22nd ITS World Congress
Towards Intelligent Mobility – Better Use of Space

SIS20: ITS and Logistics

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Outline

- USDOT ITS JPO
- Beyond Traffic: Freight Issues
- Grow America Act: Freight and Logistics
- Why Plan for Freight
- Need for Freight ITS
- FRATIS
- Freight Operations Initiatives
- Automation and Freight
- Smart Roadside

USDOT Modal Collaboration and Partnership

“Beyond Traffic 2045”

The USDOT’s outline of the trends and choices facing American transportation over the next three decades

Source: USDOT

- How will we move?
- How will we move things?
- How will we move better?
- How will we adapt?
- How will we align decisions and dollars, and invest the trillions of dollars our transportation system needs in the smartest way possible?

http://www.dot.gov/BeyondTraffic

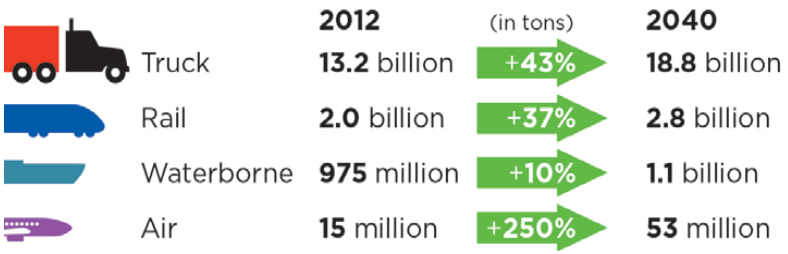
Beyond Traffic Key Issue: Freight and Logistics

- **How will we move freight?**
  - How to reduce freight chokepoints that drive up the cost of owning a business?
  - By 2040, U.S. freight volume will grow to 29 billion tons—an increase of 45%:
    - Increasing online shopping
    - Impact of airline mergers and hub consolidation
    - Changing international trade balances
    - Increasing domestic energy production

54 million tons of freight move across our nation every day

Freight Movement is Multimodal

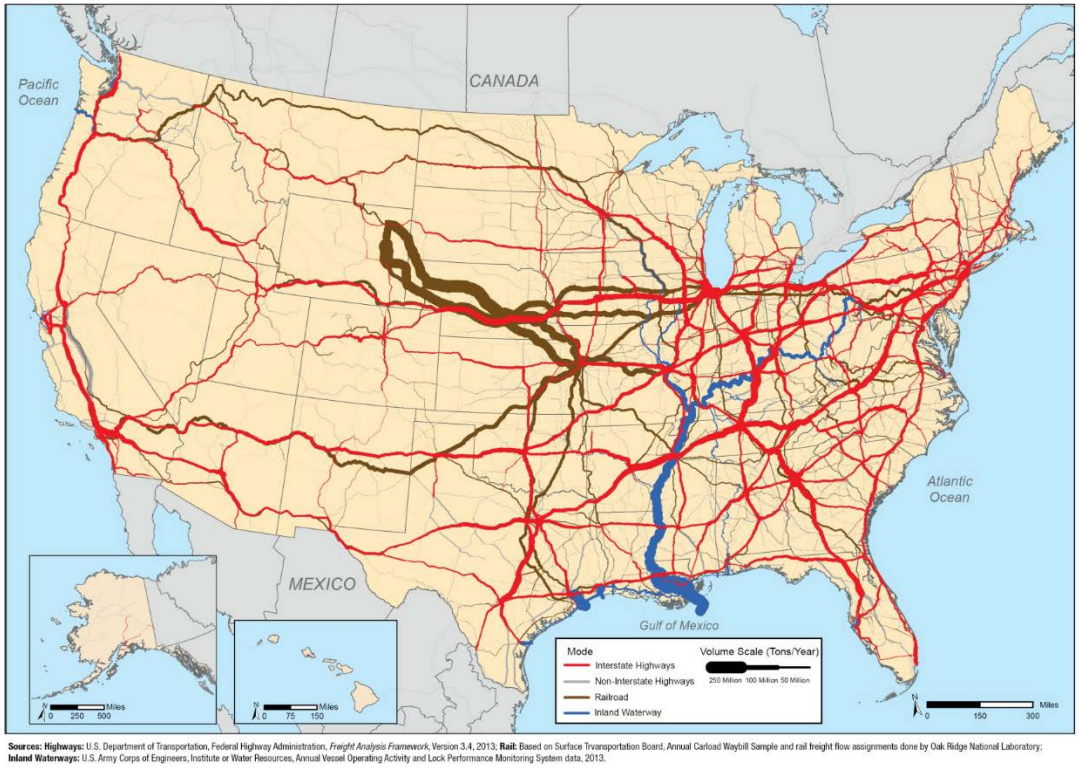
Every mode of transportation moves freight, but trucking is the primary mode of freight travel.



Grow America Act: Freight and Logistics

- The *Grow America Act* will make critical investment to help improve the safe and efficient movement of freight across all modes of transportation – highway, rail, port, and pipeline.

- Grow America provides $18 billion over 6 years for targeted investments in the nation's transportation system that will improve the movement of freight.



Annual freight flow tonnage by National Highway System, Railroads, Inland Waterways (2010)

Why the Public Sector Plans for Freight: Economic Competitiveness and Development

- All communities depend on freight to supply consumers and support businesses that are the source of jobs
- Most businesses generate freight and all businesses receive freight
- Freight industry provides goods and jobs in communities
- Multiplier effect of freight – economic generators

Need for Freight-Specific ITS Applications

- Technology is not used consistently by the trucking industry
- Trucks have unique operational characteristics
- Freight terminals do not always share queue information
- Existing public resources do not always provide freight-specific information
- System effectiveness is often limited by data availability and accuracy

Freight Advanced Traveler Information System (FRATIS)

FRATIS application bundle seeks innovations to transform freight mobility, including methods to:

- Leverage freight mobility information technologies under development in the private sector regarding freight traveler information, dynamic routing, and load matching;
- Integrate these technologies with public sector ITS and sensor information available for roadways in major metropolitan regions
- Facilitate accelerated public-private deployment of FRATIS applications.

FRATIS bundle is composed of two applications:

- **Freight-Specific Dynamic Travel Planning and Performance**
- **Drayage Optimization**

Initial FRATIS Prototypes in Progress

- **Los Angeles-Gateway Region:**
  - Develop FRATIS applications to address dynamic travel planning around the marine terminals and queues to move cargo out of the ports more efficiently
- **Dallas-Fort Worth, Texas:**
  - Incorporate integrated corridor management capability along with size and weight permitting
  - Test Connected Vehicle Basic Safety Message (SAE Standards J2735-2009)
  - Optimize drayage opportunities in coordination with rail and local truck drayage companies
- **South Florida:**
  - Similar focus as the other two sites, but includes emergency response capability to FRATIS that would integrate FRATIS functionality into Emergency Operations Center activity during an emergency such as a hurricane

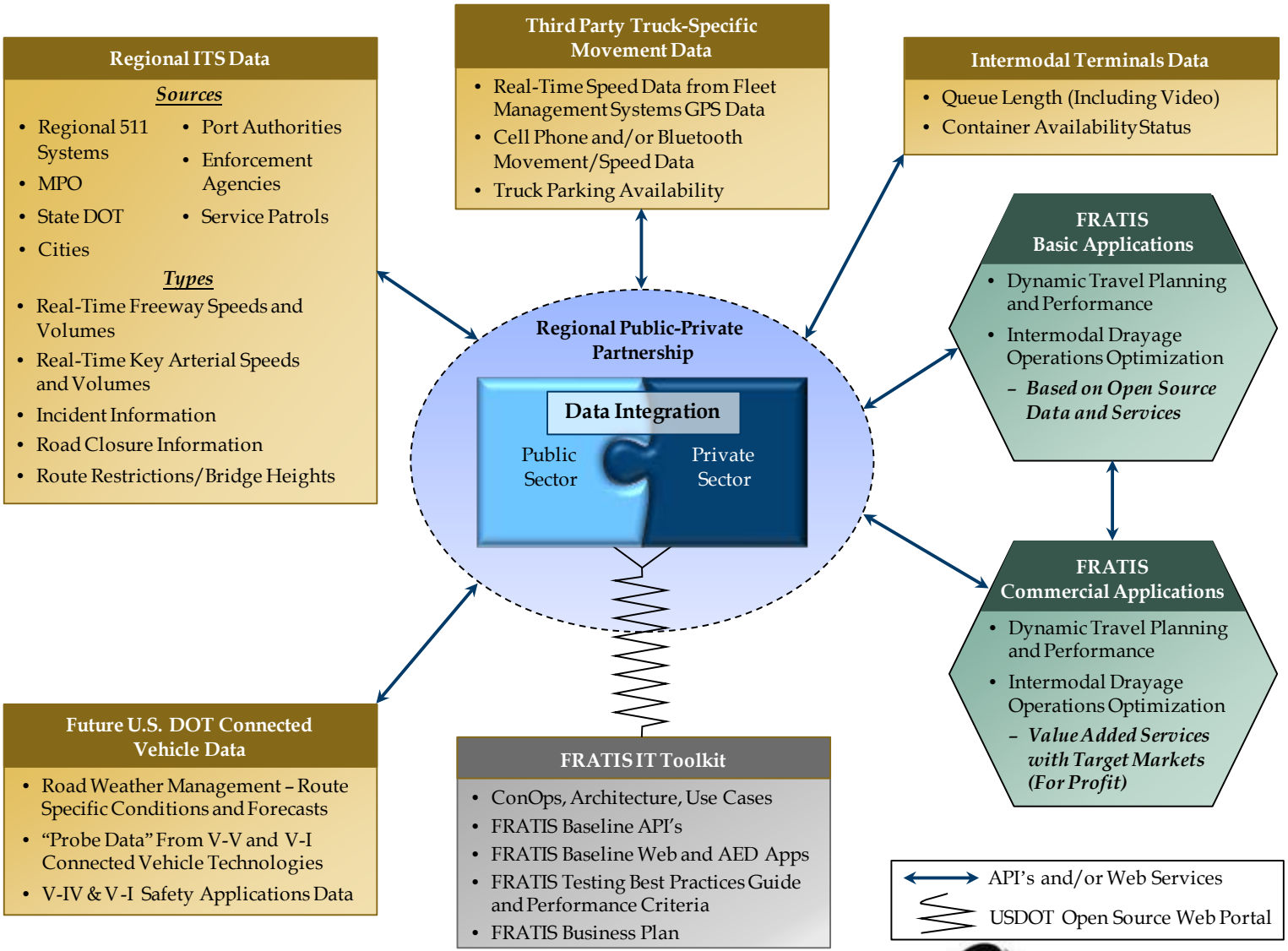
FRATIS Benefits

- Reduced congestion
- Increased system capacity
- Improved on-time delivery
- Increased number of deliveries
- Reduced empty trips
- Decreased fuel usage and vehicle emissions
- Streamlined regulatory compliance
- Minimized community impacts

10-year transformative impact targets:

- Reduce truck travel times: 17%
- Reduce bobtail (empty) trips: 15%
- Reduce terminal wait times: 35%
- Reduce freight-involved incidents: 35%
- Reduce fuel consumption/emissions: 10%

FRATIS High-Level System Concept Focuses on Data Integration and Dissemination



FHWA Freight Operations Initiatives

E-Permit/VWS

- Concept of Operations – Complete
- Architecture – Complete
- Model Deployment Sites (TN and KY) – Under Development

Truck Parking

- ITS-based Projects Funded:
  - I-5 Corridor in CA
  - I-95 Corridor (CT to NC)
  - MI (I-94)
  - MN (I-94)
  - WI (I-94)
  - PA (I-81)
- Jason's Law Survey and Comparative Assessment (§1305 of MAP-21).

FHWA Freight Performance Measures Program (FPM)

What?

- Uses trucks as probes
- Powered by technology - GPS information provide speeds by location
- Nationwide coverage
- Multiple industry data sources
- Billions of unique truck positions received and processed annually
- 600,000+ individual trucks in the population

Why?

- Provides a quantifiable basis to engage public and private sectors and investigate and explore causes of delay

How?

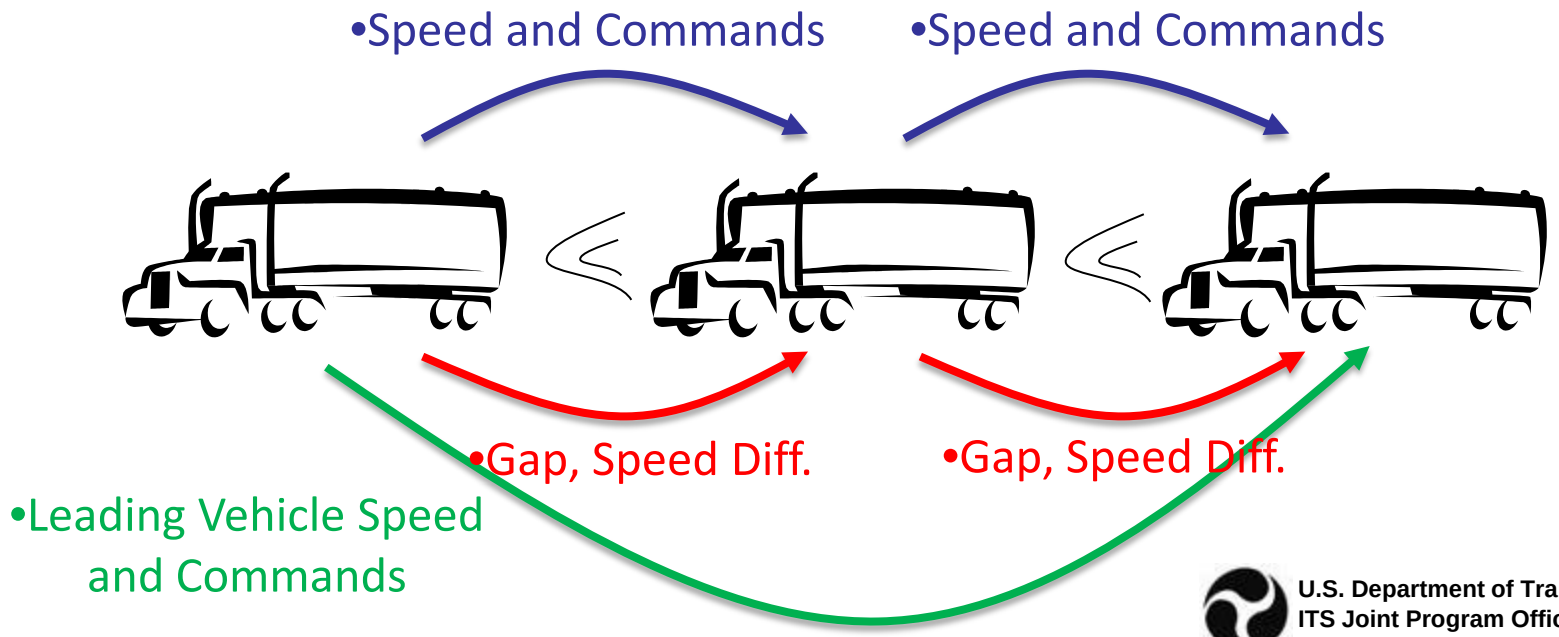
- Partnership with trusted 3rd party, data providers, and motor carriers

Automation in Freight Transportation

Fully and partially automated trucks, ships, and planes, and automatic freight-transfer facilities may eventually transform the freight industry.

Automation: Truck Platooning Research

- Three truck platoon
- 5.9 GHz DSRC Communication
- Longitudinal control only (throttle and brakes) driver, steers the truck
- Vehicles already equipped with production ACC
- Lead truck either manually or automatically (ACC) driven
- Gap is based on time headway – consistent with driver preference



USDOT Automation Program Goal

The USDOT automation program will position industry and public agencies for the wide-scale deployment of partially automated vehicle systems that improve safety and mobility and reduce environmental impacts.

Smart Roadside Initiative (SRI) Background

- What is the Smart Roadside Initiative?
  - A joint modal research initiative funded by the ITS JPO with Federal Highway Administration (FHWA) and Federal Motor Carrier Administration (FMCSA)
  - Focus – Develop roadside infrastructure draft standards for commercial vehicle operations that employ technologies for information sharing as part of Expanded CVISN
  - Goal – Deliver standards documents, hardware, software, graphical user interface code and other deployment tools to integrate electronic screening data streams into actionable information for roadside inspectors
- Related Research
  - Wireless Roadside Inspection Program
  - Universal Identification for CMVs
  - Electronic Permitting/Virtual Weigh Stations
  - Truck Parking Program

Smart Roadside Initiative Activities

- **Prototype Application Development**
  - Initiated in 2010
  - Prototype Currently in Testing in Michigan and Maryland
  - Project Completion Date – September 30, 2015
- **Gap Analysis**
  - Assembled an Inventory of Automated Enforcement Sites and Devices
  - Measured Each States' Status in Reaching SRI Goals
- **Macro-Benefits**
  - Constructed a Calculator That Estimates Benefits Generated through SRI-type Investments
  - Benefits Calculator Available in National Transportation Library
- **Impact Assessment**
  - Identifying the Specific Impacts of Implementing SRI
  - MD and MI SRI Prototype Test Sites Will be Used
  - North Carolina and Kentucky are Supporting Project through Data Sharing
  - Pre-Pass is Participating as Well; Hoping to Include Intelligent Imaging's DriveWyze Application

Maritime Administration Initiative

- Examine and develop an architecture for port scheduling and real-time wait time information
- **Goal:** Provide a common architecture for port gate scheduling and information sharing, reduce truck standing times, and greatly reduce unproductive container and equipment moves.

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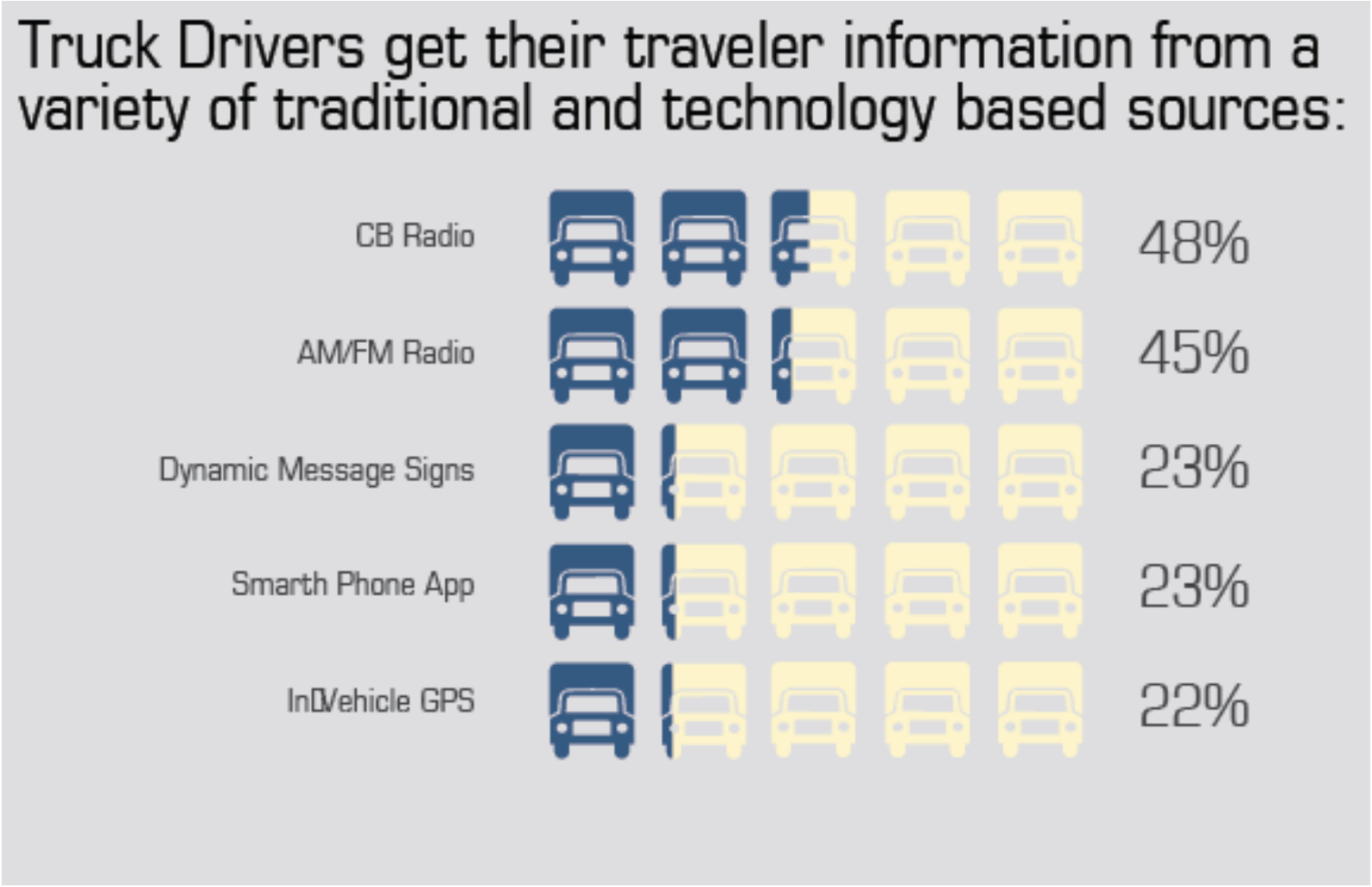
Questions or Comments?

Backup Slides

Los Angeles/Long Beach Port User Survey Responses

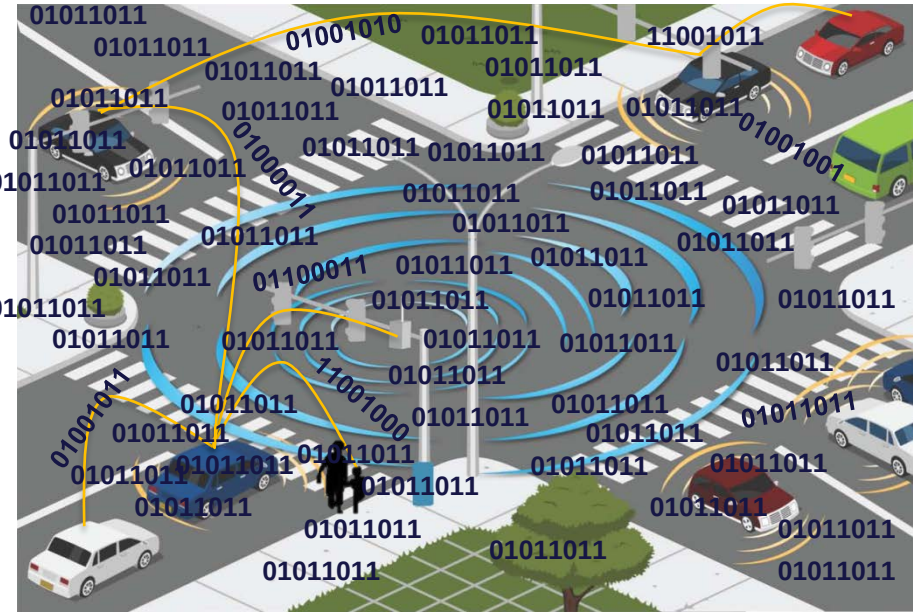


Enterprise Data

We want to facilitate transportation information sharing as part of a Connected City:

- Connected data systems
- Connected cities – sharing and using data to improve operations
- Decision support systems to perform real-time analytics
- Support transportation in the Internet of Things

Potential Data Explosion With Connected Vehicle Deployment



- Safety Pilot Model Deployment, Ann Arbor, MI
  - 2836 vehicles generating Basic Safety Messages on 73 miles of freeways and arterials (approx. 2% of vehicles)

Data Statistics	October 2012	April 2013
Number of Unique Vehicle IDs	1626	2069
Number of BSMs generated	1.3 Billion	2.7 Billion
BSM Storage Space	96 GB	197 GB

Challenges

- Data explosion imminent as connected vehicle research evolves to deployment phase
  - Significant challenges to data management and data analytics
- Will data communications swamp available channels?

Opportunities

- Use large amount of data collected from connected vehicles for better traffic management through enhanced situational awareness and prediction
  - Improve accuracy and speed of decision-making, thereby facilitating proactive management
  - Affords capability to determine causality of transportation problems, such as crashes, bottlenecks, delays, etc.
  - Provides comprehensive and accurate view of transportation systems

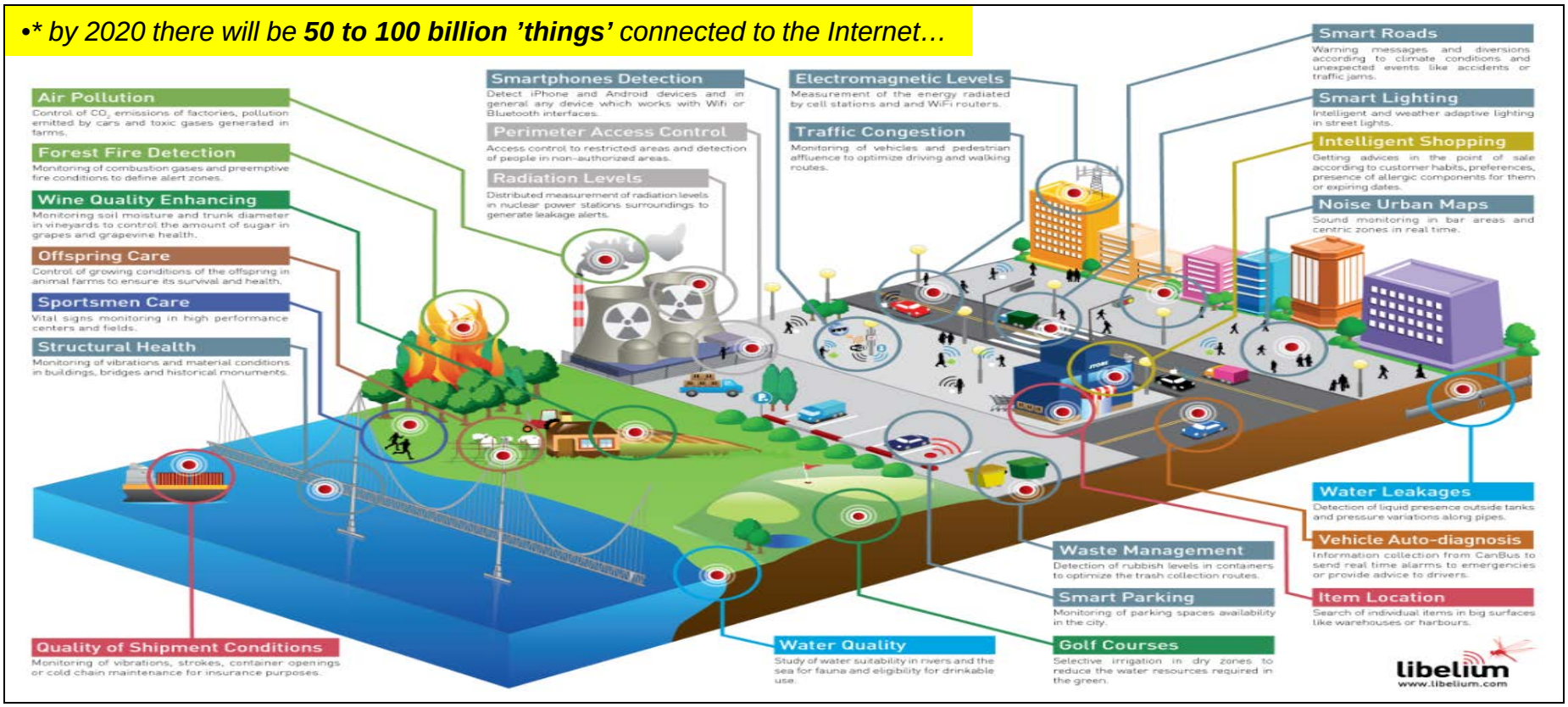
Transition to Connected Data Systems

- Connected Data Systems will support:
  - The move from connected vehicle research to deployment
  - Crowdsourcing and other mass data collection trends
  - Automated vehicles and “smart cities” initiatives
- Objectives involve developing the ability to gather, manage, and use huge amounts of data

Internet of Things (IoT)

- A digital “nervous” system for the things that comprise our surroundings
- Pervasive sensors and actuators on fixed and mobile devices
- Data made widely accessible via networks

•* *by 2020 there will be **50 to 100 billion ’things’** connected to the Internet…*



Source: Noblis

Summary of USDOT ITS Program

- USDOT is successfully developing diverse ITS transportation solutions across vehicles and infrastructure
- ITS research is delivering real capability and value to states, industry, and the public
- The ITS JPO is addressing strategic issues in transportation in:
  - Connected Vehicles
  - Automated Vehicles
  - Enterprise Data
  - Interoperability
  - Technical Assistance and Deployment
  - Emerging Capabilities
- The *ITS Strategic Plan 2015-2019* is available at:
  http://www.its.dot.gov/strategicplan/