Urban Transport Infrastructure changing in the next 10-20 years…to allow more efficient and convenient city services to be provided to the public.

• Steady performance/price enhancements and/or breakthrough technologies, enhanced capability, integrated and lower cost transport, lower fossil-fuel requirement
• Changes in economic & political environment (greater urbanization, higher density, no more “last mile” for many kinds of distributed infrastructure, consumer preferences for a sharing economy, lower fossil fuel prices or bans on use of fossil fuels or carbon taxes, speed-to-market effects on air/road/rail transport, city/national competitiveness imperatives, etc)
• IMPORTANT FOR THIS SUMMIT: Enhanced potential for capture, integration and automated analysis of multiple streams of data from the various infrastructure elements and other data sources in cities;

What (real, new) funding solutions (gov’t and private) and business opportunities might be created by these changes?

What research gaps seem most critical to fill to enable these advances?

TED: “Ideas worth spreading”, “provocative”, “dramatic”, “with at least 1 (comm) story”
Module 22: Spotlight on Digital Transportation

Day 2
Module 22: Spotlight on (Digital) Transportation

- Future of High Speed Rail
- Vehicle Networks
- Convergence of Data Networks for Roads, Autonomous Cars, Rail, Other Transit
- Digital Airports
- Data-Driven Marine Logistics

- **Brian Sedar** – Mega Projects Builder
- **Mark Thomas** - Client Dir, Cisco/Jasper
- **Ricardo Sanchez** - Tech Dir NAmer, Cintra
- **Steve Riano** - Bechtel Airport Design
- **Kim Wikström** - Dir Rebus Prog Finland
Module 22: **Spotlight on (Digital) Transportation**

**Now a word from your Builder…**

- Digital Tech will not get you Home or to Work
- Bad News / Good News Story
  - (US’ fallen apart) / (others are building it; faster than you think)
  - (mega-data projects leapfrog predecessors)
- Euro/Chinese vs US High Speed Rail ex
  - Staggering Pace, Lost Competitive Advantage
- Transportation Infrastructure also Affects Quality of Life
  - Why don’t we see/act on the Very High Cost Decline?
- Role for Business yes, but don’t lose Government
Module 22: **Spotlight on (Digital) Transportation**

**Convergence – Positive Tech / Digital Trends to Watch Closely**

- Hyperloop – not fast enough
- Multi-Modal Hubs – but not here yet
- New TBMs - capture/integrate/analyze data, incrdd capability
- Fuel/Weight Tech - disruption of Air Travel
- National Imperatives Trend – Smart countries moving ahead
Module 22: Spotlight on (Digital) Transportation

Funding Solutions / Business Opportunities

- Density – Out & Up is not going to be enough; Tunneling
- High Speed Cargo for a High Tech-dependent country?
- P3s, wrong expectation for Contractor as long-term operator
- limited applicability of P3s, esp major transport infra

Research Gaps for Stanford / PARC / Others

- Balance Financing story, esp for Govt who is poorly or ill-advised
  Where money is; fees imbalance; limitations of P3s
- Eval paybacks to society (Quality of Life) from int'l transport built
  Data is out there (esp UK)
- Grow collab w/business/academia and Govt; find/reinforce role of Govt
  in transport (see Crossrail & Kim’s pstn for great exs)
Module 22: **Spotlight on Digital Transportation: IoT**

**Mark Thomas**
Cisco Jasper
Head of Connected Car Product Marketing
Cisco Corporation

**Cars are Context**
# Module 22: Spotlight on Digital Transportation: IoT

<table>
<thead>
<tr>
<th>Location</th>
<th>Cloud based ideas (food, saved places)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Entertainment streaming, friend destination/ETA</td>
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<tr>
<td>Person</td>
<td>Real-time route changes</td>
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<tr>
<td></td>
<td>Undetectable immediate hazards, parking spot</td>
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<tr>
<td>Vehicle</td>
<td>Service bulletins, remote state changes (unlock)</td>
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</tbody>
</table>
Module 22: Spotlight on Digital Transportation: IoT

Context
Person, Location, Vehicle

<table>
<thead>
<tr>
<th>Context</th>
<th>Home</th>
<th>Friends/Family</th>
<th>Third parties</th>
<th>Auto manuf.</th>
<th>Cities</th>
</tr>
</thead>
</table>
Module 22: **Spotlight on Digital Transportation: IoT**

**Opportunities and Research**

1. Need a common language
   - Language should not be proprietary

2. Common verbs and objects (and object models)
   - Government grants appropriate
   - Learn from XML experience

3. Insufficient focus on city grade scripting
   - Consumer model: IFTTT, Stringify
Mod 22: Spotlight on Digital Transport: Roadways

- **Urban Congestion is a massive economic problem:** 7M hours and $160bn spent a year (TTI, 2015 Urban Mobility Scorecard).

- **Addressing it is a moral obligation**... and a business opportunity

- **Traditional approach:** Adding capacity and shifting demand to mass transit.

- **The Managed Lanes Alternative**
  - Adds Capacity at **limited cost to the taxpayer** by using private funds
  - **Focus on demand management** by:
    - Guaranteeing travel times at a variable cost
    - Incentivizing car pooling and shifting trips to off-peak hours
  - Provides infrastructure better suited for new driving technologies
  - Spreading across America (33 projects in 10 states)
## Mod 22: Spotlight on Digital Transport: Roadways

### Managed Lanes: Data Sources

<table>
<thead>
<tr>
<th>Operations</th>
<th>From Users</th>
<th>External Data Sources</th>
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<tbody>
<tr>
<td>Toll Gantry Transactions</td>
<td>Managed Lane usage</td>
<td>Streetlight</td>
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<td>Vehicle Detectors (MVD)</td>
<td>INRIX</td>
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<td>Speed and Volume Pricing</td>
<td>AirSage</td>
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<td>Vehicle Identifiers (AVI)</td>
<td>Travel Patterns</td>
<td>Regional congestion</td>
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</tbody>
</table>

### In House Data Warehouse

- Drive on App
- Geofencing
- Promotions
- Loyalty Programs
- HOV Declarations
- Customer Surveys
- Mystery Driver
- Pulse Surveys
Mod 22: **Spotlight on Digital Transport: Roadways**

**Managed Lanes: Data Usage**

**Objectives:**

1. Maximize infrastructure operational performance
   - 1. Reduce overall network congestion
   - 2. Eliminate bottlenecks and improve connectivity

2. Optimize revenues
   - 1. Understand users preferences, willingness to pay, travel habits
   - 2. Design promotions and products that meet their needs
   - 3. Improve Customer satisfaction

3. Improve accuracy of traffic and revenue forecasts
Mod 22: Spotlight on Digital Transport: Roadways

Managed Lanes: Future business opportunities

1. Privately developed and operated urban networks of Managed Lanes.
   
   1. Efficient and innovative delivery of infrastructure projects
   2. In 2015, 31 infrastructure funds close $35.9bn

2. Improvements to Drive on type Apps to enhance users experience and offer new on demand products (promotions, coupons, reservations)

3. Express lane nature, quality of infrastructure, and density of ITS technology makes them the best suited road to start extensive use of autonomous vehicles

4. Existing contractual limitations on new business opportunities monetization should change in the future to promote technological innovation
Mod 22: Spotlight on Digital Transportation: Airports

Steve Riano, AIA, NCARB
Global Airport Design Technical Expert
Bechtel Corporation

What are the key drivers for airport technological innovation?
- Enhanced Passenger Experience
- Increased Commercial Revenue
- Improved Operational Efficiency
- Reduced Operating Costs

What are the primary challenges and constraints?
- Multiple Vendors/Lack of Standards
- Institutional and Governmental Barriers
- Lack of Innovative Vision
- Resistance of Labor Unions
Mod 22: Spotlight on Digital Transportation: Airports

What is the Passenger Journey Like in Most Airports Today?

- Traditional Immigration Counters: JFK Airport
- Traditional Check-in Counters: Baltimore Washington Airport
- Traditional Aircraft Boarding: Chicago O’Hare Airport
Mod 22: **Spotlight on Digital Transportation: Airports**

How is the Passenger Journey Changing?

- **Automated Immigration eGates:** Hamad Airport
- **Self-Boarding eGates:** Frankfurt Airport
- **World’s Largest Self-Service Bag Drop:** Gatwick Airport

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Digital Cities Summit – Oct 3-4, 2016
Mod 22: **Spotlight on Digital Transportation: Airports**

*What is Passenger Security Screening Like Today?*

- Denver Airport
- Chicago O’Hare Airport
- Hartsfield Jackson Atlanta Airport
Mod 22: Spotlight on Digital Transportation: Airports

How is Passenger Security Screening Changing?

- Smart Security Lanes: London Gatwick Airport
- IATA Checkpoint of the Future: Prototype
Mod 22: Spotlight on Digital Transportation: Airports

Where do we go next?

- Smart Security Trials: Hartsfield Jackson Atlanta Airport/Delta Airlines and TSA
- Denver Airport Great Hall: Public Private Partnership
- LaGuardia Airport Central Terminal Building: Public Private Partnership
THE BALTIC SEA SURVIVAL GAME
IF THE FLOW STOPS
THE COUNTRY STOPS
THIS IS THE FUTURE
CURRENT LOGISTICS IS NOT EFFICIENT
SHIPS’ UTILIZATION RATE IS 35%

SHIPS SPEND ABOUT 40% OF THEIR TIME AT PORTS

16–19 ACTORS INVOLVED IN DELIVERING A FREIGHT CONSIGMENT
WE HAVE CREATED A MARKETS INTEGRATOR

EXPORT COMPANY

LAND TRANSPORTATION

PORT

SEA TRANSPORTATION

END CUSTOMERS

TECHNICAL SOLUTIONS

REGULATION

INFRASTRUCTURE INVESTMENTS

DIGITAL SOLUTIONS
ARE YOU READY
FOR THE NEXT WAVE?
Module 22: Spotlight on Digital Transportation

Q&A Discussion

ANY OTHER COMMON THEMES / STORY TO DRAW / REINFORCE FROM ALL 5 PSTNS?