit; this list subject to change)
 - American Association of Highway and Transportation Officials (AASHTO)
 - Association québécoise des transports (AQTr)
 - Canadian Council of Motor Vehicle Administrators (CCMTA)
 - Canadian Institute of Planners (CIP)
 - Canadian Institute of Transportation Engineers (CITE)
 - Canadian Standards Association (CSA)
 - Canadian Urban Transit Association (CUTA)
 - Canadian Urban Transit Research and Innovation Consortium (CUTRIC)
 - Canadian Vehicle Manufacturers' Association (CVMA)
 - Canadian Wireless Telecommunications Association (CWTA)
 - Council of Deputy Ministers Responsible for Transportation and Highway Safety
 - Federation of Canadian Municipalities (FCM)
 - Global Automakers of Canada (GAC)
 - Information and Communications Technology Council (ICTC)
 - Intelligent Transportation Systems Canada (ITS Canada)
 - International Municipal Signal Association (IMSA)
 - International Standards Organization (ISO)
 - National Association of City Transportation Officials (NACTO)
 - SAE International

Friends

In addition to voting and non-voting members, the CAV Task Force also maintains an unlimited number of friends who are members of TAC and may access information on Task Force meetings.

Member participation

All CAV Task Force members are expected to attend in-person meetings and participate in Task Force activities. The Task Force Executive monitors and identifies inactive members who are unable to attend two

consecutive in-person meetings or otherwise participate actively in Task Force business for one year. Employers of inactive members may be asked for a replacement nominee.

Member diversity

The CAV Task Force provides balanced representation of governmental, non-governmental and private-sector organizations, and of different regions within Canada. While members are generally appointed by external organizations, they ideally exhibit diversity of gender, age and ethnicity.

EXECUTIVE

The CAV Task Force Executive comprises a Chair, Vice-Chair, Past Chair (once the initial Chair has been replaced), and a Board Liaison who is appointed by the TAC Board of Directors. A representative of the TAC Secretariat is appointed by senior management to act as Secretary.

Responsibilities*Task Force Executive*

- Reviews the Task Force's membership and Terms of Reference
- Reviews and approves semi-annual reports from the Task Force to the TAC Board of Directors
- Provides input to and approves meeting agendas
- Refers any requests for official TAC positions to the TAC Secretariat
- Liaises with external organizations, in collaboration with the TAC Secretariat
- Acts on behalf of the Task Force between meetings
- Conveys the Task Force's recommendations for conference sessions, panel discussions and workshops to the TAC Secretariat
- Ensures abstracts and full papers for conference sessions are reviewed with comments provided to the TAC Secretariat
- Coordinates the development of conference panel discussions and workshops

Chair

- Chairs meetings
- Reports to the TAC Board of Directors
- Liaises with the Chairs of TAC councils
- Delegates responsibilities to Vice-Chair and other Task Force members as necessary
- Reviews conflict of interest guidelines with members

Vice-Chair

- Provides updates on Task Force activities to TAC councils and committees when requested and reasonable

Term and Replacement

The Chair, Vice-Chair and Past Chair each serve a two-year term with the transition immediately following a fall meeting. At the completion of the term, the Chair becomes Past Chair and the Vice-Chair becomes Chair.

If the Chair is unable to complete their term, the Vice-Chair becomes interim Chair and begins a two-year term as Chair following the Task Force's next fall meeting. The Past Chair remains in office during that two-year term, when possible.

If the Vice-Chair is unable to complete their term, or is required to become Chair, the Task Force elects a replacement at the earliest possible date, and by electronic ballot if required, to ensure the Task Force always has a sitting Chair and Vice-Chair.

Election of Vice-Chair

At the spring meeting prior to completion of the Executive's two-year term, the Past Chair (or the Chair, if no Past Chair is active) strikes a Nomination Committee to receive member recommendations or expressions of interest in the Vice-Chair position, and to nominate a candidate or candidates for Vice-Chair for the upcoming term. The Nomination Committee typically comprises the Task Force Executive and two voting members at large. At the final Task Force meeting of the term, a Vice-Chair is confirmed and elected by the Task Force. In the case of a single candidate being nominated, a vote is taken through show-of-hands to accept that nomination. In the case of multiple candidates, a vote is taken electronically in advance of the fall meeting through secret ballot administered by the TAC Secretariat of all Task Force voting members with the exception of the Chair; in case of a tie, the Chair casts the deciding vote. Prior to announcing multiple candidates, the nomination committee approaches each candidate to ensure their willingness to participate in an anonymous vote, and to request a statement of candidacy for consideration by voting members.

MEETINGS AND COMMUNICATIONS

The Task Force holds in-person meetings twice a year, during TAC's spring and fall technical meetings; any TAC member may attend. The Task Force Executive holds teleconferences between in-person meetings, as needed. The Secretary (a TAC Secretariat representative) is responsible for communicating with Task Force members on behalf of the Task Force Executive and/or TAC Secretariat between in-person meetings, using e-mail and online platforms.

VOTING AND APPROVALS

Approvals by the Task Force (except those related to products for publication or the Task Force's Terms of Reference, as discussed below) require the support of a simple majority of those voting members present.

Approval of products for publication

Task Force products to be published by TAC must be approved by the Task Force; national technical guidelines for road transportation must be approved by the Chief Engineers' Council.

Deliverables in the final stage of development are presented to the Task Force at a spring or fall meeting, having been made available to Task Force voting members in advance, for their review. In-person votes to approve products for publication require a quorum of at least 66% of voting members to be present, and at least 75% of votes cast by show-of-hands must be in favour. Where quorum does not exist, an electronic ballot is conducted after the meeting; approval requires at least 66% of voting members to cast a ballot, with at least 75% of votes cast in favour.

Approval of Terms of Reference

To amend the Task Force's Terms of Reference, a quorum of at least 66% of voting members must be present and at least 75% of votes cast by show-of-hands must be in favour. Where quorum does not exist, an electronic ballot is conducted after the meeting; approval requires at least 66% of voting members to cast a ballot, with at least 75% of votes cast in favour.