

ITE Meeting – University of Maryland-College Park

**Integrated Corridor Systems Management
Analysis Tools and Challenges**

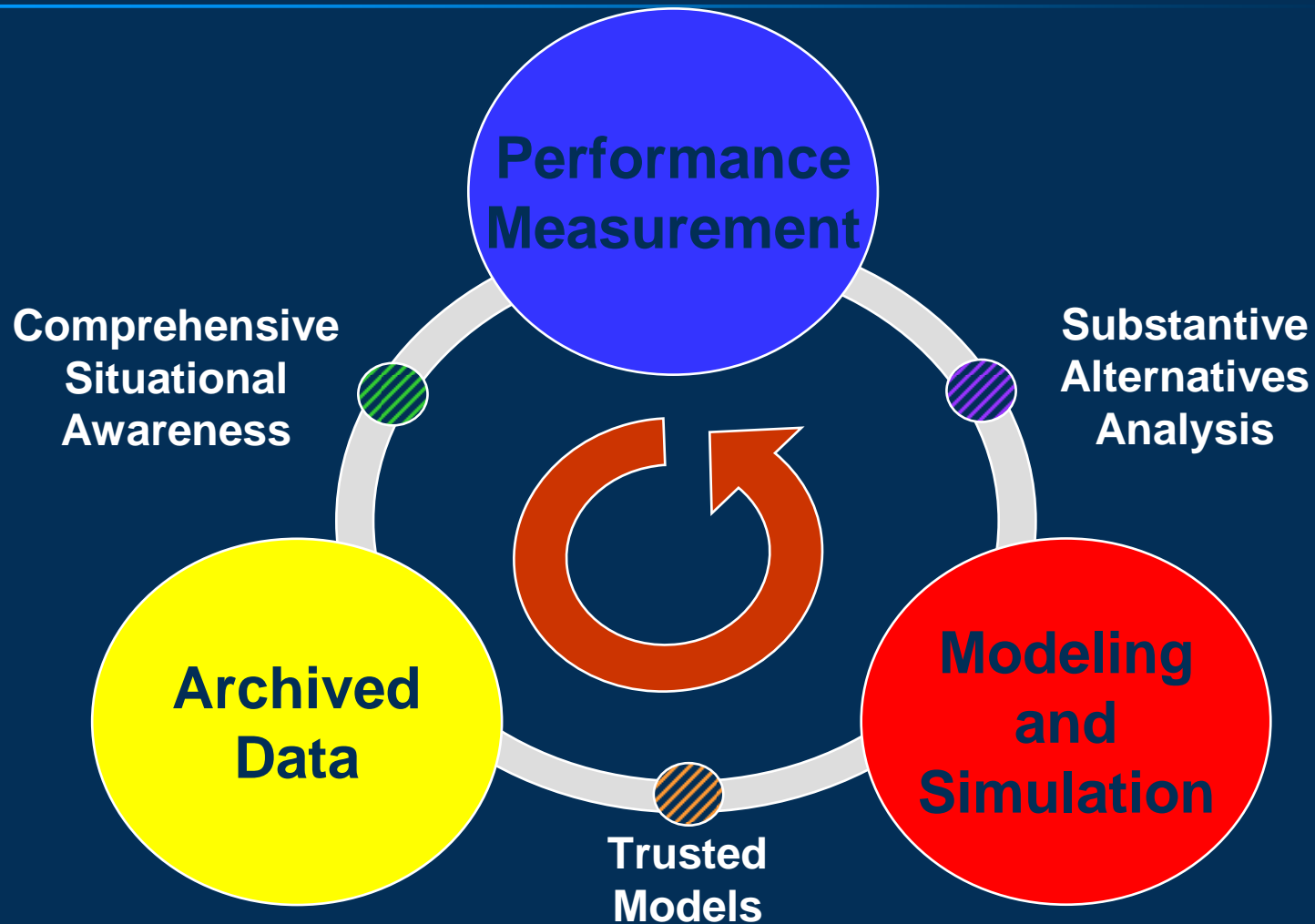
presented by
Gustave A. Cordahi
Cambridge Systematics, Inc.

19-NOV-2009

Transportation leadership you can trust.

CAMBRIDGE
SYSTEMATICS

ICSM - A Process for Continuous Improvement For Off-line Analysis and Active Traffic Management



Major ICSM Analysis Efforts in the U.S.

- **USDOT ICM Program**
 - **Minneapolis, San Diego, Dallas**
- **Caltrans CSMP**
 - **Twenty major corridors in California**
 - **Sacramento, SF Bay Area, Los Angeles region, Monterey/Santa Cruz, Orange County, San Diego, some Valley locations**
- **Atlanta GA**
 - **Beltway and Radial Highways**
- **New York**
 - **Buffalo and Mid-town Manhattan**

ICSM Analysis – Scope of Work



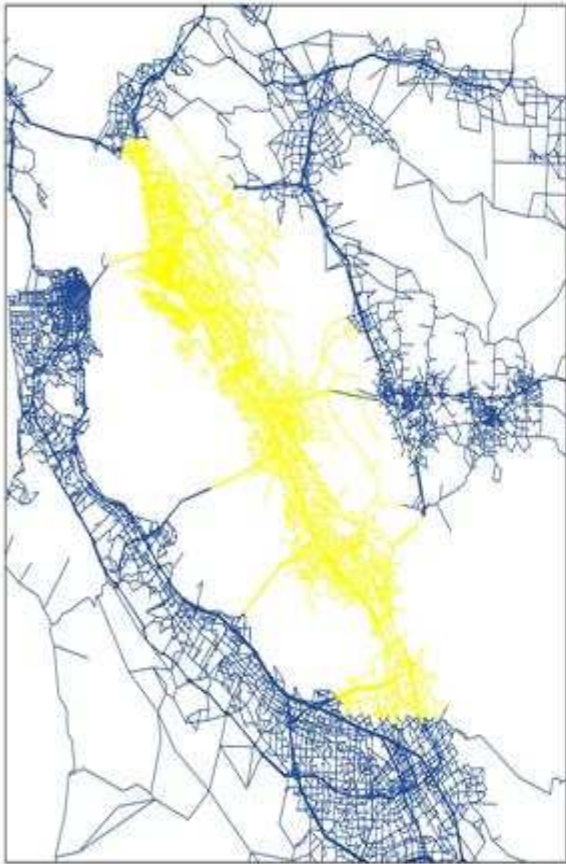
Analysis Tools

- **Macroscopic** travel demand models
 - Regional travel patterns and mode shift; enhanced by pivot-point mode shift module
- **Mesoscopic** simulation models
 - Traveler information, tolling, HOT lanes, congestion pricing and regional diversion
- **Microscopic** simulation models
 - Traffic control strategies such as ramp metering and arterial traffic signal coordination



Network Representations in Three Modeling Scales

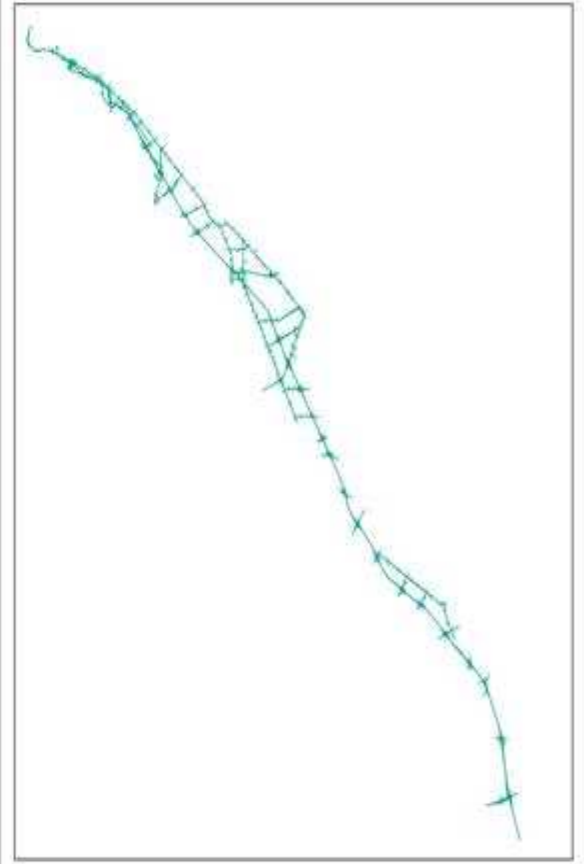
Macroscopic Model Network



Mesoscopic Model Network



Microscopic Model Network

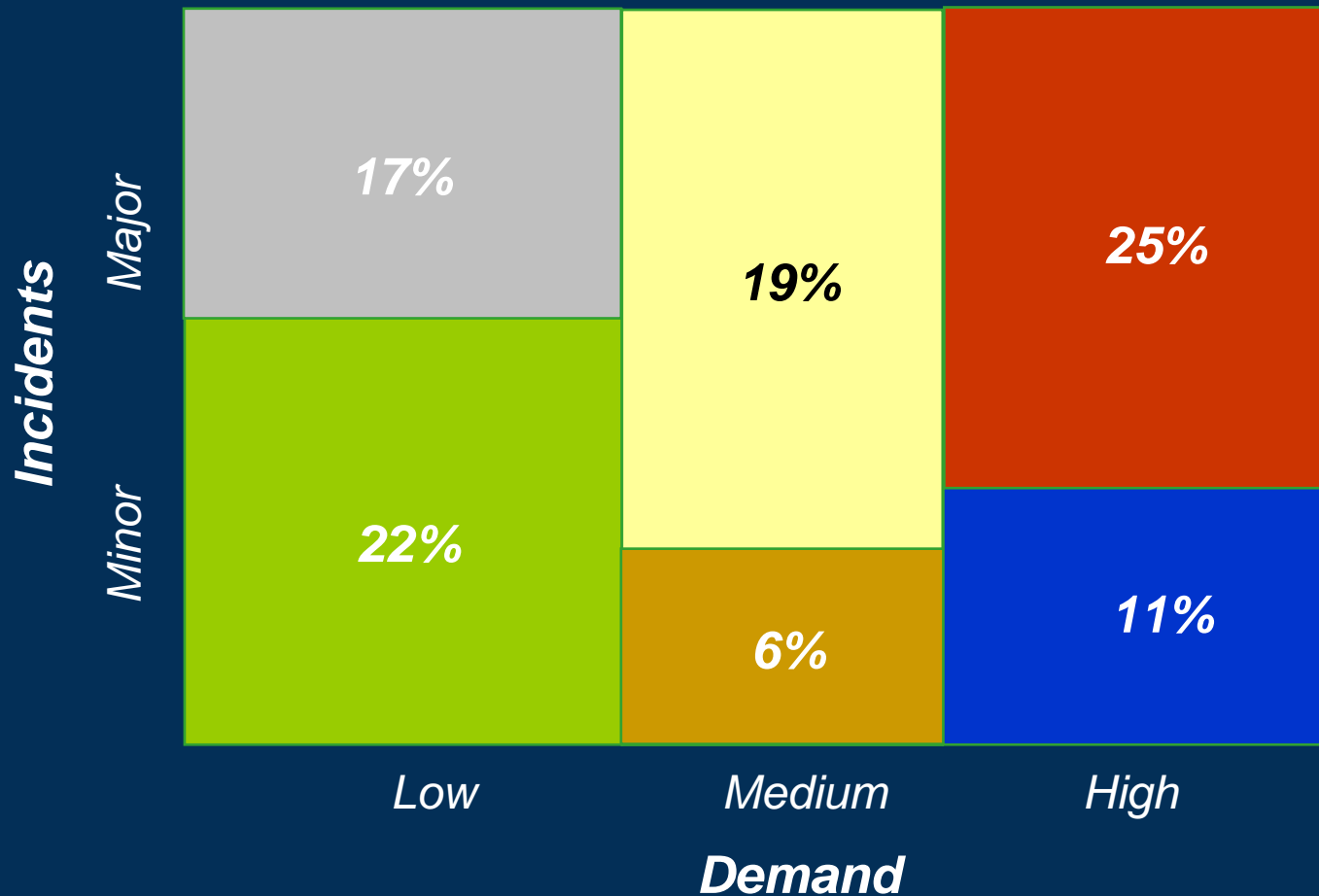


ICM Analysis Operational Scenarios

Scenario	Minn.	Dallas	SD
No Incident		●	●
Major Freeway Incident	●	●	●
Minor Freeway Incident	●	●	
Major Arterial Incident	●		●
Minor Arterial Incident	●		
Transit Incident			●
Snow Event/Inclement Weather			
Ball Game/Special Event			●
High Demand	●	●	
Medium Demand	●	●	●
Evacuation Event/Disaster Response			●

Test Corridor Operational Conditions

Incident Patterns and Travel Demand Considered Jointly

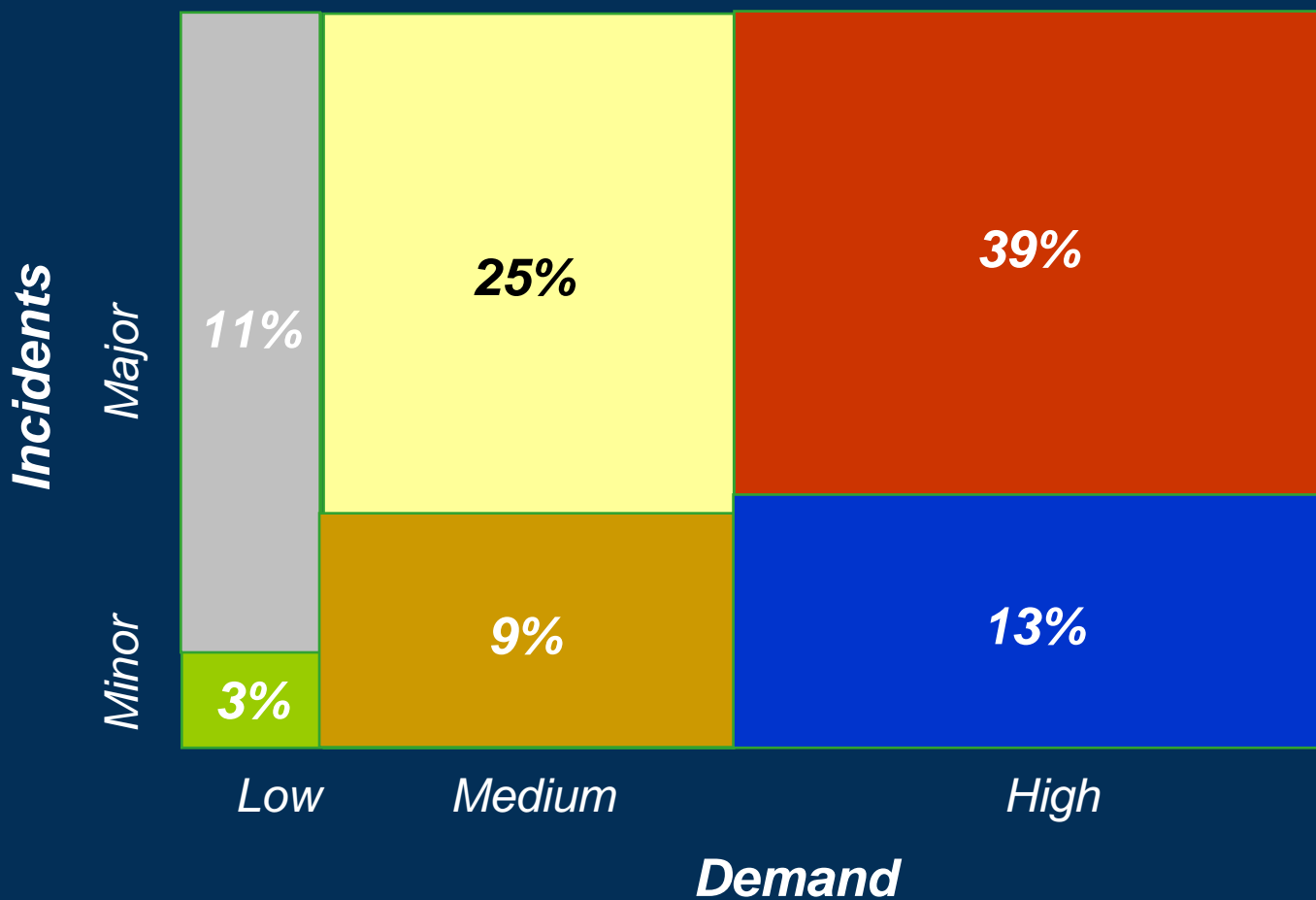


Major incidents together with high demand characterize 25% of all days (red)

22% of all days (green) feature both low demand and minor incident conditions

Test Corridor System Delay

Share of Annual Delay

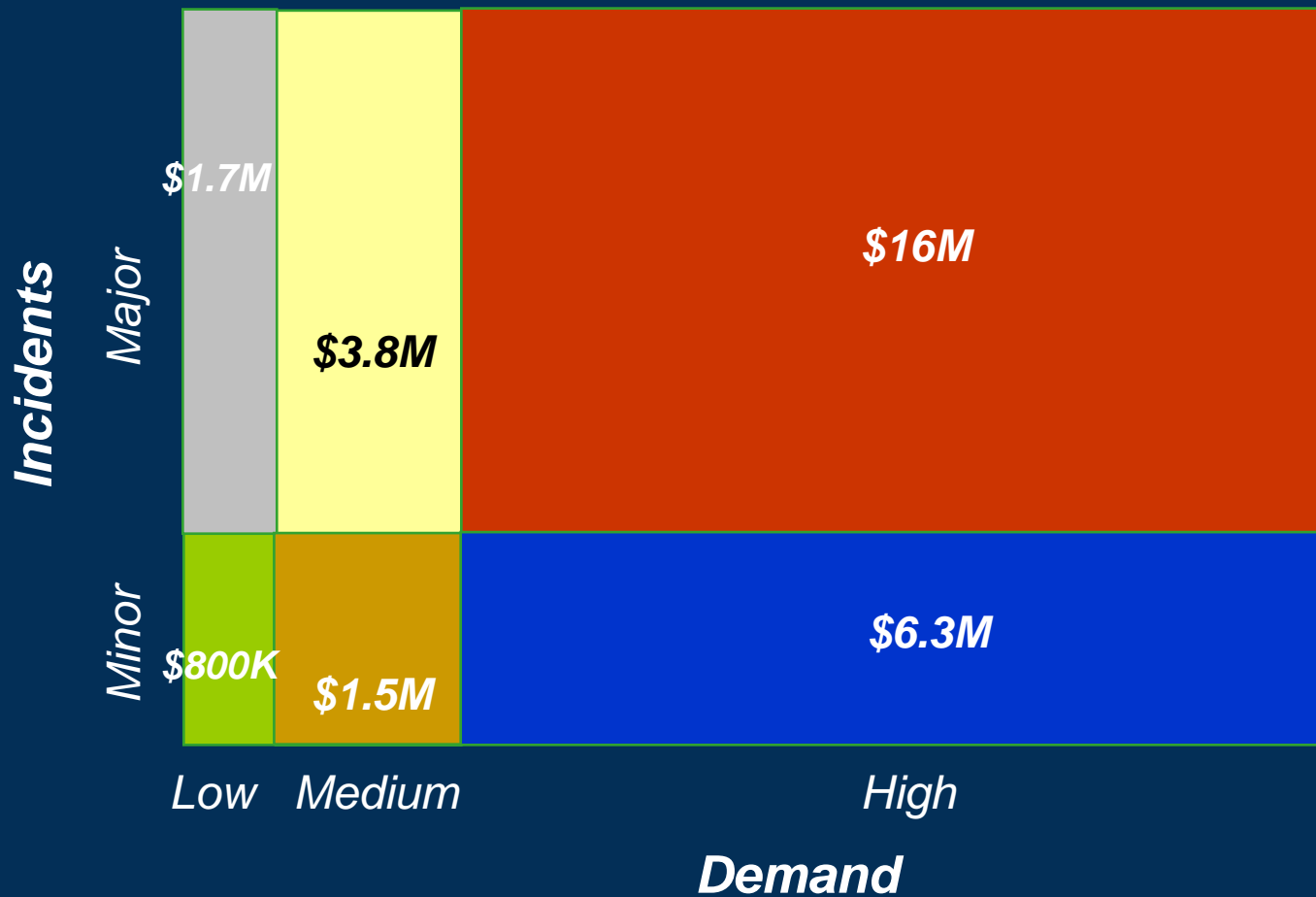


39% of total annual delay (red) occurs on the worst 25% of days

64% of annual delay (red+yellow) occurs on the worst 44% of days

Conversely, only 14% of annual delay (grey+green) occurs on the remaining 39% of days

Test Corridor AMS – Overall ICM Benefit under Different Operational Conditions



Total Test Corridor benefit in a typical year is \$31M

More than half of ICM benefit is on high demand/major incident days

ICM Strategies

ICM Strategy	Minn.	Dallas	SD
Traveler Information			
<ul style="list-style-type: none"> • Earlier dissemination and information sharing between agencies 	●	●	
<ul style="list-style-type: none"> • Comparative travel times (mode and route) 	●		
<ul style="list-style-type: none"> • Parking availability at park and ride lots 	●	●	
<ul style="list-style-type: none"> • Freeway, arterial and transit traveler information (pre-trip and en-route) 		●	●
Traffic Management			
<ul style="list-style-type: none"> • Reduced incident times 	●		
<ul style="list-style-type: none"> • Incident signal retiming for arterials or frontage roads 	●	●	
<ul style="list-style-type: none"> • Coordinated signal and ramp meter operation 			●

ICM Strategies (cont.)

ICM Strategy	Minn.	Dallas	SD
HOT/HOV Lanes			
• HOT lane (congestion pricing)	●	●	●
• HOV lane (change minimum number of occupants)	●	●	●
• Open to SOV during incidents		●	
Transit Management			
• Dynamic rerouting	●		
• Special events capacity expansion	●	●	
• Arterial signal priority	●		●
• LRT smart parking system		●	
• Add parking and valet		●	
• Physical priority to buses on arterials			●

Key Challenges

- **Data**
- **Model calibration**
- **Mode shift**
- **Traveler information**

The Purpose of Analysis

- Invest in the right ICSM strategies
 - A predictive capability to help determine which combinations of strategies are likely to be most effective
- Invest with confidence
 - Minimize conflicts or unintended consequences that would otherwise be unknowable before implementation
- Improve the effectiveness/success of implementation
 - Help in building consensus among stakeholders
 - Optimize implementation staging
- Provide long-term capability to continually improve implementation based on experience

● Thank You

- E-mail contact: **Gustave Cordahi**

gcordahi@camsys.com