

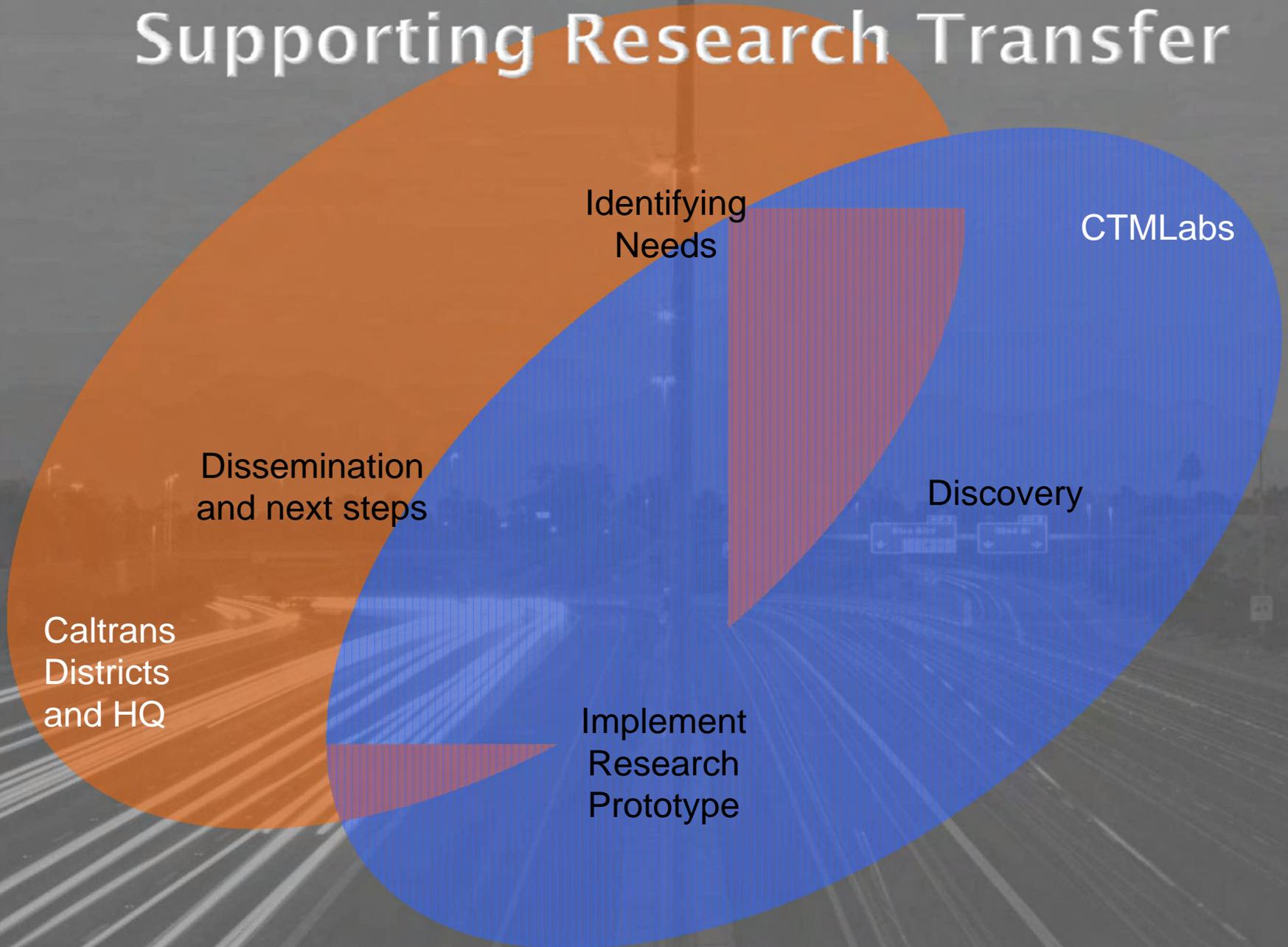
# CTMLabs Portal

## A walkthrough

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# Supporting Research Transfer



# CTMLabs Web Portal

External  
Users

External  
Systems

WWW

Portal

Management  
Interface

Project  
Interface

Common Databases  
and Services

TMCPE  
RTPMS  
Ramp Eval  
Safety  
Path Flow

CTMLabs Intertie

Caltrans Systems and Infrastructure

Go

# Example: TMC Performance

Other Districts

How can I  
Evaluate TMC  
Performance?

External  
Systems

WWW

Publicize Other

TMC processes  
evaluate and  
deploy

Published  
research  
available

Project  
Interface

Management  
Interface

Common Databases  
and Services

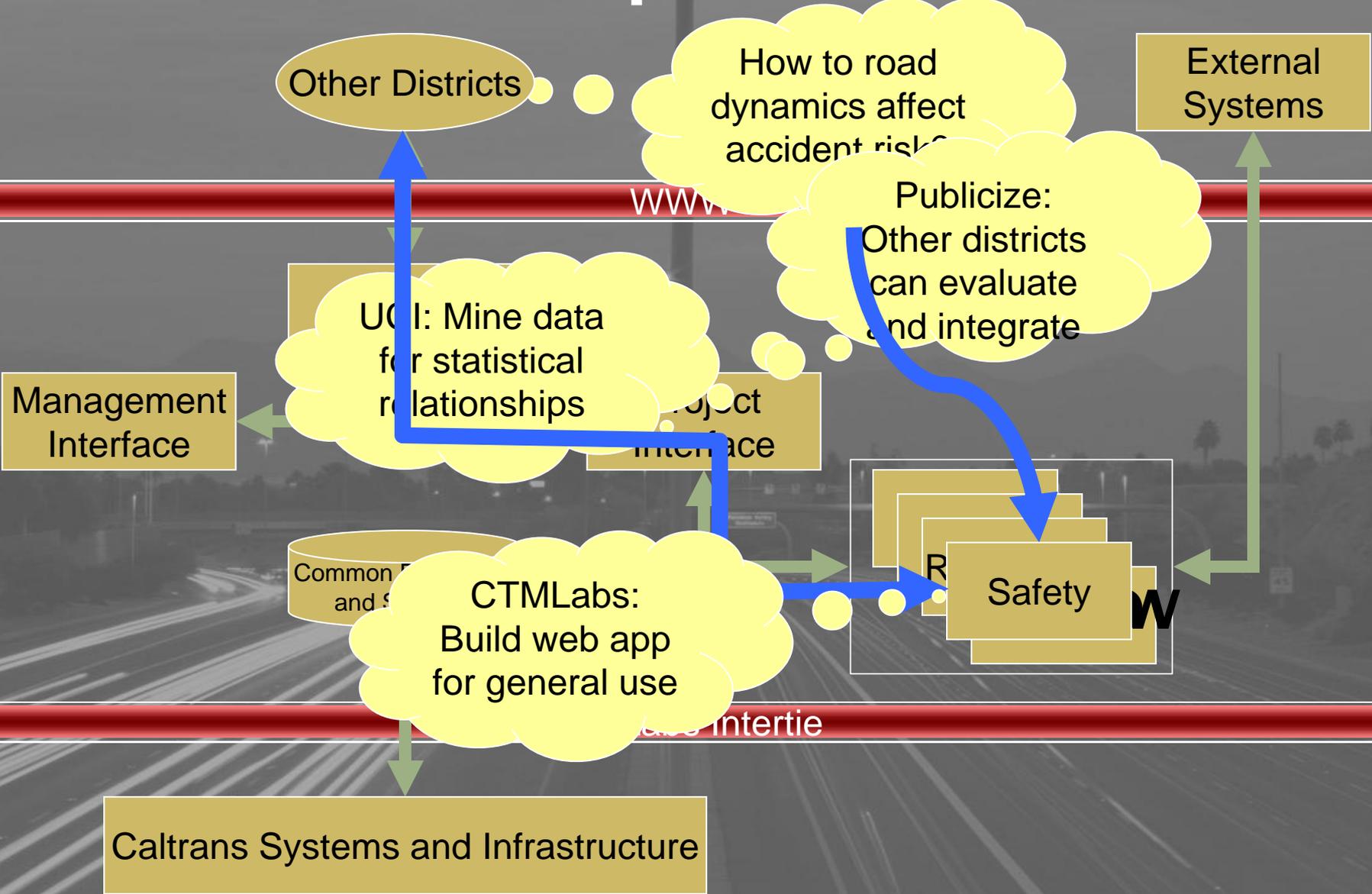
CTMLabs:  
Adapt research  
and deploy



CTMLabs Intertie

Caltrans Systems and Infrastructure

# Example: ATA



# Example: Ramp Meter Evaluation

Other Districts

How are our ramp meters performing?

External Systems

WWW

Highlight discrepancies and lagging performance

Portals: Use intertie to get RMS data

Management Interface

Project Interface

Common Databases and Services

CTMLabs: Develop web application to



CTMLabs Intertie

Caltrans Systems and Infrastructure

# TMC Performance Evaluation



# What is the value of the TMC?

## DIRECT BENEFITS

Restoring capacity  
Balancing demand

Our focus is to quantify benefits  
due to delay reduction

Delay Reduction

Accident Reduction

Lower emissions

Lower fuel consumption

General cost efficiencies

## INDIRECT BENEFITS

# Available Data

- ▣ TMC and CHP logs of **System Disruptions**
- ▣ ...managed by a set of TMC Actions
- ▣ ...measurements of Traffic Conditions under those actions



# Available Data

- ▣ TMC and CHP logs of System Disruptions
- ▣ ...managed by a set of **TMC Actions**
- ▣ ...measurements of Traffic Conditions under those actions

# TMC Actions



“Critical Events” describe response

$t_0$   $t_1$   $t_2$   $t_3$

## Identification

- Notify CHP/CT staff

Location

## Verification

- Confirm location
- Determine type
- Determine severity

## TMC Actions

Diagnosis

## Response

- Disseminate
- Field response
- Coordinate
- Manage

Diagnosis

## Monitoring

- Condition changes
- Multiple incidents

# Available Data

- ▣ TMC and CHP logs of System Disruptions
- ▣ ...managed by a set of TMC Actions
- ▣ ...measurements of **Traffic Conditions** under those actions

# Traffic Conditions

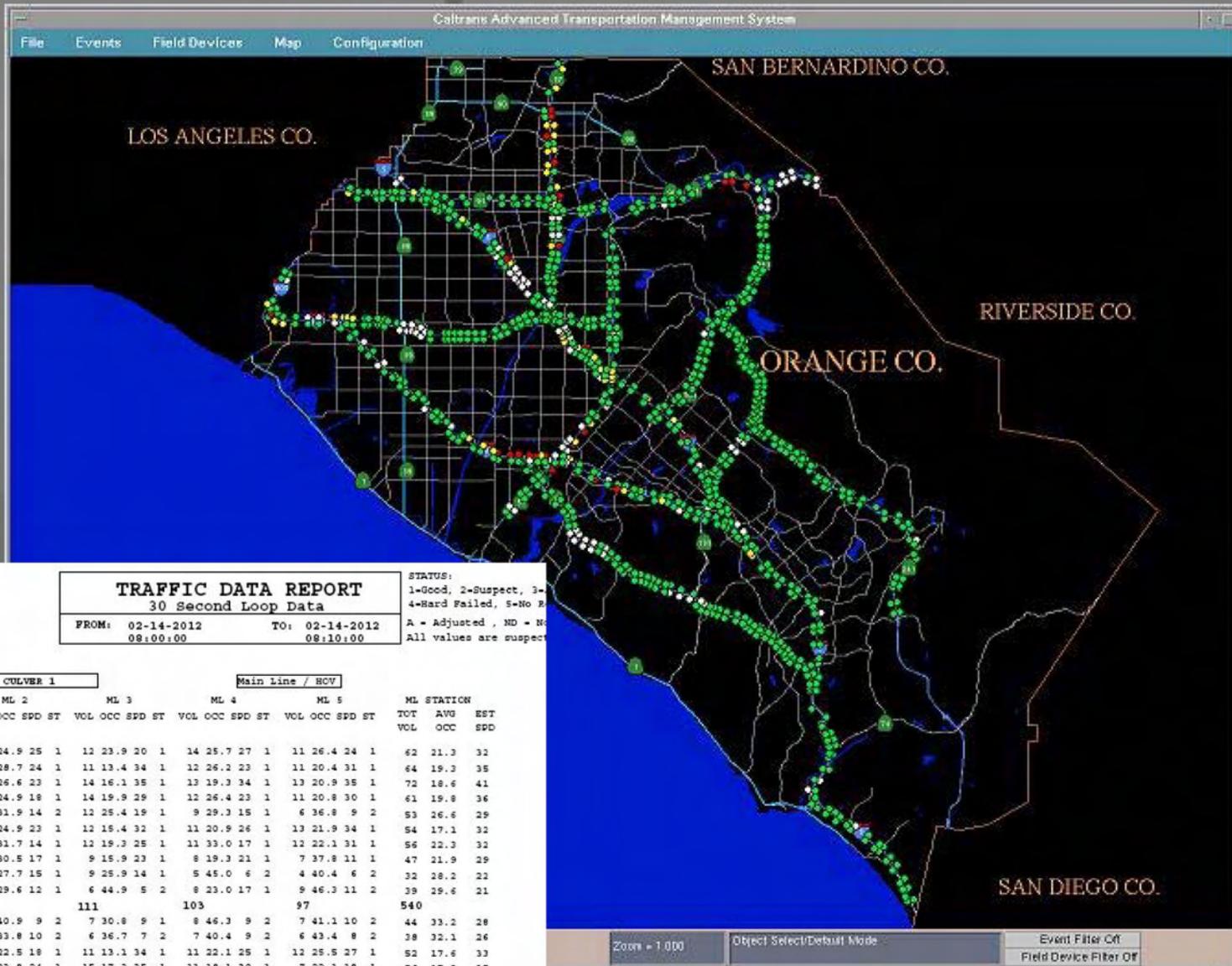
Roadway Sensors Measure:  
Speed, Volume, and Occupancy  
in real-time

These are stored to provide historical  
measurements for comparison

**Traffic Conditions**

# ATMS

Loops  
CCTV  
CMS  
Ramps



Runtime: 02-15-2012, 08:41

## TRAFFIC DATA REPORT 30 Second Loop Data

FROM: 02-14-2012 08:00:00 TO: 02-14-2012 08:10:00

STATUS:  
1-Good, 2-Suspect, 3-  
4-Hard Failed, 5-No R  
A - Adjusted, ND - N  
All values are suspect

VDS DESCRIPTION:	ORA-5-N.	PM: R26.56	CULVER 1	Main Line / HOV											
FEB-14-2012	HOV 1	ML 1	ML 2	ML 3	ML 4	ML 5	ML STATION			ML STATION					
TUESDAY	VOL OCC SPD ST	VOL OCC SPD ST	VOL OCC SPD ST	TOT	AVG	EST	TOT	AVG	EST						
08:00:30	6 51.6 NA 3	10 5.7 72 2	15 24.9 25 1	12 23.9 20 1	14 25.7 27 1	11 26.4 24 1	62	21.3	32	64	19.3	35			
08:01:00	3 62.9 NA 3	13 7.9 67 1	17 28.7 24 1	11 13.4 34 1	12 26.2 23 1	11 20.4 31 1	74	18.6	41	72	18.6	41			
08:01:30	14 39.3 NA 3	17 10.0 69 1	15 26.6 23 1	14 16.1 35 1	13 19.3 34 1	13 20.9 35 1	61	19.8	36	61	19.8	36			
08:02:00	10 36.0 NA 3	13 7.2 74 1	11 24.9 18 1	14 19.9 29 1	12 26.4 23 1	11 20.8 30 1	53	26.6	29	53	26.6	29			
08:02:30	7 47.2 NA 3	15 9.5 65 1	11 31.9 14 2	12 25.4 19 1	9 29.3 15 1	6 36.8 9 2	54	17.1	32	56	17.1	32			
08:03:00	10 45.4 NA 3	4 2.3 70 2	14 24.9 23 1	12 15.4 32 1	11 20.9 26 1	13 21.9 34 1	56	22.3	32	54	22.3	32			
08:03:30	4 62.2 NA 3	10 5.3 78 2	11 31.7 14 1	12 15.3 25 1	11 33.0 17 1	12 22.1 31 1	32	28.2	22	32	28.2	22			
08:04:00	5 50.2 NA 3	10 6.0 68 2	13 30.5 17 1	9 15.9 23 1	8 19.3 21 1	7 37.8 11 1	39	29.6	21	39	29.6	21			
08:04:30	8 42.3 NA 3	4 1.7 95 2	10 27.7 15 1	9 25.9 14 1	5 45.0 6 2	4 40.4 6 2	540			540					
08:05:00	6 50.8 NA 3	7 4.4 65 2	9 29.6 12 1	6 44.9 5 2	8 23.0 17 1	9 46.3 11 2	540			540					
5mt:	NA	103	126	111	103	97	540			540					
08:05:30	5 44.8 NA 3	13 7.2 73 1	9 40.9 9 2	7 30.8 9 1	8 46.3 9 2	7 41.1 10 2	44	33.2	28	44	33.2	28			
08:06:00	0 73.6 NA 3	11 6.4 70 1	8 33.8 10 2	6 36.7 7 2	7 40.4 9 2	6 43.4 8 2	38	32.1	26	38	32.1	26			
08:06:30	4 58.4 NA 3	8 4.6 72 2	10 22.5 18 1	11 13.1 34 1	11 22.1 25 1	12 25.5 27 1	52	17.6	33	52	17.6	33			
08:07:00	2 66.4 NA 3	9 5.4 69 1	14 23.8 24 1	15 17.3 35 1	11 18.1 30 1	7 22.1 18 1	56	17.3	35	56	17.3	35			
08:07:30	7 57.3 NA 3	11 6.7 67 1	15 22.5 27 1	13 11.5 46 1	15 21.3 35 1	10 22.4 25 1	64	16.9	39	64	16.9	39			
08:08:00	0 73.6 NA 3	7 3.8 75 2	13 16.2 33 1	13 12.5 43 1	15 17.2 43 1	15 23.9 36 1	63	14.7	43	63	14.7	43			
08:08:30	14 32.2 NA 3	9 4.5 82 2	16 19.3 34 1	13 12.1 44 1	14 15.6 45 1	11 17.8 35 1	63	13.8	46	63	13.8	46			
08:09:00	12 26.3 NA 3	9 4.8 76 2	14 15.1 38 1	16 20.5 32 1	13 21.7 30 1	13 15.2 48 1	65	15.5	42	65	15.5	42			
08:09:30	6 54.0 NA 3	8 5.0 65 2	16 17.8 37 1	8 20.5 16 1	11 33.7 16 2	13 24.6 30 1	56	20.3	32	56	20.3	32			
08:10:00	1 69.5 NA 3	8 4.2 77 2	12 19.8 25 1	6 24.5 10 1	6 39.5 8 2	6 32.0 11 1	39	24.0	29	39	24.0	29			
5mt:	NA	93	127	108	111	100	539			539					

Zoom = 1000

Object Select/Default Mode

Event Filter Off

Field Device Filter Off

# Quantifying Delay Savings

Estimated Delay under TMC management

- Projected Delay without TMC management

= TMC Savings due to TMC management

Using logs and sensor data  
Compute delay as observed

Using projections of “critical events” without the TMC, estimate impacts on traffic and the associated delay

TMC Savings is the difference between the two

# Automated Processing

## Caltrans/CHP Services

PeMS

ATMS XML

Cal

D12 Logs

Caltrans iCAD

## CTMLabs Core Services

Importer

Delay Estimator

Delay Model

TMCPE  
DB

## CTMLabs Web API

TMCPE Website

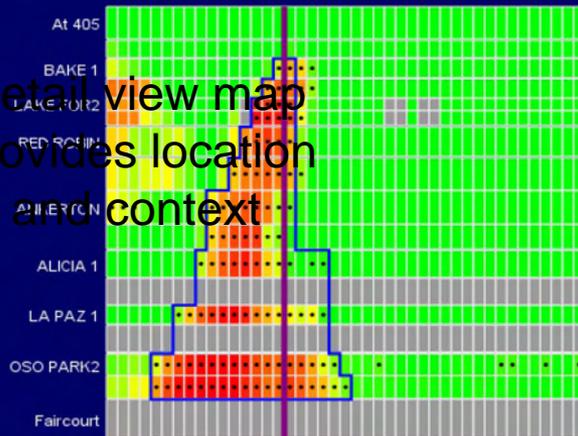
TMC Service API

CAS Security

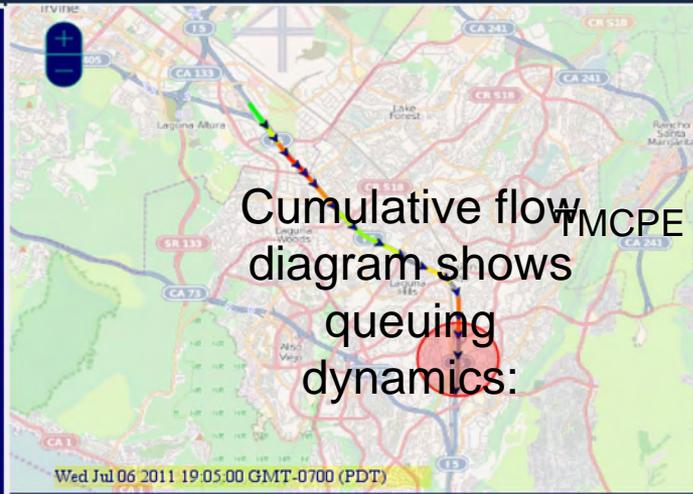
# TMCPE Website

**Jul 6 @ 19:05 Volume (veh) Occ (%) Speed (mph) Incident**  
**Obs:** 598 23 58 Yes  
**Avg on Wed @ 19:05** 423 61 No

Detail view map  
 provides location  
 and context



Cumulative flow  
 diagram shows  
 queuing  
 dynamics:



Wed Jul 06 2011 19:05:00 GMT-0700 (PDT)



Cumulative Vehicle Count at OSO PARK1

General Statistics

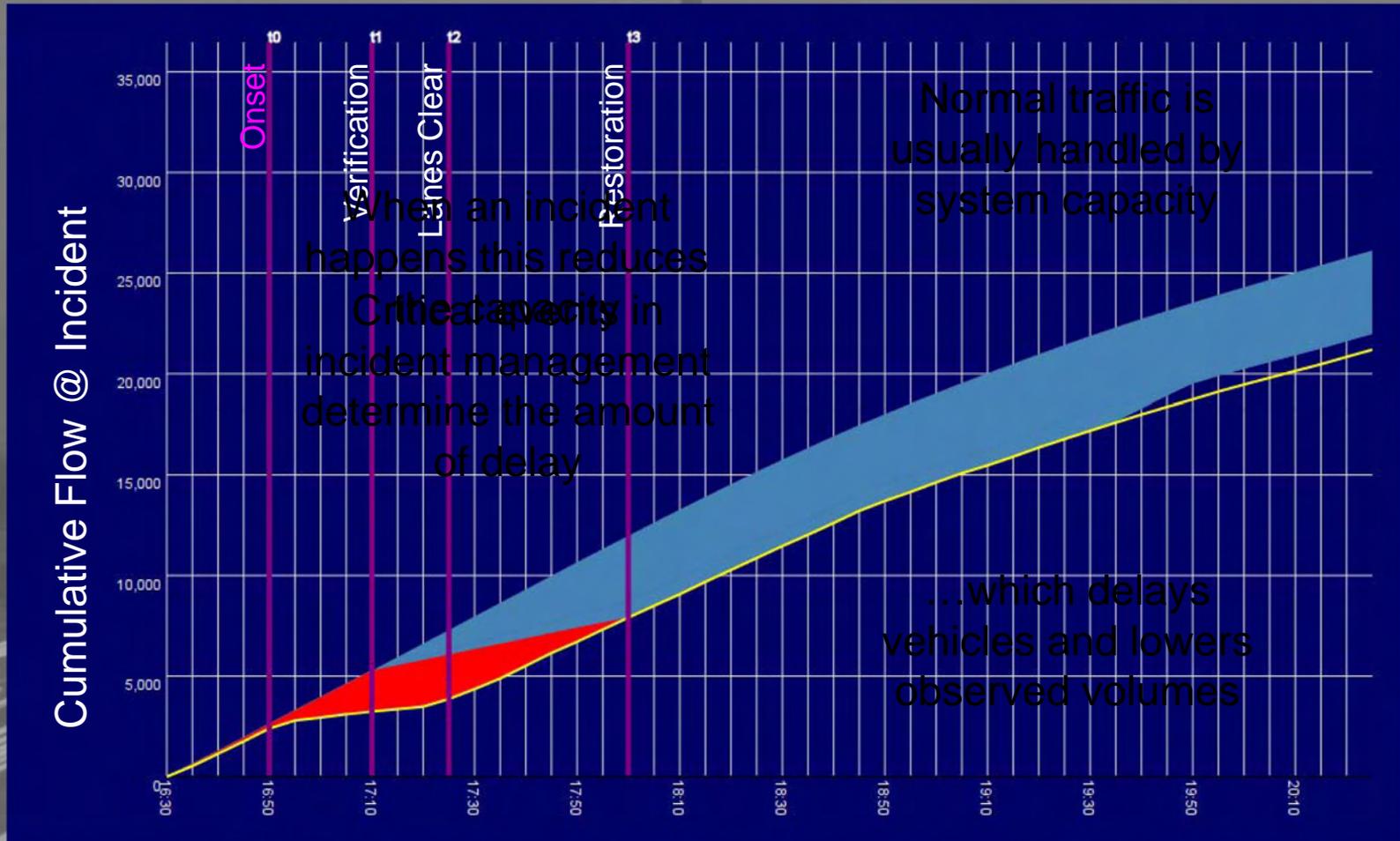
Activity Log

Facility	Net Delay <35 (w/TMC) (veh-h)	Net Delay (w/TMC) (veh-h)	Net Delay (no TMC) (veh-h)	Net Delay (veh-h)
S-S	432	519	150	369

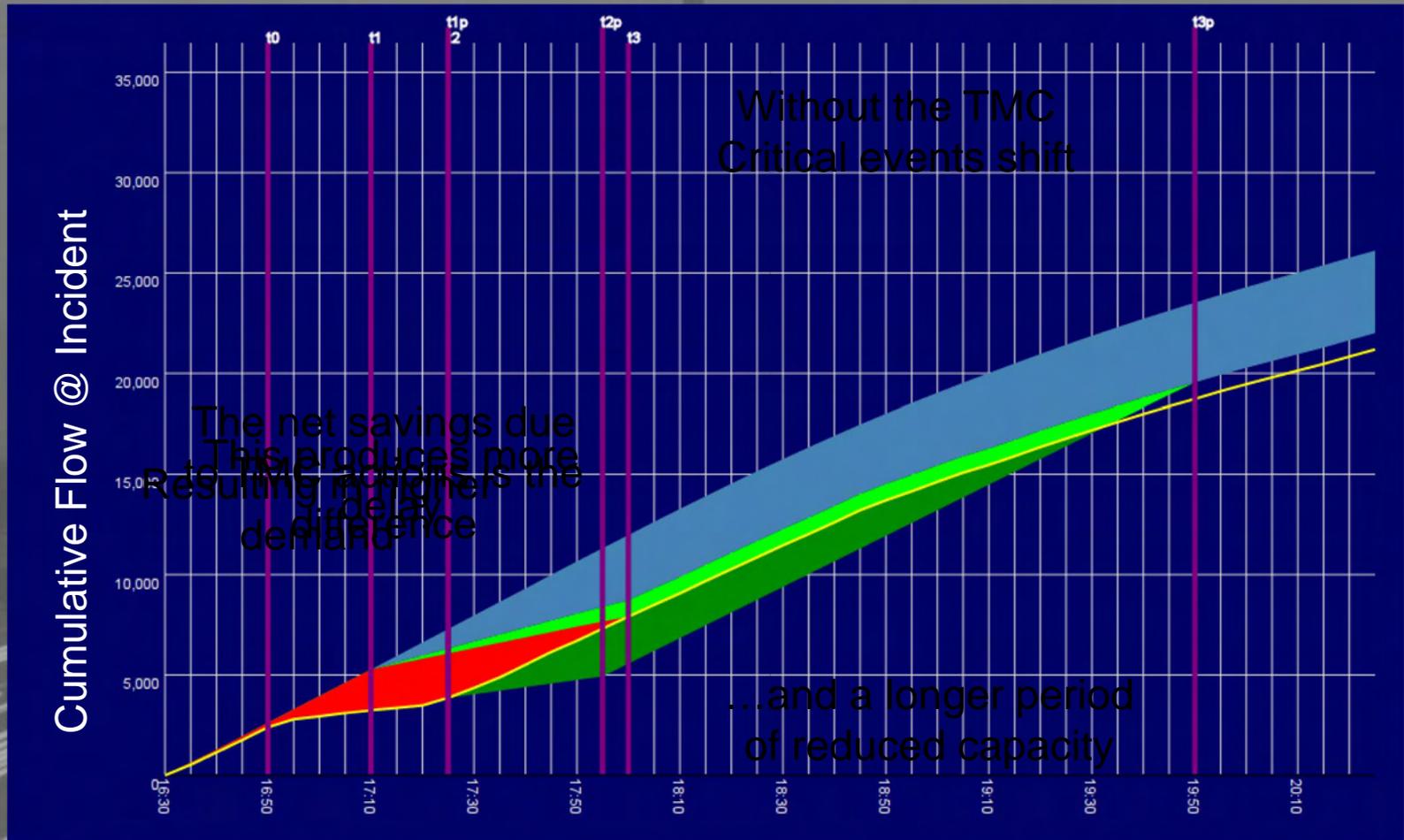
Time-space  
 diagram includes  
 estimated range  
 of impact

- [Download spreadsheet for facility analysis 14147](#)
- [Report problem with this analysis](#)

# TMC Savings Visualized

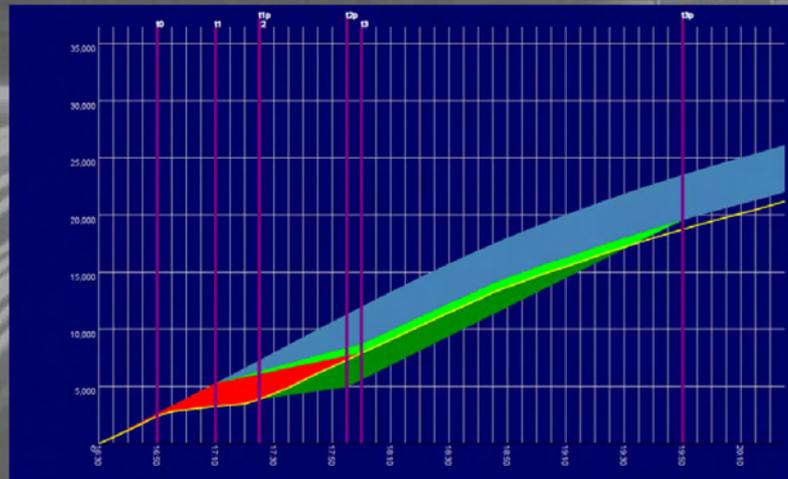


# TMC Savings Visualized



# Example Savings

Delay	Observed With TMC	Projected Without TMC	TMC Savings	%
Veh-hr	382	774	392	51%
Cost in \$	\$5008	\$10146	\$5134	51%



# TMCPE Website Demo



# Looking Ahead

- ▣ TMCPE is transferable
  - Geometries and traffic data are from PeMS
  - Logging data can be supported by TMCaI
- ▣ Planned improvements
  - Continued analysis
  - Model refinements
  - Applications to real-time management?



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