

# CATES

## Center for Advanced Transportation and Energy Solutions

### **Autonomous Vehicle Project Deliverable Number Two for City of SeaTac Elected and Staff Officials: Progress Report covering stakeholder input and outlook for Federal funding**

August 25, 2017. Revised September 25, 2017.

From: John Niles, Executive Director, Center for Advanced Transportation and Energy Solutions (CATES) and consultant to City of SeaTac

To: Will Appleton, Director of Public Works, City of SeaTac

Subject: Key findings from stakeholders and immediate action steps to begin securing Federal funding.

Prelude: The attachment to this memo is a new general background piece from another of my research and education businesses, Grush Niles Strategic, which I conduct with a colleague Bern Grush who works out of Toronto, Ontario. We are co-authoring a book titled *End of Driving*, now accepted for publication by major publisher Elsevier. The attached five pages of diagrams from a working draft of the book describe a multi-decade nominal path for the evolution of vehicle automation that is based on examination of written literature and conversations with experts. I believe the multi-decade scenario described in the attachment is reasonable to work from in designing municipal initiatives in the present day, and have acted on that belief in this report.

Further background to this project is the CATES June 29<sup>th</sup> briefing, the first project deliverable to the City posted at <http://www.ci.seatac.wa.us/Home/ShowDocument?id=16143>.

The general stance taken by CATES in interactions with stakeholders is not to seek open-ended comment on all possible directions for automated vehicles in City of SeaTac, but to describe specifically the direction I described at the City briefing on June 29<sup>th</sup>.

**Specifically, CATES is focusing on the potential for a staged deployment in City of SeaTac of small, quiet, frequent, driverless electric transit vehicles connecting residential neighborhoods to places of employment, shopping locations, light rail stations, senior activity centers, local medical facilities, and other community destinations. Such microtransit services deployed as soon as possible amount to an aggressive first step in the eventual deployment of robotic point-to-point taxi services with important equity benefits for the type of inner ring suburban markets that the citizens of SeaTac represent.**

Capable of driverless, automated operation, such vehicles would be staffed with non-driving attendants at first and forever monitored remotely for safety at all times via video transmitted to a control center. They would brake to a stop automatically as needed to avoid colliding with a car, bike, pedestrian, or

animal that came into their right-of-way. Mobility on these vehicles for users of wheelchairs and other assisting personal devices would be accommodated as needed.

There would always be a trained staffer on duty with a vehicle to go to points where something unusual or unsafe within the network has happened, to provide assistance, monitoring, and other duties as assigned from the operations guidance. Public safety officers or ambulances of course would respond to genuine life-safety emergencies dispatched by the control center or through customer use of 9-1-1.

CATES is compelled by all information obtained to date to recommend that if City of SeaTac wishes to achieve status as a Center of Municipal Excellence in Autonomous Vehicles then moving forward on planning for deployment of automated micro-transit is sound strategy, as long as the forecast costs and ridership numbers show such a path of progress is justified along all three dimensions of sustainability, namely, environment, economics, and equity. CATES is working on that justification as a primary task in the present consulting contract with City of SeaTac.

Appropriate vehicles for neighborhood service are already being developed around the world. They were illustrated in the June 29<sup>th</sup> presentation materials referenced above. Vehicles such as these have the potential to provide mobility that is safer, less expensive, non-polluting, and appropriate in size for the residential environments found in SeaTac. Maps and a five hour driving windshield survey by CATES indicates the City jurisdiction has many streets that appear to be compatible with operation of these quiet, 25 mph vehicles in marked, semi-exclusive curb lanes. Existing traffic would not be disrupted beyond making the shuttle vehicles highly visible to motorist like is important for street sweepers, snow plows, trash trucks, and bicycles. Safety and compatibility in moving in space shared with bicycles, wheelchairs, and pedestrians is a mandatory requirement and will be covered in the Action Plan final product. We understand this will be controversial to some degree.

Research by CATES has determined that these electric shuttle vehicles from any of several vendors would stay on course within designated lanes in their operating domain by utilizing a combination of GPS, on-board maps, and localization using LIDAR [laser light detection and ranging, working to detect obstacles in way similar to how radar operates] and optical vision cameras. No additional specialized telecommunications infrastructure is required along the designated routes. At points of vehicle storage and holding, powered and communicating (via existing wireless services) electric vehicle charging stations would be needed.

Examples of such vehicles being developed, tested, and/or manufactured in the United States include the Local Motors Olli, the Navya autonomous electric shuttle, and the Easymile EZ10. Local Motors, with offices in Nashville, TN; Washington, DC; and Tempe, AZ has a vehicle called Olli, now being refined and tested, and planning for deliveries of a fully-tested, proven, street-legal vehicle coming in 2020. Easymile is a French company planning to build a manufacturing plant near Detroit, Michigan. In addition, there is a domestic USA industry producing small, street-legal electric vehicles in a wide variety of configuration that over the next few years could add automated control capabilities.

These vehicles amount to a new mode of public transit. They would follow fixed and eventually dynamically variable routes with five minute headway intervals, or later, sub-five minute response times for on-demand trips. I am describing here the very early versions of services in the first column of the attachment from Grush Niles Strategic.

### **Economic development, community development, and law enforcement considerations**

The following two report sections below of observations, findings, and preliminary conclusions have been developed by CATES following onsite observations, online research in pertinent documents, and interaction with the following stakeholders:

- Stephanie Meyn, Climate Protection Manager, Port of Seattle
- Florendo Cabudol, SeaTac City Engineer
- Steve Pilcher, SeaTac City Planning Director
- Jeff Robinson, City of SeaTac Economic Development Director
- Captain Carl Cole, City of SeaTac Police Department, representing Chief Katherine Mulligan
- Kathleen Cummings, Senior Services Supervisor, City of SeaTac
- Brian Brooke, Senior Manager, Innovation and Performance, Sound Transit
- Jean Paul Velez, Shared Mobility Program Manager, King County Metro
- Darrin Grondel, Executive Director, Washington State Traffic Safety Commission
- Bob Pishue, Chief Economist, INRIX (data provider)
- Charlie Howard, Integrated Planning Director (now retired), Puget Sound Regional Council
- Charles Prestrud, Washington State DOT
- Walter Washington, Transportation Director, Sound Generations (Hyde Shuttle)
- Devin Denney, Director of Transportation, Highline School District
- Brandon Carver, Public Works Director, City of Des Moines
- Michael Matthias, City Manager, City of Des Moines
- Bob Giberson, Public Works Director, City of Tukwila
- David Woessner, General Manager, Local Motors Washington, DC Office
- Shant Boyajian, Nossaman LLP attorney and Federal Funding specialist, Washington, DC
- Fernando Ruiz, Legislative Assistant for Transportation, Congressman Adam Smith
- Steve Marshall, Transportation Technology Partnership Manager, City of Bellevue
- Bern Grush, co-founder, Grush Niles Strategic, Toronto
- Steve Buri, President, Discovery Institute, organizational home of ACES NW Network

### **Key takeaways supported by more information in the two report sections following.**

- **Given capabilities of today's vehicles, the most feasible market for the recommended first phase focus on autonomous microtransit is to serve residential neighborhoods of Seatac with connectivity to and from light rail stations, community centers, employment sites, schools, and local retail.**

- **Validity of transportation need to be met is being sought through available data from three organizations: the City itself (in hand), INRIX (promised), and Puget Sound Regional Council (promised).**
- **Microtransit serving travelers moving to/from the SeaTac Airport terminal, hotels, and parking has challenges in the early phases of microtransit deployment and is best held for a secondary phase.**
- **Automated, driverless valet parking for certain specially-equipped cars in particular parking structures is a secondary opportunity to be pursued in this project.**
- **Job creation within the SeaTac City limits from autonomous vehicle deployment is possible if pursued vigorously, but there will be no technical requirement making the City the exclusive reasonable site for related employment.**
- **City of SeaTac does have existing and potential characteristics that make it a strong candidate for becoming a Center of Excellence for Autonomous Vehicle Deployment.**
- **Staff from the Port of Seattle, SeaTac City Police, Hyde Shuttle, King County Metro, Sound Transit, Highline Schools Transportation, Office of Congressman Adam Smith, and two neighbor cities have been positive about the direction the project is taking.**
- **Potential external funding sources of the Federal Government have been identified and next steps for action have been identified, to be detailed in the Action Plan.**

#### **Detail of Interaction with Stakeholders**

1. Automated vehicles and service concepts available over the next five years do not seem appropriate for deployment that attempts to upgrade the motorized movement of customers of the SeaTac Airport, nearby hotels, and nearby parking lots serving this part of the City's economic life. This preliminary conclusion is based on field observations and knowledge of autonomous vehicle capabilities, reinforced by discussions with Stephanie Meyn at Port of Seattle, City Engineer Florendo Cabudol, City Planning Director Steve Pilcher and Executive Director of the Washington State Traffic Safety Commission, Darrin Grondel. Existing dedicated and branded fleets of vans with drivers appear to have the local mobility needs of airline travelers covered well enough at this time. International Boulevard and the airport vehicle access ramps make an overly complex environment in the short term for automated vehicle deployment. While this environment will be an attractive target when automated vehicles become more capable, the first steps with available capability can best be focused on calmer, more appropriate streets and travel needs nearby. The experience gained in simpler nearby environments adjacent to International Blvd, will provide a sound foundation for approaching airport needs later. What's important to the establishment of City of SeaTac's world class status as a center of excellence will be achieving automated vehicle applications that operate as soon as possible.
2. Moving SeaTac resident workers to and from employment locations, including the airport, and to accessing the three light rail transit stations, appear to be a more viable opportunity than delivering travelers to and from airport curb space, airport parking lots, and hotels. This would

be compatible and reinforcing of planning of first/last mile transit options by transit agencies, as described to me by Brian Brooke of Sound Transit and Jean Paul Velez of King County Metro. A cooperative relationship with King County Metro and Sound Transit has been established between the CATES project and the work of these agencies on alternative access services.

3. A secondary application of automation appropriate to the City of SeaTac environment would be deployment of an automated valet parking application within a single parking structure in cooperation with one or more car companies or equipment providers. Examples exist in Europe. Stephanie Meyn said Port of Seattle as a public agency is unlikely to be willing to deploy a system that only works with one or a limited number of automobile makes. This is a deployment idea CATES will take up with MasterPark and WallyPark during the course of this project.
4. The establishment of manufacturing automated vehicles within City of SeaTac may be able to be linked to deployment of them locally, but a discussion with David Woessner, General Manager of Local Motors in Washington, DC on August 8<sup>th</sup> was not encouraging on this point. The idea will continue to be pursued with other companies making shuttle vehicles. As stated earlier, Easymile headquartered in Toulouse, France has announced it is building a factory to make its EZ-10 vehicles near a deployment site in the Detroit, Michigan region.
5. The job creation aspects of a new micro-transit transportation mode within the City are still available and significant, even with the understanding that human drivers of the vehicles are not part of the new mode. Future employment estimates of full-time-equivalent positions will be prepared as part of the current project, covering both initial stages and the long-run. While these positions don't need to include work reporting locations inside SeaTac City limit, they could potentially be. Vehicle automation will grow, not shrink job count, and the opportunity for expanded employment rises once robo vehicles are carrying more than 20 percent of personal travel. The first ten percent or so mostly replaces bus and taxi. Depending how cleverly all the ancillary jobs are managed, the passenger transportation sector could break even on job count on the early rounds of disruption, although many new service jobs would be lower paid compared to professional drivers. If modern cities as some expect expand to 20, 30, and then 40 percent of personal travel in robotic vehicles, providers of these services will mostly be managing vehicles carrying riders who formerly looked after their own vehicles. Consider the surveillance, cleaning, managing, maintenance, and repair for the fleet that provides this additional vehicle count. Robo vehicles run 14-16 hours/day over all seven days of the week, but an FTE runs just eight hours over five days. Economy of scale is lost because the service levels needed to attract the second 25 percent of users is much higher than what is need to attract the first 25 percent, even though companies will have become more efficient in use of workers.
6. The strength of City of SeaTac as a Municipal Center of Excellence will come from (1) a formal municipal commitment based on City Council endorsement of the project-generated Action Plan with concomitant citizen acceptance to proceed by all available means on an early deployment of microtransit within the jurisdiction, (2) convenient support of out-of-town visitors to observe the project because of SeaTac Airport and in-city hotels with meeting facilities, (3) an existing, calm available street grid on which early stage microtransit could easily operate, (4) a regional

organizational support community in CATES, ACES NW Network, INRIX, Port of Seattle, and others to be recruited.

7. Supplemental transportation opportunities for youth of school age will be discussed in the Action Plan, including travel between students' homes and schools they attend, and volunteer service in stewardship of the fleet and its customers. This idea will be explored with the Transportation Director of the Highline School District, who CATES met for the first time on September 20.
8. An additional benefit of the automated shuttle system operating on the City's residential road system will be explored -- microtransit as a tourist attraction. However, significant tourist destinations need to be identified and promoted for this to happen. Possibly providing access to the Puget Sound waterfront in Des Moines could be arranged in a future expansion. Unless tourist attraction destinations can be determined as worth serving, tourism support is not likely to be an important benefit.
9. Significantly, SouthCenter mall in Tukwila is deemed a difficult destination to serve directly in an early phase of autonomous micro transit, even though this would be a worthwhile, attractive destination of likely interest to SeaTac residents and visitors. For the moment, automated shuttle service to one or more of the five SeaTac bus stop boarding points for the King County Metro RapidRide F line between Burien and Renton will be the only immediately available opportunity for setting up access to SouthCenter Mall. For this to be attractive, the connection times would have to enjoy a high level of coordination to avoid customers on either the automated shuttle or the human-operated RapidRide arriving just in time to a transfer point to see only the departing tail lights of the vehicle they seek to board.
10. From several sources, including PSRC, INRIX, and City of SeaTac traffic engineering, CATES has been eagerly seeking measured or modeled origin-destination trip data for in-city surface travel. INRIX has so far responded positively with a commitment to provide trip paths from its vehicle-provided tracking data, which will hopefully reach this project timely following CATES' submission to them of GIS shape files defining the boundaries of the Travel Analysis Zones (TAZs) that we seek to understand as the set of origins and destinations with which to match travel patterns. Furthermore, O-D data from modeling has been provided by SeaTac's traffic engineer Florendo Cabudol and is expected to be provided by the modeling staff at Puget Sound Regional Council.
11. Shuttle service for SeaTac's senior citizens to move about without private cars as a supplement to the Hyde Shuttle appears to be a feasible opportunity for service by microtransit. Community centers, medical offices, and shopping would be target destinations. In twice visiting the SeaTac Community Center in the north end of the City I learned it has plenty of parking for 100 senior citizen lunch attendees, but there is no convenient routine Metro transit service to bring in people from their homes for those who are unable to drive. The Hyde Shuttle and King County Metro Access vehicles deliver citizen customers of the Center who plan in advance, but do not readily support spontaneous trips because of an advanced reservation requirement. I met August 29th with Walter Washington the new transportation director for the non-profit Sound Generations that operates Hyde Shuttle throughout the County to discuss opportunities for

serving the older SeaTac population without an option to drive a car, and he is eager to cooperate on innovative mobility service delivery.

12. CATES has reviewed the City's Transportation Plan and Comprehensive Plan to ensure all City activity recommended by this automation project is compatible with the policies laid out in those existing official City policy documents. I am finding the existing Comprehensive Plan map and official City maps of streets, bicycle lanes, and pedestrian facilities very useful for understanding the potential for new in-city travel options. Some of the more isolated SeaTac residential areas appear on first glance to be difficult to serve.
13. I held an in-person meeting on September 15 with SeaTac Police Captain Carl Cole, representing Police Chief Lisa Mulligan, for a review of the intended project direction, some idea sharing on the contribution of ubiquitous shuttles for handling impaired pedestrians and drivers, and the usefulness of using video cameras on the exterior of automated vehicles for general law enforcement purposes. Captain Cole was generally receptive to all project ideas, while expressing some concern over how to manage the likely irritation of some motorists to slow-moving microtransit vehicles on City streets.
14. Meetings to brief the project's direction to City of Des Moines senior staff on September 12, and City of Tukwila Public Works Director on September 15 yielded a positive response and interest at the staff level in cooperating with City of SeaTac in future implementation of automated microtransit that extended into these neighboring jurisdictions. A similar project review is in the process of being set up with Public Works Director Maiya Andrews of Burien.
15. Meeting with the Highline School District Transportation Director Devin Denney on September 20 revealed enthusiasm for cooperating with City of SeaTac on planning for an automated microtransit system, including the possibility of engaging the middle- and high-school student community in using, maintaining, promoting, and protecting the system.

### **Federal Funding Strategy Following from SeaTac City Council Acceptance of the Action Plan**

Note: At present, the intent is to recommend via the Action Plan a Federal (or other external source) funded set of activities that will require no other local City budgeted resources beyond management staff attention.

#### **Summary of Federal funding opportunities**

- **Puget Sound Regional Council Transportation Improvement Program (TIP) call for transit projects funded by Federal Transit Administration, January 2018, reported verbally by PSRC.**
- **Best option is USDOT "Advanced Transportation and Congestion Management Technologies Deployment Initiative," call for projects, estimated February 2018.**
- **Attachment of City efforts in autonomous microtransit to the existing Federal grant funded Sound Transit Mobility Sandbox, to be explored in the present project and if available to be triggered following Council endorsement of the Action Plan in December 2017; low probability of success.**

- **Attachment of City efforts to the existing City of Seattle, multi-jurisdictional grant from U.S. Department of Energy’s Community-based Advanced Transportation Projects, to be explored in the present project and if available, to only be triggered following Council endorsement of the Action Plan in December 2017; low probability of success.**
- **Attachment of City efforts to future grant-funded projects of City of Bellevue that emerge from its Transportation Technology Partnerships program, to be explored in the present project and if anything useful emerges, to be triggered only following Council endorsement of the Action Plan in December 2017.**

CATES is now formulating a funding concept for the City of SeaTac Action Plan that would propose something like this: a consortium of two to five King County municipal jurisdictions would be formed, including the Cities of SeaTac and Bellevue where liaison by me with Steve Marshall, that latter City’s Transportation Technology Partnership Manager, aimed toward the goal of official coordination and cooperation in future funding applications to the Federal Government has already begun. Steve Marshall is in Washington, DC the week of September 25 exploring Federal funding options.

The proposed consortium would come together to write a proposal for a circa thirty million dollar start-up investment in a public-private technology deployment that would include automated, driverless shuttle networks that are 50% covered by Federal funds and 50% covered by funding and in-kind support from existing local-government and non-government activities. Several autonomous microtransit pilots would be set up in this proposal, including one for City of SeaTac.

For example, a long-run vision consistent with USDOT’s intent for large-scale deployments of an Advanced Public Transportation System<sup>1</sup> is to establish microtransit (small vehicle, driverless) service on 100 lane miles of routes – continuous loops, or a series of point-to-point routes – in shared suburban curb lanes connecting neighborhoods to light rail stations, transit centers, and bus rapid transit (BRT) stops where travelers can transfer to existing Sound Transit and King County services. This level of service providing three minute response time on this many route miles would require 130 vehicles, including spares. These vehicles could also serve other community destinations such as recreation and event centers, libraries, medical facilities, and shopping centers.

The Public Works directors in the Cities of Tukwila, Burien, and Des Moines have all been contacted with the notion in mind that these places have residential zones directly adjacent to similar such zones in City of SeaTac. These adjacent areas would be natural regions for system expansion and support for Federal investment on the front end.

CATES contemplated proposal to the USDOT could be created from a top-down perspective with goals of large-scale, sustainable deployment operating with a high degree of safety and zero emissions at a lower cost than seen with traditional motor bus and taxi operations. The proposal and the forthcoming CATES

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<sup>1</sup> See U.S. Department of Transportation Notice of Funding Opportunity Number DTFH6116RA00012 “Advanced Transportation and Congestion Management Technologies Deployment Initiative”  
[https://www.fhwa.dot.gov/fastact/nofo\\_atcmtd\\_20160325.pdf](https://www.fhwa.dot.gov/fastact/nofo_atcmtd_20160325.pdf)

Action Plan for SeaTac would encompass a justification for a multi-city system, and also initially for a starter line service within the City of SeaTac.

At no expense to the City of SeaTac, while I was in Washington, DC in early August I visited for thirty minutes with Fernando Ruiz, the transportation-assigned Legislative Assistant to Congressman Adam Smith of our State's 9<sup>th</sup> District encompassing City of SeaTac. I briefed him on the underway AV project and the City's potential intent to request Federal grant assistance in the future. He was receptive to this idea and offered that the Congressman would certainly endorse a funding request.

### **Details attractive to USDOT, a potential source of financial support**

While the microtransit operating concept includes no vehicle drivers, the resulting system would have a staffed control center monitoring all vehicles across multiple municipalities, plus maintenance, security, and customer service staff. The long-run target operating cost per passenger mile has a policy target to be ½ of the current operating cost per passenger of fixed route transit service now including amortization of capital expenditure. The long-run goal would be to double public transit ridership in the served communities for the same level of resources that are providing the mobility services now. Therefore, the effect of this plan on the entire King County transit system would be to raise its efficiency by adding more customers to the overall system, and also by lowering operating expenditures per customer by trading drivers for support personal.

Under the grant-funded program, a manager and implementation team would be formed with new positions housed in an operating entity that may or may not be embedded in an existing transit agency or municipal jurisdiction. The vehicles would be leased from vehicle manufacturers or their agents, rather than bought outright. A turn-key contract operation operated by the private sector under a franchise is contemplated.

In choosing specific routes – that would be located completely within the municipalities in the consortium – priority should be placed on serving neighborhoods with the highest representation of youth, elderly, disabled, and other non-car-driving, mobility-disadvantaged populations. Across all populations, a new higher level of customer access to the public transit system would be measurable after the implementation of microtransit providing better connections.

A basic resourcing concept to gain the necessary matching funds would be to design microtransit routes that serve transit centers and rail stations in order to support growth in ridership on existing light rail and bus routes and thus create better fare box recovery rates and in effect expand the entire integrated public transit system that King County enjoys. This concept would permit locally-operated public transit expenditures on routes that would experience higher passenger loads from connected microtransit routes to be counted as matching resources for Federal grant dollars.

There are other sources of matching resources as well, for example, hours of work from existing staffs, the VW diesel emissions penalty fund, contributions by places served with employee access such as the

airport, hotels, and commercial parking services of City of SeaTac. Fares from riders collected via the existing Orca RFID cards would also be a source of funds.

Authorization to pursue funding like described here will presumably be decided by the City based on recommendations coming out of the Action Plan final document that is the end product of the present engagement with CATES.

**Preliminary steps in the present project to be ready to move toward Federal funding applications following adoption of Action Plan recommendations from this project:**

1. Review the winning grants for the 2017 funding round for the USDOT “Advanced Transportation and Congestion Management Technologies Deployment Initiative” as part of getting ready for its likely spring 2018 call for proposals. Action, CATES.
2. Be ready to apply for funding in the PSRC call for projects seeking Federal funds through the periodically repeating Transportation Improvement Program (TIP) in January 2018. Action, CATES, with follow up by City staff. As preparation for this eventuality, CATES will assist the City in getting whatever authorized action comes out of this project into the lists of projects maintained by PSRC for the TIP. PSRC staff are aware of this project. I got myself appointed as the first private sector appointee to the PSRC Regional Traffic Operations Committee, an appropriate forum for discussing and advancing vehicle automation within the processes of our region’s Metropolitan Planning Organization.
3. Examine the opportunities for funding and other support from the City of Seattle’s August 2017 grant from Department of Energy’s Vehicle Technology Office described as follows, “\$1.9 million to accelerate the use of EVs in shared mobility applications in four major U.S. markets and establish best practices for all U.S. metro regions.” Action, CATES.
4. Maintain cooperation with Sound Transit and King County Metro in their Mobility Sandbox project which enjoys Federal Transit Administration support. This project supports development of first/last mile small vehicle public access to light rail stations. Action, CATES, reinforced by City staff communicating with peers in the two transit agencies.
5. Maintain cooperation with City of Bellevue’s Transportation Partnerships Manager who is actively seeking to develop multi-jurisdictional projects that go beyond the borders of that City, Action, CATES, reinforced by City Staff communicating with peers in Bellevue’s DOT.
6. Maintain contact with the transportation-assigned assistants to the three Members of Congress who represent City of SeaTac residents—the two Washington Senators, Patty Murray and Maria Cantwell, and Representative Adam Smith. Action, City of SeaTac.

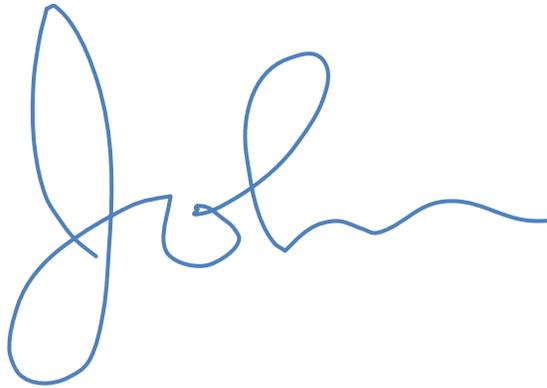
Further steps will be recommended in the Final Report Action Plan.

An economic model for microtransit in and around City of SeaTac, building on a foundation of present day origin-destination data and available cost data will be prepared as part of this project’s Action Plan. Early calculations are promising, and microtransit simulations have shown viability in jurisdictions larger than SeaTac. In this eventuality that microtransit does not pan out as the planning proceeds, the planning will change focus to other steps that can be taken now to keep City of SeaTac in the forefront

of active and responsible follow up to technological and entrepreneurial developments happening around the world in vehicle automation.

For example, as mentioned above, there may be opportunities within large private parking complexes in the City to demonstrate driverless parking systems and small shuttle vehicles to move customers from one part of a large parking structure to another. This opportunity will be explored by CATES in the present study, as a secondary priority for the time being.

I am looking forward to continue working to draft an Action Plan including an approach to funding along the lines described here. Input – questions, comments, suggestions, or criticism -- from any and all readers of this document would be most useful and appropriate throughout the period between now and end of October.

A handwritten signature in blue ink, consisting of a large, stylized initial 'J' followed by a cursive 'h' and a wavy line extending to the right.