The Alpheus Group

Senate Standing Committee on Transport and Communications (TRCM)

Wednesday, February 8, 2017
6:45 pm to 8:00 pm
Rm. 2, Victoria Building

Topic of Debate:

1. Study on the regulatory and technical issues related to the deployment of connected and automated vehicles

Meeting Highlights:

- The committee met today for its study on the regulatory and technical issues related to the deployment of connected and automated vehicles. They heard from witnesses from Transport Canada, who updated the committee on Canada's current status in this disruptive realm.

- In her opening testimony assistant deputy minister Catherine Higgens made it clear that the government is still in the very early phases of this work. However, a few trends emerged. It became apparent that Canada is unlikely to see these vehicles on our roads in the next few years as they must be tested in Canada's cold climate.

- Ms. Higgens also identified the regulatory issues that are associated with the new technology, emphasizing that while the government is still in the early phases of studying both what the regulations should be and who should be responsible for them, it is certain that they must be in line with international standards and must function in tandem with the United States' approach. The United States have already begun to establish some guidelines.

- Another key point Ms. Higgens noted is that new players are entering the transportation realm, such as Samsung, and as a result guidelines must be built with the careful coordination of not only of the different levels of government and countries, but also with different kinds of industry players.

- Key concerns raised in the committee surrounded regulation and safety. The committee worried about potential security threats, such as hacking, as well as data privacy. The witnesses explained that there would be fail safes in place and potential approaches such as those used with cellphones would be considered.

- The most frequently aired concern surrounded regulation and jurisdiction. The committee was concerned about what regulations would be established, who would be establishing them and who would be responsible for them. The closest thing to an answer that the witnesses were able to provide was that Transport Canada is working diligently and globally to establish some sort of regulatory framework in conjunction with the United Nations, the United States, different levels of Canadian government and industry associations. However, Transport Canada is currently studying the issue and has yet to establish anything firm.

Committee Business:

None.

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Witnesses in Appearance:

Organization/Department	Individual	Title/Position
Transport Canada	Catherine Higgens	Assistant Deputy Minister, Programs, Programs Group
	Craig Hutton	Director General, Strategic Policy, Policy Group
	Kim Benjamin	Director General, Road Safety and Motor Vehicle Regulation, Safety and Security Group
	Ryan Klomp	Acting Senior Director, Environmental and Transportation Programs, Programs Group

Witness Testimony / Overview:

Catherine Higgens (Assistant Deputy Minister, Programs, Programs Group, Transport Canada) told the committee that this work is timely, as globally transportation systems are being transformed by emerging and disruptive technologies. She explained that there are numerous benefits to real-time vehicle connectivity and automation, explaining that these benefits are encouraging economies with significant automotive industries to develop policies and modernize their regulatory frameworks to incorporate connected and automated vehicle technologies. She then defined some terminology. She explained that connectivity, or connected vehicles, use wired and wireless technology to allow vehicles, transportation infrastructure, and road users to exchange information in real time. She then told the committee that automation refers to the use of in-vehicle technologies, such as sensors, cameras, GPS, and digital maps to allow vehicles to navigate by taking over some or all driving functions. She noted that connectivity and automation are not competing technologies, but rather are highly complementary and also explained that as a result of this innovation, non-traditional players are entering the automotive market. She relayed that higher, "value added" vehicle development is shifting away from vehicle assembly and towards information-communication-technologies. Higgens added that there is also a shift towards "mobility as a service," explaining that users of the transportation system increasingly expect seamless mobility that is driven by connectivity. This means ride-sharing companies (like Uber) are becoming global in scope and redefining how we perceive mobility. These trends and technologies will bring about changes in the mobility of both goods and people, transportation accessibility and efficiency, as well as land use and employment. Higgens then moved onto the challenges that will be faced in this transition and asserted that driving requires the ability to read traffic signs, operate in inclement weather, anticipate the actions of other road users and negotiate unpredictable situations like construction zones. She admitted that full automation, a vehicle capable of driving door-to-door under any condition, may be a decade or more away. It is more likely that we will see incremental automation in our vehicles over the next several years. She noted that governments, industry and other stakeholders will need to work together to establish standards for assessing the performance of full automation. Also explained that questions such as how well a system needs to perform before it is considered safe enough to drive without a human operator present and how an automated vehicle should operate if it encounters a situations where it is unable to navigate are questions that will need to be answered. Moving forward, transportation will become increasingly embedded in Canada's critical digital infrastructure. She added that modern vehicles depend on electronic systems, admitting that the shift to software systems will contain potential cybersecurity vulnerabilities that need to addressed. Work in this regard is underway. Higgens indicated that the government will also need to address issues of data privacy and ownership moving forward. With regard to the future, she explained that the United States, Europe and Japan have invested significantly in connected and automated vehicle test-beds and deployment initiatives. Some jurisdictions are also moving forward with regulatory action and providing deployment guidance to industry. As an example, she mentioned that the United States has published a proposed rule which will require all new light-duty vehicles to contain "vehicle-to-vehicle communication capabilities for safety." The United States have also published a federal *Automated Vehicle Policy* to speed up the delivery of an initial regulatory framework and to provide best practices to guide manufacturers and other entities in the safe design, development, testing and deployment of automated vehicles. If Canada is to keep pace, it will have to recruit highly trained people with new skills as well as support the development of smart-infrastructure and communications technologies. This, Higgens noted, will require collaboration between all levels of government in Canada, industry, academia and the public. It will also be important to ensure Canada's transportation system is ready for the introduction of connected and automated vehicles, noting that cross border

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interoperability will have to be maintained with the United States. She cautioned against the potential patchwork of regional and local laws and practices that could hinder industry's deployment efforts, suggesting that government leadership could preempt such issues. Higgens outlined that no single level of government or department is responsible for all aspects of connectivity and automation in transportation – everyone has a role to play, including industry associations. Canadian policy and regulatory approaches must also align and complement emerging international standards. She pointed out that the G7 Transport Ministers have agreed to work jointly to support developments in the field of automated and connected driving with the objective of making a significant contribution towards increasing road safety and improved mobility worldwide. Canada is participating in the G7 Transport Minister's working group and work is also happening with the United Nations World Forum for Harmonization of Vehicle Regulations to represent Canada's interests in collaboration with the United States. In closing, she emphasized that promoting innovation in the transportation sector is a key element of Minister Garneau's *2030 Strategy*. She insisted that achieving this decision will require Canada to develop and maintain a profound understanding of the issues and impacts of disruptive technologies to ensure that Canada is able to proactively exploit opportunities, address challenges, and leverage the full potential of these technologies.

Questions for Witnesses:

Pierre Hughes-Boisvenu (Conservative) pointed out that the report seems quite general. He wondered where Canada stands today, what Transport Canada's role is and who within the government is managing the file. He said that this will be a transportation revolution, but he doesn't feel that the current information they've received from the department adequately captures where the government is heading with all of this. He then asked whether Transport Canada is in touch with the provinces and manufacturers in order to understand what their respective plans are. He wondered whether there are strategies in place as to how to make the transition and expressed his opinion that Transport Canada is being quite passive on the file.

Catherine Higgens (Assistant Deputy Minister, Programs, Programs Group, Transport Canada) explained that from the government's perspective, they feel they can make an important contribution by focusing on new technologies and fostering a progressive and flexible regulatory approach for bringing these products to market. She added that the Department will integrate tests to pilot the technologies in Canadian, real-world settings. She explained that such testing is critical for understanding how Canada will take advantage of these technologies. She noted that they can work with their counterparts to develop parameters within which the industry can then bring forward technologies. She expressed that the United States and Japan have moved forward with some testing, but explained that Transport Canada is currently working to understand how best to take advantage of this technology in the Canadian context. She added that one company created an innovation center in Ottawa to build and consolidate its position in the development of these technologies, and she explained that the government is in contact with them to understand their needs. She noted that the government is also working with universities on the development of a test bed in order to test out these products in Canada. She explained that this is a demonstration that is going on as they speak. She added that some universities also have centres of excellence to explore the new technology.

Kim Benjamin (Director General, Road Safety and Motor Vehicle Regulation, Safety and Security Group, Transport Canada) described two sides to the regulatory framework: the context and the framework itself. She explained that they work with their European partners to understand the building blocks for how these standards will look in order to make sure they work in the Canadian context. She added that a lot of the actual technical standards are developed on a multilateral basis, adding that Transport Canada participates in ISO working groups and work with their European partners in the development of new technical standards that are the building blocks of how these technologies will move forward. They do this so they can ensure that, once developed, the global standards are ones that will work in Canada. She explained that they also made changes to the *Motor Vehicle Safety Act* two years ago to allow them to incorporate, by reference, standards once they are developed so Transport Canada does not have to develop new standards by themselves. She added that they are also conducting testing in Quebec to make sure they understand that technologies being built elsewhere will work in Canadian conditions. There is a working group set up by the Council of Ministers that is pulling together representatives of different groups to ensure that there is no duplication of efforts. She explained that Transport Canada is still gathering information to more readily understand what to do next. The next phase of regulations will be on the braking side, then will explore how to ensure you are in the correct lane.

Norman Doyle (Conservative) pointed out that the United States appears to have taken the lead in this industry. He wondered whether, given the new United States' wish to renegotiate NAFTA, that will change the integration of United States and Canada's automotive industry. He then asked about the infrastructure that will be needed to handle the infrastructure requirements of urban versus rural areas in Canada. Lastly, asked about potential job loss.

Catherine Higgens (Assistant Deputy Minister, Programs, Programs Group, Transport Canada) responded that it is too early to tell what the United States government intends to do with respect to NAFTA, but these concerns are in the forefront of officials' minds. She explained that there is a good foundation to build on between the two countries. She also noted that Ontario has moved ahead and created a policy for on-road testing of automated vehicles which she said will help to inform the Department as to what they need to focus on and how to regulate. Also pointed out that in the Fall Economic Statement, the government announced its intention to launch a smart cities challenge which will encourage innovation. She explained that they will gain more information about infrastructure requirements from this. Lastly, she identified that disruptive technologies disrupt quite a few things, including jobs. However she pointed out that there are strengths in Canada with respect to R&D and information and technologies, explaining that there will be opportunities in this area. There will be changes in areas such as drivers.

Terry Mercer (Liberal) asked about jobs, trade, and privacy, wondering where Canada's innovation is in this area. He worried about privacy implications of automated vehicles. He then touched on safety, worrying that unless all vehicles on the road have connectivity they could be left out of the vehicle to vehicle communications. He wondered if that is a concern. He also asked how well the system needs to perform before it is deemed safe enough to drive and how a vehicle should behave if it encounters an area where it cannot drive safely, wondering who will be responsible for answering such questions.

Catherine Higgens (Assistant Deputy Minister, Programs, Programs Group, Transport Canada) responded that they need to engage the public with respect to the disruptive concerns relating to this technology. She noted that privacy has been discussed at the international level, identifying that there are technical players in Canada that are strong in this regard and could look into it.

Ryan Klomp (Acting Senior Director, Environmental and Transportation Programs, Programs Group, Transport Canada) distinguished between two types of connectivities – vehicle to vehicle communications and in-vehicle technologies such as a DVD player. He explained that the vehicle to vehicle technology has privacy as a key factor of the system's development. He noted that they wanted to ensure that it would be difficult to track both individuals and their vehicles, recognizing that public acceptance is key and that this is an issue that will have to be approached holistically.

Kim Benjamin (Director General, Road Safety and Motor Vehicle Regulation, Safety and Security Group, Transport Canada) explained that most collisions that occur happen because of driver error as opposed to a vehicle issue. She explained that the idea that the car would let you know that you're about to hit someone could help to prevent issues arising from unconnected vehicles, and this technology would move forward in its efforts to diminish possible human error. She added that with respect to vehicle connectivity, one of the things the United States is looking at is that they want all new vehicles to have the technology built in, the idea being that slowly the fleet would transform into one where the technology is there. She said that there will be an incremental shift. There are also concerns being raised about how best to meet standards, identifying that there will have to be more variable methodologies. She explained that all the tests that they require a manufacturer to meet will have to be adjusted to meet the necessary standards of the new technology. Added that they are interested in the committee's recommendations in this regard. She identified that connectivity could also be brought into the vehicle through cell phones, indicating that the issue is being approached in a variety of ways.

Betty Unger (Conservative) explained that she took a ride on a bus with a connected vehicle in front of them, noting that the vehicle was speaking to them so much that she found it very distracting. She then touched on the issue of cost, wondering who will be able to afford these vehicles if connectivity is built into all of them. She also wondered how roads will need to be changed, asking what will happen to the trucks that use the roads now. She explained that when she experienced the connected vehicle, she noticed there was technology mounted on posts and buildings to speak to the car - pointing out that someone has to pay for all those and wondered how that's going to happen. She then identified that Transport Canada works with the United Nations World Forum for Harmonization of Vehicle Regulations and asked how closely Canada has been working with the United States, as they are likely to be Canada's biggest partner.

Kim Benjamin (Director General, Road Safety and Motor Vehicle Regulation, Safety and Security Group, Transport Canada) responded that they are looking at the human-vehicle interaction interface to reduce distraction. She also noted that when Transport Canada brings forth regulation, it is because there is a safety benefit to it. She explained that they must present that the life-saving technology will offset its costs through the fact that it saves lives. The cost benefit has to be positive. She told the committee that they go to the UN with the United States and try to ensure the Canadian standards are as closely aligned to the United States as possible, adding that they work very closely together. Explained that if there is a safety reason they might choose to have a difference between Canada's regulations and those of the United States, but they are working to try to be closely aligned.

Catherine Higgens (Assistant Deputy Minister, Programs, Programs Group, Transport Canada) touched on the issue of infrastructure, noting that it is critical. She added that sensors have to be built in to take into account weather and provide speed messaging. She explained that this is something that gets embedded in infrastructure. She then pointed out that what Senator Unger was speaking about was the test bed in Edmonton adding that it is a collaboration between Transport Canada, the provincial government and universities. She noted that congestion costs Canada $5 billion per year, noting that efficiency-increasing efforts have potential benefits for the economy at every level of government. She added that the benefit of the automated vehicle sector to Canada has been estimated as being as high as $65 million.

Ryan Klomp (Acting Senior Director, Environmental and Transportation Programs, Programs Group, Transport Canada) explained the importance of having the infrastructure, noting that having a system between the highways and roads and all other infrastructure will bring the concept into the 21st century with a digital overlay. He added that just having traffic lights timed with the movement of vehicles could save 2-5 per cent on fuel economy for vehicles. He also pointed out that the variable speed limits alone save another 5-13 per cent on fuel economy, particularly along very congested corridors. He explained that when you're able to deal with the whole transportation system together you can see the economic and safety considerations.

Art Eggleton (Liberal) referred to Ms. Higgens saying there is no single level of government responsible for this technology. He asked about coordination for all of this and wondered who does that. He then pointed out that Ms. Higgens said that the United States has published a federal automated vehicle policy to guide best practices and wondered if Canada will as well.

Craig Hutton (Director General, Strategic Policy, Policy Group, Transport Canada) explained that leadership in the deployment of this technology requires a large degree of coordination, including with technology players such as Samsung that are new to the transportation industry. He added that things like the Council of Ministers are essential for ensuring the work is being shared and coordinated as deftly as possible, touching on issues like licensing and asset management in the context of a variety of jurisdictions.

Kim Benjamin (Director General, Road Safety and Motor Vehicle Regulation, Safety and Security Group, Transport Canada) responded that yes, the United States has published their guidelines. She explained that Transport Canada is looking at the American guidelines as well as the Australian guidelines to determine the best regime for Canada. She noted that Transport Canada is looking at developing such a policy but are still in the studying phase. Stressed that she could not provide a date as to when that will happen yet.

Bob Runciman (Conservative) pointed out that technology is moving quickly and it is difficult to stay ahead of it, identifying that the policing and security concerns of this industry are a big challenge. He didn't have a question for the witnesses, but identified that the committee should put forth an interim report on policing and security of unmanned vehicles.

Patricia Bovey (Unaffiliated) asserted her fascination with the globalization of this subject, wondering how much Canada has to reinvent the wheel with regard to this technology and questioning what is already out there that Canada can simply build on. She noted that driverless cars are supposed to be road-ready in three years, noting her concern about the timing and wondering whether Transport Canada is looking at conducting all of the research themselves. She also hoped that the officials will look at the issue of ethics.

Kim Benjamin (Director General, Road Safety and Motor Vehicle Regulation, Safety and Security Group, Transport Canada) responded that they are collaborating, but there are regional concerns such as the legislative regulatory framework and the standards that go into that as well as determining what issues will be the responsibility of which level of government. She added that with respect to the timing, there is a range of views as to when the vehicles will arrive in Canada. She explained that a vehicle capable of driving in Nevada will not have such an easy time in the Canadian winter, adding that it is likely that Canada will not see these cars in three years.

Mike Duffy (Unaffiliated) asked whether there are industry players wanting to work in Canada now who are waiting on Transport Canada to finish its study in order to begin. He then touched on the fact that Google Street View and Uber have been able to develop driverless cars in areas with snow, wondering why that could not happen here. Lastly, wondered if there is a regulatory reason as to why Uber is not conducting the same driverless car tests in Canada as it has been conducting elsewhere.

Kim Benjamin (Director General, Road Safety and Motor Vehicle Regulation, Safety and Security Group, Transport Canada) responded that Transport Canada has not had industry come to the door with a proposal that indicates how they will undertake such work and maintain safety, so there has not been a request for exemption that includes any documentation for Transport Canada to look at yet.

Ryan Klomp (Acting Senior Director, Environmental and Transportation Programs, Programs Group, Transport Canada) explained that the Google car still has to have a human in the car, noting that testing these vehicles on the road is an important part of understanding how they will react in real-world situations. He said that he is not aware of any regulatory reasons that would preclude Uber from conducting such testing here.

Terry Mercer (Liberal) speculated as to whether or not Canada is ready to capitalize on these changes in terms of jobs for Canadians, but noted that the witnesses didn't need to answer. He also wondered why they are only working with universities in Ontario as opposed to elsewhere. Senator Mercer then touched on the issue of hacking, wondering what would happen if someone takes down the system when people are dependent on the vehicle.

Catherine Higgens (Assistant Deputy Minister, Programs, Programs Group, Transport Canada) explained that although she had only mentioned the work they've undertaken in collaboration with Ontario universities, many great universities across Canada are doing this work as well.

Ryan Klomp (Acting Senior Director, Environmental and Transportation Programs, Programs Group, Transport Canada) noted that there are ways for the vehicles to have their communications revoked by the network if they are behaving in a malicious way. He noted that the critical element of cybersecurity is continually identifying and mitigating the threat. He acknowledged that this will be a continual process that requires a sharing of best practices similar to the current approach with cell phones. He noted that there have been no known hacking events to date, but it is something of concern and there will be fail-safes put in place in the vehicles.

Stephen Greene (Conservative) wanted to know where federal jurisdiction ends and provincial begins, wondering if there is a description of where these issues lie and who should ask what. *At this point, the Chair asked the Transport Canada witnesses to provide that document to the committee if they have it.*

Actions Taken by the Committee & Follow-Up Items:

None.

Future Business:

- The committee will continue the study on automated vehicles on Tuesday, February 14 when they will hear further testimony from officials in the Department of Innovation, Science and Economic Development.

- • The committee will also hold an in-camera meeting on February 15th to discuss its future agenda.

Senators in Attendance:

Liberal	Conservative	Unaffiliated
Dennis Dawson (Chair)	Michael MacDonald (Deputy-Chair)	Patricia Bovey
Terry Mercer	Pierre Hughes-Boisvenu	Diane Griffin
Art Eggleton	Norman Doyle	René Cormier
	Stephen Greene	Rosa Galvez
	Betty Unger	Nancy Hartling
	Bob Runciman	Raymonde Saint-Germain
		Michael Duffy