NCHRP 3-65: Applying Roundabouts in the United States

Data Collection and Extraction

Michael Kyte, University of Idaho

TRB Roundabout Conference, Vail, CO

May 23, 2005

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION PLANNING/TRAFFIC ENGINEERING

Bhagwant Persaud, Canada
David Harkey, USA
George Mason University, USA
McDonald & Partners, UK
Rensselaer Polytechnic University, USA
Rod Troutbeck, Australia
Ruhr-University Bochum, Germany
University of Idaho, USA

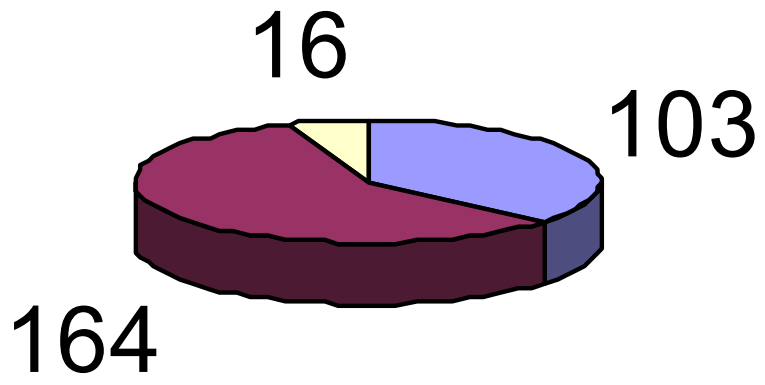
National Roundabout Conference 2005 DRAFT

Topics of Discussion

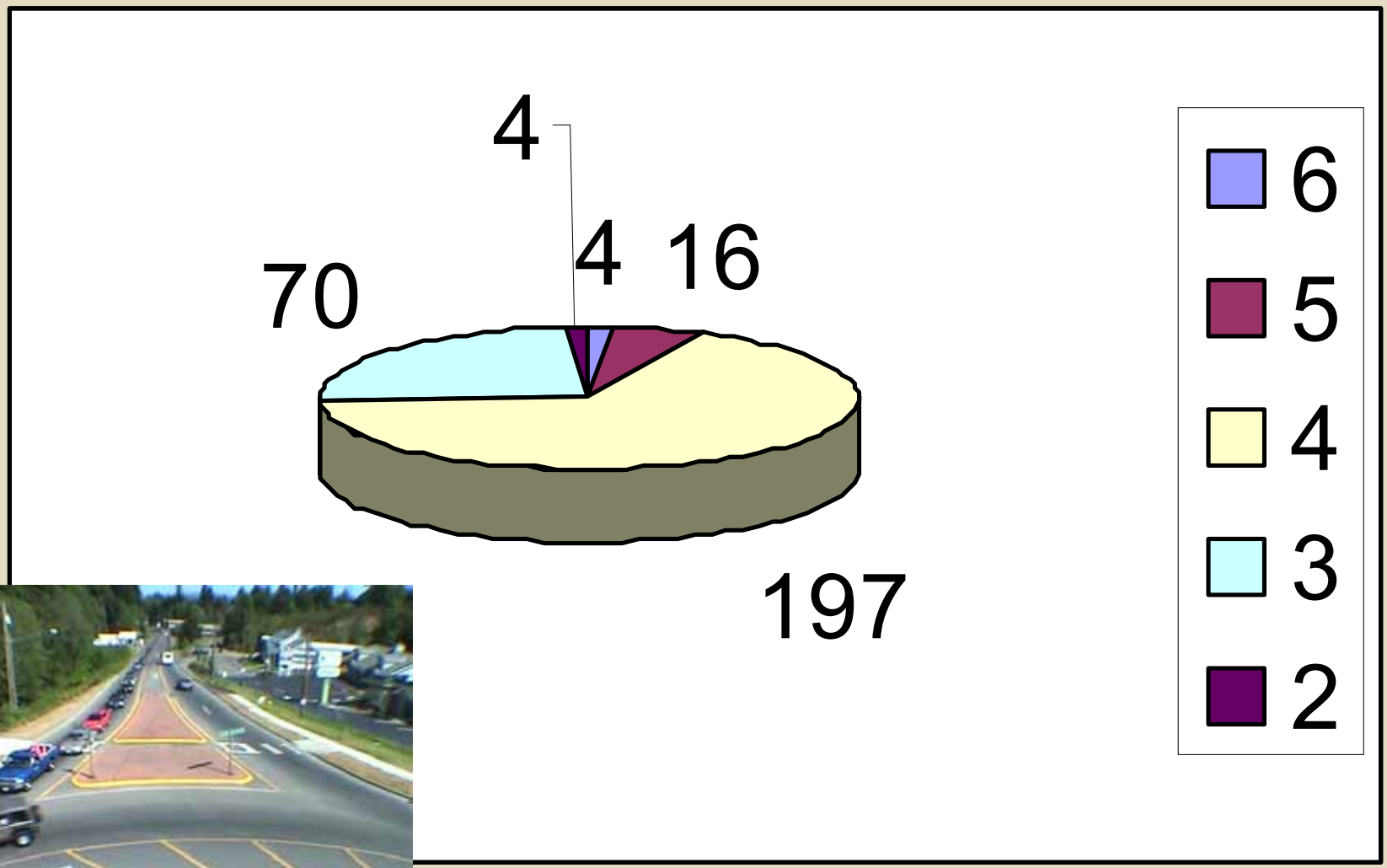
- **National roundabouts data base**
- **3-65 project data base**
  - *Operations data*
  - *Safety data*
  - *Speed data*
  - *Geometric data*
  - *Bicycle/pedestrian data*

Roundabouts in U.S.

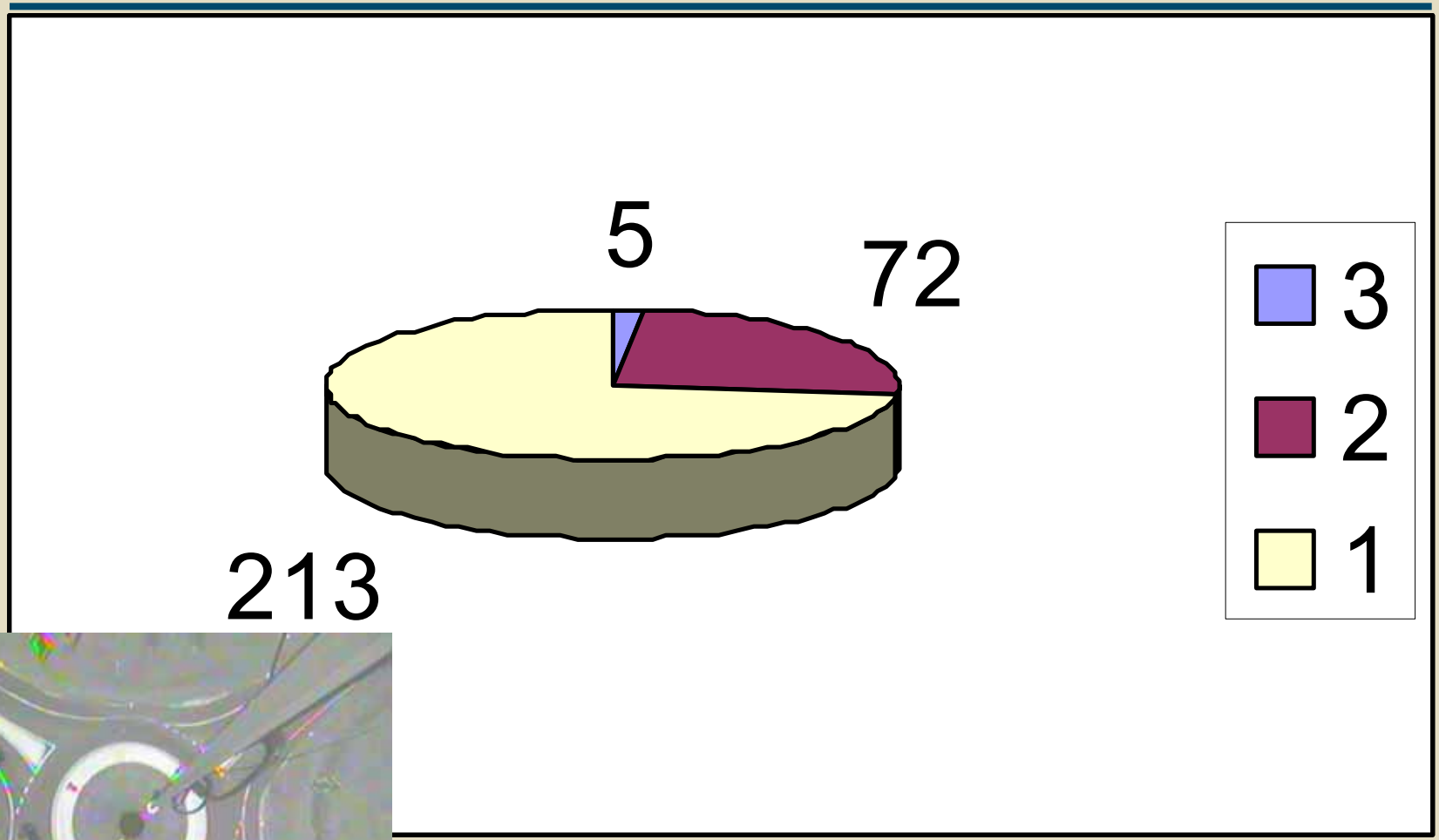
Roundabout setting

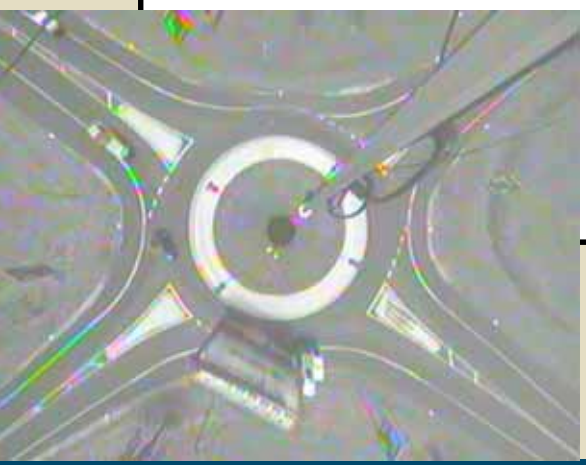


Number of approaches

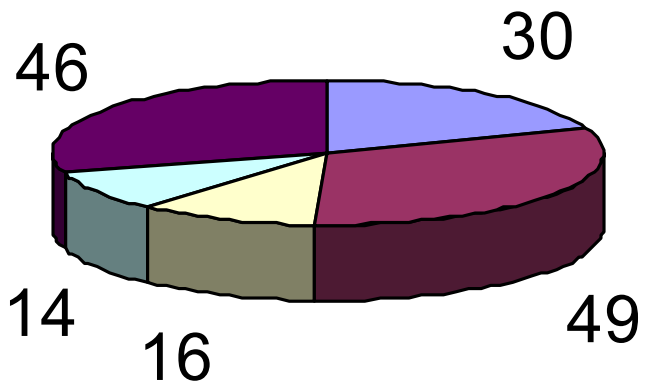


Number of lanes on circulatory roadway





Previous facility



One-way stop control

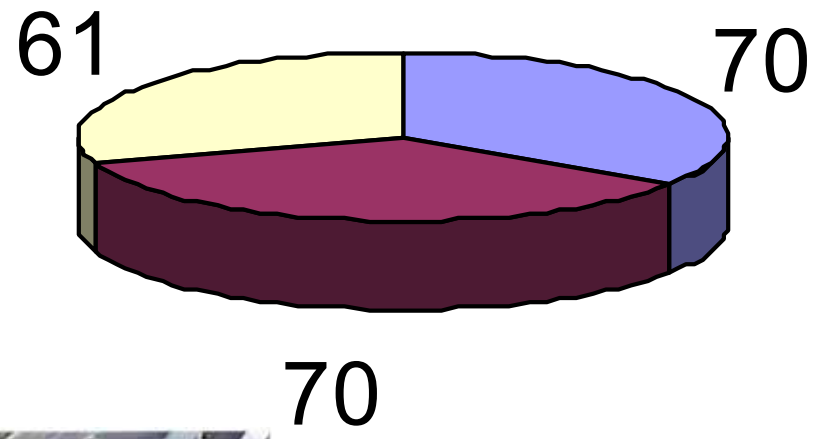
Two-way stop control

All-way stop control

Signal control

None

Year created

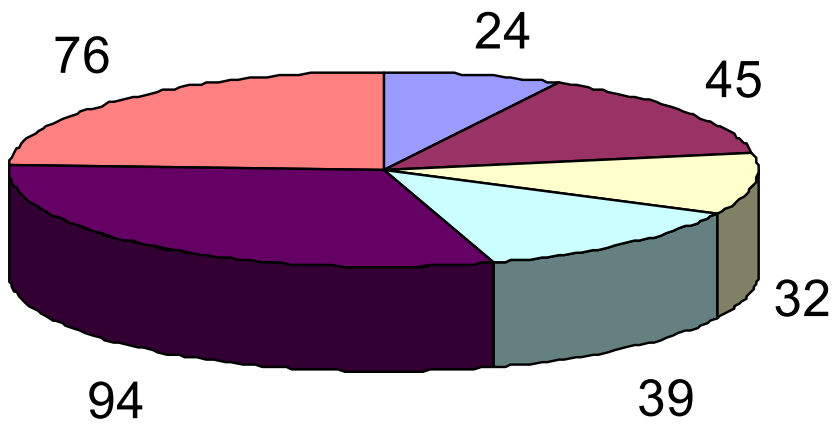


2000 or later

1995-1999

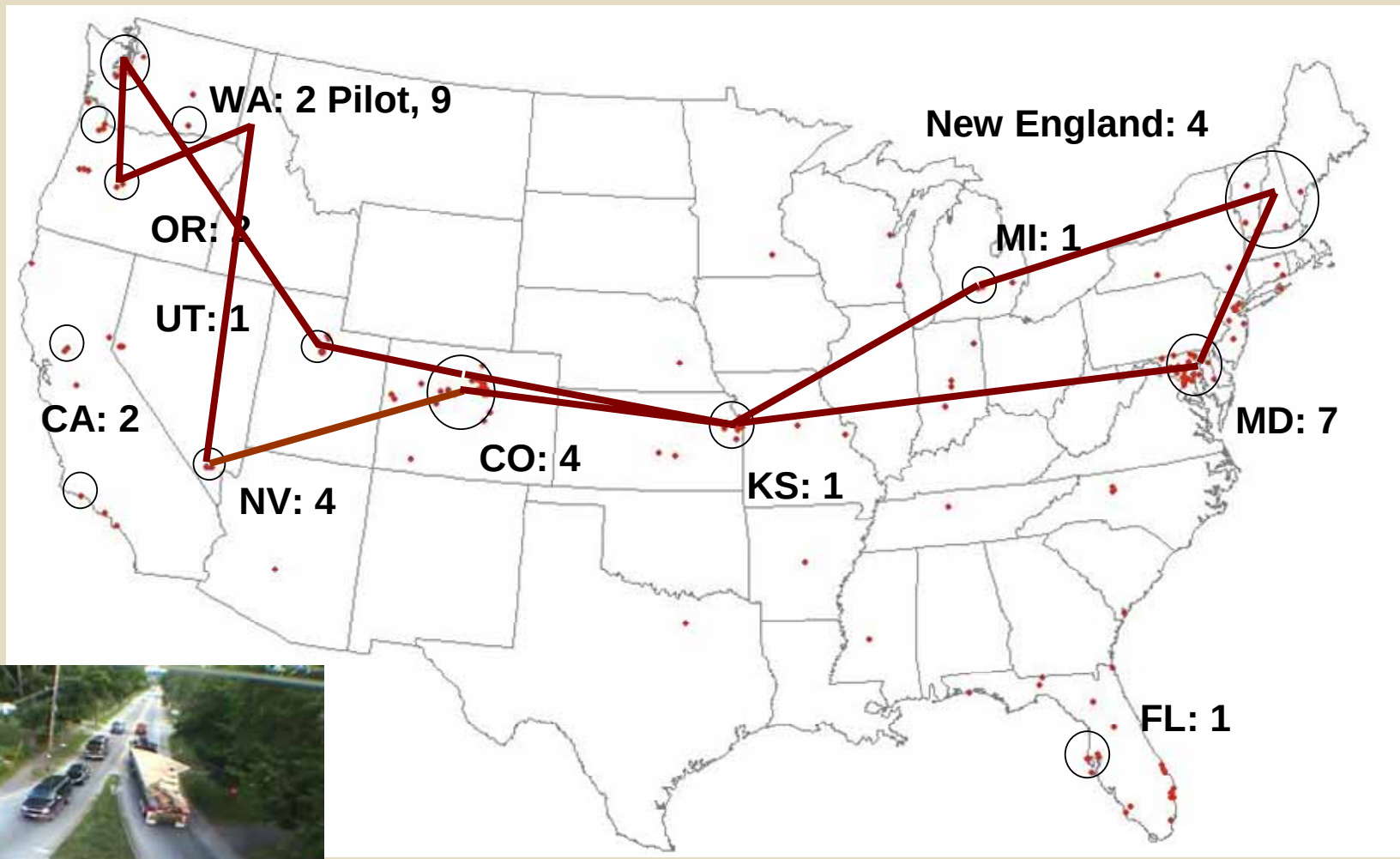
1994 or earlier

Geographic location (zip code)



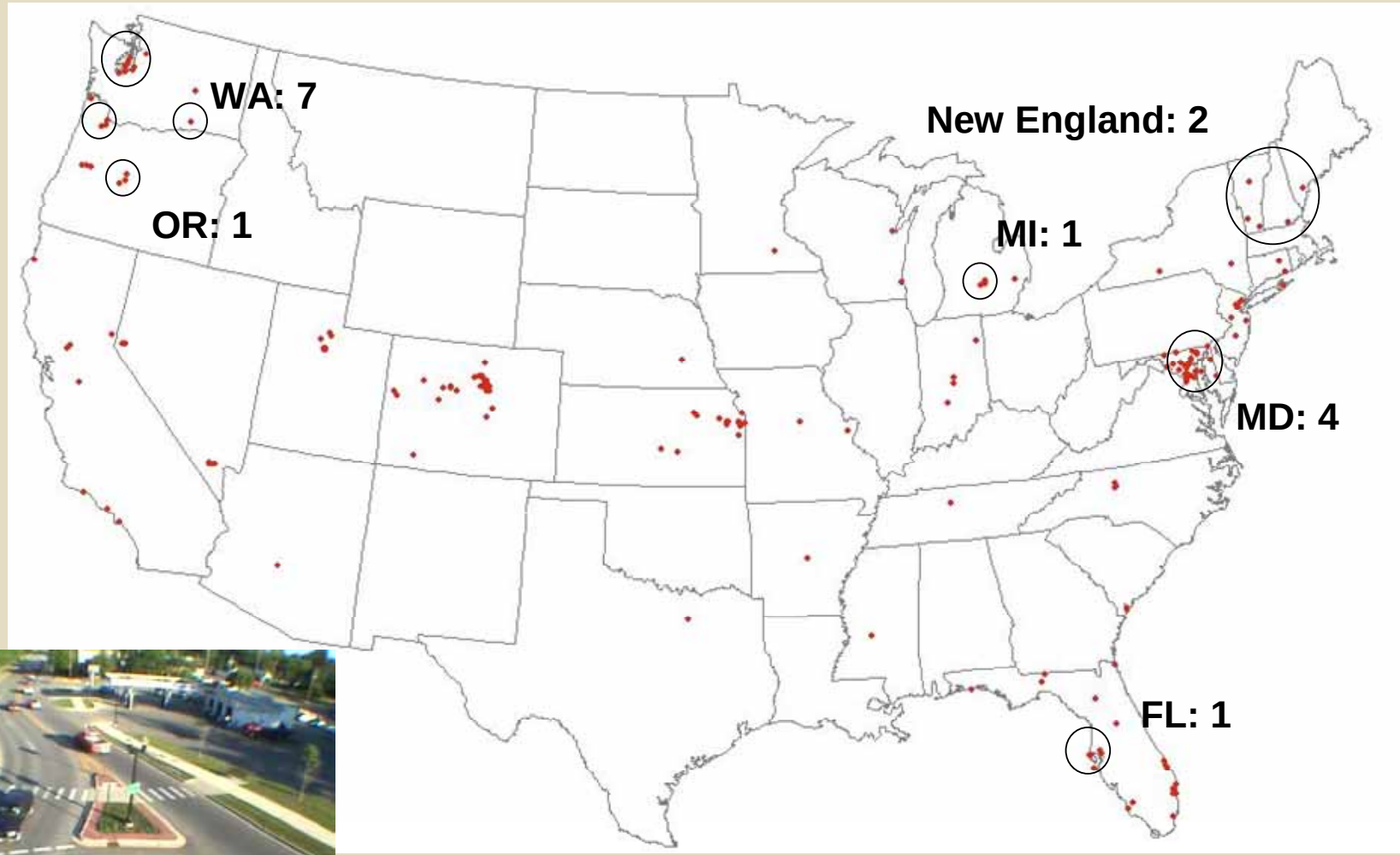
- Northeast (0,1)
- Mid-Atlantic (2)
- South, Southeast (3,7)
- Midwest (4,5,6)
- Mountain West (8)
- Pacific Coast (9)

Video data collection sites



National Roundabout Conference 2005 DRAFT

Video data collection sites - operations



Mast and camera

Mast and camera

Mast and camera

Field of view

Field of view

Example fields of view: MD06

Table 1. MD06. MD 2 at MD 408/MD 422, Lothian, Maryland

Lanes on circulatory roadway Lanes on approaches Number of approaches	1 1 4	
MD06-E1	MD06-N1	MD06-S1

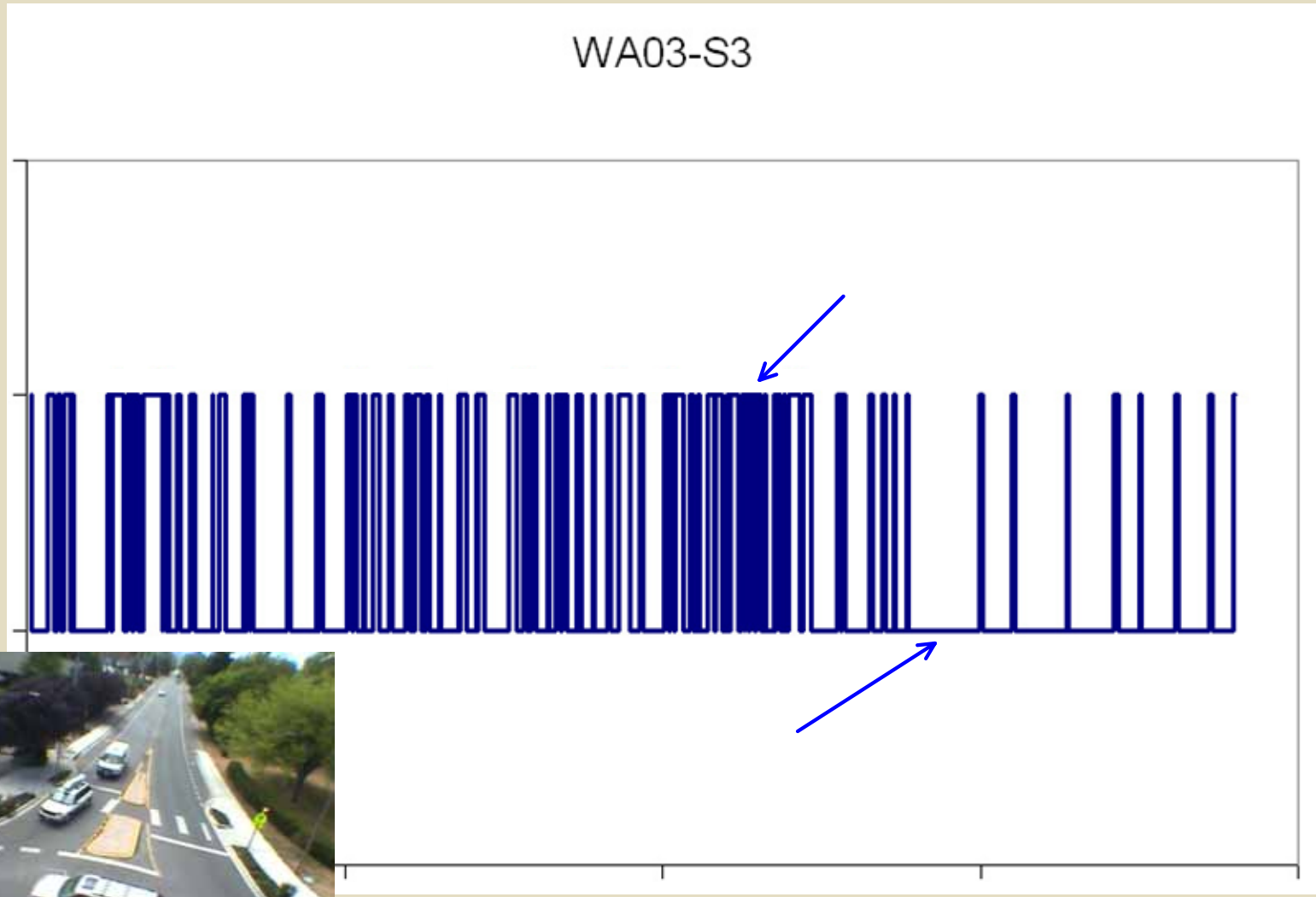
National Roundabout Conference 2005 DRAFT

Total video time, operations data set

- **One lane sites**
  - *10 sites*
  - *16 unique approaches*
  - *Video tape time: 15:53:16*
- **Two lane sites**
  - *6 sites*
  - *10 unique approaches*
  - *Video tape time: 18:30:18*

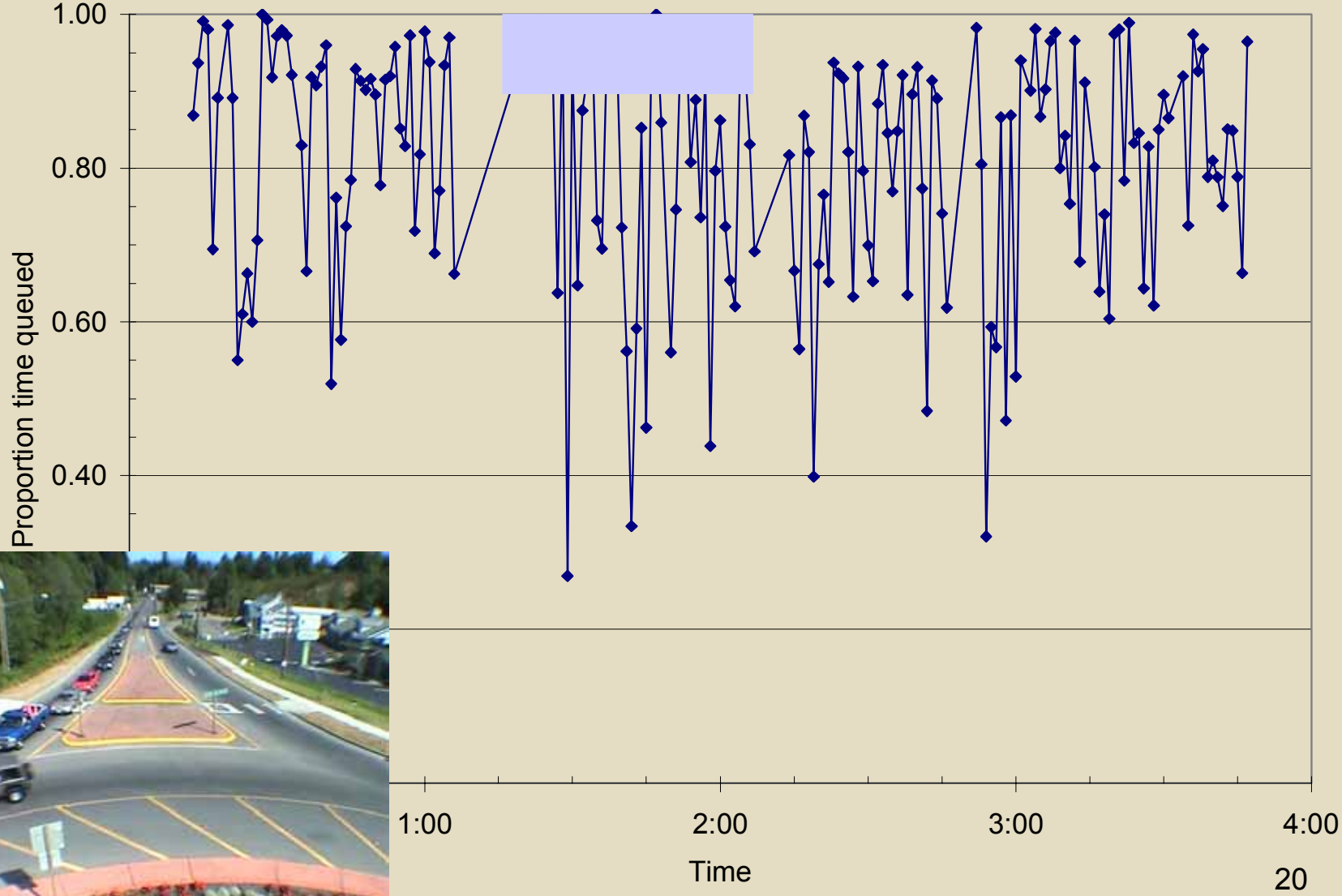
National Roundabout Conference 2005 DRAFT

Queue presence: WA03-S3



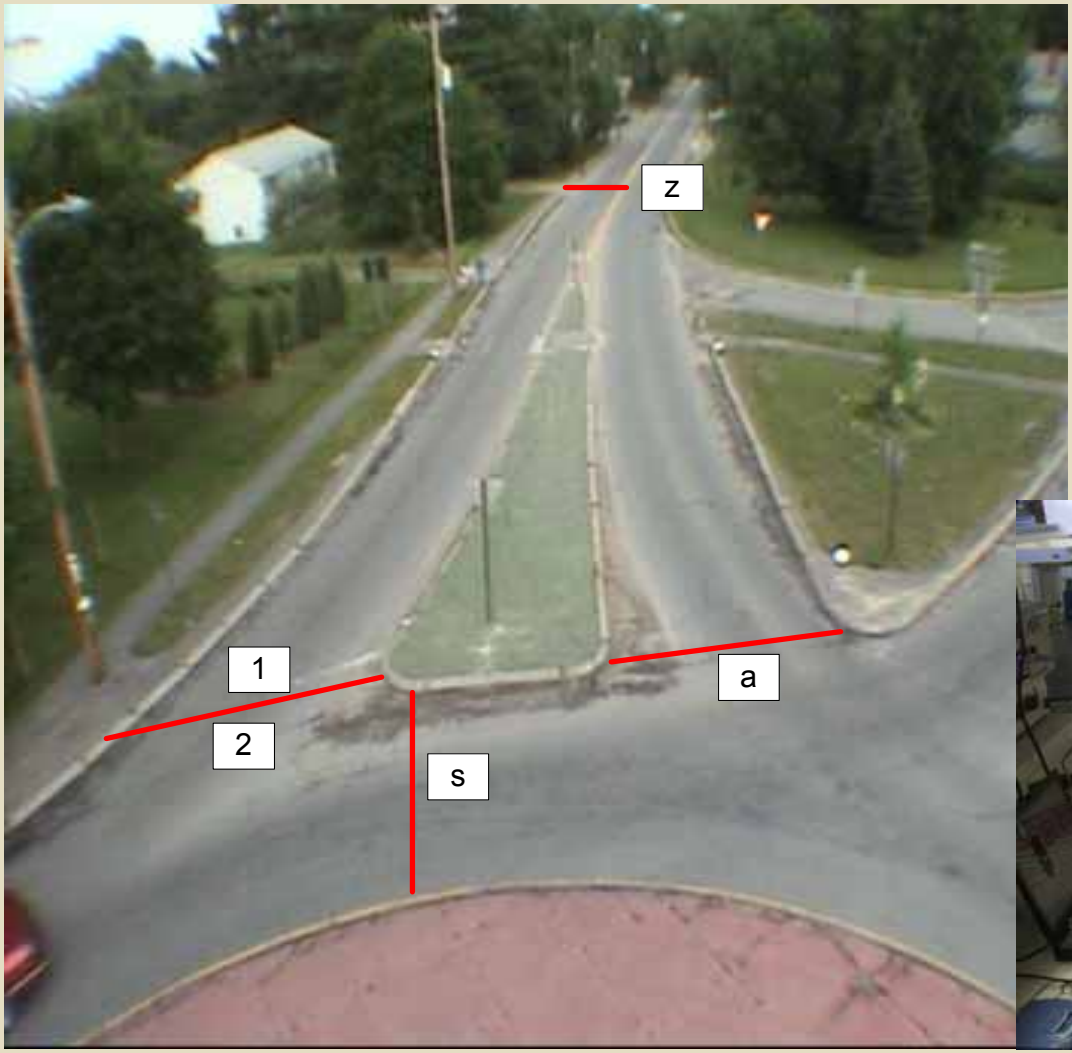
National Roundabout Conference 2005 DRAFT

Proportion time queued vs. time, WA04-N



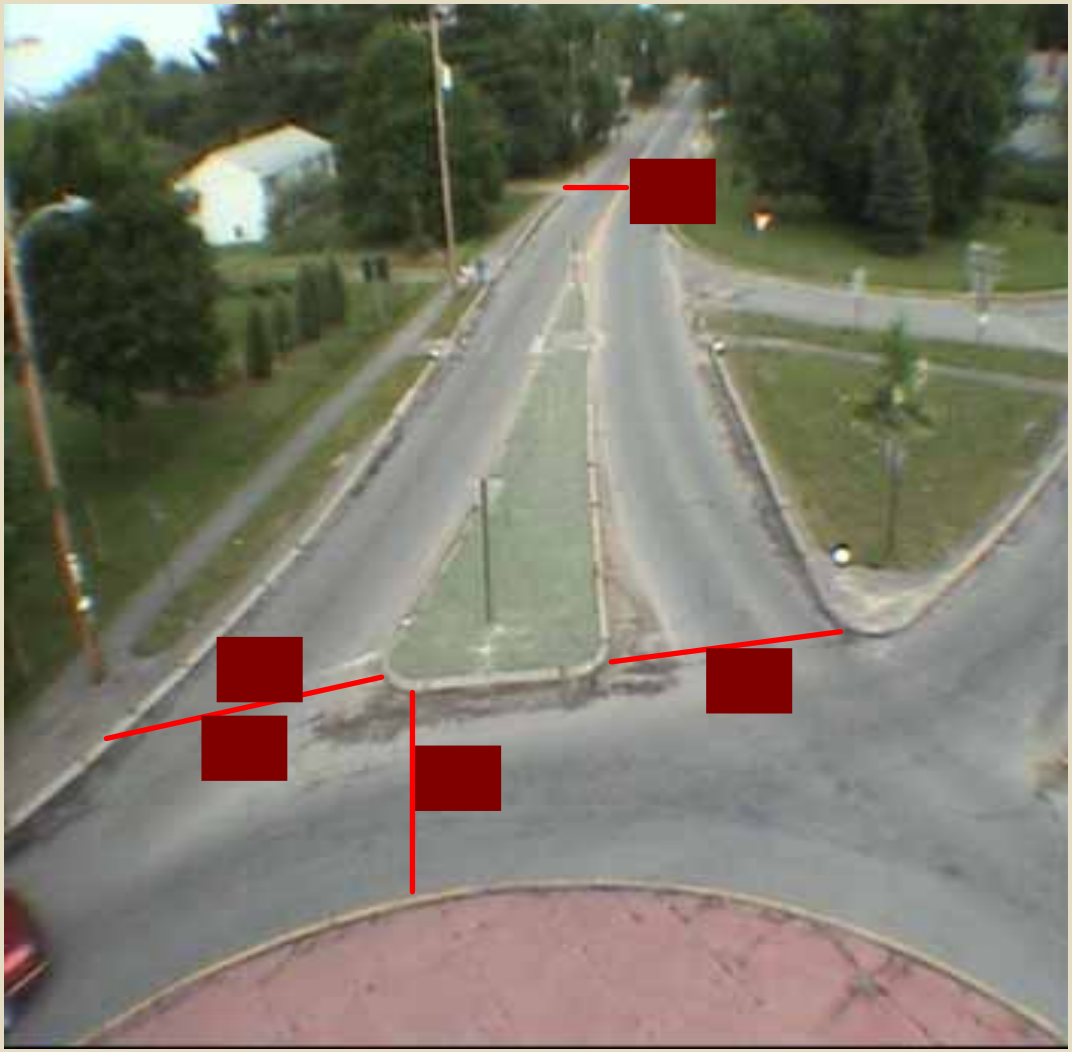
National Roundabout Conference 2005 DRAFT

Events of interest: ME01-E



National Roundabout Conference 2005 DRAFT

Events of interest: ME01-E



Events recorded:

z - upstream point

1 - first in queue point

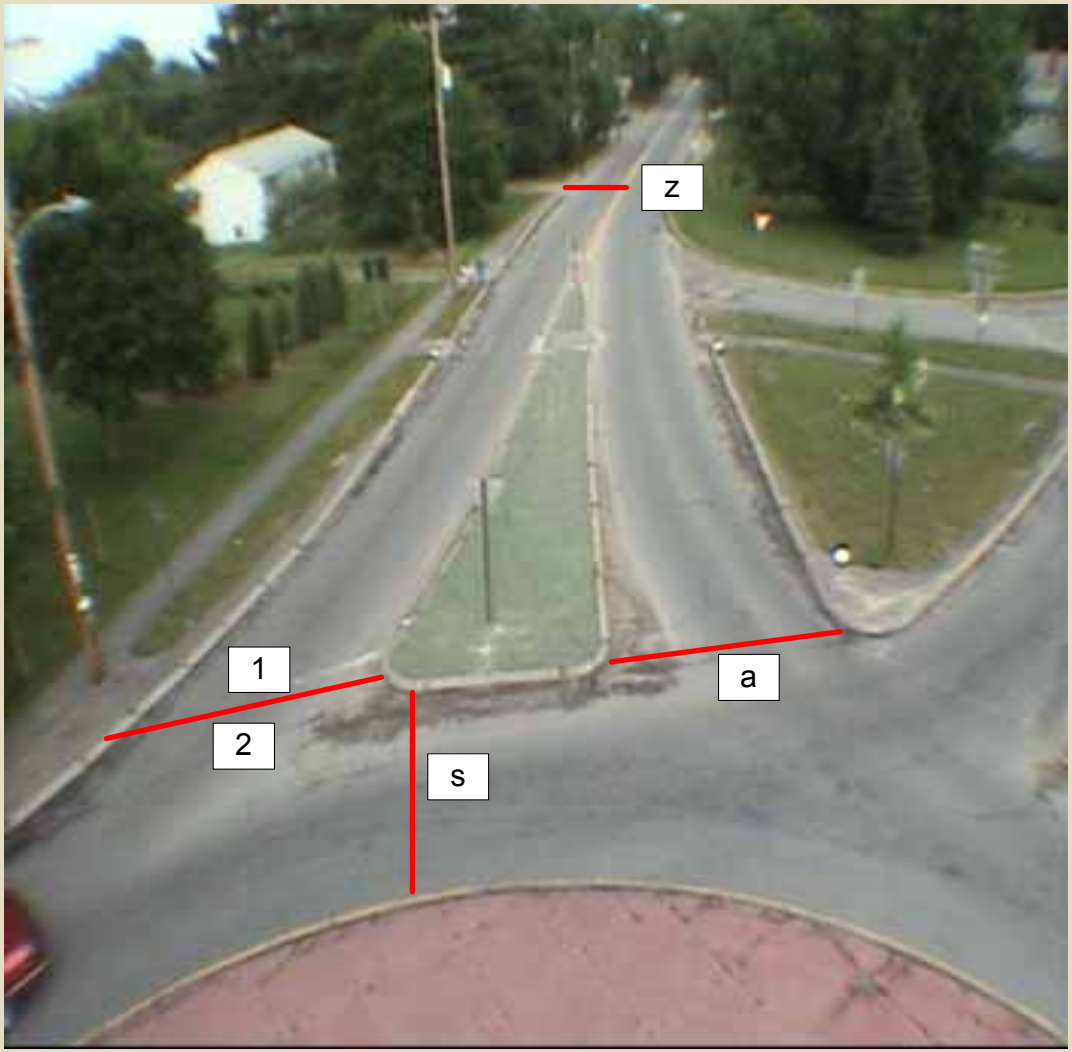
2 - entry point

s - conflict point

a - exit point

National Roundabout Conference 2005 DRAFT

Parameters: ME01-E



Parameters:

(1-minute summaries)

Entry flow

Exit flow

Circulating flow

Service time

Move up time

Percent time queued

National Roundabout Conference 2005 DRAFT

Events of interest: ME01-E

Parameters:

(1-minute summaries)

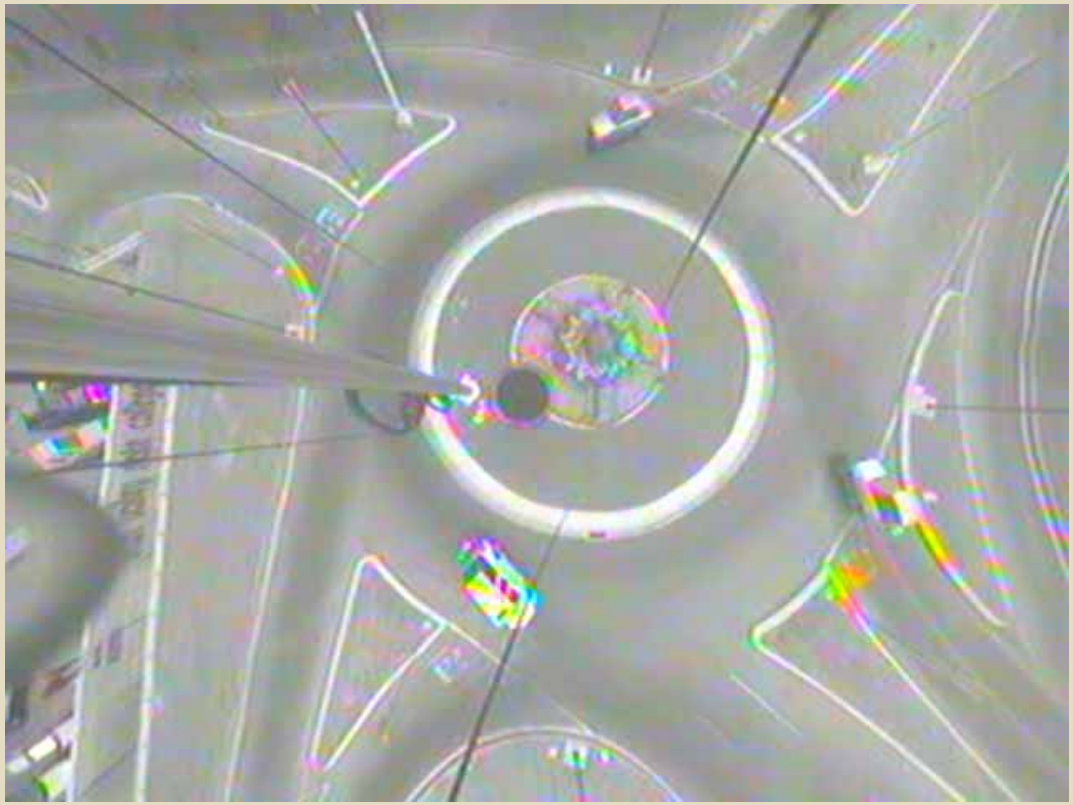
Delay

$z \rightarrow 2$

[difference between measured and free flow travel times]

National Roundabout Conference 2005 DRAFT

Events of interest: UT02



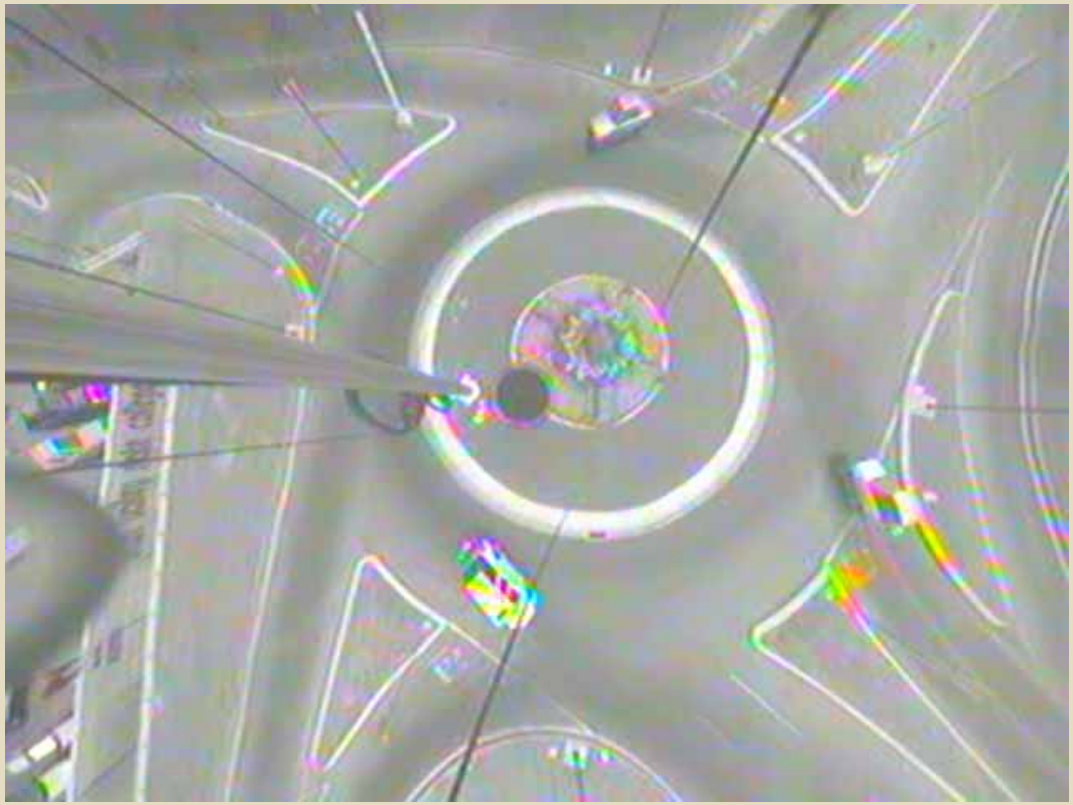
Parameters:

Turning movements

Travel times

National Roundabout Conference 2005 DRAFT

Events of interest: UT02



Parameters:

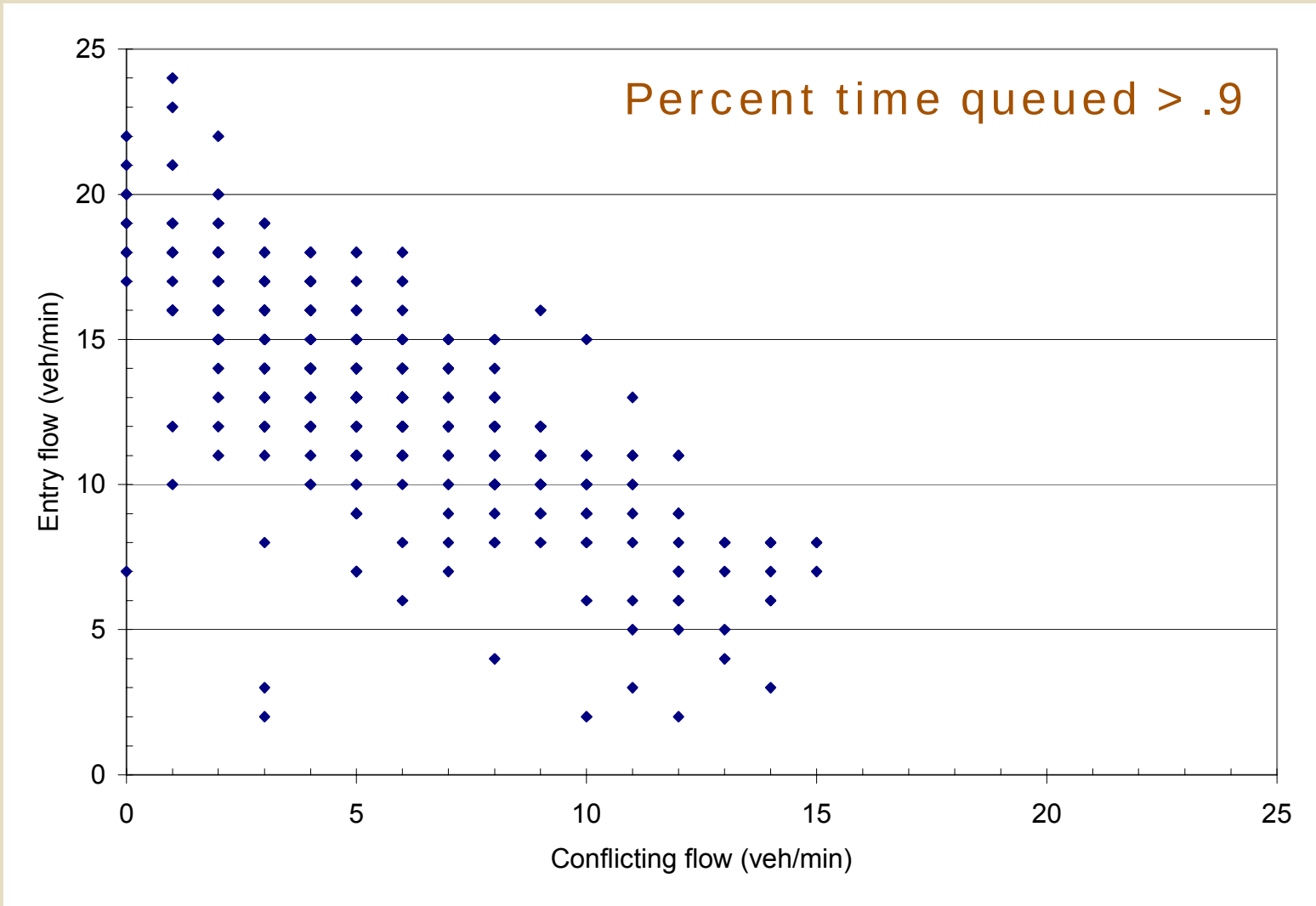
Accepted gaps

Rejected gaps

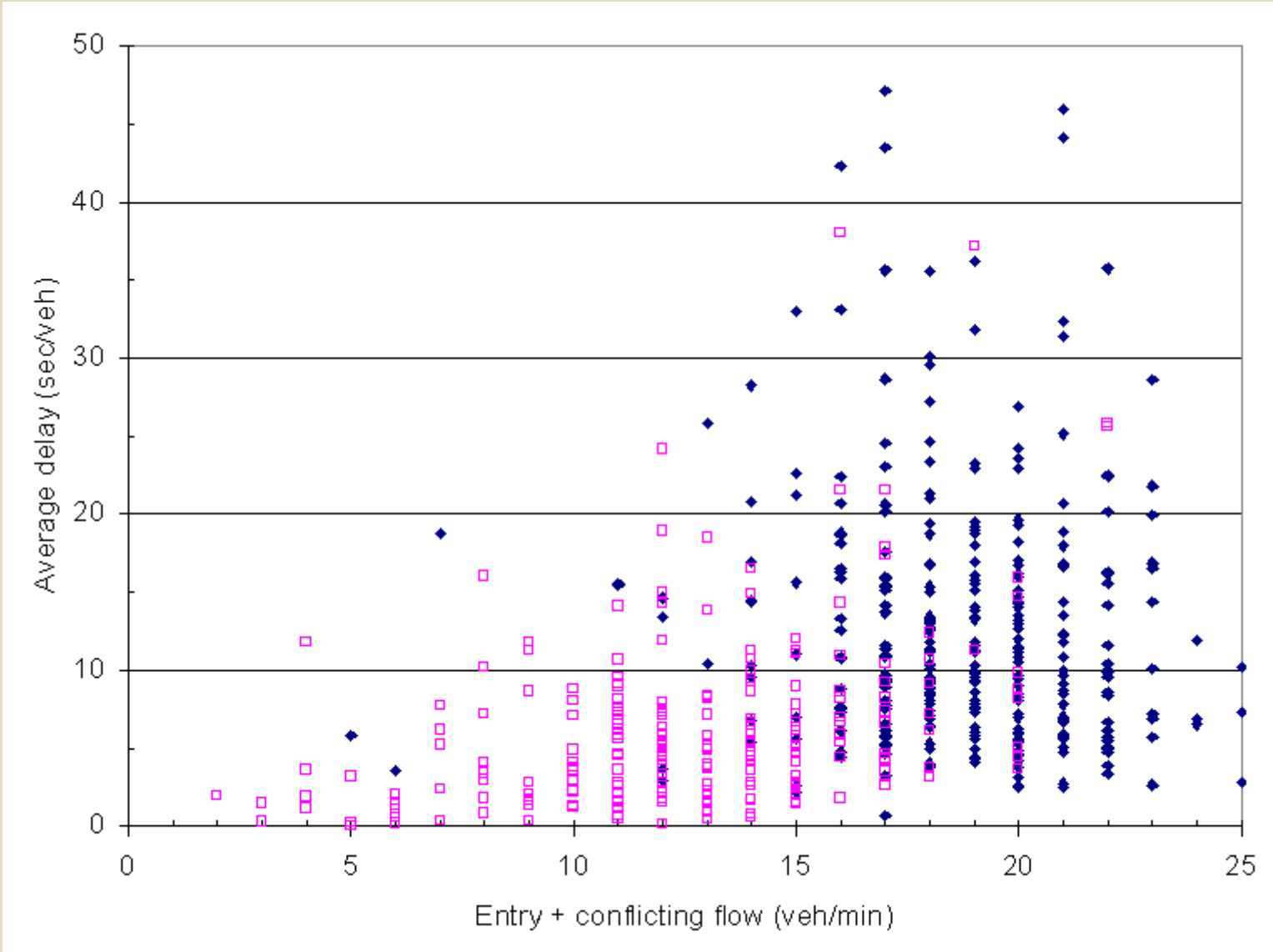
Follow up times

National Roundabout Conference 2005 DRAFT

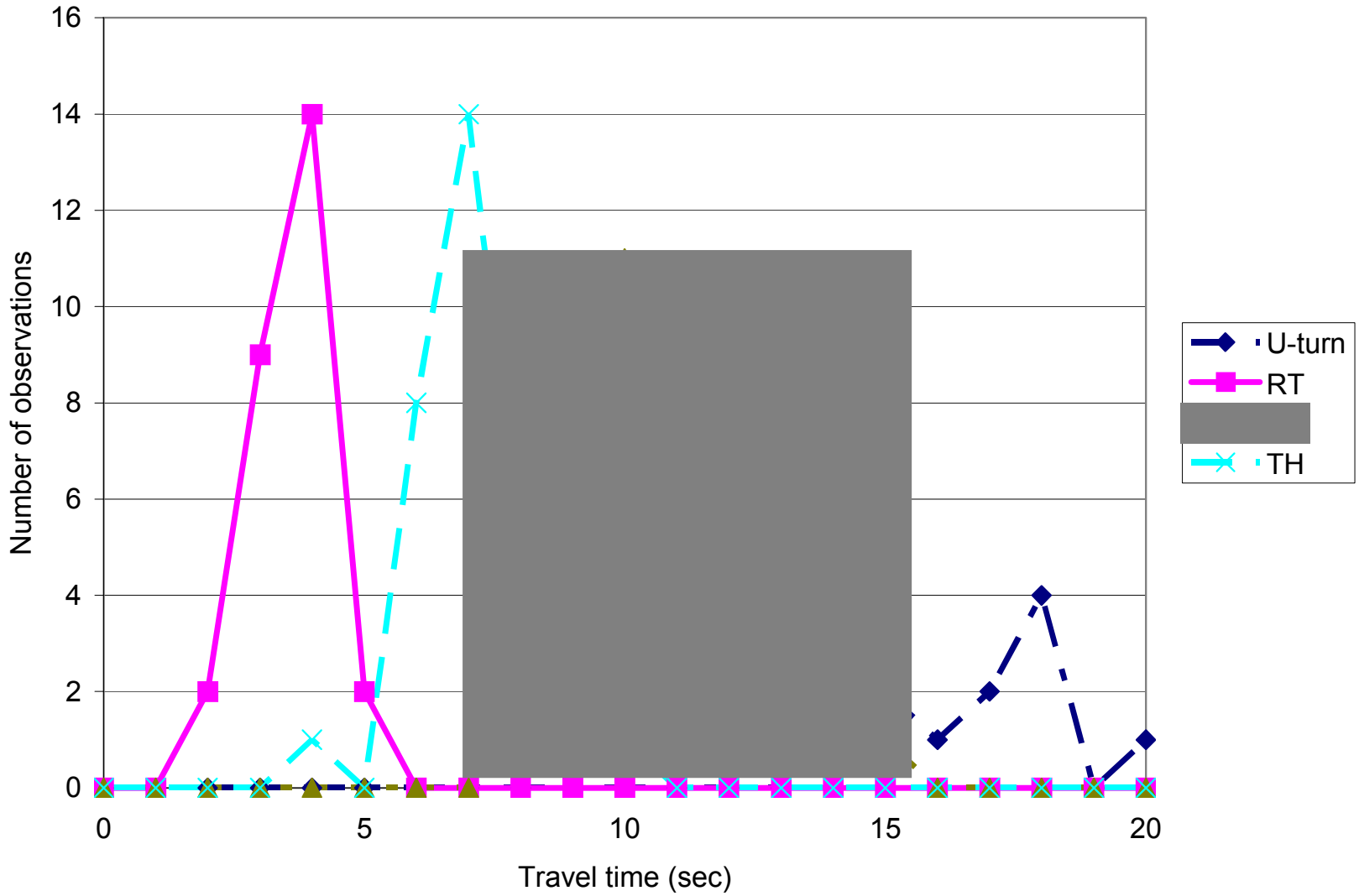
Operations data set highlights – one lane sites



Operations data set highlights – one lane sites



Operations data set highlights – one lane sites



National Roundabout Conference 2005 DRAFT

Operations data set highlights – one lane sites

- **Gap sequences**
  - *Accepted lag*
    - 8282
  - *Rejected lag followed by accepted gap*
    - 1318
  - *Rejected lag, followed by one or more rejected gaps, followed by accepted gap*
    - 1151

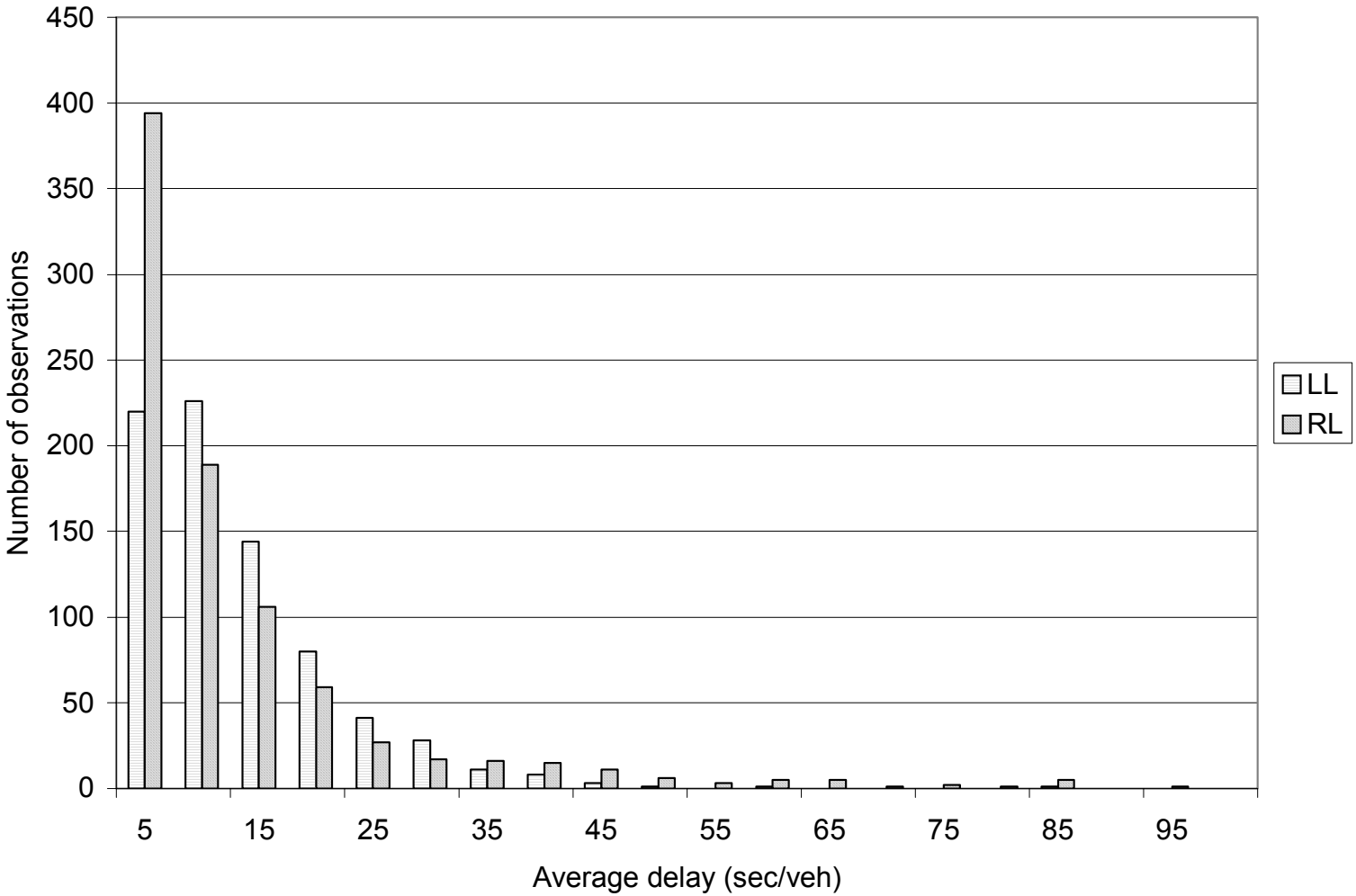
National Roundabout Conference 2005 DRAFT

Operations data set highlights – two lane sites

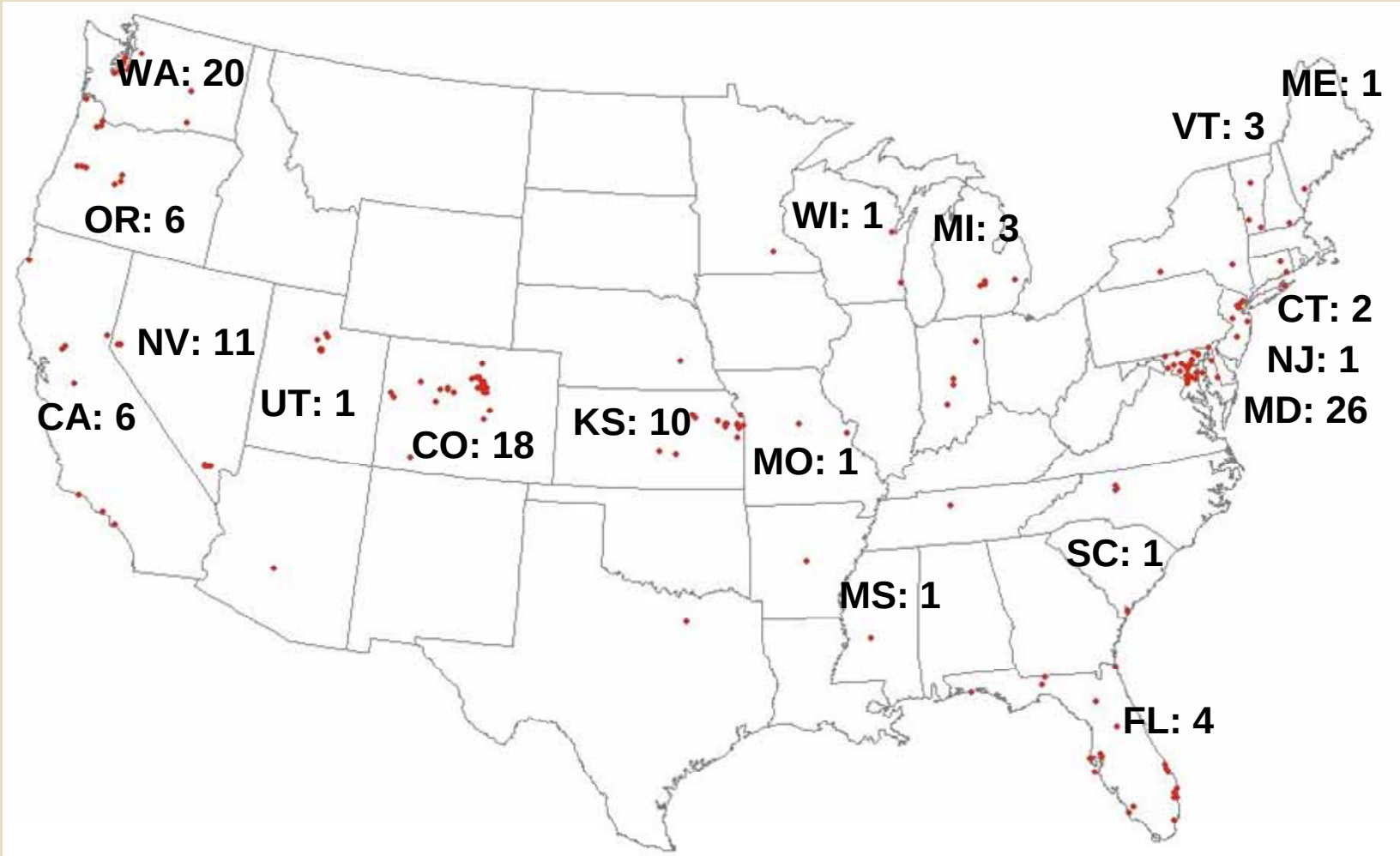
Flow rate (veh/min)	Number of observations		
	Entry flow		Conflicting flow
	Left lane	Right lane	
5	434	350	148
10	257	368	324
15	74	174	269
20	7	13	78
25	0	0	21
30	0	0	29
35	0	0	19
40	0	0	11
45	0	0	4
50	0	0	2
55	0	0	0
60	0	0	0

National Roundabout Conference 2005 DRAFT

Operations data set highlights – two lane sites



Safety data collection sites



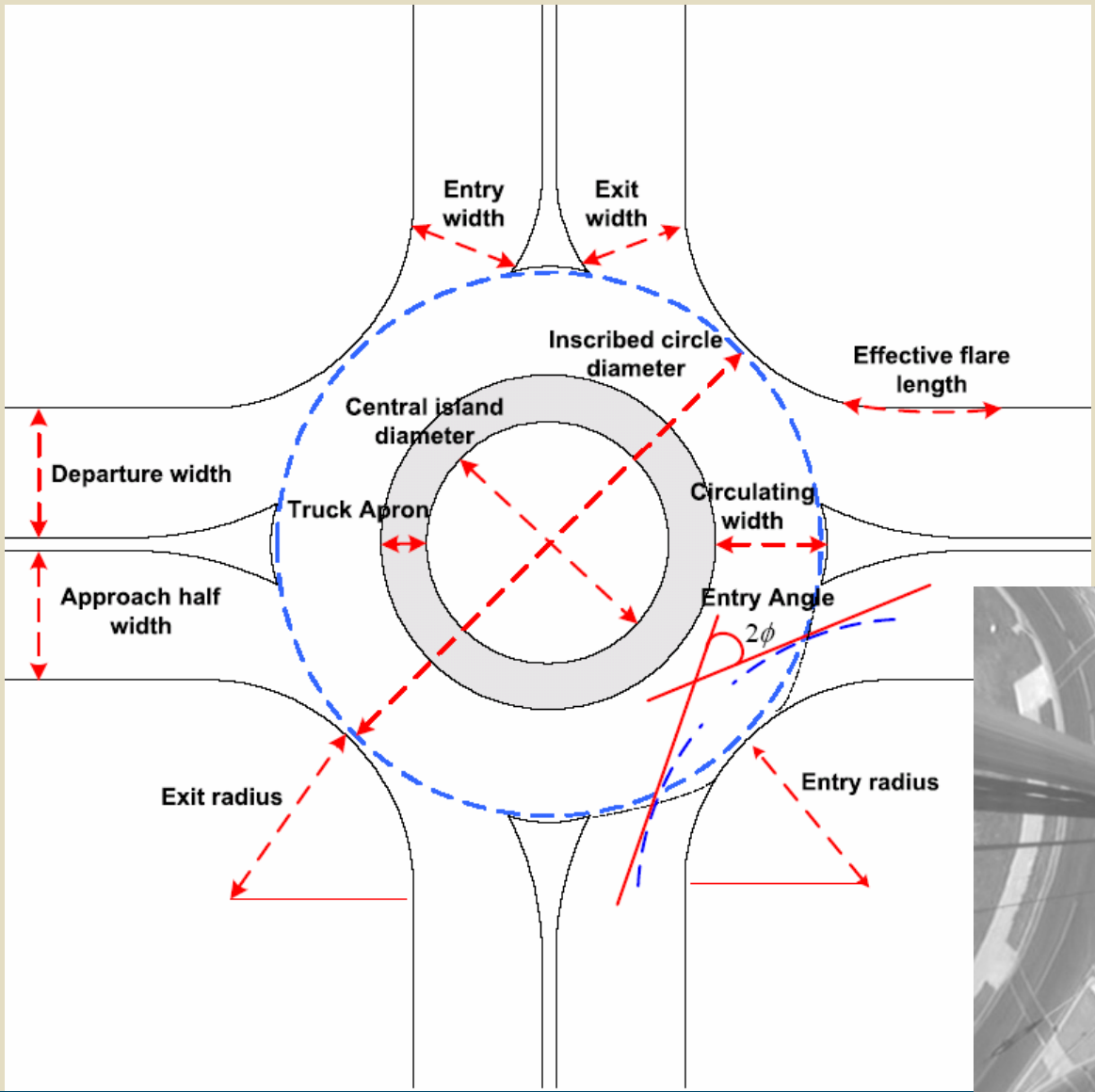
National Roundabout Conference 2005 DRAFT

Safety data collection - overview

Crash Data	Number of sites
Intersection Crash Data Collected	**117**
Approach-Specific Crash Data Collected	**55**
Approach Data Collected/Extracted	
•Geometric Data Collected	**133**
•Geometric Data Extracted	**93**
•Video Data Collected/Received	**38**
•Operational Data Extracted	**16**
•Speed Data Collected	**34**

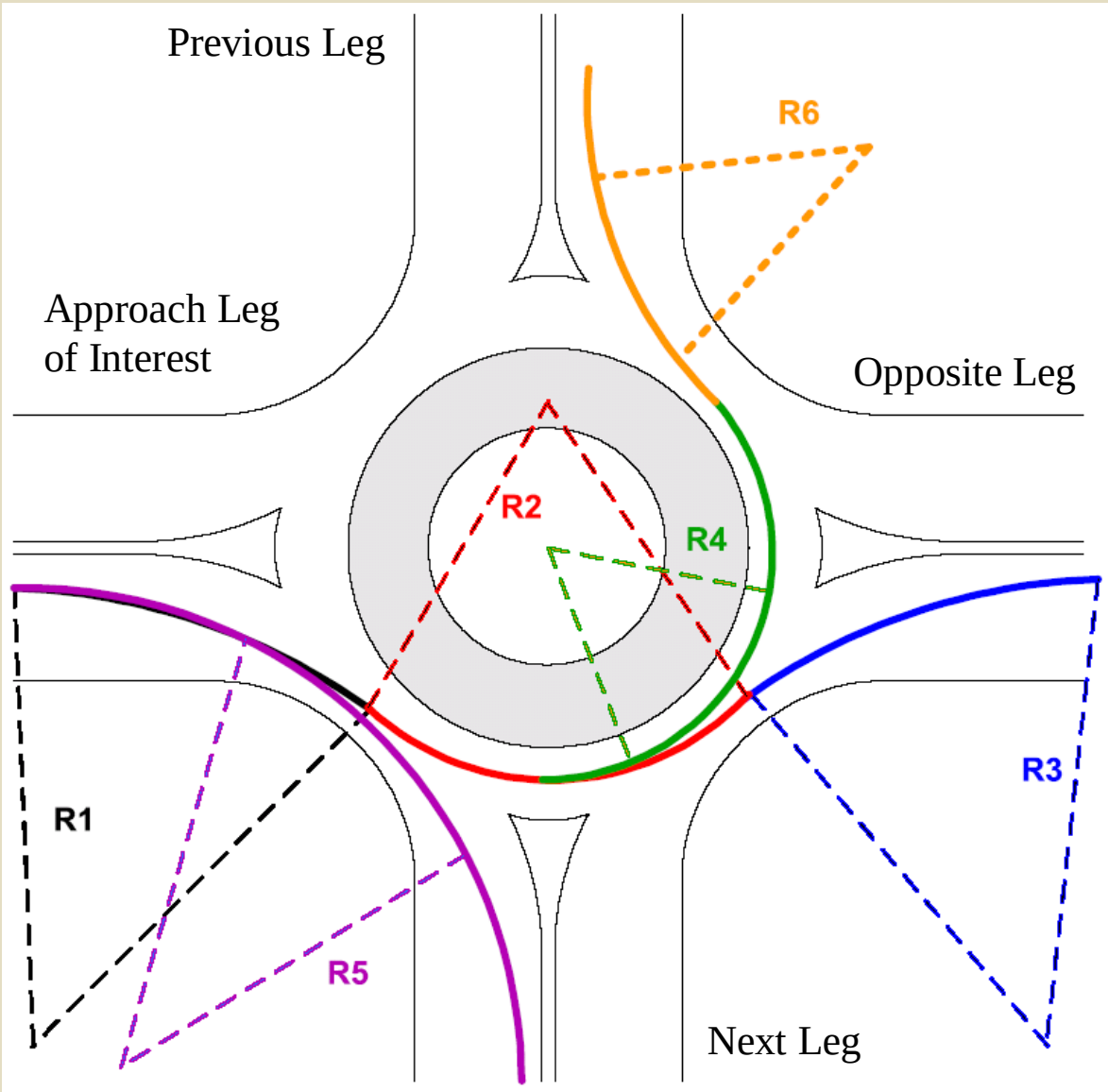
National Roundabout Conference 2005 DRAFT

Geometric data collection - overview



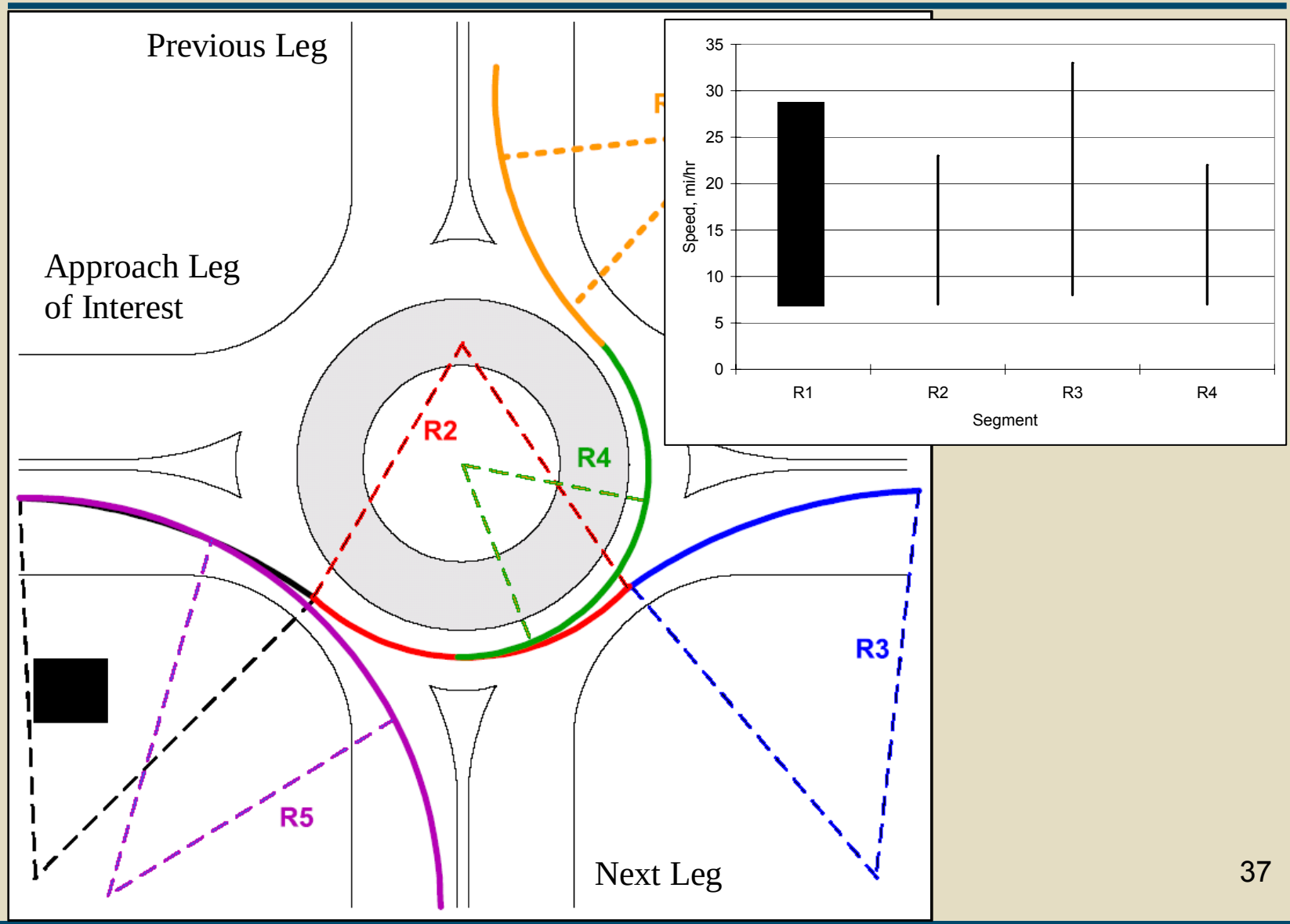
National Roundabout Conference 2005 DRAFT

Geometric data collection - overview



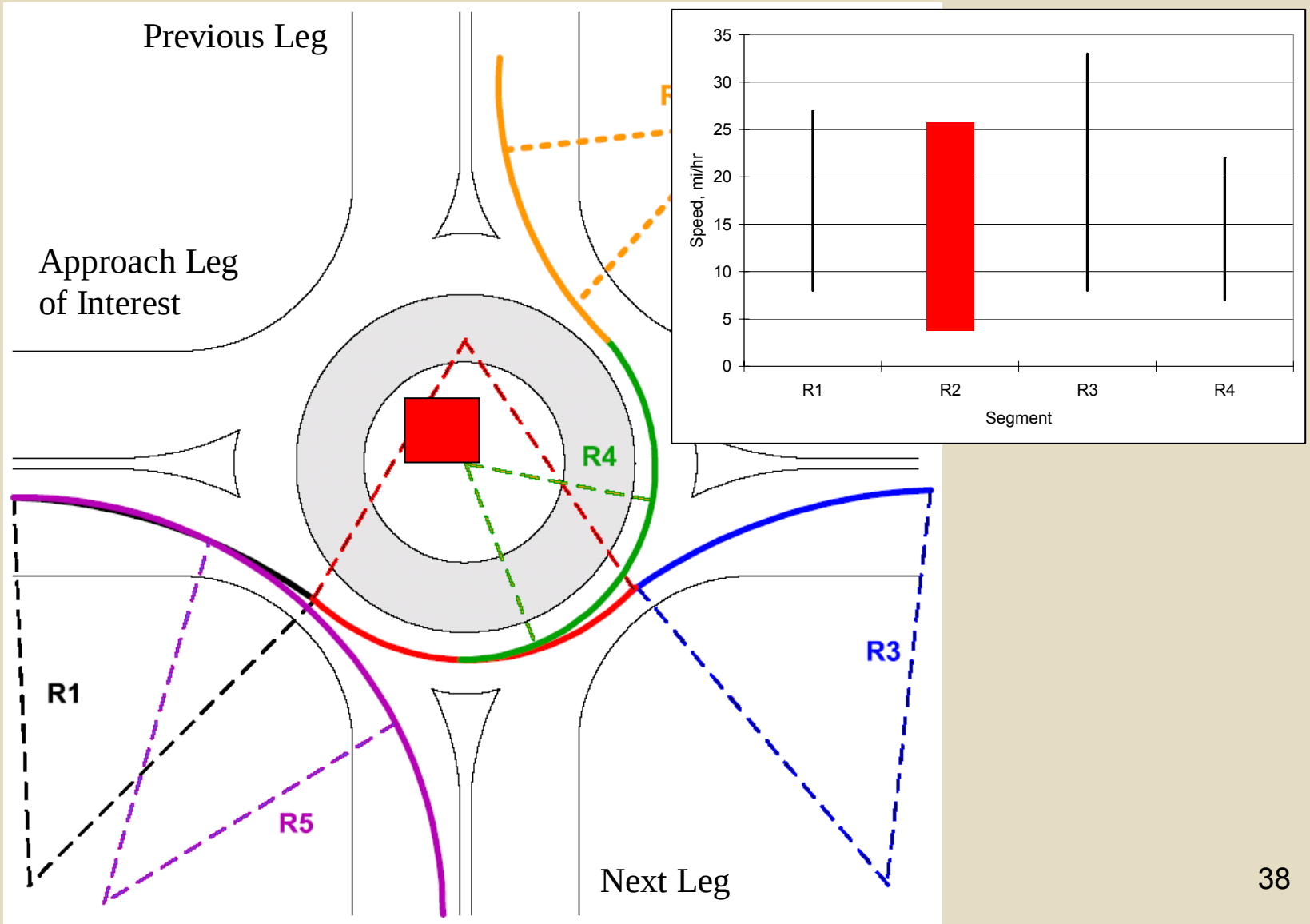
National Roundabout Conference 2005 DRAFT

Speed data collection - overview



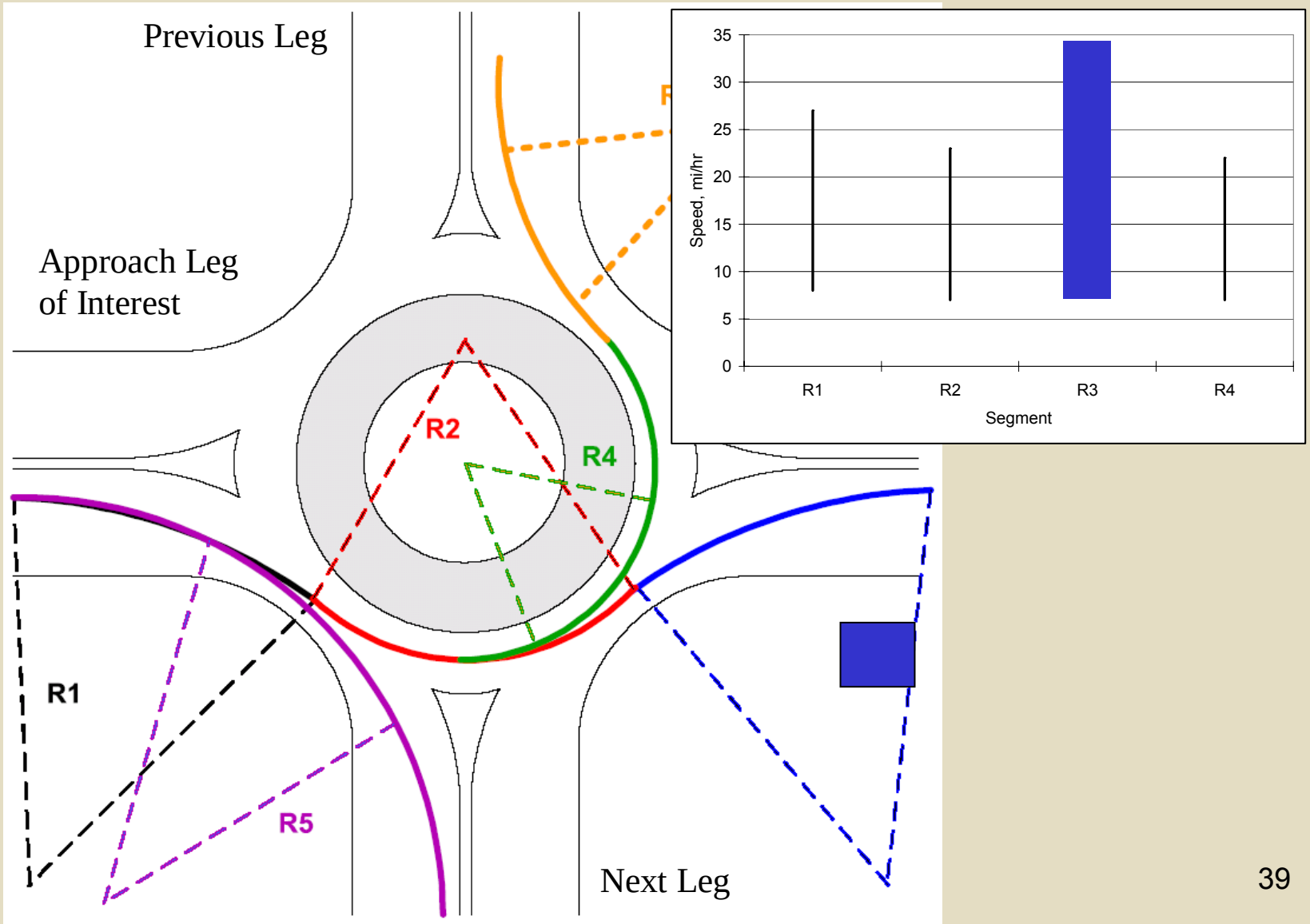
National Roundabout Conference 2005 DRAFT

Speed data collection - overview



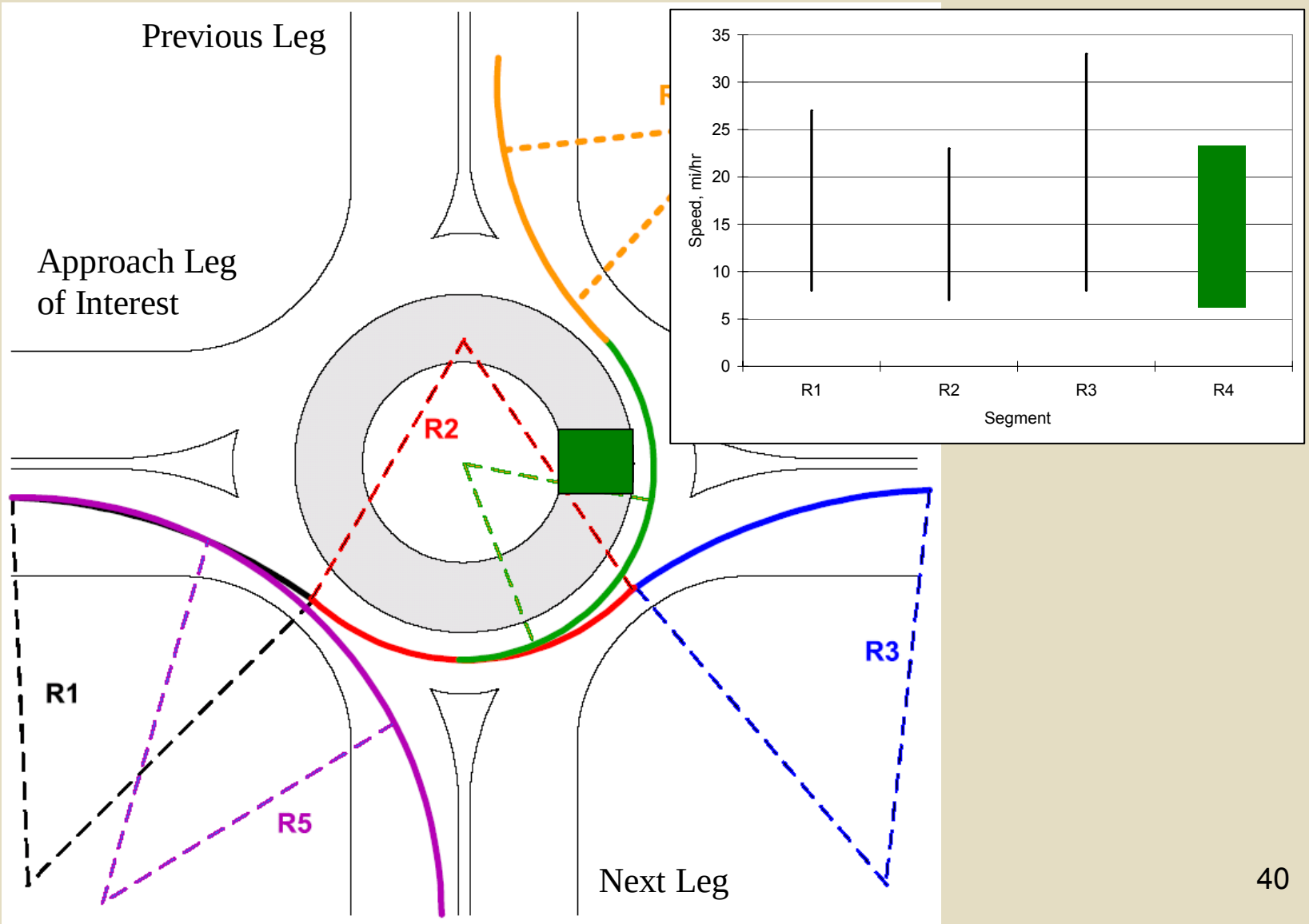
National Roundabout Conference 2005 DRAFT

Speed data collection - overview



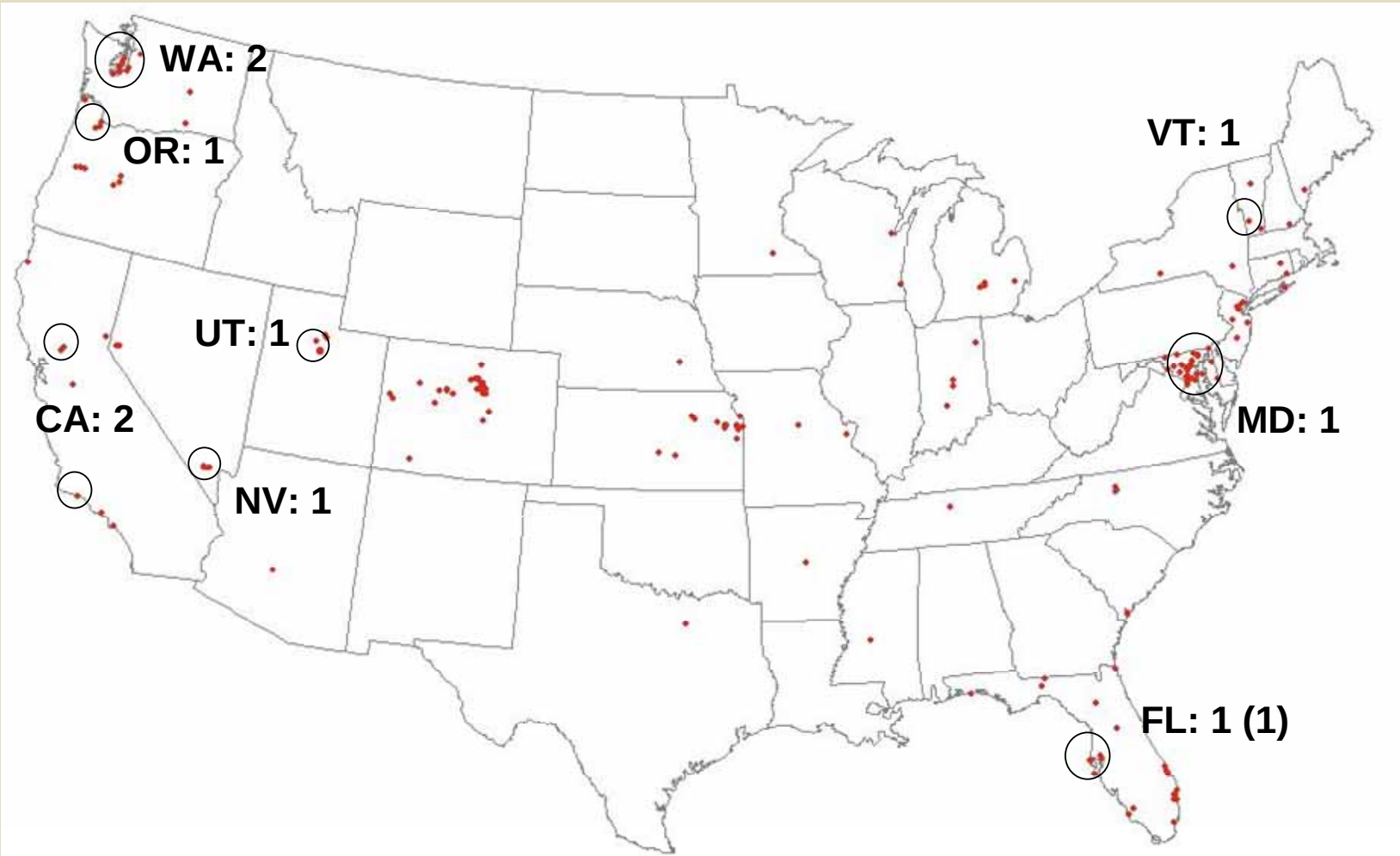
National Roundabout Conference 2005 DRAFT

Speed data collection - overview



National Roundabout Conference 2005 DRAFT

Video data collection: Bicycles/pedestrians



And now for the details...

National Roundabout Conference 2005 DRAFT