Smart Cities 101 & the Smart Cities Challenge
Adrian Pearmine
National Director for Smart Cities and Connected Vehicles
DKS Associates
What is a Smart City? (Smart City 101)

A **smart city** uses digital technologies or **information and communication technologies (ICT)** to enhance quality and performance of urban services, to reduce costs and resource consumption, and **to engage more effectively and actively with its citizens.** Sectors that have been developing smart city technology include government services, transport and traffic management, energy, health care, water and waste.

-Wikipedia Definition
Smart City Sectors

http://www.wi-fi360.com/
Think of your City like the Nervous System

**Sensors or IoT:**
The nerve endings capturing signals

**Telecom Network:**
The nervous system backhauling the signals

**Big Data:**
The brain processing the signals

**Thoughts & Images:**
Dashboards & Applications
New Transportation Bill **FAST Act** (Fixing America’s Surface Transportation) has heavy emphasis on Smart Cities.

**Smart City Challenge seeks the best in integrated transportation technology for mid-sized cities**

*Posted by Anthony Foxx*

“The city that develops the most innovative, most forward-thinking plan to harness technology and reimagine how people move will receive up to $40 million to become the first city in the world to implement it...And that’s not all. Our partner in this, Vulcan, Inc., is offering an additional $10 million to the winning city to incorporate electric vehicle infrastructure into the city of tomorrow.”
<table>
<thead>
<tr>
<th>Partners</th>
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<tbody>
<tr>
<td>Paul Allen’s Vulcan, Inc.</td>
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<tr>
<td>Mobileye</td>
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<tr>
<td>Autodesk</td>
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<tr>
<td>NXP</td>
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<tr>
<td>Amazon Web Services</td>
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<tr>
<td>Alphabet’s Sidewalk Labs</td>
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<tr>
<td>U.S. Department of Energy</td>
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</tbody>
</table>
USDOT Smart Cities Vision Elements

**Technology Elements (Highest Priority)**

- **Vision Element #1** Urban Automation
- **Vision Element #2** Connected Vehicles
- **Vision Element #3** Intelligent, Sensor-Based Infrastructure

**Innovative Approaches to Urban Transportation Elements (High Priority)**

- **Vision Element #4** User-Focused Mobility Services and Choices
- **Vision Element #5** Urban Analytics
- **Vision Element #6** Urban Delivery and Logistics
- **Vision Element #7** Strategic Business Models & Partnering
- **Vision Element #8** Smart Grid, Roadway Electrification, & EVs
- **Vision Element #9** Connected, Involved Citizens

**Smart City Elements (Priority)**

- **Vision Element #10** Architecture and Standards
- **Vision Element #11** Low-Cost, Efficient, Secure, & Resilient ICT
- **Vision Element #12** Smart Land Use
Smart Cities Challenge Submittals

DOT Smart City Challenge

1,400 local officials, companies, academics and non-profits joined our webinars

800 people participated in our Smart City Forum

300 companies have expressed interest in partnering

77 applications received for the Smart City Challenge

5 Smart City Challenge Finalists to be announced in March at SXSW

1 Smart City Challenge Winner announced in June

#DOTSmartCity
www.transportation.gov/smartcity
Today has become pretty rough:

1) We've never had this much snow, this long, as long as I've lived here,
2) We're about to get a coating of ice over the top of it, like a big one,
3) I need to get my daughters over to their mom's house before the ice storm hits, which will now be almost a two hour ordeal
4) I'm supposed to be on a plane this evening and the only luncheon speaker at an event in Sacramento tomorrow,
5) I'm sick…or at least trying my darndest to shake it off before it goes into a full blown one.

Any chance that we could reschedule for Friday? 9:00? 1:00? 2:30? Or next Mon or Tue, almost wide open?
Portland’s Response

Smart City Challenge: Ubiquitous Mobility for Portland.
Proposal: https://www.portlandoregon.gov/transportation/69999
Video: https://youtu.be/JyiuPiLrM48
Community Outreach & Partnerships

- Community Cycling Center
- Asian Pacific American Network of Oregon
- Girls Inc.
- National Association of Minority Contractors of Oregon
- Ride Connection
- Self Enhancement, Inc.
- Verde
- Worksystems, Inc.
Students describe Smart Cities
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1786</td>
<td>First US Native American Reservation</td>
</tr>
<tr>
<td>1844</td>
<td>Slavery made illegal in pre-state Oregon</td>
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<tr>
<td>1844</td>
<td>&quot;Lash Law&quot; instituted</td>
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<tr>
<td>1850</td>
<td>&quot;Donation Land Act&quot; instituted by Congress</td>
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<tr>
<td>1892</td>
<td>&quot;Allen Land&quot; and &quot;Oregon Business Restriction&quot; Laws implemented</td>
</tr>
<tr>
<td>1926</td>
<td>&quot;Exclusion Law&quot; actually repealed</td>
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<tr>
<td>1948</td>
<td>Vanport flooding; 1/400 people left homeless</td>
</tr>
<tr>
<td>1960</td>
<td>Veteran’s Memorial Coliseum opens</td>
</tr>
<tr>
<td>1964</td>
<td>Emanuel Hospital expands; consultant recommends leveling neighborhood homes for parking</td>
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<tr>
<td>1964</td>
<td>City council declares area blighted, Portland Development Commission destroys the community in the area</td>
</tr>
<tr>
<td>1974</td>
<td>President Nixon decreases federal funding for expansion; neighborhood destruction ends</td>
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<tr>
<td>1975</td>
<td>Funding for Mt. Hood Freeway diverted to first MAX light rail line</td>
</tr>
<tr>
<td>1980</td>
<td>First Comprehensive Plan adopted</td>
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<tr>
<td>1990</td>
<td>The Oregonian Newspaper publishes &quot;Blueprint for a Slam&quot;</td>
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<tr>
<td>1991</td>
<td>Portland Metro adopts Regional Urban Growth Goals and Objectives</td>
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<tr>
<td>1993</td>
<td>First U.S. City to create and adopt a Climate Action Plan</td>
</tr>
<tr>
<td>1996</td>
<td>Pedestrian and Bicycle Master Plans adopted</td>
</tr>
<tr>
<td>2000</td>
<td>Portland Metro adopts Regional Transportation Plan</td>
</tr>
<tr>
<td>2000</td>
<td>Racist language in &quot;Exclusion Law&quot; removed from Oregon Constitution</td>
</tr>
<tr>
<td>2015</td>
<td>Update to Climate Action Plan and adoption of Vision Zero citywide</td>
</tr>
</tbody>
</table>

Tale of Two Portlands

- 1786: First US Native American Reservation
- 1926: “Exclusion Law” actually repealed
- 1960s: Public infrastructure projects destroy Portland’s African-American community
- 1990s: Portland’s redlining practices exposed
- 2000: “Exclusion Law” language removed from Oregon Constitution
- 2015: Update to Climate Action Plan and adoption of Vision Zero citywide
UB Mobile PDX: Mobility Marketplace
UB Mobile PDX: Ubiquitous Mobility
Go LA & Go Denver Examples
LA Go: Gamification

this month
1. Tom, 22 miles by bike 4600 cal
2. Linda, 6.7 miles walking 2200 cal
3. Me, 2.2 miles walking 900 cal
4. Esther, no walking 0 cal

powered by UP

cost  time  mode  fitness  goals

cost  time  mode  fitness  goals

this month
22 trips by car 2.3 CO2
2.6 miles walking 430 cal
12 trips by bike 0.3 CO2

you relied too much on car trips

did you know:
you could have reduced your CO2 impact and improve your fitness by participating in the Metro program "FitMobility". Click here to learn how.
Demonstration Corridors

Priority Demonstration Zones

POWELL/DIVISION CORRIDOR

COLUMBIA BOULEVARD CORRIDOR

122ND AVENUE CORRIDOR

- Powell-Division Corridor
- Columbia Corridor

- Freight Priority Zone
- Enhanced Mobility
- Downtown
- Innovation Quadrant
- Columbia Boulevard
- Light Rail Corridor
- Bus Corridor
- Street Car Line
- Light Rail Line
- Bus Line

- Dedicated Short Range Communications (DSRC) at each corridor signal
- Electric Vehicle Charging Location
- Copper and Fiber Optic Communication Network
- Future Wireless Systems to Expand Communication
- Car & Ridesharing Focus
- Traffic Control Center
- Major Educational Institutions & Partnering Opportunities
Why these corridors?

COLUMBIA BOULEVARD CORRIDOR

122ND AVENUE CORRIDOR

POWELL/DIVISION CORRIDOR

High Crash Corridors

Community of Concern
Sidewalk Labs & Intersection
Mobileye Crash Avoidance
Autonomous Shuttles
Ladders of Opportunity
Partner Cities: Replicability

- Seattle
- Portland
- Los Angeles
- Detroit
- Richmond
- New Orleans
Life After the Challenge?

Big Question: What is Portland still moving forward with after the Smart Cities Challenge?

- TriMet: Mobility on Demand Sandbox
- Portland State University: Award of Transportation Center with focus on Smart Cities
- Still exploring kiosks
- NSF/NIST Air Quality & Transportation: continuing further expansion & research
- T4 America participation
- Global Cities Teams Challenge (NIST run program): Hosting Transportation Seminar 2/1 - 2/2
TriMet Mobility on Demand Grant

In response to the 2016 MOD Sandbox Notice of Funding Opportunity (NOFO), FTA:
- Received 78 eligible proposals requesting $57,146,181 in Federal funds.
- Project proposals were evaluated based on each applicant’s responsiveness to the program evaluation criteria published in the NOFO.
- FTA is funding 11 MOD Sandbox projects, as shown in the table below, for a total of $7,931,080.
- TriMet awarded ~$680 K for central kernel of proposal.
## Some of the MOD Sandbox Awards

<table>
<thead>
<tr>
<th>State</th>
<th>Entity Name</th>
<th>Project Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>San Francisco Bay Area Rapid Transit District (BART)</td>
<td>Integrated Carpool to Transit Access Program</td>
<td>$358,000</td>
</tr>
<tr>
<td>FL</td>
<td>Pinellas Suncoast Transit Authority</td>
<td>Public-Private-Partnership for Paratransit Mobility on Demand Demonstration (P4-MOD)</td>
<td>$500,000</td>
</tr>
<tr>
<td>IL</td>
<td>Chicago Transit Authority (CTA)</td>
<td>Integrated Fare Systems – From Transit Fare to Bike Share</td>
<td>$400,000</td>
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<tr>
<td>OR</td>
<td>Tri-County Metropolitan Transportation District of Oregon</td>
<td>Open Trip Planner Share Use Mobility (OTP SUM): Open Trip Planner Integration of Transit with Shared-Use Mobility Real-Time and Data Enhancements</td>
<td>$678,000</td>
</tr>
<tr>
<td>TX</td>
<td>Dallas Area Rapid Transit</td>
<td>MOD Sandbox - The First and Last Mile Solution</td>
<td>$1,204,000</td>
</tr>
<tr>
<td>VT</td>
<td>Vermont Agency of Transportation</td>
<td>Vermont Statewide Transit Trip Planner—Fixed and Flex</td>
<td>$480,000</td>
</tr>
<tr>
<td>WA</td>
<td>Pierce County Public Transportation Benefit Area Corporation</td>
<td>Limited Access Connections</td>
<td>$205,922</td>
</tr>
</tbody>
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Elements from TriMet’s MOD Proposal

Existing Infrastructure and Applications

- VTA OTP Responsive Web App
- TriMet OTP Web App
- TriMet Mobile Ticket App: moovel RideTap
- US & Worldwide OTP Implementations
- OTP Transportation Tools

Screenshot example of desktop web version of VTA trip planner to be deployed 2016

Screenshot example of mobile responsive web version of VTA trip planner
Elements from TriMet’s MOD Proposal

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- VTA OTP Responsive Web App
- TriMet OTP Web App
- TriMet Mobile Ticket App: moovel RideTap
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moovel’s RideTap is a feature in TriMet’s mobile ticket app. It enables riders to easily access nearby transportation to help with the first or last mile of their trips.

RideTap includes ride-sharing service Lyft and car-sharing service car2go with more options expected in the future, including bike sharing.

The booking and payment features are planned for moovel’s RideTap SDK (Software Development Kit). As a partner on this project, moovel will participate to design OTP to facilitate this future feature and potentially develop the necessary hooks compatible with their SDK.
PSU’s TREC/NITC

NITC in the News

Portland State University's transportation center has secured a U.S. Department of Transportation national center grant worth $15.6 million over five years.

**Transportation center earns $15 million federal research grant, national designation**

*posted on Monday, December 5, 2016, 6:00am PST*

Portland State University has secured a five-year grant from the U.S. Department of Transportation for transportation research, education and outreach. Portland State's Transportation Research and Education Center, TREC, will administer the grant, which is expected to total $15.6 million.

The NITC program will focus on four research areas: increasing access to opportunities; improving multi-modal planning and shared use of infrastructure; advancing innovation and smart cities; and developing data, models and tools. Among the 11 projects funded in the first year of the grant are:
Exploring Kiosk Opportunities
Other Initiatives

- National Institute for Standards and Technology (NIST) Global Cities Teams Challenge (GCTC)
  - Selected Portland as GCTC Project of the Year and
  - Host of the Transportation Super Action Cluster Conference Feb 1 & 2

- Portland Bureau of Transportation
  - Grants for upgrading central signal system and limited CV demonstration
  - AT&T and GE Smart Cities Spotlight Cities focusing on 122nd Ave Implementation

- City of Portland
  - Incoming Mayor Ted Wheeler is excited about Smart Cities
Questions?

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