

Innovations, Realities, Opportunities and Challenges

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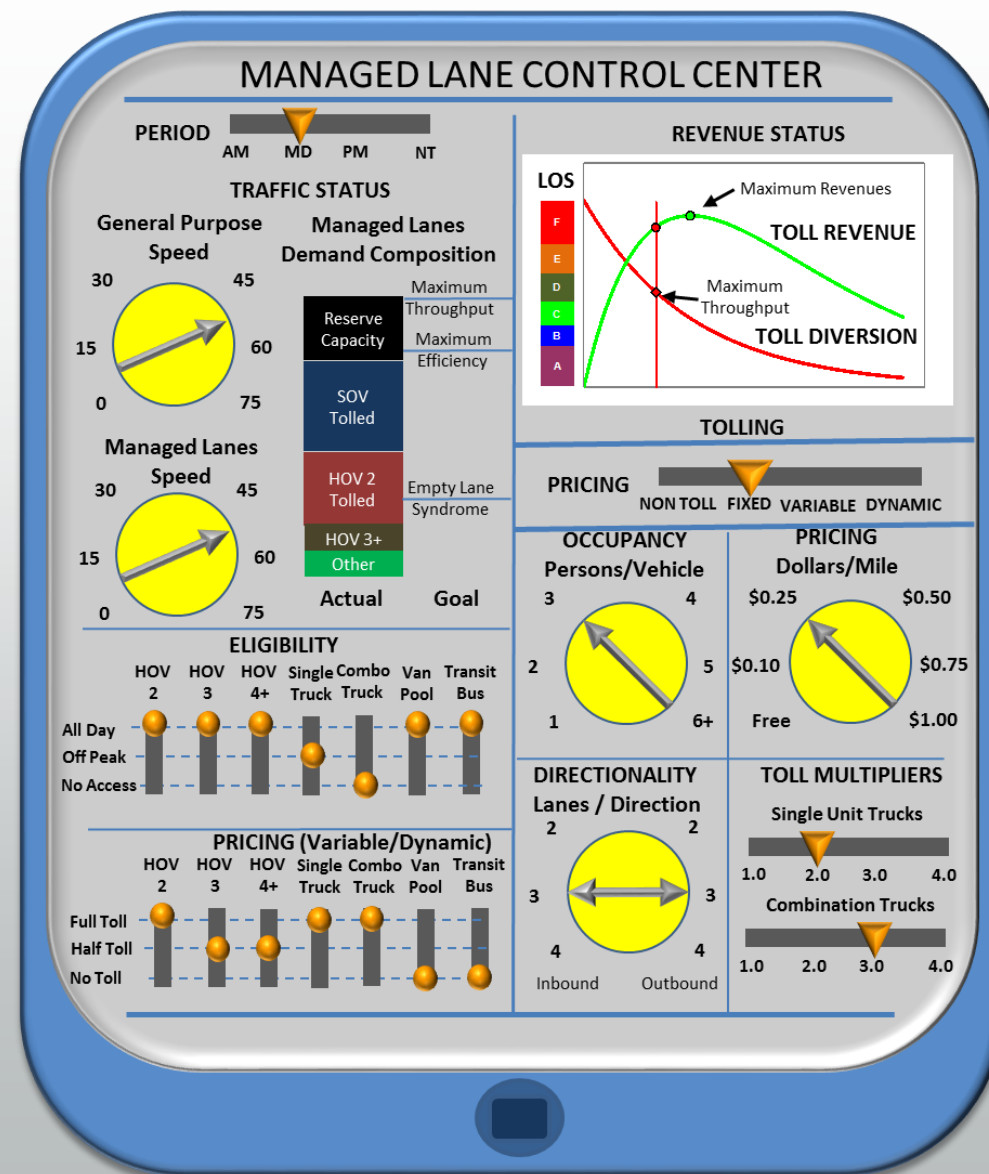
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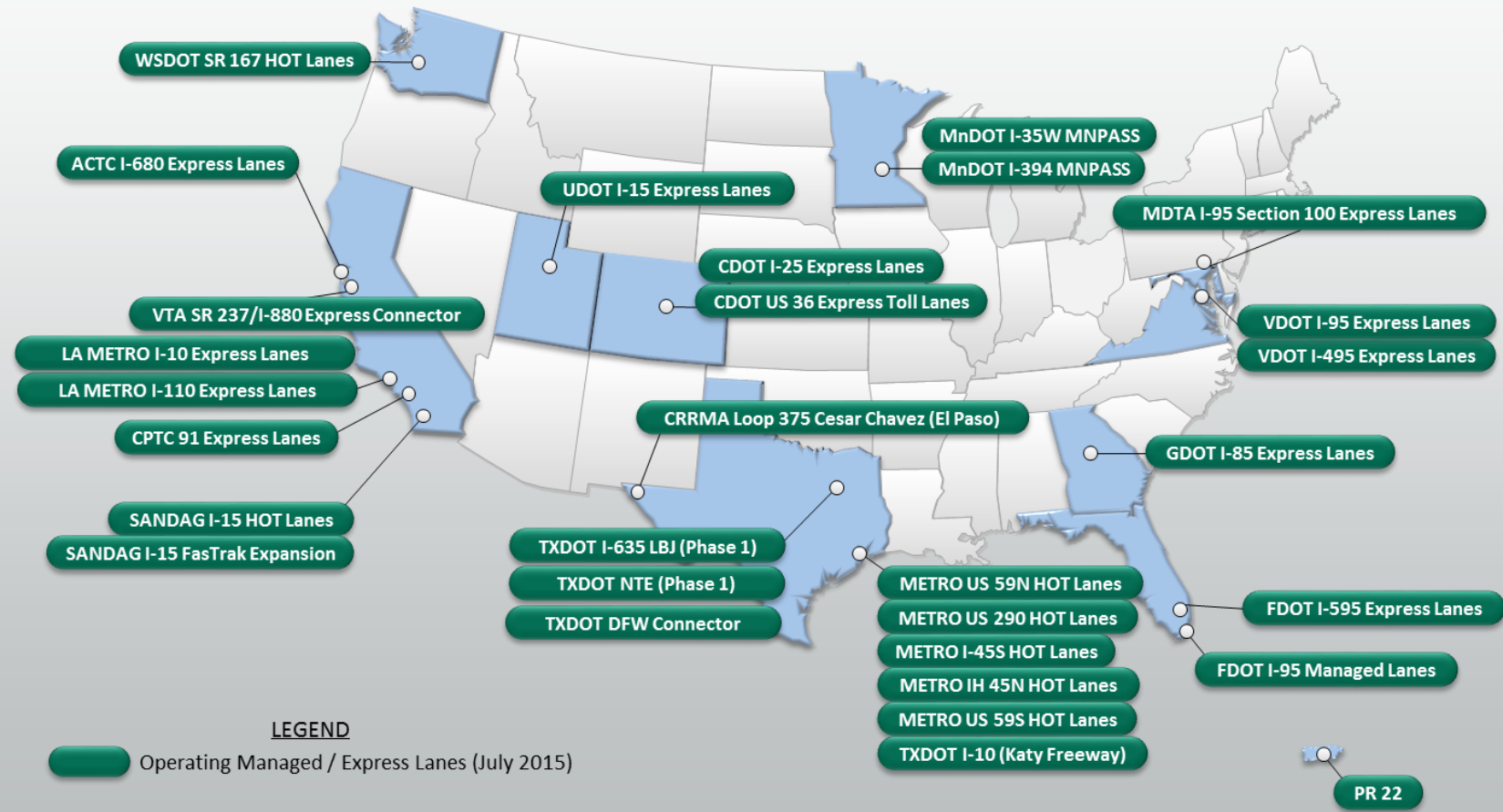
MANAGED LANES REALITIES

- Caters to a Unique User
- Each Variable is Influential
- Complex Combinations
- No Managed Lane is Similar (at any one time)



TOP TEN T&R OBSERVATIONS/LESSONS LEARNED

1. Core Dependencies
2. Configuration
3. Tolling Policy
4. Data Collection
5. Behavior
6. Sensitivity
7. Volatility
8. Integration
9. Big Data
10. Expectations

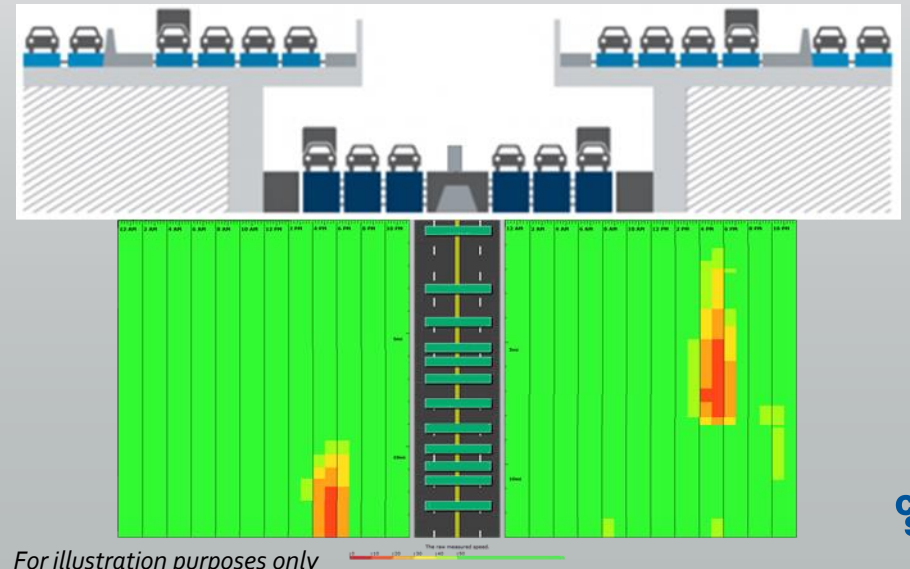
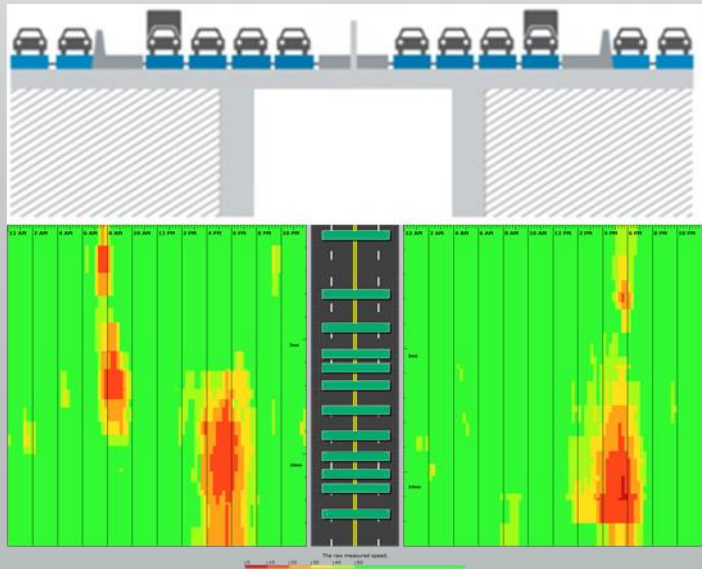


1 – CORE DEPENDENCES/AXIOMS

- Success is Dependent on Operational Failure
 - *Configuration remains the same*
- Sensitive Equilibrium
 - *Users Respond in Real Time*
- Balanced Approach
 - *Financing versus Demand Management*

2 – CONFIGURATION MATTERS (A LOT)

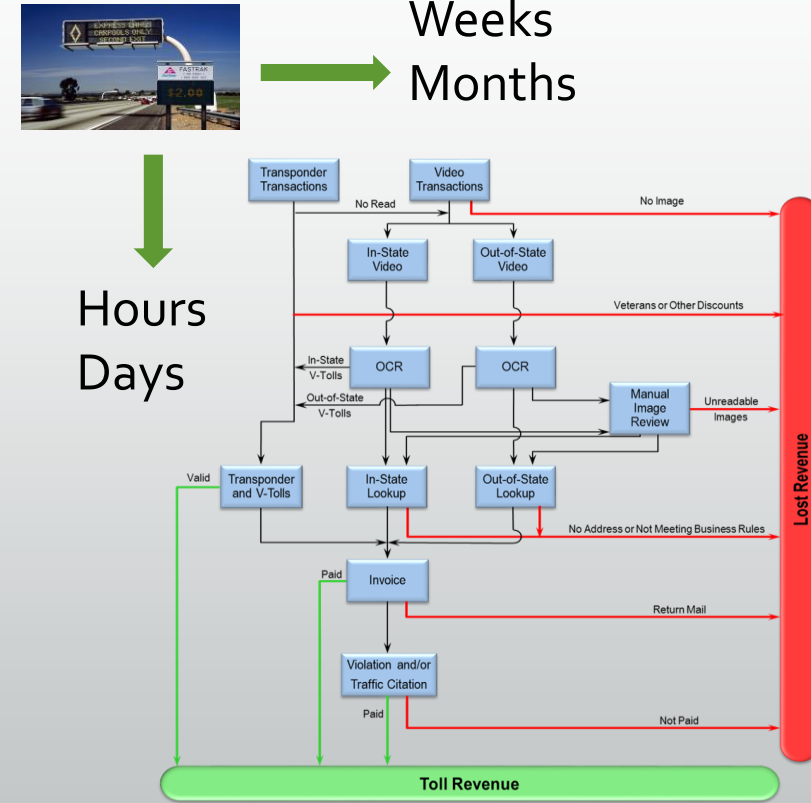
- Managed Lanes Provide Additional Capacity
 - *Location of Access/Egress Impactful*
 - *Operational Analysis is Essential*
- Reconfigurations Change Bottlenecking Characteristics
 - *Can Reduce the Time Savings Benefit*
 - *Service Roads or Direct Connections Improvements*



For illustration purposes only

3 – TOLLING POLICY DRIVES EVERYTHING

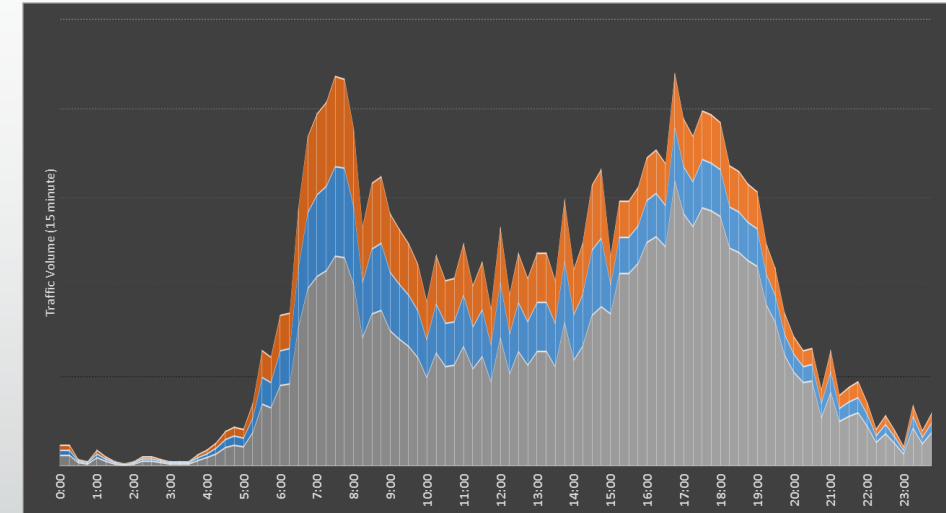
- Regional Goals/Objectives Identification
 - *Throughput versus Revenue Maximization*
 - *Business Rules (Video Billing, Collection Fees)*
 - *System Cohesiveness*
- Exemption Markets/Discounts
 - **Who Pays?** -- “Tesla Lanes”
 - *Innovative Discount Initiatives*
 - *Violation Definitions*



COMMUNICATION OF BENEFITS TO THE PUBLIC

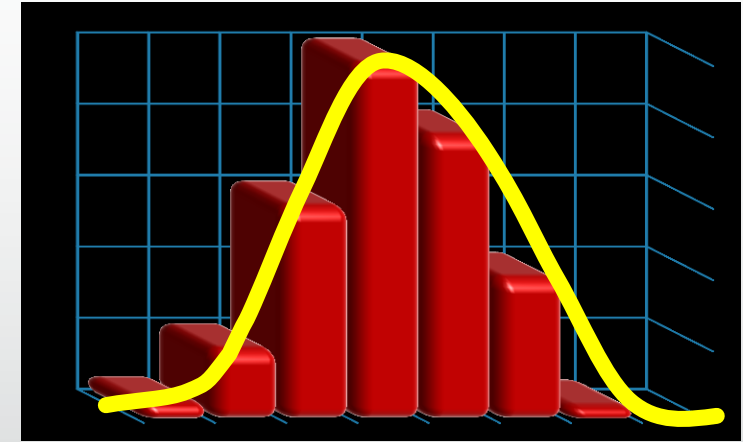
4 – DETAILED TRAFFIC DATA IS ESSENTIAL

- Natural Variability/Law of Averages
- Understand and Anticipate Intent
 - *Detailed Initial Toll Rate Levels*
 - *Buses/Ridership*
 - *Diversion to/from Local Arterials*
- Travel Patterns/Occupancy



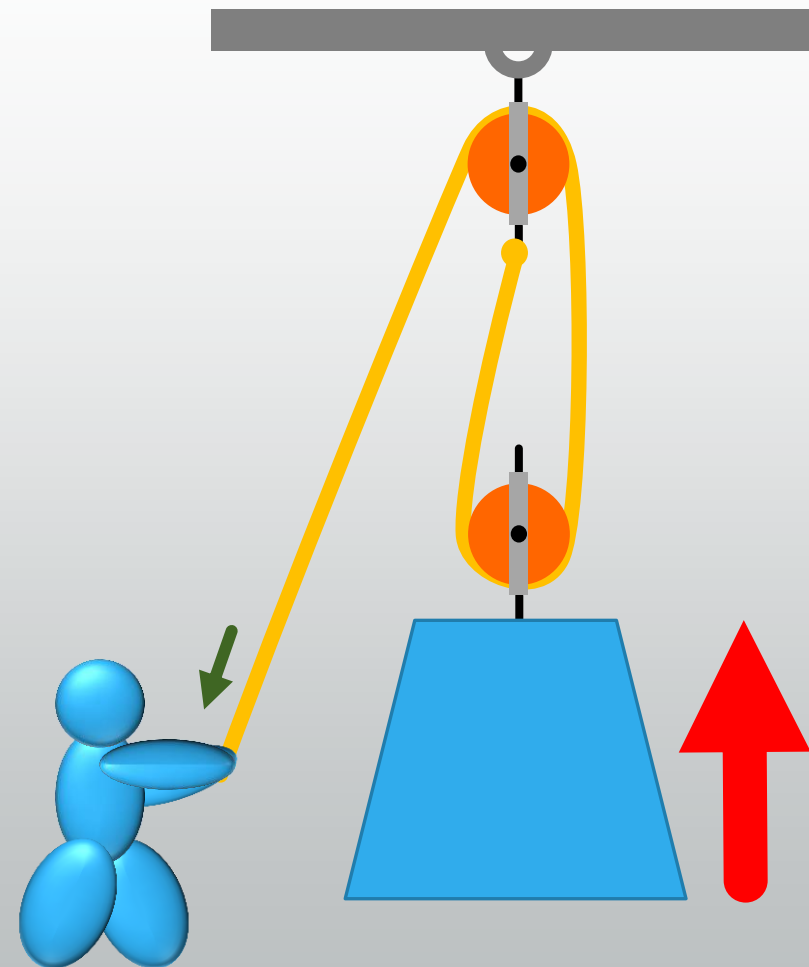
5 – UNDERSTAND BEHAVIOURAL TRAITS

- Value of Time Distributions
- Market Shares
 - *Captures Non-Traditional User Patterns*
 - *Skewed Region Focus (Outliers Not Average)*
- Non-Time Saving Factors
 - *Reliability Considerations*
 - *Safety/Habitual*



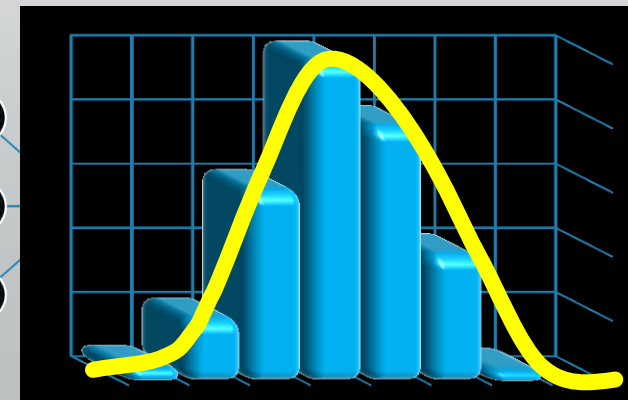
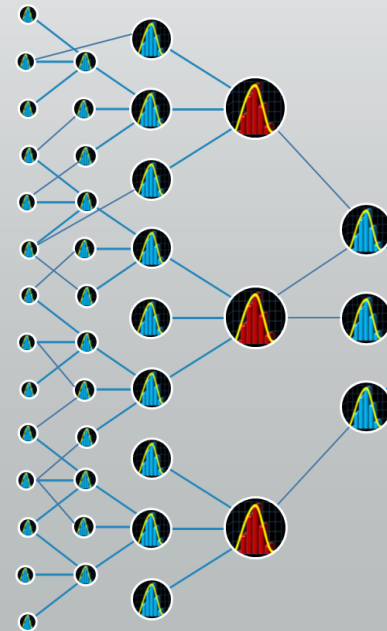
6 – HIGH DEGREES OF SENSITIVITY

- Detailed Socioeconomic Profiling
 - *Location and Composition is Critical*
 - *Small Changes Lead to Big Impacts*
- Demand Effects
 - *Capacity*
 - *Weather/Events*
 - *Gas Prices*



7 – VARIABILITY/VOLATILITY IS NORMAL

- Sensitivities/Elasticities are Greater
 - *10% Traffic Change can have 30-40% Revenue Impact*
- Results in Greater Variation
 - *Between Study Phases*
 - *Through Value Engineering*
- Multiple Sensitivities
 - *Risk Analysis*



8 – INTERGATED SOLUTIONS/SYNERGY

- Integration of BRT/Transit/Parking
- Win-Win Scenario – “Reliability /Mobility Lanes”
- Response to Diverse Questions
- Supporting Diverse and Different Stakeholders
- Challenges of System Connectivity

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9 – EMBRACE NEW DATA SOURCES

- Disaggregate Data Sources
 - *INRIX/AIRSAGE/METROPIA/STREETLIGHT*
 - *Real Time and Historical*
- Connecting the Dots
 - *Natural Variations Summaries*
 - *Magnitude and Temporal Changes*
 - *Risk Range Development*

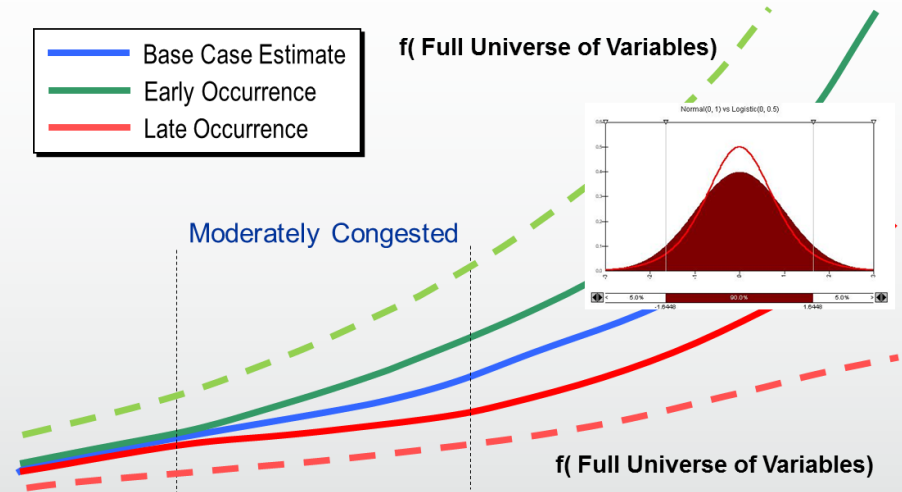
The logo for INRIX, featuring the word "INRIX" in a blue, serif font with a horizontal line above it.The logo for airsage, featuring a stylized red and grey icon of a road or path, followed by the word "airsage" in a red, lowercase sans-serif font, and the tagline "The power of where and when" in a smaller, grey font below it.The logo for STREETLIGHTDATA, featuring the word "STREETLIGHTDATA" in a grey, uppercase sans-serif font, with a yellow lightbulb icon above the letter "I" in "LIGHT".The logo for metropia, featuring a stylized bar chart icon with red, orange, green, and blue bars, followed by the word "metropia" in a lowercase sans-serif font, and the tagline "Driving a better city" in a smaller, grey font below it.

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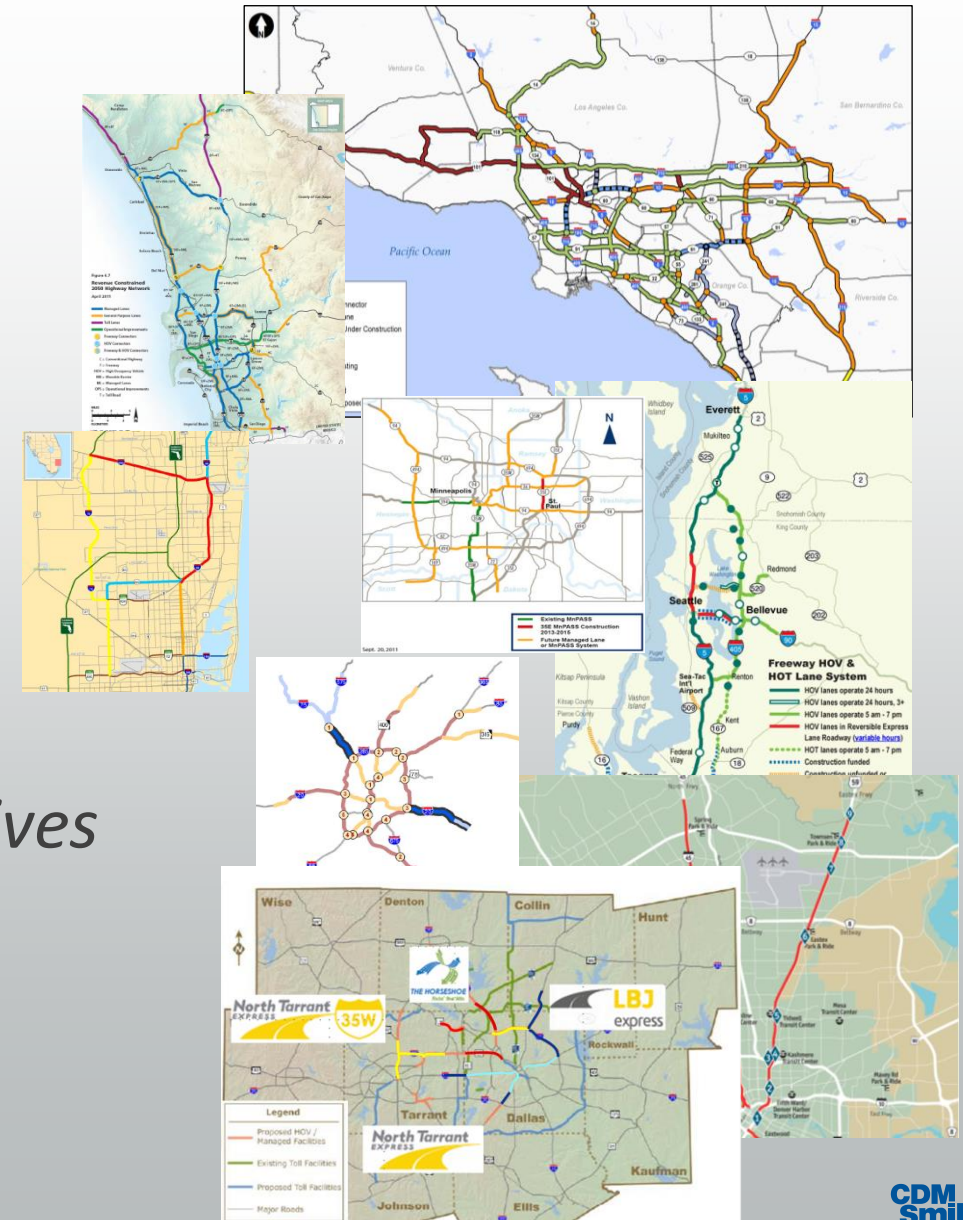
10 – EXPECT THE UNEXPECTED

- Destructive Technologies
 - *New apps/Models*
- New Active Traffic and Demand Management Initiatives
 - *Dynamic Lane Assignment/Shoulder Running*
 - *Variable Speeds Limits*
- Future “What if” Profiling

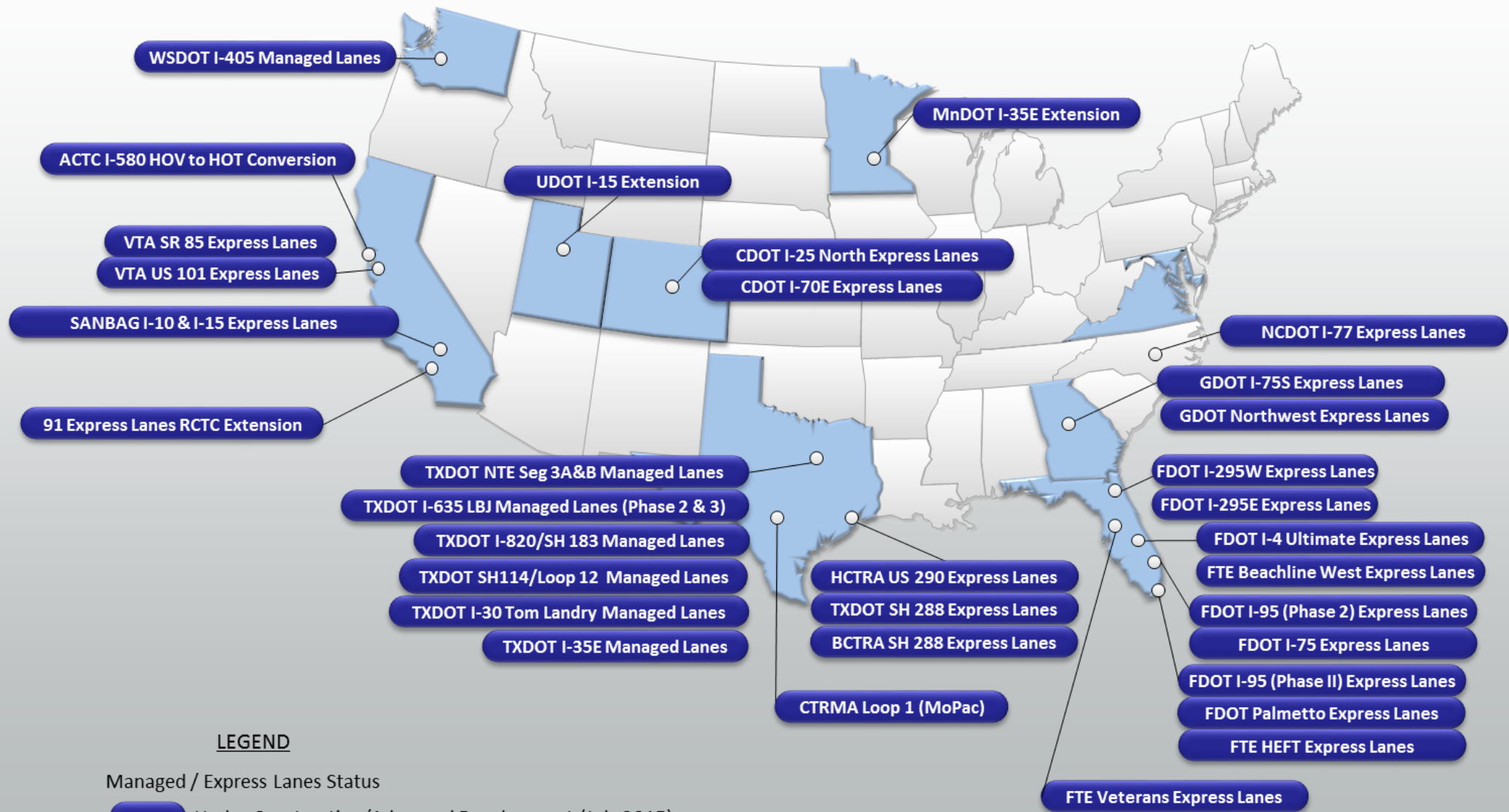


NEXT FRONTIER

- Managed Lane Systems
- Bigger Data - Bigger Models
- Complex Managed Lane Financing Structures
- Future Trends
 - *Generational Shifting, Gas Prices, Connected Vehicles, MBUF/VMT Initiatives*



“COMING SOON” MANAGED LANE PROJECTS



LEGEND

Managed / Express Lanes Status

 Under Construction/Advanced Development (July 2015)

For illustrative purposes and not intended to reflect the full comprehensive list

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Thank You
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