

December 4, 2017

The City of Calgary
Office of the Councillors (8001)
700 Macleod Trail S.E.
Calgary, AB, Canada T2G 2M3

Dear Councillor,

ACAMP requests support from the City of Calgary in the local development of autonomous systems. ACAMP understands the City of Calgary has commissioned a report by the City of Calgary Direct Administration and requests this report on autonomous systems be sent to the Province of Alberta, in conjunction with this a request to enact legislation that would allow for testing of autonomous vehicles in the Calgary region. The release of this report and implementation of adequate legislation to support the developments in the autonomous vehicle technology is vitally important to ACAMP for our ongoing involvement in this technology.

ACAMP is a not-for-profit product development centre in Alberta Canada presently supporting over 350 clients building new product technologies across all markets from embedded systems to autonomous drive technology and artificial intelligence. We have 40+ multi-disciplinary engineers on staff to engage with different companies.

ACAMP has recently established an Advanced Systems for Transportation Consortium through funding via the province of Alberta with focus on a Smart Infrastructure & Transportation Initiative. Through this consortium, we are engaged with more than 30 organizations from around the world in developing autonomous vehicle applications using Canadian made technologies.

To advance his technology it is vital that ACAMP has local facilities available to test autonomous systems developments. ACAMP requests the City of Calgary establishes a process, to request the use of City-owned assets for testing.

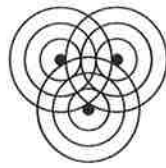
The establishment of a formal process to request the use of City-owned assets and local infrastructure will enable ACAMP to conduct realistic testing of current and future autonomous vehicle projects. These projects will establish Calgary as the center of expertise in autonomous vehicles and systems in Canada.

For more information on this request or to address any questions you may have, please do not hesitate to contact me through my email below,

Regards,

Ken Brizel
CEO, ACAMP

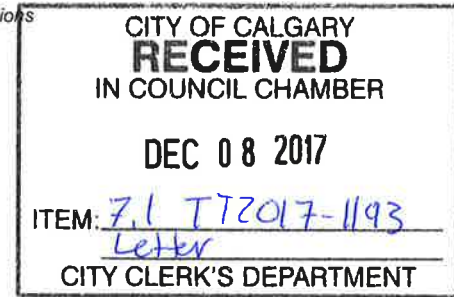
1919 - 94th Street NW
Edmonton, Alberta, T6N 1E6
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kbrizel@acamp.ca



Murandi
Communications Ltd.
Innovative Radio Frequency Solutions

29 November 2017

The City of Calgary
Office of the Councillors (8001)
700 Macleod Trail S.E.
Calgary, AB, Canada T2G 2M3



Dear Councillor,

Murandi Communications requests support from the City of Calgary in the local development of autonomous systems. Murandi Communications understands the City of Calgary has commissioned a report by the City of Calgary Direct Administration and requests this report on autonomous systems be sent to the Province of Alberta, in conjunction with this a request to enact legislation that would allow for testing of autonomous vehicles in the Calgary region. The release of this report and implementation of adequate legislation to support the developments in the autonomous vehicle technology is important to Murandi Communications for our ongoing involvement in this technology.

Murandi Communications, in conjunction with Aurora Wireless Networks, is currently working with ACAMP to prove out the feasibility of using a made in Alberta wireless telemetry technology called MLink in the monitoring and control of an autonomous test vehicle.

To advance this technology it is important that Murandi Communications have local facilities available to test autonomous systems developments. Murandi Communications requests City of Calgary establishes a process, to request the use of City-owned assets for testing.

The establishment of a formal process to request the use of City-owned assets and local infrastructure will enable Murandi Communications to participate in the realistic testing of current and future autonomous vehicle projects. These projects will help establish Calgary as a centre of expertise in autonomous vehicles and systems in Canada.

For more information on this request or to address any questions you may have, please do not hesitate to contact me at 403-777-9988 ext 227 or through my email below.

Best Regards,

Andy McGirr

Technical Manager
Murandi Communications Ltd.
Andy.McGirr@murandi.com

Murandi Communications Ltd.

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Confidential and Proprietary



Dr. Lina Kattan
Professor
Urban Alliance Professor in Transportation Systems Optimization
Department of CIVIL ENGINEERING
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December 7, 2017

RE: Letter of support for Autonomous Vehicle Testing in Calgary

To whom it may concern:

Please accept this Letter of Support as an indication of my full endorsement for using the City assets for Autonomous Vehicle Testing in Calgary. As a Professor specializing in the field of Smart Transportation, I see a great value in this initiative as it is strongly aligned with three of the University of Calgary's research themes: Human Dynamics in a Changing World which focuses on Smart cities and efficient transportation systems, Energy Innovation for Today and Tomorrow which looks at low-carbon technologies, and New Earth-Science Technology aiming, among others, to develop technologies for environmental monitoring in a variety of applications, including transportation. In addition, the proposal is well aligned with the mandate of the Urban Alliance, a strategic partnership between the University and the City to undertake research to benefit Calgarians.

This initiative will create several opportunities for University of Calgary. The University of Calgary is planning to be a key collaborator with the City of Calgary team members on this initiative through the existing Urban Alliance partnership. This collaboration will include access to faculty research experience and skills, participation of High Quality Personnel (HQP), and use of established laboratories and specialized equipment. This initiative will also provide these new students first-hand exposure to the field of Autonomous and Connected Vehicle research in Canada, as will also offer our graduate students a unique opportunity for experimenting with automated and connected transportation in real-life conditions. New products, concepts and models are expected to be created. These innovations that will be patented and commercialized by the University of Calgary's commercialization office to Canadian ITS companies and agencies.

This initiative of using the City assets to conduct Autonomous Vehicle Testing in Calgary, will also benefit the ITS industry, municipal and governmental agencies, and the public. Despite significant Canadian ITS deployment, research is seriously lacking in the field of Electrical, connected, autonomous and shared vehicle research, compared to the U.S. and Europe. Using the City assets to conduct Autonomous Vehicle Testing in Calgary will be an essential step to secure a leading position for Calgary in developing, testing and evaluating these technologies. It will also assist in the UofC's new strategic vision of "Eyes High" (to be in the top 5 research universities) by: attracting new funding federal funding, attracting and training top Highly Qualified Personnel, fostering new Public/Private/Academic Partnership and enabling UofC researchers to collaborate and link with top international researchers.

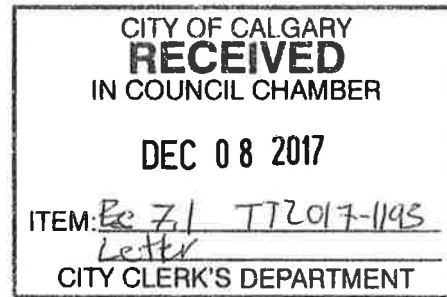
Sincerely,

Lina Kattan, PhD, PEng

CITY OF CALGARY RECEIVED IN COUNCIL CHAMBER
DEC 08 2017
ITEM: <u>7.1 TT2017-1193</u> <u>Letter</u>
CITY CLERK'S DEPARTMENT

30 November 2017

The City of Calgary
Office of the Councillors (8001)
700 Macleod Trail S.E.
Calgary, AB, Canada T2G 2M3



Dear Councillor,

Dynamic Source Manufacturing Inc. (DSM) requests support from the City of Calgary in the local development of autonomous systems. DSM understands the City of Calgary has commissioned a report by the City of Calgary Direct Administration and requests this report on autonomous systems be sent to the Province of Alberta, in conjunction with this a request to enact legislation that would allow for testing of autonomous vehicles in the Calgary region. The release of this report and implementation of adequate legislation to support the developments in the autonomous vehicle technology is vitally important to DSM for our ongoing involvement in this technology.

DSM is an Electro-Mechanical Manufacturing Services provider with manufacturing facilities both in Calgary and Tempe, Az. Most of what we manufacture today, is electronics based products. However, two areas that we are focusing on with regards to autonomous systems is to open a facility to install the autonomous electro-mechanical systems into vehicles here in the province of Alberta.

To advance this technology it is vital that DSM has local facilities available to test autonomous systems developments. DSM requests City of Calgary establishes a process, to request the use of City-owned assets for testing.

The establishment of a formal process to request the use of City-owned assets and local infrastructure will enable DSM to conduct realistic testing of current and future autonomous vehicle projects. These projects will establish Calgary as the centre of expertise in autonomous vehicles and systems in Canada.

For more information on this request or to address any questions you may have, please do not hesitate to contact me at 403-516-1888 x222 or through my email below,

Regards,

A handwritten signature in black ink, appearing to read 'Duane Macauley'.

Duane Macauley

President, Dynamic Source Manufacturing Inc.

dmacauley@dynamicsourcemfg.com

VEERUM

3400-525 8 Ave SW
Calgary, AB, T2P 1G1

Transportation and Transit Committee
C/O The City of Calgary
Mail Code: #8067
PO Box 2100, Station M, Calgary, AB T2P 2M5



Dear Committee Members,

Supporting the Autonomous Systems Sector

The VEERUM team are delighted that The City of Calgary is considering the establishment of an intake process for using City-owned assets that supports the economic development of the autonomous systems industry.

Our technology solution brings certainty to capital project delivery—the Digital Twin predicts and resolves issues in the virtual world before they impact cost and schedule in reality. We are undertaking a range of projects and attracting work in Alberta and globally, including South Africa, Europe and South America. We proudly employ 32 people in Calgary.

Part of our Digital Twin technology involves the automated capture of data from a physical site. We use a range of geomatics, autonomous systems and autonomous vehicles to capture of this data in a frequent, reliable and accurate way for our clients.

If The City of Calgary becomes a test-bed for autonomous systems it would accelerate our development, ensure we remain competitive in the global market and reduce our R&D costs. Also, being an early adopter will help ensure Calgary is viewed at a technology leader which will help attract more businesses, investment and talent to come and work in our city.

As a start-up our resources are limited and we seek a process with few regulations and clear insurance and indemnification requirements that facilitate autonomous vehicle testing. An effective intake process and outcomes will support our development and, as importantly, foster a culture of innovation with local businesses, organizations and governments.

We fully support the development and implementation of policies that support technology R&D and commercialization in Calgary. Thank you to The City of Calgary for the opportunity to provide input to this process.

Yours sincerely

A handwritten signature in black ink, appearing to be "Steve Fisher".

Steve Fisher
CEO

Joseph Hlady
President
Infrastructure Mapping & Autonomy
410, 505 8th Ave SW
Calgary, AB, T2S 2C4



Calgary City Council
800 McLeod Trail SE
Calgary, AB T2P 2M5

November 2nd, 2017



Our Endorsement of the City of Calgary's Proposed Permitting Process for Autonomous Technologies

Dear City Council,

I am writing you to express our support for the proposed permitting process for autonomous technologies. Infrastructure Mapping and Autonomy believes that this is a sensible approach to supporting the growth of this burgeoning technology sector at its current state.

About IMA

Infrastructure Mapping and Autonomy (IMA) is a Calgary based start-up providing advanced mapping and data collection technologies to greenfield and brownfield construction projects, infrastructure operations and maintenance, as well as project development and planning. Our primary focus is processing data to bring valuable and useful information to our customers. Our core capabilities are our in-depth knowledge and experience with workflow automation for massive datasets, and sophisticated processing technologies. This entails the use of cloud services, continuously finding new opportunities for automation, and even the use of artificial intelligence and machine learning.

We have an inherent interest in autonomous vehicles/systems (AV/S) because several of the technologies we leverage were developed by the autonomous vehicle industry and are now becoming an integral part of autonomous systems. Advancements from the AV/S field are revolutionizing other industries such as data collection and data processing and these advancements are enhancing our business. Most importantly, however, AV/S technology is finding its way into every aspect of the geomatics and data collection industries and into the industries of the customers that IMA serves, such as the energy, transportation, and asset management industries. This is where the technology morphs from autonomous vehicle technology into autonomous system technology.

IMA's Position

The world around us is changing in many ways, and for Calgary to strive in the future as it has done in the past, it must move to a technology-centric economy. The importance of autonomous system (AS) technologies in the future of all industries cannot be understated, and it should be forefront in Calgary's economic development strategy.

Simply put, supporting AS technology testing in Calgary directly supports start-ups and mature companies alike. IMA encourages The City of Calgary to create an environment supportive of autonomous vehicles and autonomous systems. We ask that The City create a mechanism for companies to quickly apply for and process their applications for testing, proving, and using terrestrial autonomous systems within the city limits. Enabling the testing of existing and new autonomous technologies will enhance Calgary's position as a burgeoning centre for artificial intelligence (AI), advanced computing and machine learning, advanced manufacturing, autonomous vehicle and robotics, and geomatics and data collection.

The current proposal, as we understand it, is to use a similar approval system as the on-line system for the film industry. This approval system would satisfy our company's requirements. IMA believes that a simple, but clear and comprehensive application process, hosted on-line, would be the best approach.

Being on-line would make it easy for non-local firms to apply without investing in travel or a local presence prior to approval. Removing such hurdles has a direct impact on lowering testing costs and improves the value of money spent on technology demonstration through its real-world environment.

IMA would like to clearly signal our endorsement of the City's proposed on-line permitting systems for autonomous vehicle and system testing for Calgary and Alberta.

Background

Relative to most cities, Calgary has a strong technology ecosystem, including a growing AS sector. There are other centres in Canada with larger technology sectors, and several are leaders in artificial intelligence, telecommunications, and autonomous systems. There are of course many leaders in technology in the USA as well. However, relative to its overall size, Calgary's technology sector is strong and can compete with large centres in Canada and the USA in many regards.

As a technology centre, Calgary's strength comes from our highly educated population with a proportionally large number of engineers and scientists. As an energy hub for several decades Calgary (and Alberta as a whole) developed an education and research system that supported that industry.

The energy sector - such a significant industry for our city and province for so long - inherently nurtured other technology-related industries, particularly in geo-science, environmental science and chemical engineering. The industrial services supporting the energy sector such as fabrication and advanced micro manufacturing have also been providing world-class technologies for many years. Calgary also has notable, world-class expertise in instrumentation, micro-electronics, sensor fusion and data analytics.

Growing Beyond Energy

Though the above-mentioned capabilities were generally energy focused in their infancy, many of those companies and sectors are now sophisticated and mature enough to allow them to expand into other industries.

For example, Calgary is a world centre for geomatics, particularly because an important part of the energy industry is mapping (i.e. geomatics). Because the energy industry nurtured our geomatics companies for so long, and an academic environment to support the growth of geomatics was created, the full breath of geomatics-related services can be found in Alberta. This ranges from world-class survey companies, to autonomous aerial vehicle training, and to highly specialized sensor manufacturing. This growth beyond energy sector is true for our firm as well, which started as an energy focused business. Now, only 25 percent of our revenue now comes from energy related services, with the balance now coming from transportation and environmental science customers.

Nurturing an Independent Technology Sector

It is not just companies that were previously dependent on the energy industry that have grown Calgary's technology sector. Calgary's size, talent pool and access to capital has contributed to the growth of our technology sector. Tech talent and entrepreneurship are shining in start-ups like:

- **ZayZoon**, a fintech start-up making waves in the employee payment world. This young company is getting worldwide coverage of their technology.
- **PintSender**, a social media / e-commerce company which allows you to send a pint of beer to a friend via a text message. After signing many of Calgary's local bars and craft breweries up to their app, they have now expanded to providing "skip the line" beer ticking services to Calgary's largest festivals and events.
- **CHATA.ai** is using AI and natural language processing technology to help people better access and interact with their business data.
- **RocketSpace** wouldn't be opening in Calgary if there wasn't a start-up culture needing accelerator space in Calgary.

Remember Smart Technologies, NovAtel and General Dynamics? They're all still here in Calgary developing new technology and selling to world markets. Lockheed Martin's autonomous drone division recently moved to Calgary and acquired a local business.

Supporting the Calgary Technology Sector

We could go through a long list of Calgary technology companies, but our goal here is to illustrate that Calgary does have a leading technology sector that isn't completely dependent on the energy industry. The technology sector needs government support – and help with the regulatory environment - just as the early energy industry received in its early days. By making it easier for companies to test autonomous systems, Calgary will be directly supporting companies working in this space and will have a direct effect on their ability to grow and market their services and technology.

In our opinion, the City should focus on a large market application process for autonomous systems, not just autonomous vehicles, including the ability to test autonomous systems which will include sensor fusion, autonomous navigation (but not fully autonomous) and all the associated backend infrastructure in instances where their testing has community impact. For example, should a company be questioned regarding their testing of an autonomous vehicle or system on city roads or in a public space, it would be good to have a record available to show authorities that they have asked – and received – permission.

Creating a Culture of Innovation

For all the interest in attracting new autonomous technology companies to Calgary, IMA believes the real goal should be on supporting the technology culture that is already growing in Calgary. Creating an on-line system that will make it easier for companies to apply to test autonomous systems and technology in Calgary will go a far way to support a culture of innovation in Calgary and to support existing and new technology companies.

Most importantly, it will bring technology into the public eye and help move Calgary towards a technology centric economy. Clearly, our civic leaders understand the importance of a community having a culture of inclusiveness and a culture of giving. We hope that you will also see the value of fostering a culture of science and innovation at the community level.

The future entrepreneurs of Calgary are out there. But they are not oilmen, they are technologists and innovators. They will build the Calgary of tomorrow with their creative minds and open Calgary to the global technology economy. The City can support the next generation of entrepreneurs in many ways, and one is by making it easier to test technologies in public spaces and help bring those ideas out of the laboratory and into the real world.

Autonomous systems are one of the next big disruptive industries coming to the world. The supporting technologies and systems like AI, machine learning, micro manufacturing, and sensor fusion are part of that new industry and are also infecting other industries. IMA encourages the City to directly (through initiatives) and indirectly (through easing bureaucracy) support the growth of these industries and technologies in Calgary.

Sincerely and respectfully,

Joseph Hlady
President, Infrastructure Mapping & Autonomy