The Merits of Autonomous Vehicle Testing in Calgary

EXECUTIVE SUMMARY

Many jurisdictions in North America and globally are looking to facilitate autonomous vehicle (AV) testing in hopes of boosting economic activity and creating jobs. Testing can occur both on public roads and private lands. A range of approaches have been used, from constructing testing facilities, to simply changing legislation to allow testing with minimal requirements. In all cases, a level of enabling legislation has been put in place to enable testing. Key findings were that a simple process with few regulations, a central point of contact, and ensuring the onus of safety and liability was placed on testing companies were important factors of success. Given that testing programs have been in place in some locations for several years, finding a competitive niche was also important for a new testing program in Calgary to stand out from other locations and to support economic activity.

Administration has consulted with a wide variety of parties to determine the feasibility of allowing testing of AVs in Calgary. Regulation over the use of roads is under the jurisdiction of the Government of Alberta by way of the *Traffic Safety Act* and other legislation. Private property is not regulated as part of the *Act* so long as the testing area (road, parking facility or other area) is not normally accessible by the public. This opens the potential for AV activities on private property initially. While legislation is not yet in place for testing on public roads, the Government of Alberta is working on the issue and anticipates that a regulatory framework for AV testing will be announced no later than June 2018. Recommendation 1 directs Administration to submit the report to the Province and formally request the legislation changes.

Secondly, in meeting with industry and academia stakeholders, it was apparent that Calgary's niche is in the field of autonomous systems (sensing, cognition, and actuation), more specifically geomatics (includes activities such as mapping, surveying and geospatial systems). There are currently over 2300 companies employing over 17000 Calgarians in this industry. Administration asked what The City of Calgary specifically could do to best facilitate industry activities. Making City assets available for use in testing AVs in Calgary was the main request. This included access to physical assets (roads, parking lots, buildings, and sites such as lanfills) and data assets (signal systems, travel info, etc). To facilitate this, Administration is proposing that an intake process be established, led by Calgary Economic Development (CED), to provide a single point of contact that would allow applicants to submit testing requests. While a proposed process is still being finalized, Administration is looking to model the intake process after the CED Film Permit process, since this process has several similarities (unique locations, activities with an element of risk, etc). The Film Permit process has proven successful and has processed roughly over 400 applications this year, of which half use City assets. The goal for AV testing is to set up a similar process, with few regulations and clear insurance and indemnification requirements that facilitate AV testing. While the process will be focused first on AV testing on contained City assets, the process can easily be extended to public roads when enabling Provincial legislation is in place. Administration is currently working with CED on a strategy to resource this initiative in 2018. This will allow the intake process to be established and determine initial uptake prior to reviewing broader resource requirements.

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ADMINISTRATION RECOMMENDATIONS:

That the SPC on Transportation and Transit recommend that Council

1. Direct Administration to forward the report to the Province of Alberta in conjunction with a request to enact legislation that would allow for testing of autonomous vehicles on roads in the Calgary region.
2. In cooperation with Calgary Economic Development, direct Administration to establish an intake process for using City-owned assets that supports the economic development of the autonomous systems industry in Calgary.

PREVIOUS COUNCIL DIRECTION / POLICY

At the 2017 June 26 meeting, Council approved Notice of Motion NM2017-16 – "Investigation of the Merits of Autonomous Vehicle Testing in Calgary" which contained the following direction:

"NOW THEREFORE BE IT RESOLVED that Administration, in collaboration with Calgary Economic Development and consultation with the region, prepare a business case and risk assessment to evaluate the merits of testing autonomous vehicles on Calgary's roadways and the region and report back to Council through the Transportation and Transit Committee no later than Q4 2017.

AND FURTHER BE IT RESOLVED that if there is merit to testing autonomous vehicles on Calgary's roadways, that Council forward the business case and risk assessment to the Province of Alberta in conjunction with a request to enact legislation that would allow for testing of autonomous vehicles on Calgary's roads."

BACKGROUND

As part of report TT2017-0382 (The Future of Transportation in Calgary) presented at the 2017 May 17 meeting of the Standing Policy Committee on Transportation and Transit, representatives from industries relating to AVs indicated to Committee that a framework for facilitating testing could be beneficial in facilitating current industry activities and attracting new investments. This feedback was identified in the rationale for the Notice of Motion brought to Council to investigate the merits of developing a framework to facilitate testing activities.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Administration undertook a multi-faceted approach to determine the potential merits and drawbacks of supporting the testing of AVs in the Calgary region. Attachments 1 and 2 of this report contains the business case and risk assessment respectively, which provides a more comprehensive summary of the research undertaken.

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Existing Legislation and Government Activities

Currently, AVs are not expressly regulated at either the Federal or Provincial level but aspects of AV operations are affected by existing Federal and Provincial legislation that regulates motor vehicles. Transport Canada oversees regulation of the vehicles (specifically, safety standards) while Alberta Transportation oversees the operation of vehicles on roads. Transport Canada does have a framework that allows for the importation of test vehicles for research purposes under certain conditions.

Administration has been working closely with the Government of Alberta on identifying the legislative and process requirements to facilitate the use of AVs on Alberta roads. AVs are not explicitly prohibited in current legislation; rather, the existing legislation does not contemplate them. It is also unclear if an autonomous vehicle can currently be registered for operation in Alberta. The current work involves identifying pieces in existing legislation (such as the *Traffic Safety Act*) which may conflict with allowing AVs to operate, and preparing appropriate amendments. It is important to note that the *Traffic Safety Act* applies to all roads. Testing can occur on private property or City property to which the public does not have access, as the *Traffic Safety Act* does not apply to such property. To facilitate public road testing, the Government of Alberta anticipates having a regulatory framework for AV testing announced no later than June of 2018.

Jurisdictional Scan

There are many jurisdictions, ranging from local to national levels, both globally and in North America, that either have frameworks in place to allow for the testing of AVs on public roads or are in the process of establishing such frameworks. Administration focussed on six jurisdictions in North America where testing has been permitted and has been well established over a period of time. These jurisdictions were the Province of Ontario, the City of Edmonton, Contra Costa County (California), and the States of Michigan, Nevada and Arizona.

Attachment 1 includes a case study of each location outlining the general processes, areas of success and learnings. A range of approaches have been taken across the jurisdictions that were reviewed. Contra Costa and Michigan have both developed physical, test track facilities, which allow companies to test a variety of vehicle functions in a secure environment. This is complemented by state legislation allowing on-street testing. Edmonton is taking a similar approach on a smaller scale with a testing facility on the University of Alberta campus. The Ontario approach has been to establish a general framework to enable on-street testing through a streamlined application process and a common point of contact. The Nevada and Arizona approach has been very open, allowing on-street testing to occur through legislation with minimal oversight from the state government.

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While all of the above methods have attracted some level of testing and economic activity, some common themes have emerged. Firstly, it was noted by all jurisdictions that fewer regulations were preferred by testers. This helps facilitate testing by reducing barriers, but it also reduces the chance that the regulations may be unintentionally detailed, hindering certain aspects of testing. Secondly, a consensus was that the company testing vehicles would be responsible for ensuring safe operation in public spaces. Maintaining reputation is a significant motivator for this outcome; however some jurisdictions backstop this with insurance requirements or other methods. Third, a single point of contact and a streamlined process was the most effective way to support testing. Finally, many jurisdictions have had their programs in place for a number of years, being located where existing companies (technology and auto manufacturing) are currently established. This puts Calgary (and others) at a potential disadvantage with respect to offering testing. Several jurisdictions suggested that focussing on particular aspects or niches with respect to the vehicles could provide the biggest benefit for local industries.

Testing has been partially responsible for attracting funding. For example In March 2017, Ford announced that it will be investing $337.9 million to open a research engineering center in Kanata, Ottawa that will focus on infotainment, driver-assist features and autonomous vehicles and in August 2017, Taiwanese electronics manufacturing company Foxconn announced it will be building a multibillion-dollar research and development facility for autonomous vehicle components in Michigan. Ultimately the goal of attracting funding is local job creation.

Local Industry Scan

Administration has had several discussions with a wide variety of businesses, ranging from local to international companies, regarding Calgary as a potential hub for AV testing. Vehicle manufacturers indicated that they are, generally, looking to test in markets with higher exposure, more direct presence of government and higher levels of congestion. However, there are several firms in Alberta that are focussed on developing supporting systems for AVs. A common theme that was identified was that there are several parallels between the oil and gas industry and autonomous systems, such as geomatics, mapping, GIS systems and sensor systems. When asked how The City can best support industry efforts, the ability to use City assets was identified. The nature of the support was primarily seeking access to physical assets (roadways, parking facilities, landfills, traffic controls), fleet, and related staff support. Industry is not asking for direct funding of their activities.

Academic Scan

From an academic perspective, the focus in Calgary has been research and support around autonomous mobile systems. Autonomous systems is an umbrella term that encapsulates technologies that relate to the automation process. These systems include: sensing the environment (sensing), making a decision (cognition) and implementing the decision (actuation).

The University of Calgary has particular strength in geomatics engineering and autonomous mobile systems, with a team of multi-disciplinary faculty and students involved in research and

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development over the past 30 years. This has led to over $15 million in research revenue and creation of six spin-off companies. SAIT and the University of Alberta also have several activities related to autonomous systems. The availability of a process that facilitates the testing of these components to support autonomous systems was seen to be a major benefit to these activities. The main benefits to academia would be to improve skills training, attract further industry and academic partnerships, and facilitate commercialization potential.

Proposed Approach

To enable the testing of autonomous systems in Calgary, Administration is exploring an approach similar to the Filming Permit process that is currently managed by CED. This process would be developed to support testing of autonomous systems rather than just autonomous vehicles. Through discussions with stakeholders, it was recognized that there are several similarities between choosing a location to conduct filming and choosing a location to test technology:

- Both activities are focussed on a specific location, with unique opportunities and issues
- Both activities can involve unconventional activities, which can involve a level of risk
- Both activities use similar City assets (roads, parks, police services, etc.)
- Facilitation of both activities is to fulfill broader economic objectives (diversity of industry, creation of jobs, etc.)

The benefits of mirroring the film permit process are that:

- It creates a single intake point between industry and The City (via CED)
- Calgary Economic Development has the most exposure to local businesses which facilitates contact
- Insurance, indemnification and other requirements are addressed up front as part of the submission
- It takes into account the unique nature of each request (location, details of work, etc.)
- The existing process has proven successful in the film industry and is highly regarded
- The application is very simple and straightforward, at only two pages.

The new process would allow industry and academia to conduct testing as needed and provide a consistent and fair approach. It is expected that applicants would be required to cover any costs incurred by The City as part of the process. Establishing this intake process would be the simplest and most effective way of supporting autonomous systems industries with minimal cost and risk to The City. Administration is currently working with CED on a strategy to resource this initiative in 2018. This will allow the intake process to be established and determine initial uptake prior to reviewing broader resource requirements. The objective would be to have the process in place to intake applications by the end of Q3 2018.

It is important to note that setting up the process is not exclusively linked to enacting Provincial legislation for AVs. Testing can occur on private property so long as it is not considered a public road. Depending on the nature of the request, and in particular, the proposed location, some

testing may be able to occur under existing legislation. No testing would be permitted that does not align with existing legislation. However, enabling broader legislation would expand the potential for testing activities.

A risk register, using The City's Risk Management framework, was developed to evaluate the risks around testing and is included as Attachment 2. The main risk, from The City's perspective, is the risk to public safety. The proposed approach mitigates this by requiring appropriate insurance and indemnification from entities seeking to test, as well as a history of previous testing and guiding testing to assets that minimize the exposure to the public and staff (i.e. non-peak times, when facilities are closed, etc.). It is expected that the reputational risk to testers is high enough that they will want to minimize any major risks prior to testing through their own research and development activities.

Consultation with the Calgary Region

Administration organized a meeting and presentation with interested regional partners to share information on the emerging future technologies and the proposed testing process. It is expected that regional requests may also be a mix of private property and public road activity. While public road testing will be dependent on enabling provincial legislation, private testing can be coordinated with applicable regional partners. The CED would coordinate with regional partners much like the film process, by connecting applicants with the appropriate contacts in each area, who can then determine permit and other requirements. While there were no formal commitments, there was a general level of support to work with potential applicants identified through the CED intake process.

Stakeholder Engagement, Research and Communication

Direct engagement was focused in three areas. Industry stakeholders provided feedback and assessment of what The City could do to support testing. Other jurisdictions provided input on the success of their programs and what lessons could be passed on. Finally, input was sought from other stakeholder partners, such as CED and academia.

No public engagement exercises were conducted as part of the report.

Strategic Alignment

AVs will have a mix of impacts that will both support and detract from the objectives of the Municipal Development Plan (MDP) and Calgary Transportation Plan (CTP). This is largely dependent on the extent and adoption of the technologies. This was examined in detail as part of report TT2017-0382 (The Future of Transportation in Calgary).

Establishing a process to facilitate vehicle and technology testing most strongly aligns with creating a prosperous city, one of the five Council Priorities in Action Plan 2015-2018.

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Social, Environmental, Economic (External)

The most significant benefit of permitting AV testing and access to City assets is the potential economic benefits that could result. There are over 2300 businesses in Calgary working in the autonomous systems industry, supporting over 17000 employees. A simplified testing process could provide a boost to these businesses and help diversify Calgary's economy and support job growth, all with little cost to City taxpayers.

There are no social or environmental impacts anticipated from allowing City assets to be tested but the technologies themselves may improve these outcomes.

Financial Capacity

Current and Future Operating Budget:

Since applicants are expected to cover any operational costs that arise, no operating budget impacts are expected. There could be impacts if City resources are required for indirect expenses that are not typically recovered for. Administration will monitor this and adjust cost recoveries if needed.

Administration is currently working with CED on a strategy to resource this initiative in 2018. This will allow the intake process to be established and determine initial uptake prior to reviewing broader resource requirements.

Current and Future Capital Budget:

There are no capital impacts arising from the recommendations.

Risk Assessment

Attachment 2 includes the risk register that documents the risks associated with allowing testing to occur. The main risk to The City from allowing testing of technology using City assets is the potential for safety and liability issues. This can be mitigated through requirements for insurance and indemnity, similar to the requirements for film location permits. The process would also require evidence of a proven testing record prior to permitting use of City assets. Testing would be managed to minimize inconvenience to the public.

Conversely, if Council does not wish to proceed with making City assets available for testing, the main risks would be a lack of coordination and staff (resource) consumption to respond to requests that may still come in, and a potential loss in economic activity should the testing have broader economic benefits.

REASONS FOR RECOMMENDATIONS:

The proposed process for facilitating industry requests to use City assets for testing technology is of low risk and cost to The City while supporting business and economic activity. Risks from technology testing can be mitigated through proper agreements and indemnity.

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ATTACHMENTS

1. Attachment 1 - Autonomous Vehicle Testing in Calgary – Business Case
2. Attachment 2 - Autonomous Vehicle Testing in Calgary – Risk Register