USDOT and PATH

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California PATH

- In 2011, two major California transportation institutions merged into a single entity.
- California Partners for Advanced Transit and Highways
  - Established in 1986, under the Institute of Transportation Studies at UCB
  - Multi-campus, multi-disciplinary
  - Pioneer in Intelligent Transportation Systems
- California Center for Innovative Transportation
  - Established in 2001, under the Institute of Transportation Studies at UCB
  - Focus on accelerating the deployment of innovative transportation technologies
- Formed the California Partners for Advanced Transportation Technology
  - Multi-campus, multi-disciplinary
  - Research and deployment, system management and safety

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- Developing and deploying technologies to help solve the nation's most pressing transportation issues
  - Congestion, mobility, system productivity, and safety
  - Multi-modal, corridor focus

- With ancillary work and benefits in:
  - Air quality/environment
  - Energy consumption
  - Cost effectiveness
  - Regional/statewide economic health

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- 40 full-time staff and academic researchers, 40 faculty and students.
- Soft funded program solely based upon projects, although Caltrans provides a small level of base management support.
- Strong foundation in basic research and demonstration through technology demonstrations.
- Now, after merger, a strong record on transportation technology deployment.
  - Transferring academic research and privately developed technology to practitioners and the traveling public.
  - Making the case to stakeholders
    - Evaluations, business cases, FSR's, presentations, etc.
  - Removing the barriers
    - Change management, changes to specs, legislative proposals, etc.

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California Has Been Quietly Progressing…

- Californian's agree to a $20B transportation bond in 2006
- The California Transportation Commission is on-board
  - They demand science based reasoning for project selection
  - They consider the use of technology as a cost effective investment
  - They allocate over $100M to ITS projects
- $4.5B for Corridor Mobility Improvement (CMIA)
- Corridor System Management Plans required on all CMIA corridors
  - Over 50 CSMPs; over 25 use microscopic traffic simulations
  - Simulations and other scientific assessment point to most cost effective investments – typically ITS

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California Has Been Quietly Progressing…

- Investing in data production and acquisition.
  - The lack of reliable data is the single biggest issue in monitoring and managing transportation performance.
    - 60% increase in detection systems since 2004
    - Development and deployment of data archiving tools
    - Development and deployment of alternative sensors networks
    - Understanding the value of mobile data sources
    - Understanding, purchasing, and using 3rd party data
- Investing in more efficient modeling tools for transportation investment planning.
  - Current models are slow, time consuming, and costly
- Investing in more efficient methods for real-time operational improvements.
  - Tools to allow operators to run real-time scenarios? Develop active playbooks?

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California Has Been Quietly Progressing…

- Investigating how crowd sourcing might change the face of transportation management.
  - Will this make transportation management better or worse?
  - Taking a proactive position to ensure the best possible outcomes.
- Understanding what role will connected vehicles will play in improving the safety and mobility of California corridors.
  - How shall California prepare and what demonstrations are necessary in to convince stakeholders and travelers in the most vehicle dependent state?
- California is interested in the deployment of the next generation ICM in a yet-to-be selected California corridor.
  - What does this look like?
  - What is the mix between investment in infrastructure, vehicle, and community?
  - Integration of conventional tools, newly developed technology, and the use of social networking tools for self management.

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How is PATH Assisting California?

- Assisting California in determining where best to invest
  - Developed the very first Corridor System Management Plan (CSMP) on I-880 in the San Francisco Bay Area
  - Promoting and assisting the use of microscopic traffic simulation and other scientific techniques to determine the most cost effective transportation investments
  - Evaluating current CSMP's and micro-simulation as a sustainable business process

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- Addressing California's data deficiencies
  - Development and deployment of PEMS – Performance Measurement System http://pems.dot.ca.gov
    - Online system providing graphical and map based traffic data in real time.
    - Provides diagnostics, imputation for missing values, speed calculations, etc.
  - Understanding the value of probe data through Mobile Century, Mobile Millennium
    - First use of crowd sourced cell phones to collect speed data, great public excitement.
    - Development of real time traffic estimation and fusion models (not control).
  - Data Quality and Hybridization
    - What are the quality standards and data formats government require to purchase data?
    - Fusing 3rd party data with legacy data – Hybridization.
    - Information and control?

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- Developing more efficient modeling tools
  - Newly developed macro modeling tool called TOPL – Tools for Operational Planning
    - Modeling that took months or years to establish and calibrate now takes weeks or days
    - Scenarios that took days to run now takes minutes or seconds
    - Provides predictions of traffic conditions given changes to ramp metering, lanes, etc.
    - Designed to assist corridor managers in making decisions, web based for easy access.
    - Open Source.
- Conducting work on the Connected Vehicle Program
  - CICAS- SLTA
  - Upgrading California test facility in the San Francisco Bay Area
  - Attempting to promote Connected Vehicle demonstration in California
  - Team California

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- Designing next generation corridor management (ICM 2.0)
  - Connected Corridors – Cooperative Corridor Management
  - Vehicles, Infrastructure and People
  - Develop a single system facilitating among:
    - Travelers
    - Vehicles
    - Infrastructure
    - Organizations
  - Traveler collaboration.

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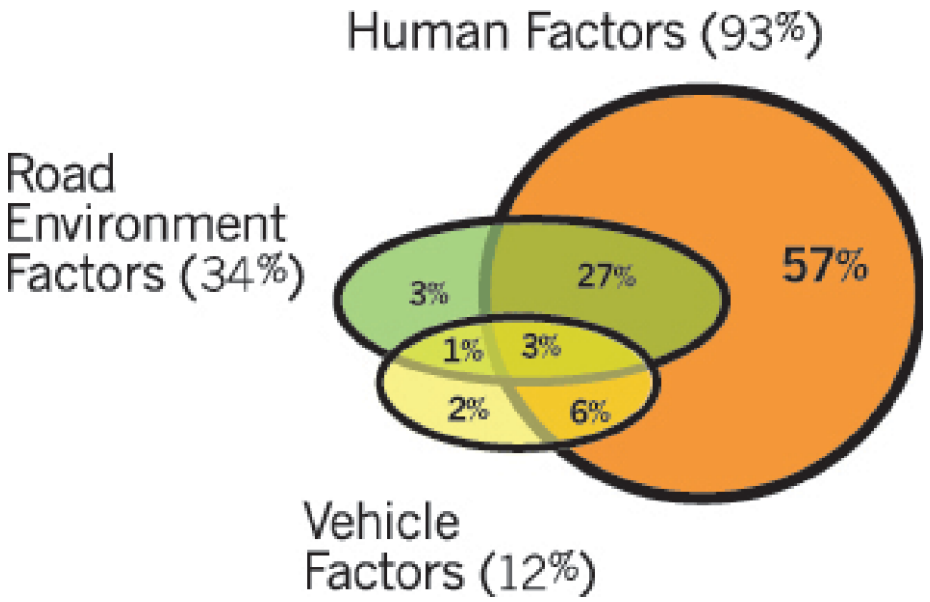
ICM 2.0 – People as Part of the Solution

Factors



Research and Deployment Areas

- The social internet – A connected world
  - People can participate, in real-time, in demand management, psychology and crowd sourced intelligence. First and last mile problem, demand management, multi-modal travel choices.
- Big data – New sources, new combinations
  - Probe data, visual data, ubiquitous sensors, texts, tweets, etc. Significant fusing of data to provide information from small amounts of data (arterials, rural highways, ramps). Knowledge and control.
- Cloud computing – Unlimited storage, computational power, and data distribution
  - Simulation, system management, routing, real-time control, predictive and control actions methods that were not possible are now possible.

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Research and Deployment Areas

- Smart Devices – Automobiles and infrastructure capable of making decisions
  - Better coordination, incident reduction.
- Real-time control of complex systems – New strategies combining multi-modal productivity and demand management
  - Made possible by cloud computing, big data, smart devices and the social internet. Prediction, learning, adapting, control. Real-time, reliable control of complex corridors.
- Organizational dynamics – Risk management in corridors (personnel requirements, policy modifications, laws)
  - People and organizations will always be part of the process and they must evolve to enable the management of complex systems. Risk management, decision support systems, legal items, finance.

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Thank You!
Questions?