



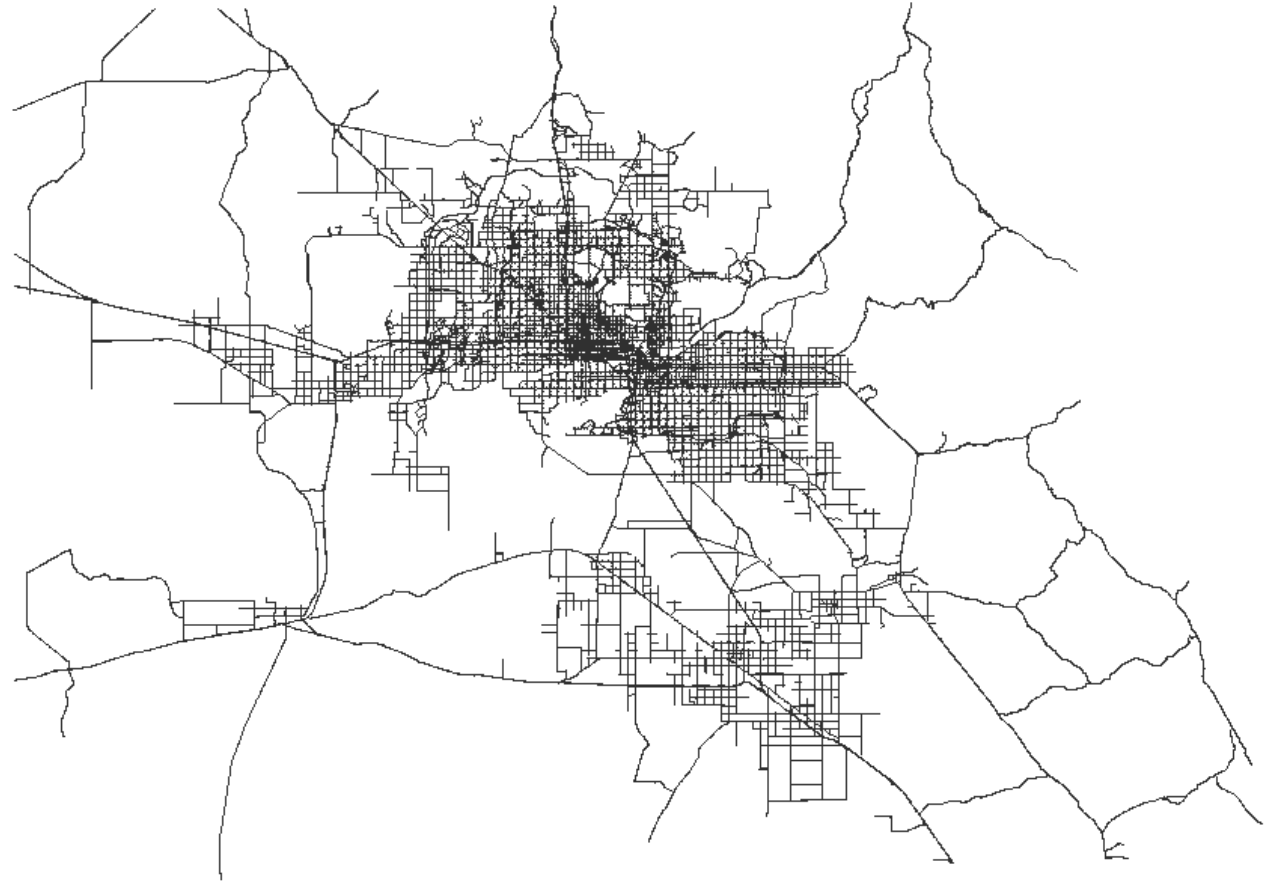
Opportunities for Regional DTA Validation with Mobile Data

Daniel Morgan
Caliper Corporation

7th TRB Innovations in Travel Modeling Conference, Atlanta, GA, June 24, 2018

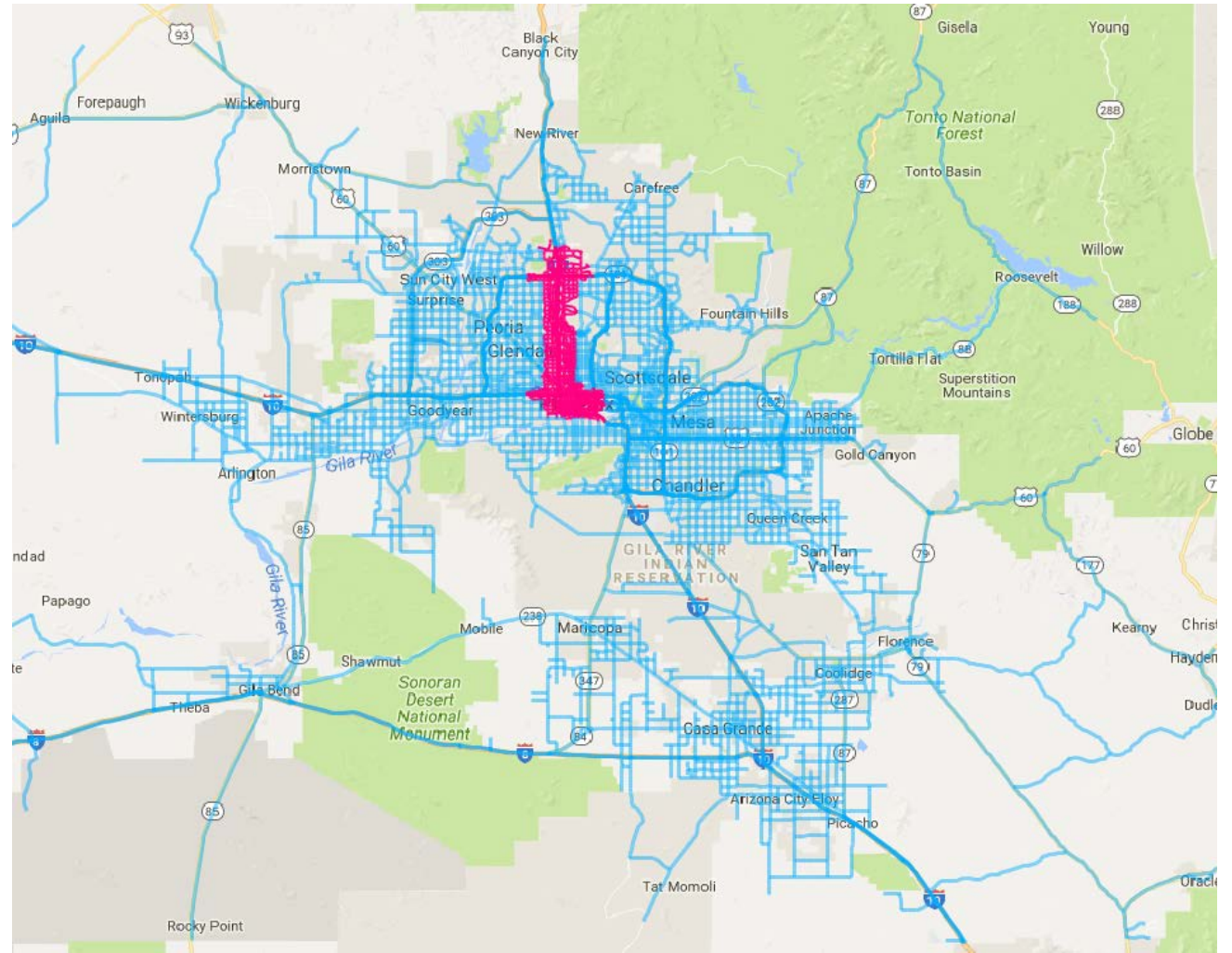
Opportunity

Leverage mobile data in validation of regional and wide-area DTA models



State of the Practice

A summary in two projects

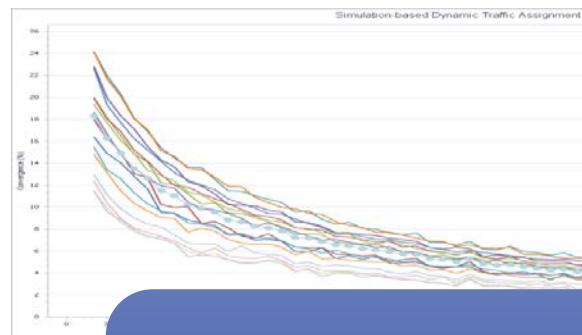


State of Practice: Calibration



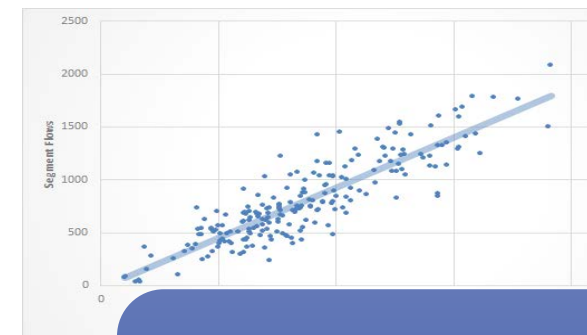
TDM

- Produce initial trip table estimates



DTA

- Equilibrate dynamic route choices



ODME

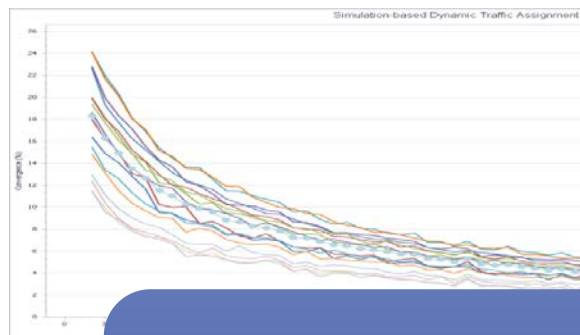
- Adjust trip tables to match counts

State of Practice: Calibration



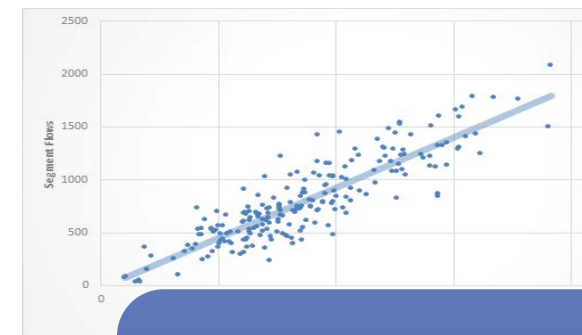
TDM

- Produce initial trip table estimates



DTA

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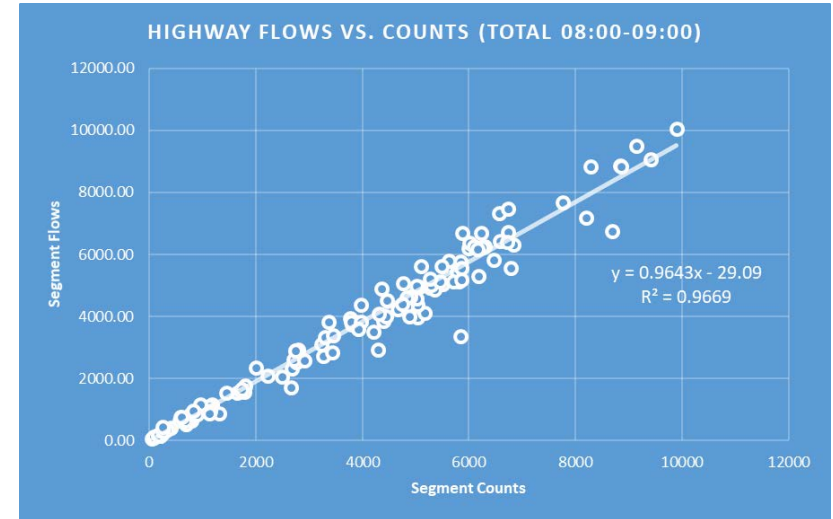
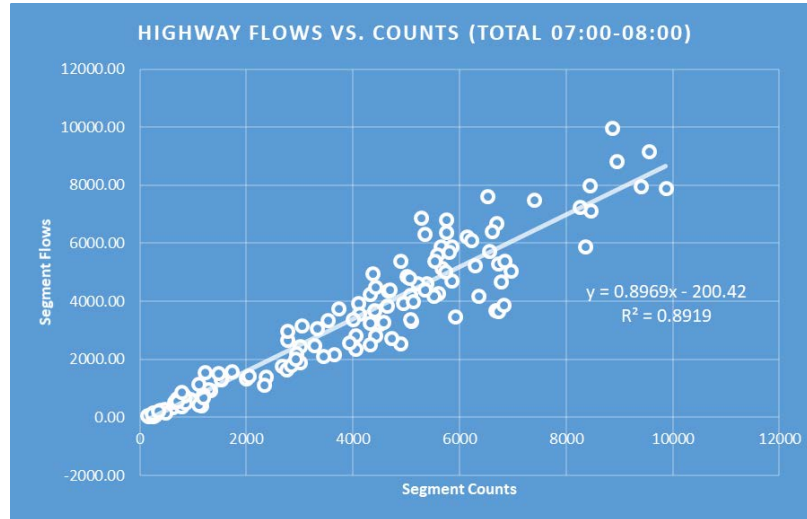
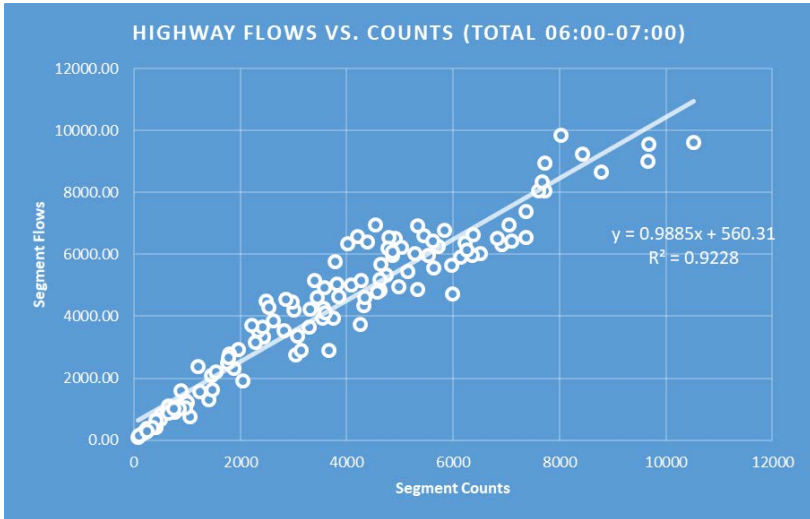
ODME

- Adjust trip tables to match **counts**

Reliance on aggregate data

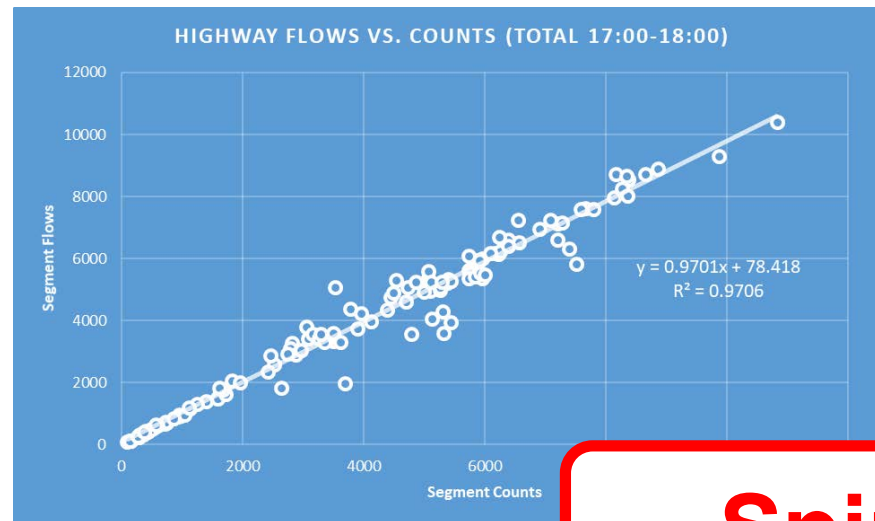
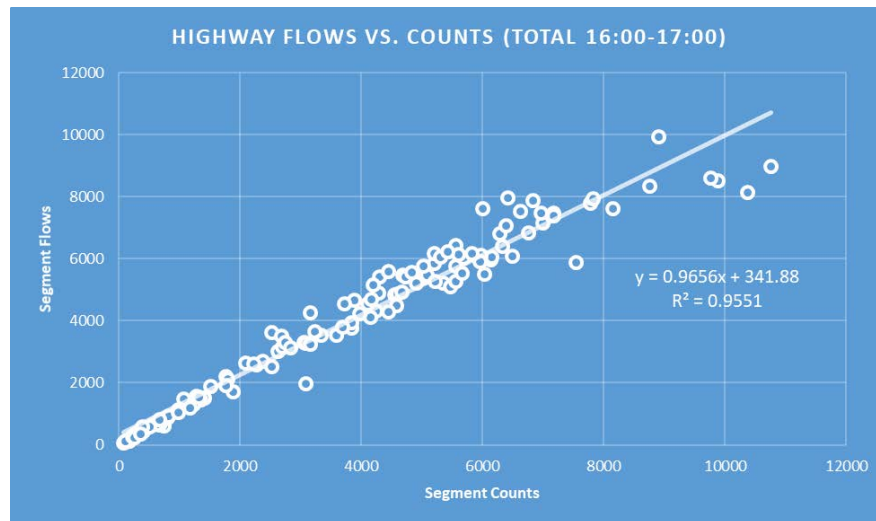
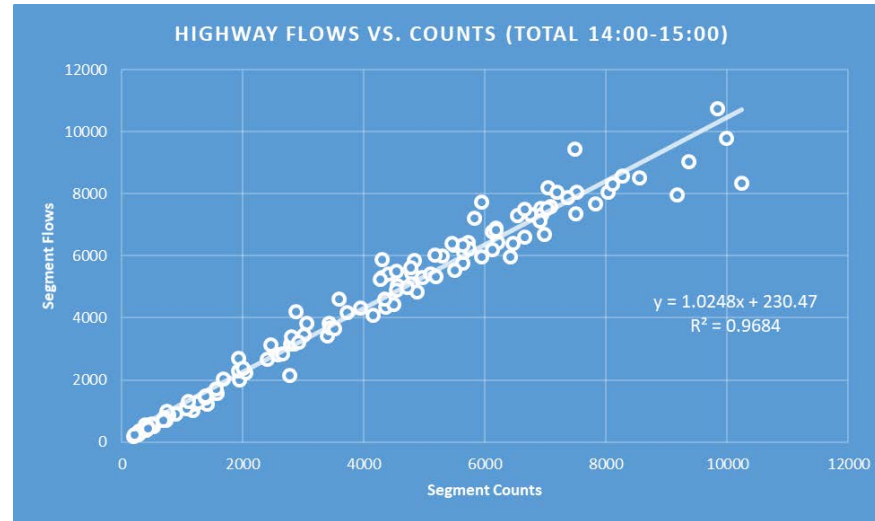
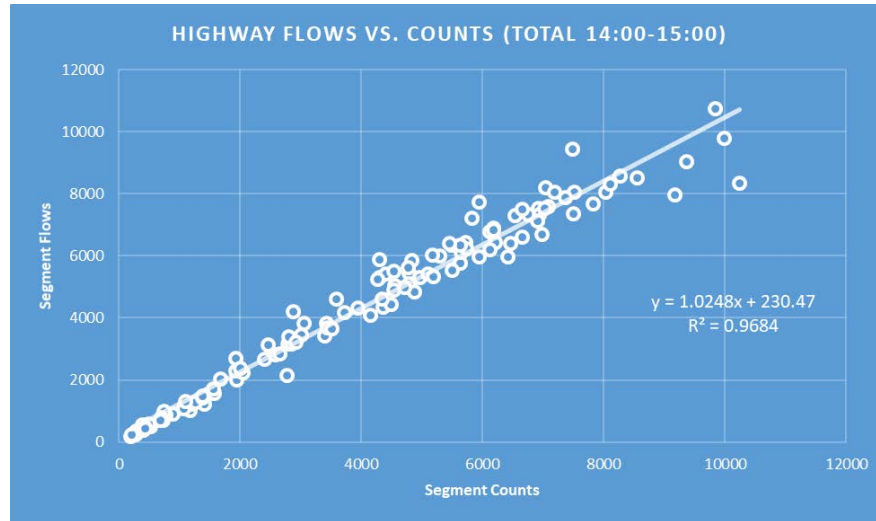


Calibration: AM Counts (Scatter/R²)



Spine

Calibration: PM Counts (Scatter/R²)



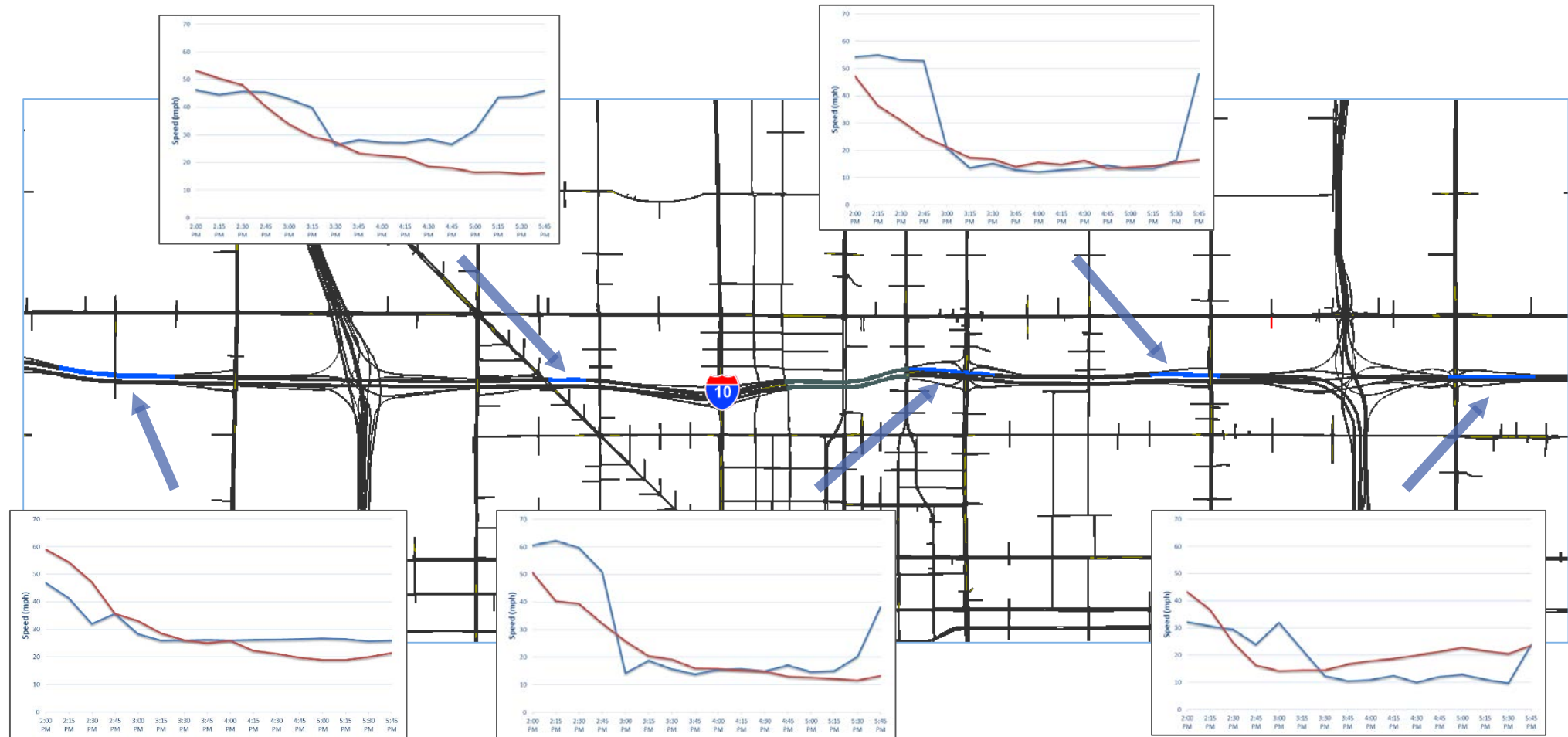
Spine

Calibration: Counts (RMSE)

Period	Interval Beginning	Freeway (N= 209)		Ramp (N= 668)		Arterial (N= 1941)		All (N= 2818)	
		%RMSE	% (Flow-Count)/ Count	%RMSE	% (Flow-Count)/ Count	%RMSE	% (Flow-Count)/ Count	%RMSE	% (Flow-Count)/ Count
Hour Interval									
AM	6:00	15.6	-6.8	35.1	0.2	31.7	-3.8	29.3	-4.0
	7:00	16.7	-5.5	32.7	-7.4	29.4	-14.5	28.1	-11.0
	8:00	19.0	-5.3	32.0	-2.7	29.1	-13.7	29.3	-9.6
PM	14:00	14.9	-6.0	28.0	-4.1	30.2	-18.1	26.9	-12.4
	15:00	16.0	-7.4	30.1	-9.0	30.8	-18.7	28.1	-14.1
	16:00	20.8	-8.2	35.6	-13.1	33.3	-19.9	32.4	-15.6
	17:00	24.3	-9.4	37.4	-16.2	38.1	-21.1	33.1	-18.1

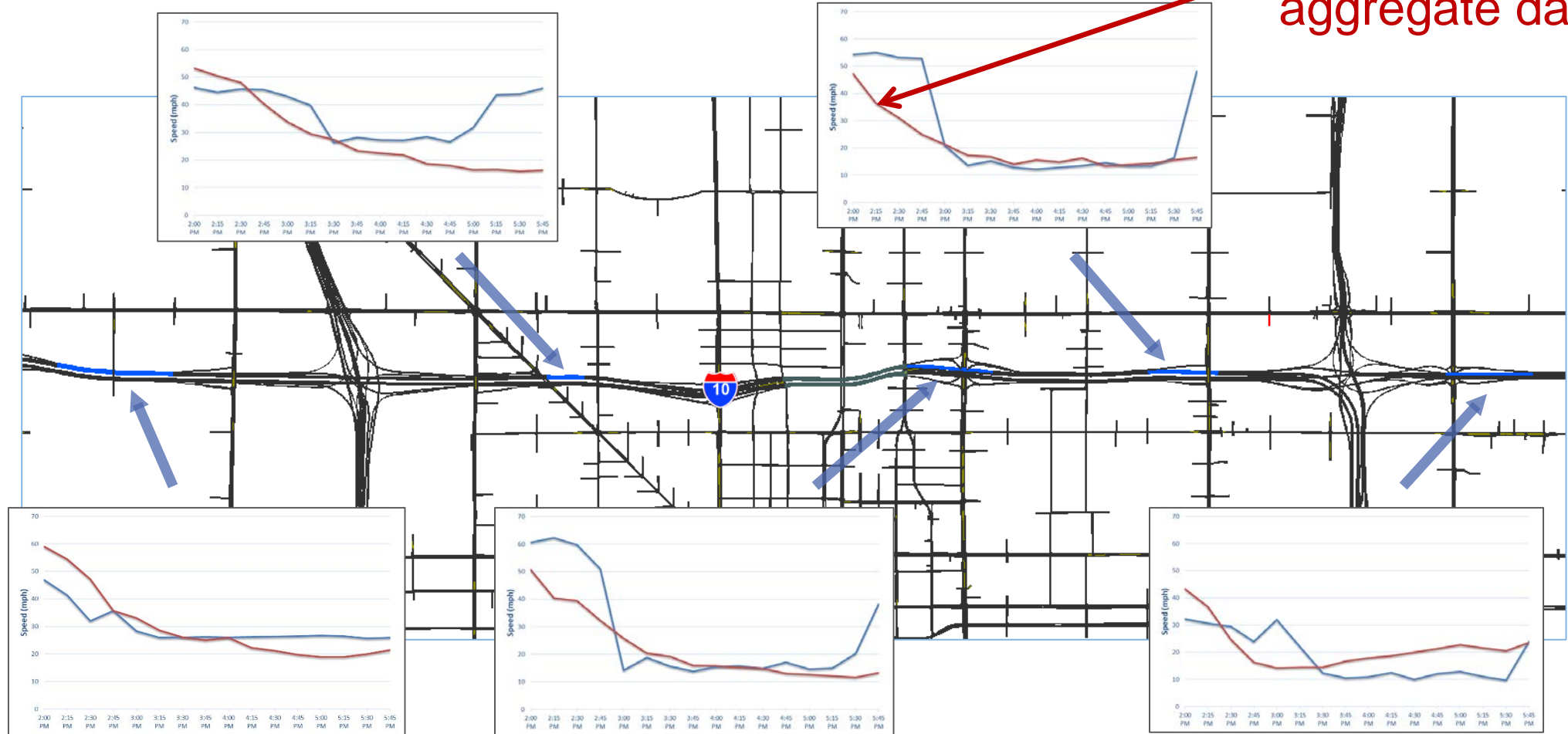
Regional

State of Practice: Validation

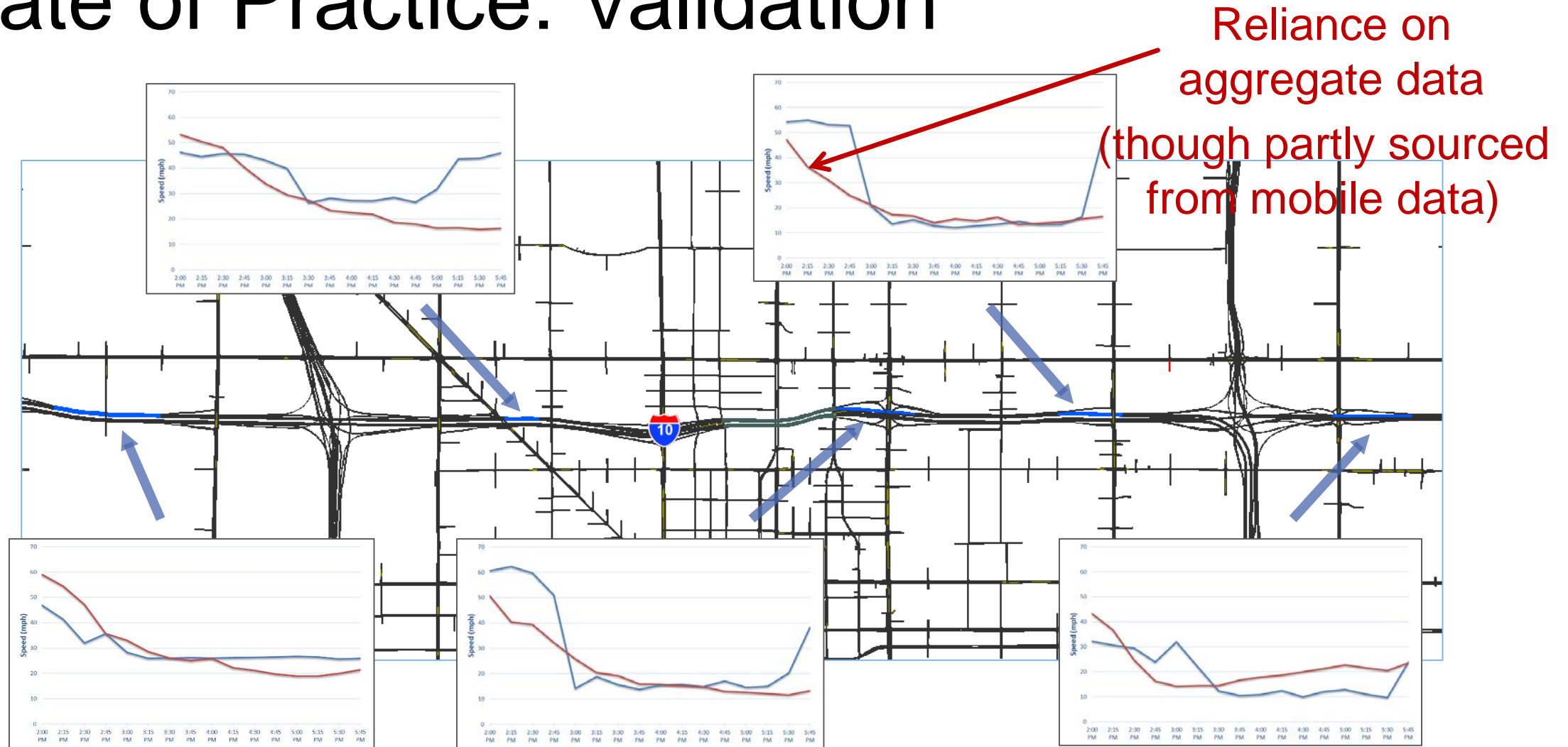


State of Practice: Validation

Reliance on aggregate data



State of Practice: Validation



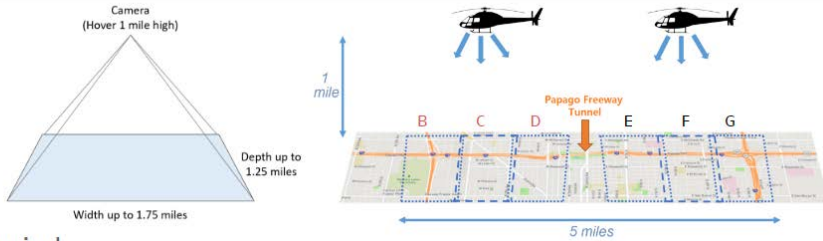
Reliance on aggregate data (though partly sourced from mobile data)

Validation Data: Vehicle Trajectories



Data Collection

- 2 Helicopters
- 6 Cameras
- 21 M pixels per image
- 1 Frame per second
- 2-Hour survey per peak period

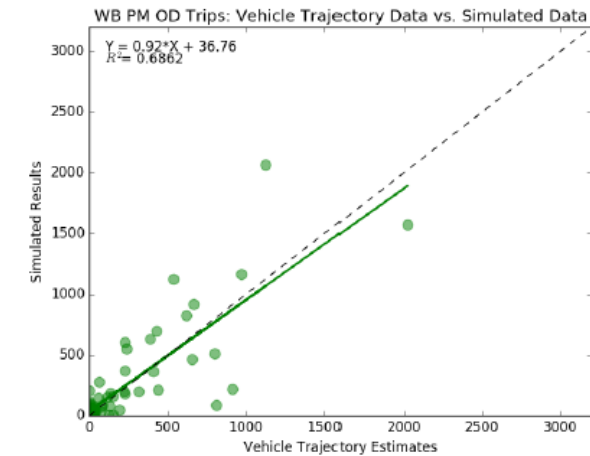
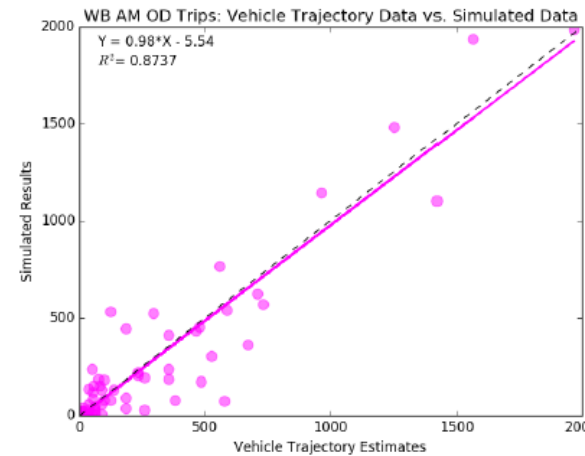
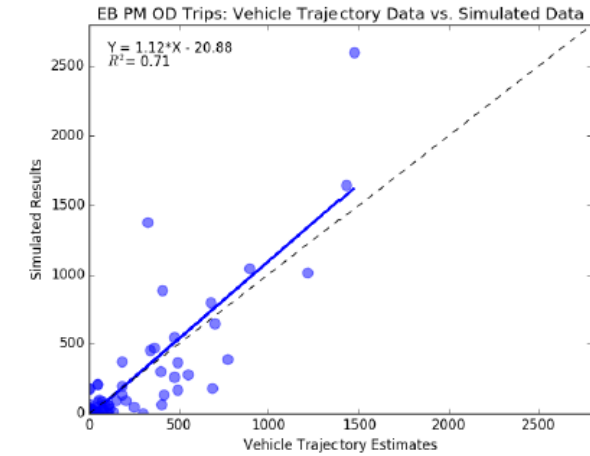
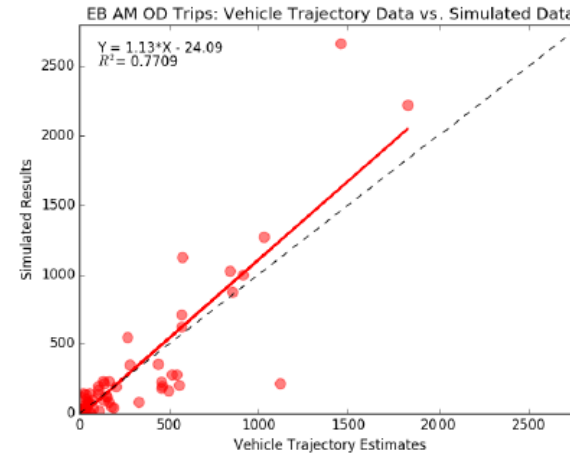
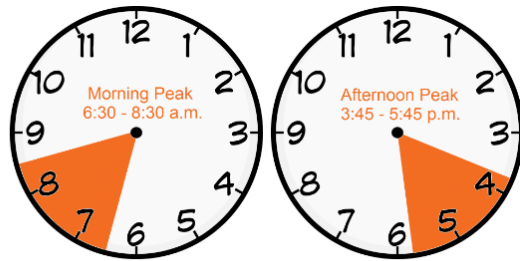


2 days were selected based on historical traffic data

2 peak periods each day

to show the development, evolution and discharge of recurring congestion at bottlenecks.

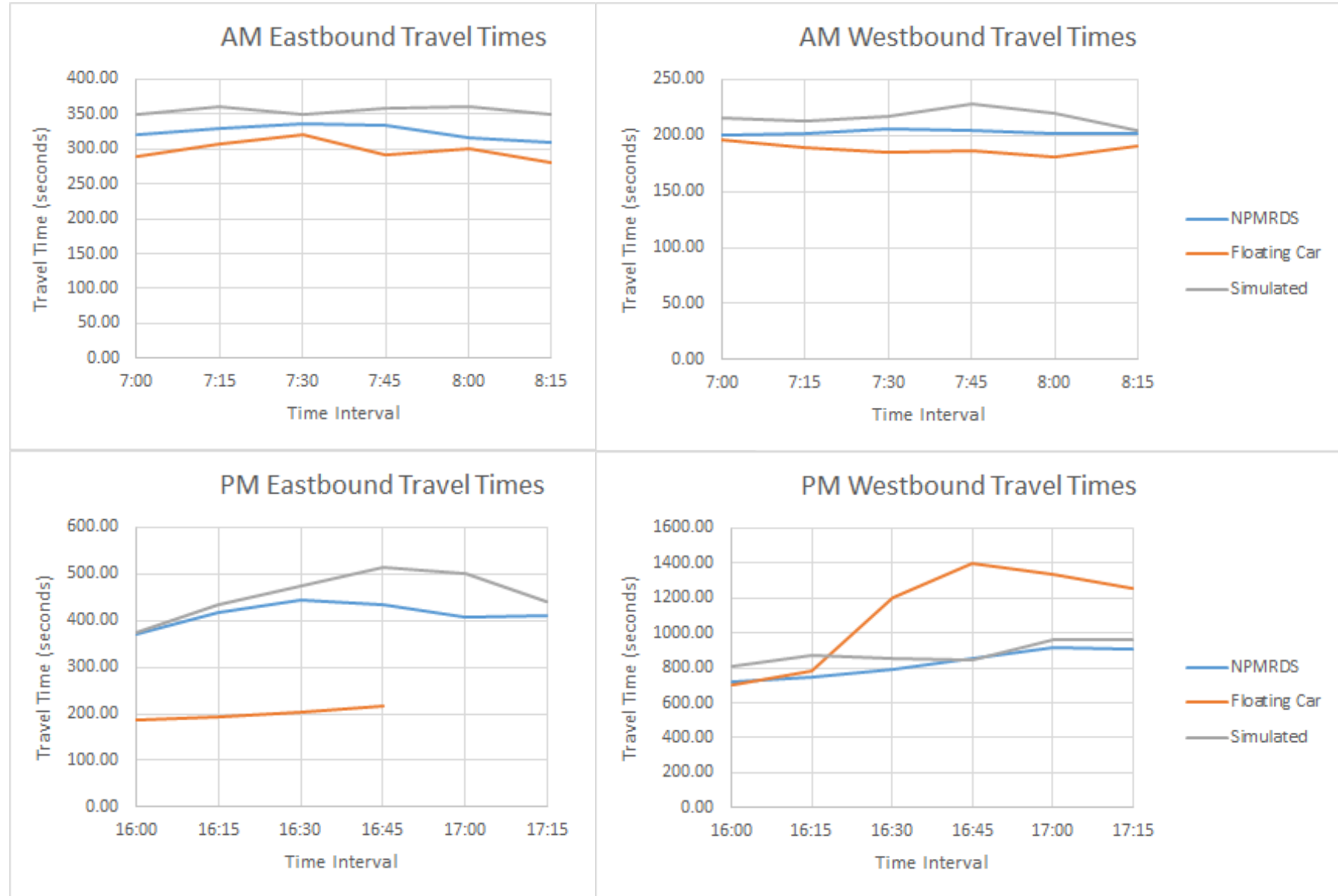
October 2014						
Su	Mo	Tu	We	Th	Fr	Sa
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1



References: MAG Bottleneck Study TMIP Webinar on Oct. 18, 2017 & <http://bottleneckstudy.azmag.gov>

Validation to Vehicle Trajectory Data

Scratching the surface of potential



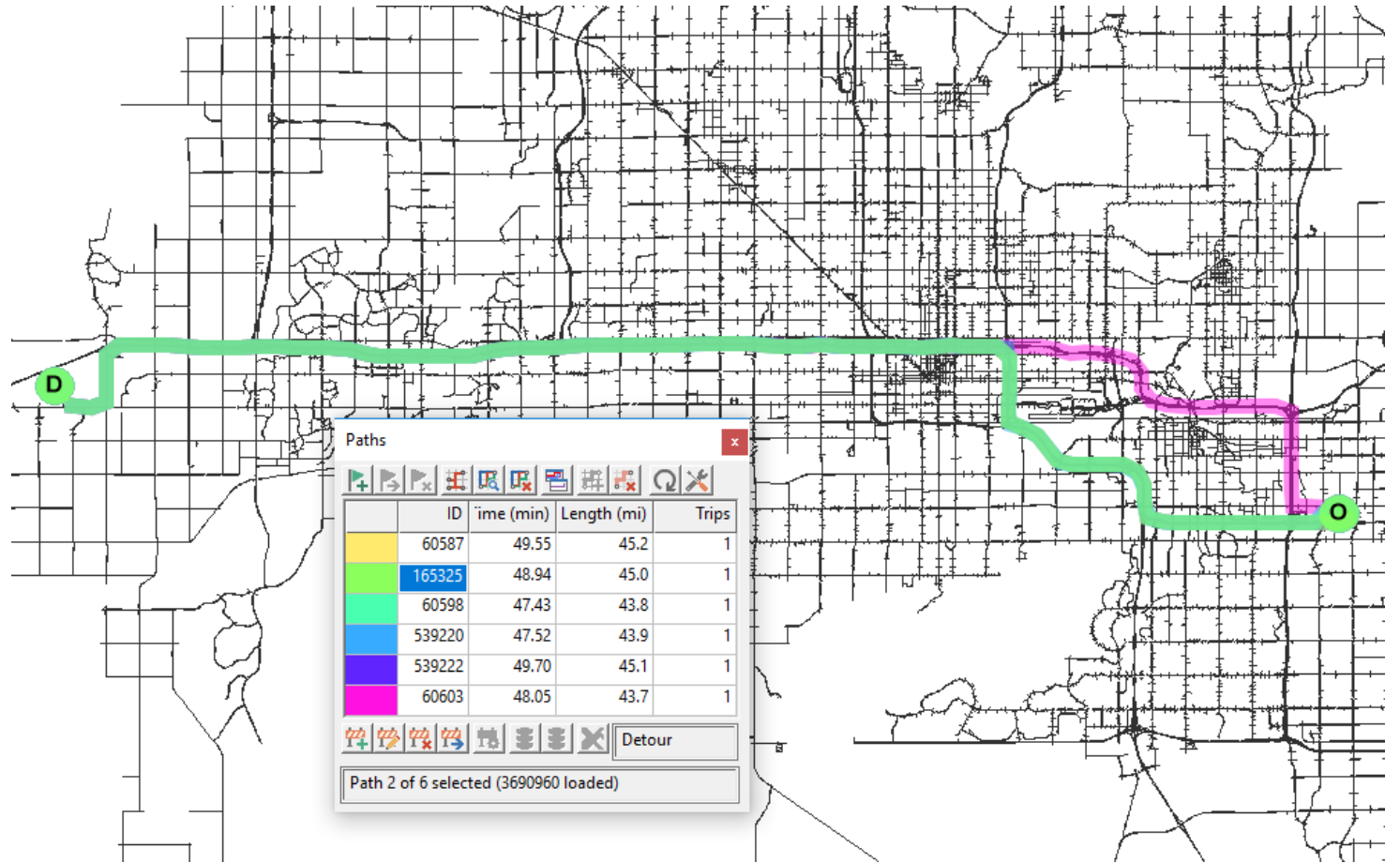
How Can Mobile Data Assist DTA Validation?

- Path visualization and audit
- Critical link analysis
- Calibration of simulation models



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Q&A

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