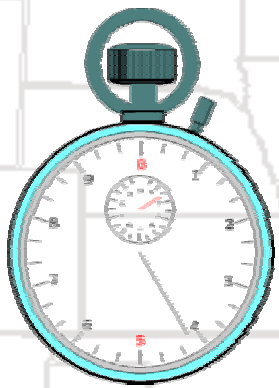
Pilot Mobility Monitoring Program: Metrics, Data, and Year 1 Activities



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Presentation Overview

- Joint effort between Texas Transportation Institute and CSI
- Performance Measures
- Supporting Data and Methods
- Structure of the Program
- Future Direction

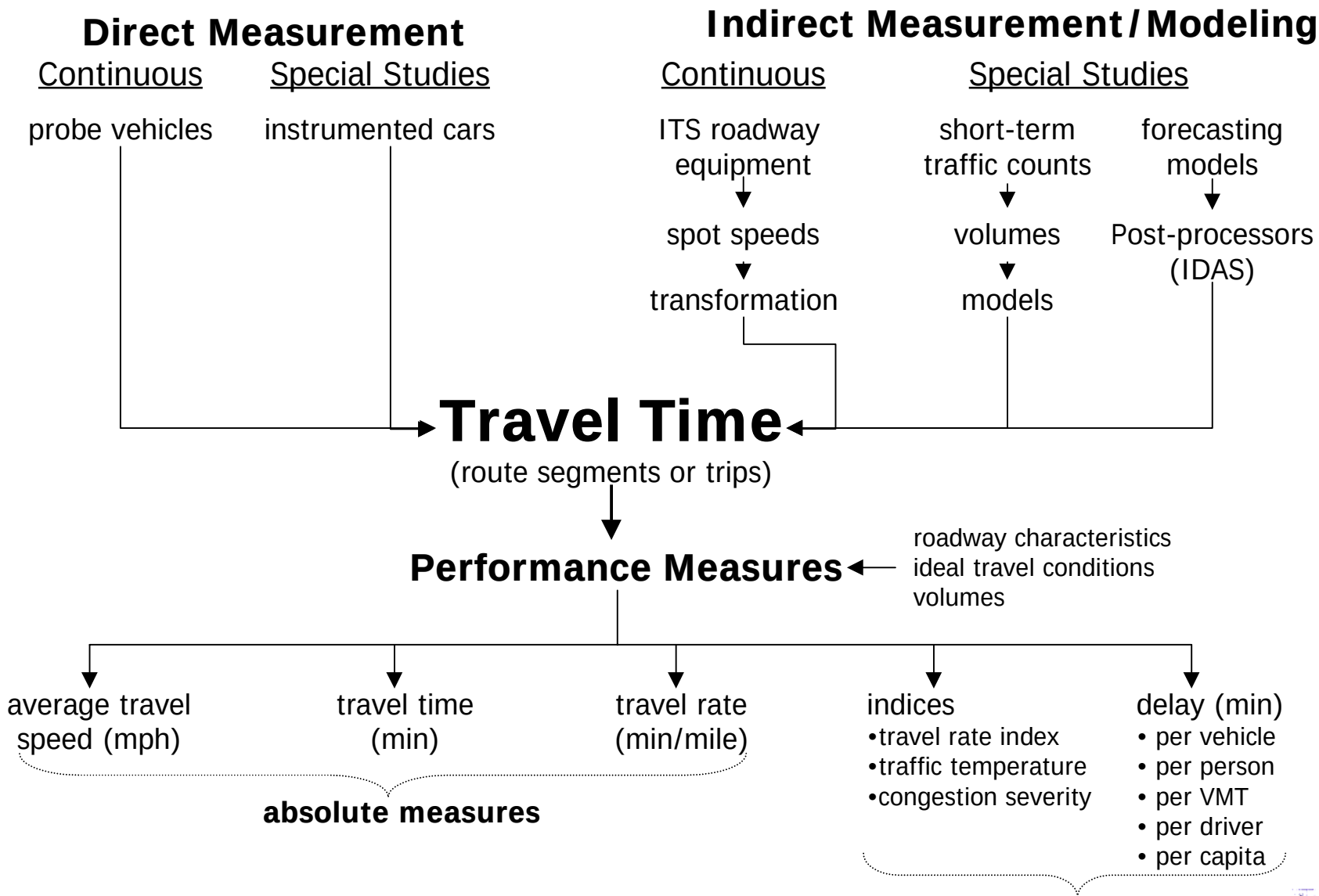
A Few Terms

- Congestion -- happens to facilities
- Mobility -- happens to users (how they experience the transportation system)
- Accessibility -- interaction of transportation system and activities (opportunities)

Performance Measures (Metrics)

- System performance tracked at the level of the user (trip) and facility (corridor)
- Understandable to professionals and public
- Multiple metrics to capture full range
- Existing data and methods, preferably through continuous monitoring
- Integration with other transportation functions

Travel Time-Based Performance Measures



Recommended Measures: Basic

- Travel Rate Index (TRI)

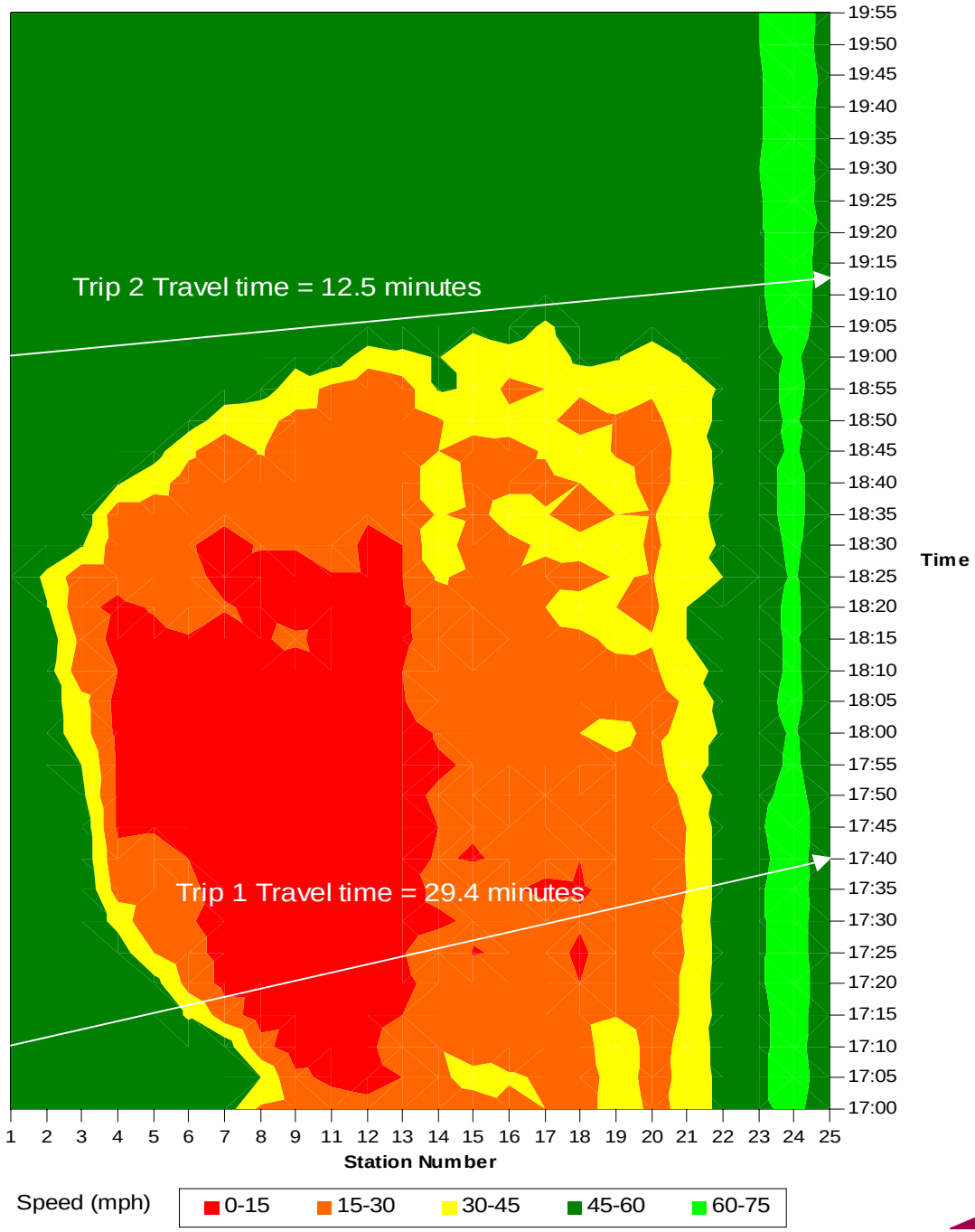
  ratio of: $\frac{\text{travel rate in peak}}{\text{ideal travel rate}}$

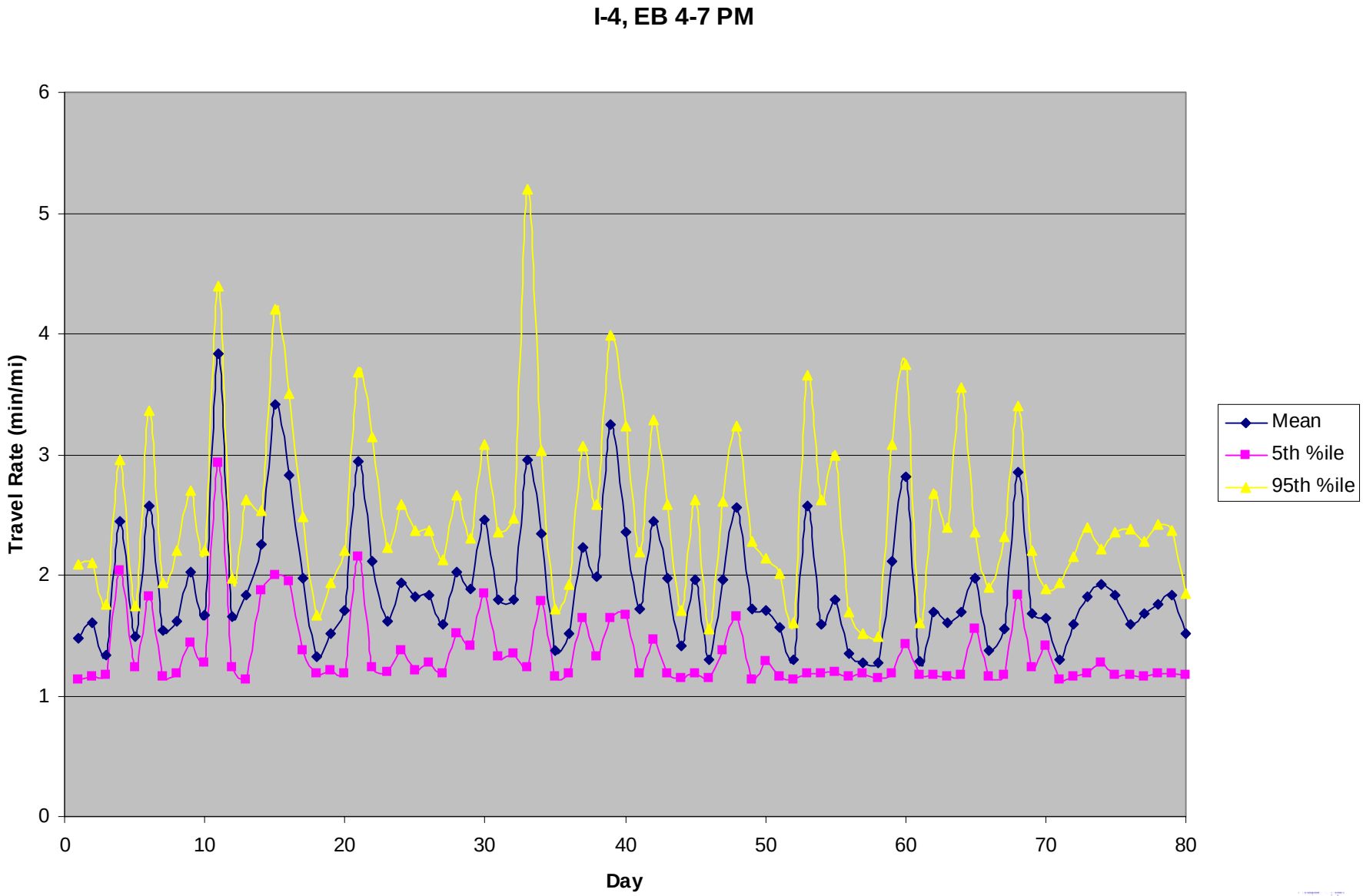
- Delay per Driver
- Percent of Congested Travel
  - %VMT where speeds < 45 mph (fwy)

Recommended Measures: Reliability

- Based on distribution of travel rates
  - % of travel with travel rates higher than 120% of average
  - normal statistics (variance, %tiles)
  - on-time performance
- Requires continuous monitoring

Speed Contour Plot of Time vs. Distance




I-4, EB 4-7 PM
Travel Rate (min/mi)
0
1
2
3
4
5
6
0
10
20
30
40
50
60
70
80
Day
Mean
5th %ile
95th %ile

Orlando Example (cont.)

Dir	Travel Rate	Speed	% > 1.2(Mean)
EB	1.90	32 mph	22%
WB	1.28	47 mph	10%
Comb	1.58	38 mph	16%

TRI = 1.58/1.10

= 1.44

Goal Setting: Mobility Progress Index

- $MPI = \dfrac{VMT_c/VMT_b}{TRI_C/TRI_b}$
- >1.0 ==>mobility getting better, despite VMT growth
- "Adjusts" TRI for VMT changes
- Useful also for trend analysis

MPI: Example

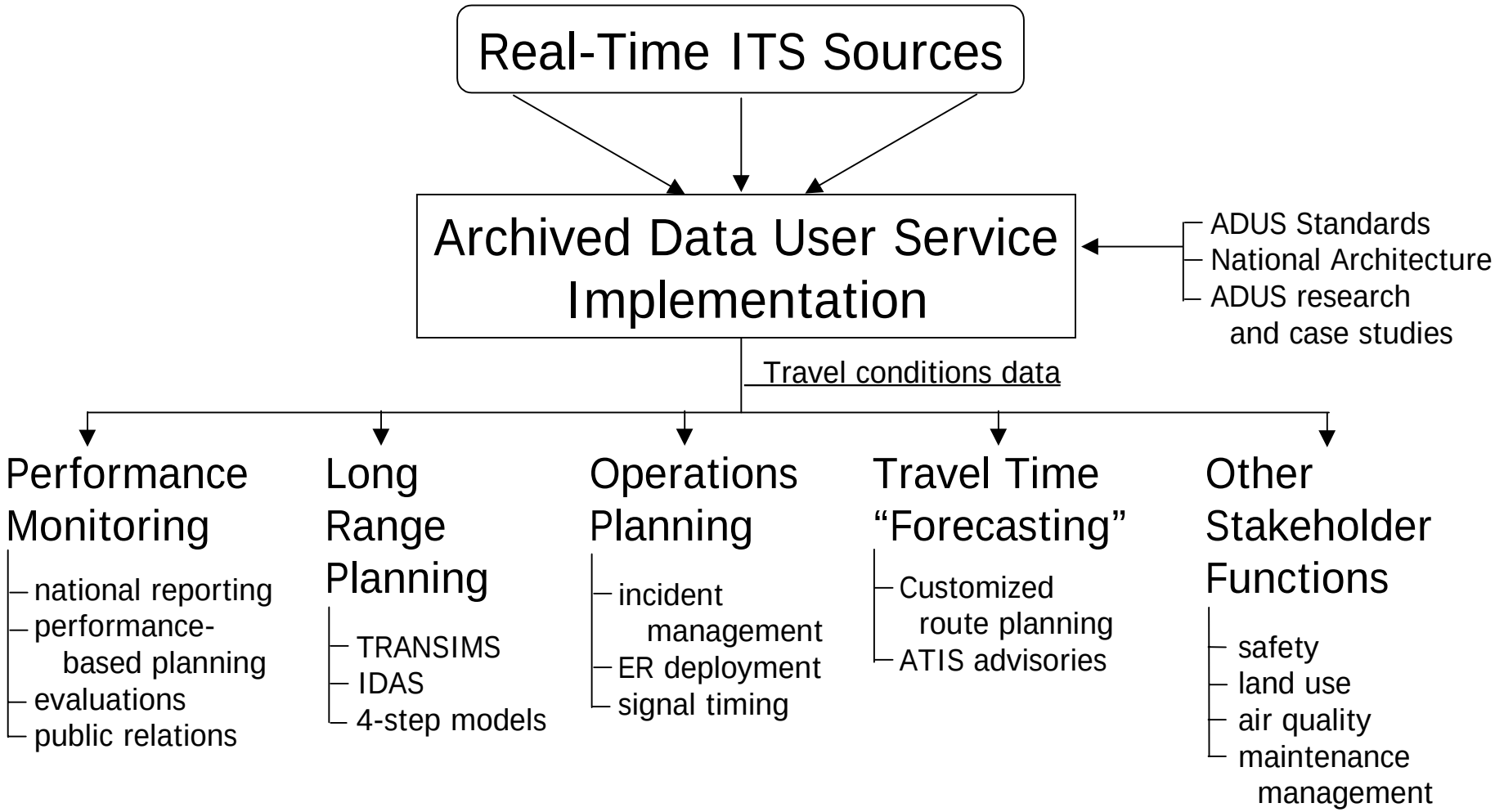
- VMT growth = 3%
- TRI change = 2%

MPI = 1.03/1.02

= 1.01

- Indicates area "more than kept up with" VMT growth

Importance of ADUS



Year 1 Program

10 major urban areas:

Atlanta	Cincinnati
Detroit	Hampton Roads
San Antonio	Houston
Los Angeles	Minneapolis/St. Paul
Phoenix	Seattle

Year 1 Program (cont.)

- Local buy-in/partnerships
- Freeways first (facility focus)
- Direct measurements from ITS ("loops and probes")
- Supplemental data for non-ITS routes
- Encourage local processing of metrics
- Encourage calibration of field equipment

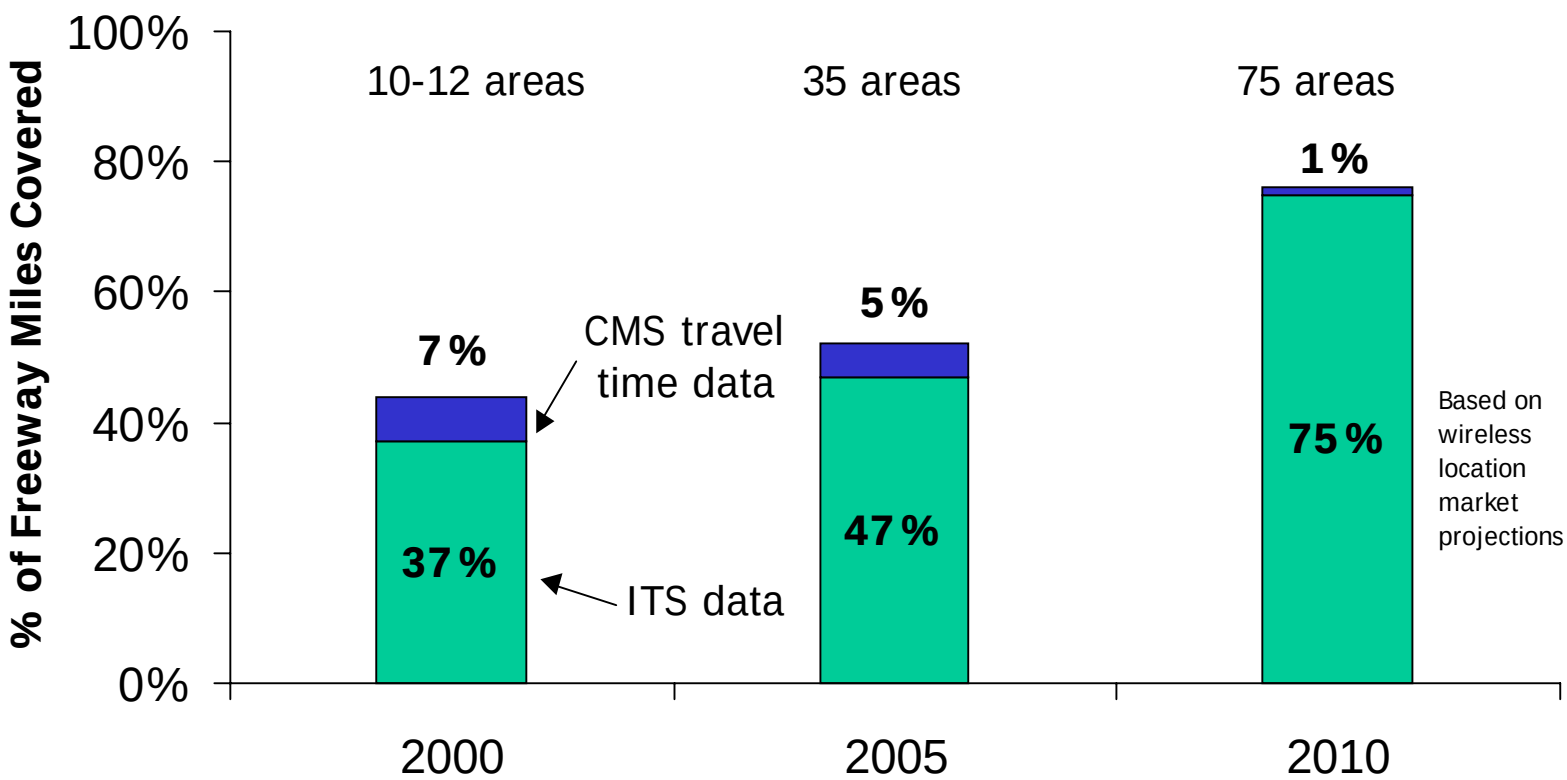
Building Synergy

- Program should be *cooperative* with locals, not exclusionary
- Complement/enhance existing activities
- Encourage local use of data
  - buy-in avoids "unfunded mandate" syndrome
  - demonstrate usefulness by providing customized products (at first)

Supporting Activities

1. Coordination with ADUS Activities (standards and case studies)
2. Data QC Methods
3. Converting Field Data to Travel Time
4. Information Products
5. Research Data Base
6. Reliability of Performance: Perception and Measures

Evolution of Program



Reporting Options

- Short-Term:
  - special collection effort
  - variety of formats (take whatever's there)
- Long-Term:
  - standard formats and reporting schedule
  - corridor summaries vs. data from equipment ("raw" form)

Private Sector Involvement

- ISPs, auto makers, and information "brokers" may be a major future source of information because they need:
  - complete coverage (alternate routes)
  - travel times, not loop speeds
- Cell phone location and recruited probes likely data sources (low cost)

Mobility Monitoring: Summary

- Multiple metrics, including reliability, built around travel time
- Long-term success linked to ADUS and local use of the data
- Start with freeways in 10 cities
- Expand into other cities and arterials
- Embrace new technologies for travel time as they come online