Memo

To: Land Use Subcommittee Members of the Oregon Autonomous Vehicles Task Force
From: Eric Hesse, League of Oregon Cities' Task Force Representative
Date: March 28, 2018
RE: Public Sector Information Needs to Guide AV Policy and Manage AV Testing/Deployment

As Oregon defines its policy and legal framework for the testing and deployment of Autonomous Vehicles (AVs), state, regional and local governments will require certain information to effectively fulfill their roles in implementing and advancing adopted policy goals and enforcing existing and developing new laws to protect and advance the public interest. As managers of the public realm, including the public rights of way in which AVs will operate, public sector entities are rightly aiming to define policies and practices to ensure AVs will improve traffic safety, decrease congestion, boost transportation choices, and support a strong economy and vibrant community development.

To enable effective short- and long-term land use and transportation planning as well as ongoing transportation system management, the private sector, using public roads, should be required to share useful information to assist in that effort. Transportation agencies have always collected information on how people and vehicles travel to make sure that the transportation system is safe and efficient for all users, and that companies that provide transportation services operate responsibly. Our infrastructure is built with public funds, and the public expects us to use data to oversee it responsibly. This memo aims to outline what information will be most useful in this regard and suggest ways in which it can be provided to ensure efficacy for the purposes above while duly protecting personal privacy and proprietary competitive information.

Why do public sector agencies need information about AVs?

To carry out their responsibility to plan and manage transportation and land use systems, AVs, along with other recent developments in technology, both require us to improve the information that we use due to the significant impacts they will have on how people travel, and that they present an opportunity to do so because they collect large amounts of data. In order to fulfill State, Metropolitan Planning Organization (MPO) and local governmental responsibilities for federal and state transportation and land use planning requirements, we need better information to carry out our responsibilities for two key reasons:

- **The transportation system is changing more rapidly than ever before, so we need more up-to-date information.** Most transportation modelling is based primarily on the Household Travel Survey, which is part of the census. These surveys are so labor-intensive and costly, we only are able to update them every decade. Up until recently, this system worked fine because the way in which people traveled did not change that much from year to year, but that is no longer the case. The Portland Metro region’s last travel survey was completed in 2010. Uber and Lyft began serving our metro area in 2015, and in 2018 they carried over 12 million trips in the City of Portland alone—and we have no way of accounting for these services in our transportation demand models used for planning and compliance purposes. Some agencies, including Metro and the City of Portland, are exploring private data sources that promise to capture AVs and shared mobility, but these sources are expensive and are not always reliable. AVs will likely accelerate the pace of disruption, because there are dozens of companies poised...
to launch an Uber- or Lyft-like service when AVs arrive. **We can’t keep up with the pace of change unless we update the information we gather more frequently.**

- **Vehicles aren’t sticking to highways, so we need more geographically detailed information.** Up until recently, when traffic was bad most drivers used to stay on the main road because they didn’t know a better route. Consequently, most transportation agencies placed the sensors that they use to conduct traffic counts on main roads. Now, GPS systems and apps like Waze help drivers find opportunities to shave a few minutes off their commutes by taking shortcuts down neighborhood streets to avoid congested areas; AVs will automate this process. In order to manage congestion and ensure that local roads are safe, it will no longer be sufficient for local governments to focus on freeways and major arterials; we will need information on how vehicles are using most streets. **We need more detailed information on travel patterns, collisions and near-misses to better design the transportation system to keep everyone moving and prevent traffic deaths.**

To address the unique opportunities and challenges presented by AVs

There are a host of unique issues that AVs present, and we need information on how they are traveling to take advantage of new opportunities and tackle new challenges:

- **Many AVs will likely be operated in shared fleets by private companies.** The first passenger AVs are expected to be deployed as shared vehicles by companies like GM, Waymo, Uber and Lyft, and some believe that AVs will usher in an era when far fewer people own cars. On one hand, this could allow us to convert parking lots into places for people, and could make travel more convenient for everyone. On the other hand, it would fall to public agencies to ensure that profit-motivated companies provide safe and equitable service and create regulations or incentives to encourage them to help reduce congestion.

- **Local governments will also likely need to consider new methods of collecting transportation revenue,** as revenue from gas tax, vehicle registration fees, and parking fees decline significantly; mileage charges may be the most efficient and fair way to replace the gas tax. Many cities have enacted regulations on Uber and Lyft to ensure that they provide safe and equitable service, and some even collect fees from these services that they use to fund public transportation or wheelchair-accessible service. Local governments need to continue to have the right to regulate these services, and collecting information on how these services operate is key to understanding their impact on the public roads and developing and administering effective regulations that maximize the full potential of AVs.

- **Dedicating lanes for AVs could make the system more efficient for everyone.** AVs are expected to move more people per lane because they can travel in high-speed platoons—but this won’t happen at scale if they are mixed with human-operated vehicles. We need to know how many AVs are using a roadway so that we can identify the point when it makes sense to dedicate roadway space to AVs to help them realize their potential while protecting public safety.

- **AVs can circle instead of parking, increasing congestion and emissions.** If parking is too costly or inconveniently located, travelers could direct their vehicles to circle the block or travel to a faraway lot instead of parking, adding to traffic and pollution. We need information on how AVs behave with no passenger in the car so that we can manage traffic and parking—and we won’t get that information from surveying people on their travel behavior.
It is important to note that many of these information needs stem from interests that agencies and the public share with the companies that are advancing AV technology. We all want to reduce congestion and keep the transportation system in good shape so that everyone can get where they need to go, whether they are in an AV, a human-driven vehicle, or a bus. We all want to maximize the potential of AVs to make our streets safer and more efficient and our communities more vibrant. We are aligned with companies like Daimler, GM, Waymo, Uber and Lyft in wanting people to be able to share vehicles and trips. We understand companies’ concerns about protecting confidential and competitive information, and we are already addressing these concerns and set the stage for collaboration in meeting our shared goals.

What information do state and local governments need to fulfill their responsibilities?

Information most relevant to understanding the impacts of AVs on travel and maximizing their benefits are listed below. The list is consistent with the National Association of City Transportation Officials’ (NACTO) Data Sharing Principles.

- **Trip origins, destinations, types (passenger, goods delivery, or zero-occupancy/goods), and time of day**, to understand travel demand. NACTO calls for origin/destination data at the block face level (i.e., which side of a city block a trip or ends at). Cities such as Portland, New York and Boston collect TNC data at the block face level or an even finer scale.

- **The number of vehicle occupants**, allowing Oregon to incentivize shared travel and capture value from zero-occupant vehicles. Cities have become more interested in occupancy data as the impacts of TNCs on congestion have become more apparent (New York and San Francisco).

- **Location and severity of collisions and location of instances of rapid acceleration and deceleration and sudden collision avoidance**. As Oregon’s vision is to **eliminate deaths and serious injuries on its transportation system by 2035**, maximizing the safety benefits of AVs is a key opportunity to reach that goal. Transportation agencies use state and federal collision information to identify safety problems. Yet data on non-fatal collisions is not always available, and collisions are often under-reported. AVs can provide that information, including data on near-misses to help identify potentially dangerous locations before collisions occur. Most TNC regulations require collision reporting (for example, see Portland’s City Code, section 16.40.280), and NACTO calls for collecting data on collisions and acceleration/deceleration.

- **Route traces and parking information** to understand how AVs are affecting travel patterns (e.g., whether vehicles cruise or park, whether AVs are rerouting onto local streets to avoid congestion and how they may be contributing to congestion based on time and location). This is the only data point listed that is not reflected in NACTO’s principles nor in existing TNC regulations, but we believe it is critical to fully understanding the impacts of AVs. For public agencies, collecting this data would create the risk of compromising personal information since detailed information on trip patterns could be used to identify individuals, and it would also pose technical issues associated with storing and managing large quantities of data. Potential ways to address these issues are discussed below.
- Traffic volumes and length of trips (in minutes) and/or vehicle speeds to identify congested trips and causes of delay.

- Information on traffic violations by AVs. While hopefully a small set of data, the underlying challenges of safely integrating law-constrained AVs with human-driven vehicles, bicycles and pedestrians, may result in helpful data.

Additional information from Transportation Network Companies (TNCs) operating AVs would be helpful to help ensure shared fleets provide safe and equitable service.

- Service provider (e.g., Uber, Lyft) and type (e.g., UberBLACK, UberPOOL). This is a standard requirement in city-TNC data sharing agreements. Cities are increasingly interested in service type since the introduction of shared TNC services, but few collect it.

- Booking type (advance/real-time); wait time; cost of trip; and location, date, and time of unfulfilled, declined, and cancelled rides. This information helps ensure shared fleets are meeting people’s needs throughout our communities. Shared fleets might be able to provide travel options for those who need them the most. The evidence is mixed. Some studies of TNCs have found people of color, people in wheelchairs, and other marginalized groups face longer wait times and greater numbers of unfulfilled rider requests. Overlaying data on wait times, costs, and cancellations with Census demographic data can help us understand whether Oregonians are receiving equitable service.

- Number and type of passenger complaints can be a valuable resource for understanding safety and equity. Portland collects TNC complaint data (see pp 19-20 of the Greyball Audit Report).

How should information be provided?
Data must be properly managed to avoid compromising privacy and proprietary information.

Public agencies already manage a variety of sensitive data, including data on people’s health and employment, while protecting privacy. Aggregation is the most common method to protect sensitive data, and one of the simplest to execute. Aggregation can enable agencies to use data. We are not interested in individual trips; we are interested in travel patterns, and many transportation agencies lack capacity to manage large quantities of data. Data can be aggregated spatially, temporally, or both. Other techniques such as truncation and synthesis can also help yield actionable information while protecting individual privacy.

It is difficult to recommend a one-size fits all approach to aggregating AV data. Needs vary by agency type (local agencies need finer-scale data than regional or state agencies) and type of data (we typically need more detailed data on safety than we do on travel patterns, because we need to pinpoint collision “hot spots”). How much we aggregate data is also driven by the amount of data available; when less data is available we aggregate at a larger scale in order to avoid revealing personal information or drawing conclusions based on samples that are not statistically significant. Eventually, AVs will likely carry enough trips that it will be possible to aggregate data at a very fine scale without compromising private/personal data or the validity of results, and the recommendations we offer below are based on
this assumption. However, it may be necessary to rely on more aggregate data during the coming transition when AVs carry a smaller amount of trips. NACTO’s data sharing principles recommend aggregating different data to different scales, and our recommendations below, which are largely consistent with NACTO’s recommendations, follow suit.

<table>
<thead>
<tr>
<th>Data type</th>
<th>Spatial aggregation</th>
<th>Temporal aggregation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip origins and destinations</td>
<td>Block face</td>
<td>Hourly averages</td>
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<tr>
<td>Number of occupants</td>
<td>Street segment</td>
<td>Hourly averages</td>
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<tr>
<td>Safety (collisions, sudden acceleration/deceleration)</td>
<td>Point (disaggregate)</td>
<td>Real-time</td>
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<tr>
<td>Route traces</td>
<td>Street segment or by origin/destination pairs, or disaggregate with trip ends truncated</td>
<td>Hourly averages</td>
</tr>
<tr>
<td>Traffic volumes and speeds</td>
<td>Street segment</td>
<td>Hourly averages</td>
</tr>
<tr>
<td>Booking type; wait time; cost of trip; unfulfilled, declined/cancelled rides</td>
<td>Census tract</td>
<td>Hourly averages</td>
</tr>
<tr>
<td>Passenger complaints</td>
<td>N/A (complaint data does not need to be spatial)</td>
<td>Real-time</td>
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