



SHRP 2 Naturalistic Driving Study

Assessing the Needs of Roadway Information Database Users

Today's Presenters



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SHRP 2 Naturalistic Driving Study-- Assessing the Needs of Roadway Information Database Users

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SHRP 2 Naturalistic Driving Study-- Assessing the Needs of Roadway Information Database Users

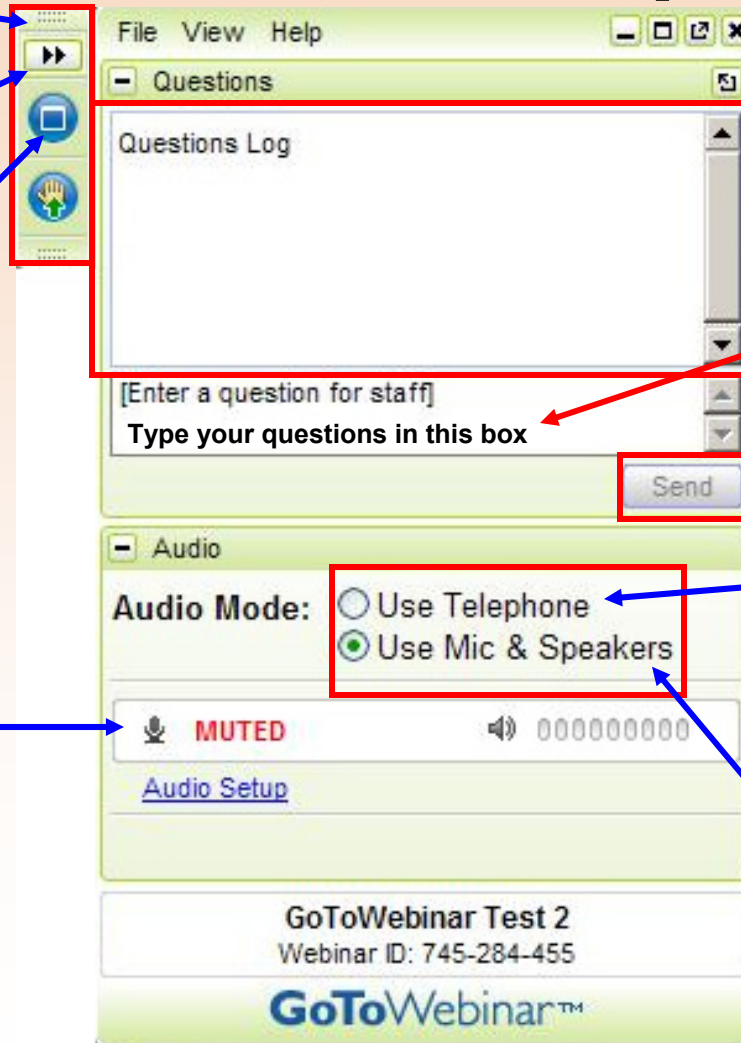
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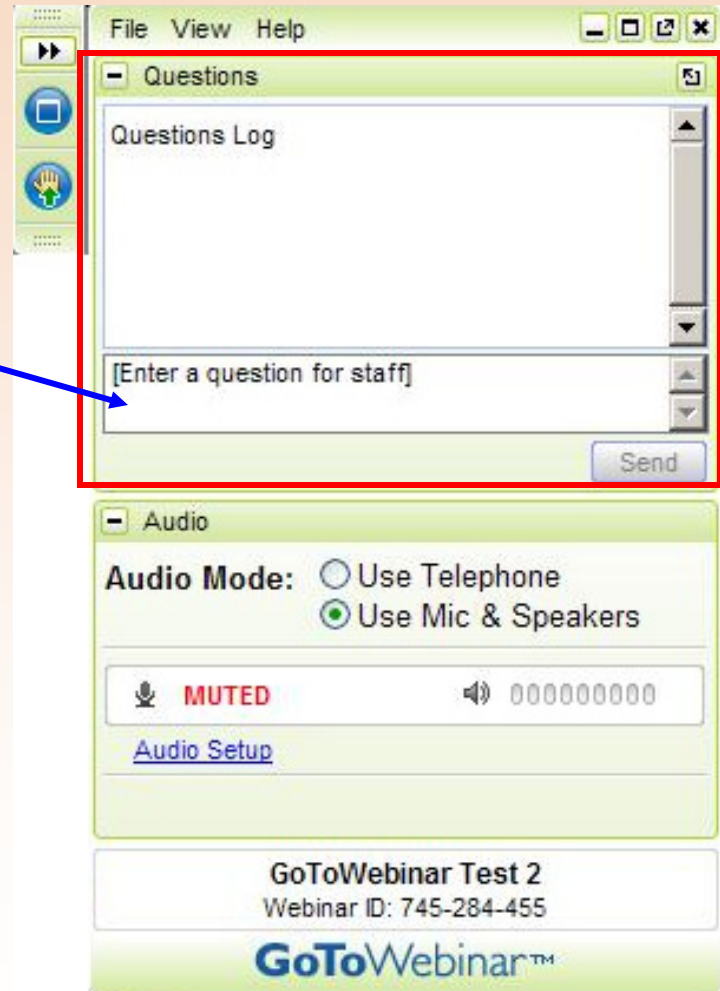
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Thank you for joining the webinar!

www.TRB.org/SHRP2

<http://www.surveymonkey.com/s/shrp04a>

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SHRP 2 Naturalistic Driving Study

Assessing the Needs of Roadway Information Database Users

Charles Fay Sr. Program Officer, SHRP 2



—Overview SHRP2 Program

—SHRP2 Naturalistic Driving Study

—Project So₄A Team: Roadway Information Database



SHRP 2 Program

- Authorized by Congress \$170 million; 7year
- Targeted, short-term program of strategic highway research
- Administered by TRB under MOU with FHWA and AASHTO
 - Integrates multiple disciplines to address critical needs in 4 areas



SHRP 2 Program





SHRP 2 Governance

Oversight Committee

Overall program responsibility

Technical Coordinating Committees

One for each strategic focus area

Work plan development, research monitoring

Expert Task Groups

One for each group of related contracts

RFP preparation, proposal review

Assist TCC with review of deliverables

In total to date: 40+ committees, 400+ members



SHRP 2 Safety Research Program

Naturalistic Driving Study and Complementary Roadway Database





SHRP 2 Safety Research Program GOAL

Greatly increased knowledge of *driver behavior*

How the driver interacts with and adapts to the vehicle, roadway characteristics, traffic environment, traffic controls, weather, etc.

Differences in *crash risk* associated with these interactions
Proposed countermeasures based on the findings



Naturalistic Driving Study

To achieve these goals – naturalistic driving study (NDS)

Instrumented vehicles: continuous recording of video and sensor data

Driver assessment tests for primary drivers

Detailed crash investigations for selected crashes

Roadway/roadside characteristics and features from mobile data collection vans and external sources

NDS + Roadway Data anticipated to be > 1 petabyte of data



Naturalistic Driving Study

~ 2000 instrumentation packages (DAS) operating over 2 years

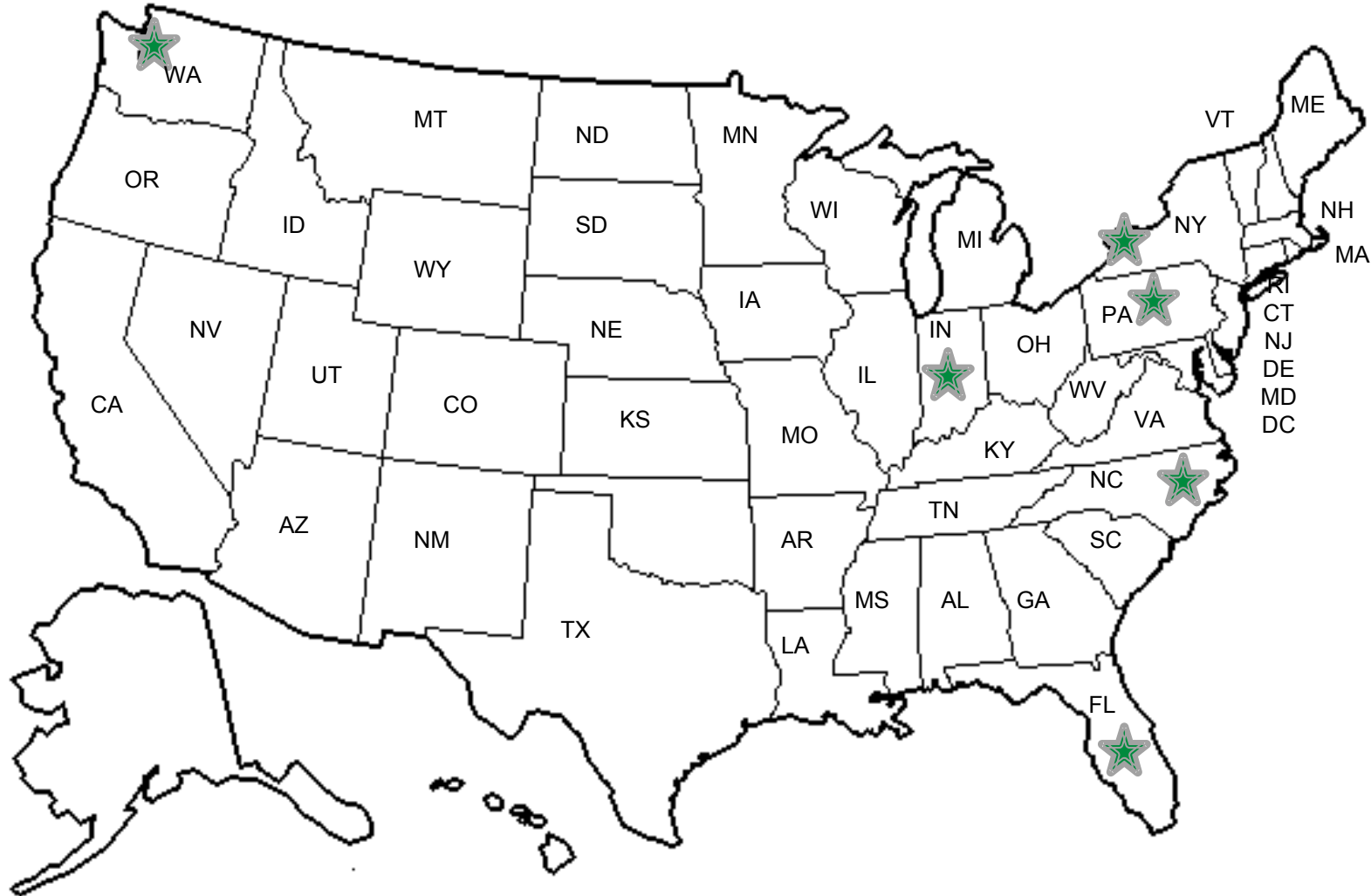
~ 3100 participants

6 sites

Passenger cars, vans, SUVs, pick ups

Naturalistic Driving Study (NDS)

Seattle, WA, Erie County, NY, Central PA, Bloomington, IN, Raleigh-Durham, NC, Tampa Bay, FL



Data Acquisition System (DAS)

- Multiple Videos
 - Algorithm: Head Pose Monitor
 - Algorithm: Lane Tracker
 - Algorithm: Driver ID
- Accelerometer Data (3 axis)
- Rate Sensors (3 axis)
- GPS
 - Latitude, Longitude, Elevation, Time, Velocity
- Forward Radar
 - X and Y positions
 - X and Y velocities
- Cell Phone
 - ACN, health checks, location notification
 - Health checks, remote upgrades
- Illuminance sensor
- Passive alcohol sensor
- Incident push button
- Video
- Audio (only on incident push button)
- Turn signals
- Vehicle network data
 - Accelerator
 - Brake pedal activation
 - ABS
 - Gear position
 - Steering wheel angle
 - Speed
 - Horn
 - Seat Belt Information
 - Airbag deployment
 - Many more variables...

Project So4: Acquisition of Roadway Information

So4A: Roadway Information Database Developer, Technical Coordination, Quality Assurance for Mobile Data Collection

\$1.0 million

Start date: 5/4/2010

So4B: Mobile Data Collection

\$3.5 million

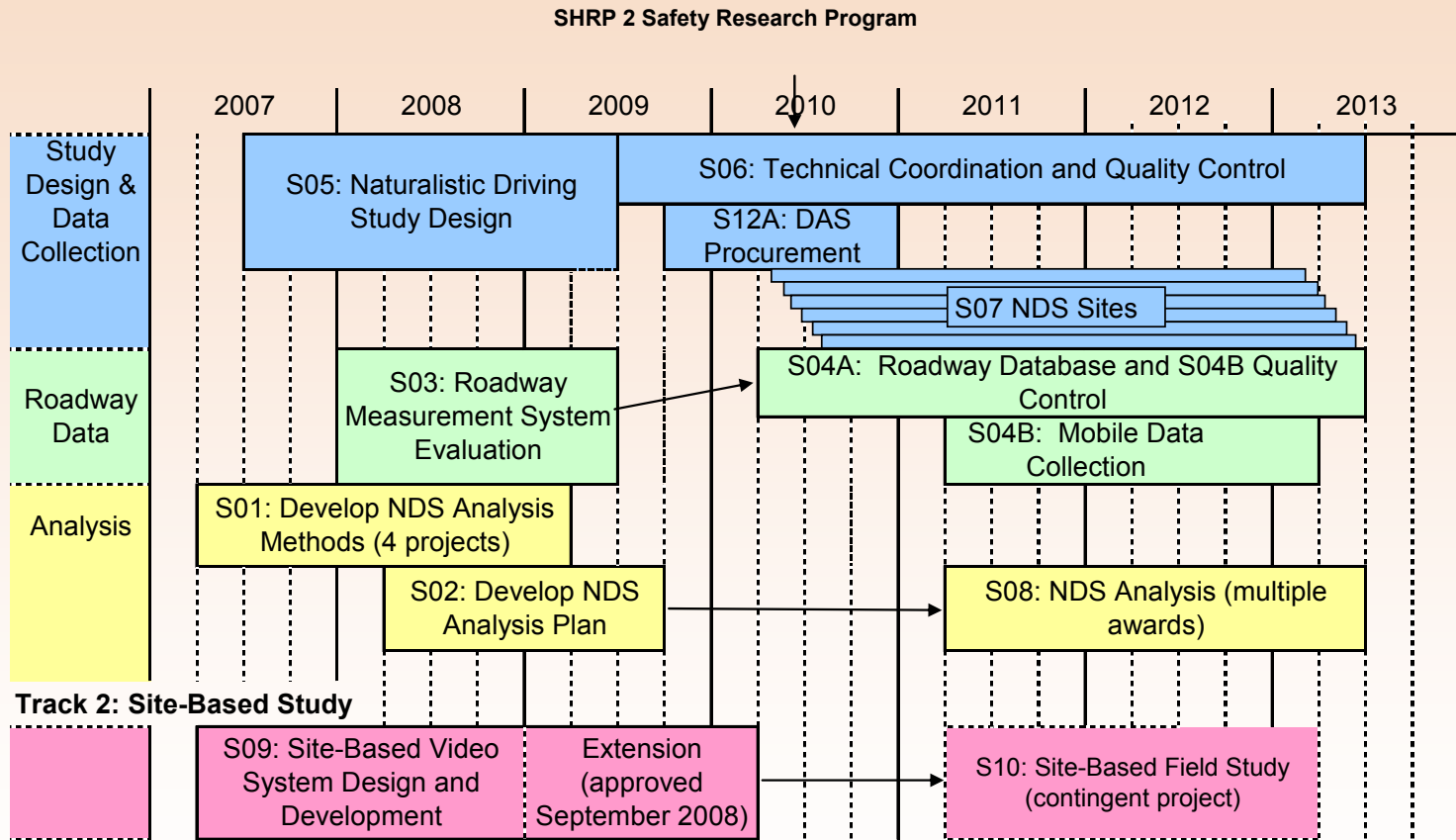
RFP & Q released to short list

ETG: November 9-10, 2010

Anticipated start date: Spring 2011

SHRP 2 Safety Research Program

Timeline



Revised April 2010



Assessing the Needs of Roadway Information Database Users



Frequently Asked Questions about the SHRP 2 Naturalistic Driving Study



What is SHRP 2?

In 2005, the United States Congress created the second Strategic Highway Research Program (SHRP 2) to address the challenges of moving people and goods efficiently and safely on the nation's highways. SHRP 2 is administered by the Transportation Research Board of The National Academies, under a Memorandum of Understanding with the Federal Highway Administration (U.S. Department of Transportation) and the American Association of State Highway and Transportation Officials.

SHRP 2 is a targeted, short-term research program carried out through competitively awarded contracts to qualified researchers in the academic, private, and public sectors. SHRP 2 addresses four strategic focus areas: the role of human behavior in highway safety; rapid renewal of aging highway infrastructure; congestion reduction through improved travel time reliability; and transportation planning that better integrates community, economic, and environmental considerations into new highway capacity. Additional information about SHRP 2 can be found on the program's Web site at www.trb.org/shrp2.

What is a "naturalistic" driving study?

A naturalistic driving study investigates ordinary driving under real-world conditions in order to make the driving experience safer. In the SHRP 2 study, 3000 volunteer drivers will agree to have their cars fitted with cameras, radar, and other sensors to capture data as they go about their usual driving tasks.

Experience with earlier naturalistic driving studies demonstrates that drivers quickly forget the presence of cameras and sensors, which are as inconspicuous as possible. This allows researchers to study driving behavior that is as close to "natural" as possible: thus a "naturalistic driving study." This kind of study is needed because driver behavior contributes to more than 90% of crashes and is the primary factor in more than 60% of crashes.

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http://onlinepubs.trb.org/onlinepubs/shrp2/NDS_FAQs.pdf



SHRP 2 S-04A

**Roadway Information Database
Development and Technical
Coordination and Quality Assurance of
the Mobile Data Collection Project
(S04B)**

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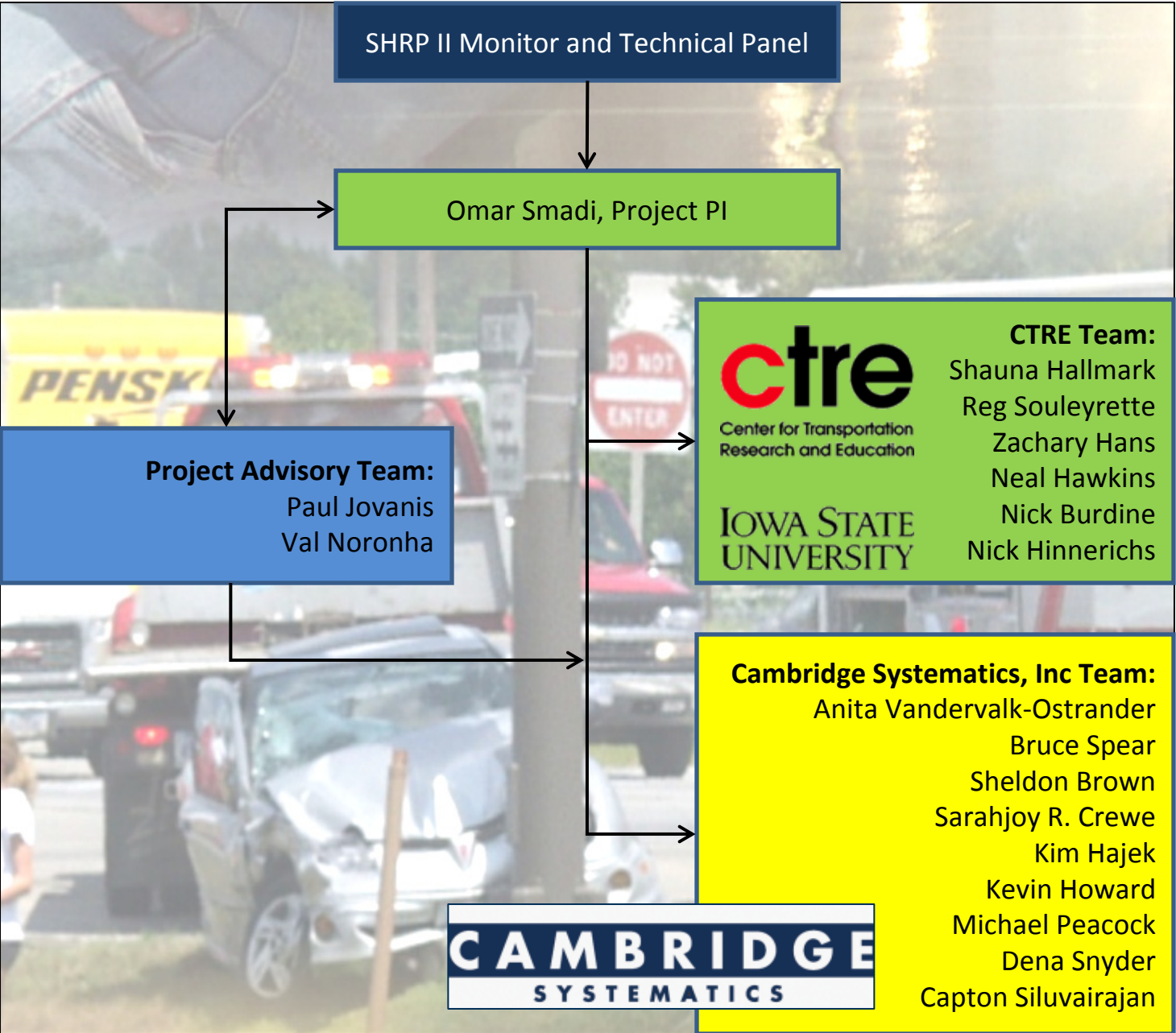
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STRATEGIC HIGHWAY RESEARCH PROGRAM



Research

Team

Research Team



Webinar Objectives

- Project S04A introduction
- Prioritization process
- Survey



Research

Goals



S04A

Goal is to design, build, and populate a Roadway Information Database:

- With data from the mobile data collection project (S04B) and other existing roadway data from government, public, and private sources.
- The database should link the roadway data to the Naturalistic Driving Study data (S07) to facilitate safety analysis.

Roadway Data

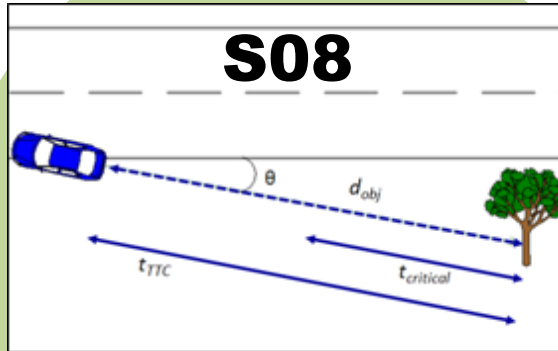


Naturalistic Driving Data



S04A

S08





Research

Objectives

Objectives:

- Develop a data collection strategy for roadway information that complements the SHRP 2 Naturalistic Driving Study and supports exposure-based risk analysis as well as other safety analysis.
- Develop method(s) for linking roadway information with the Naturalistic Driving Study Database for analysis purposes.
- Provide coordination and quality assurance for the collection and delivery of data by the S04B mobile roadway data collection contractor(s).
- Develop and populate the SHRP 2 Roadway Information Database.

S04A

Objectives:

- Manage the Roadway Information Database for the duration of the SHRP 2 program.
- Support data analysis efforts requiring roadway data for the duration of the SHRP 2 program.
- Develop a long-term plan for database management and stewardship after the SHRP 2 program.



Research

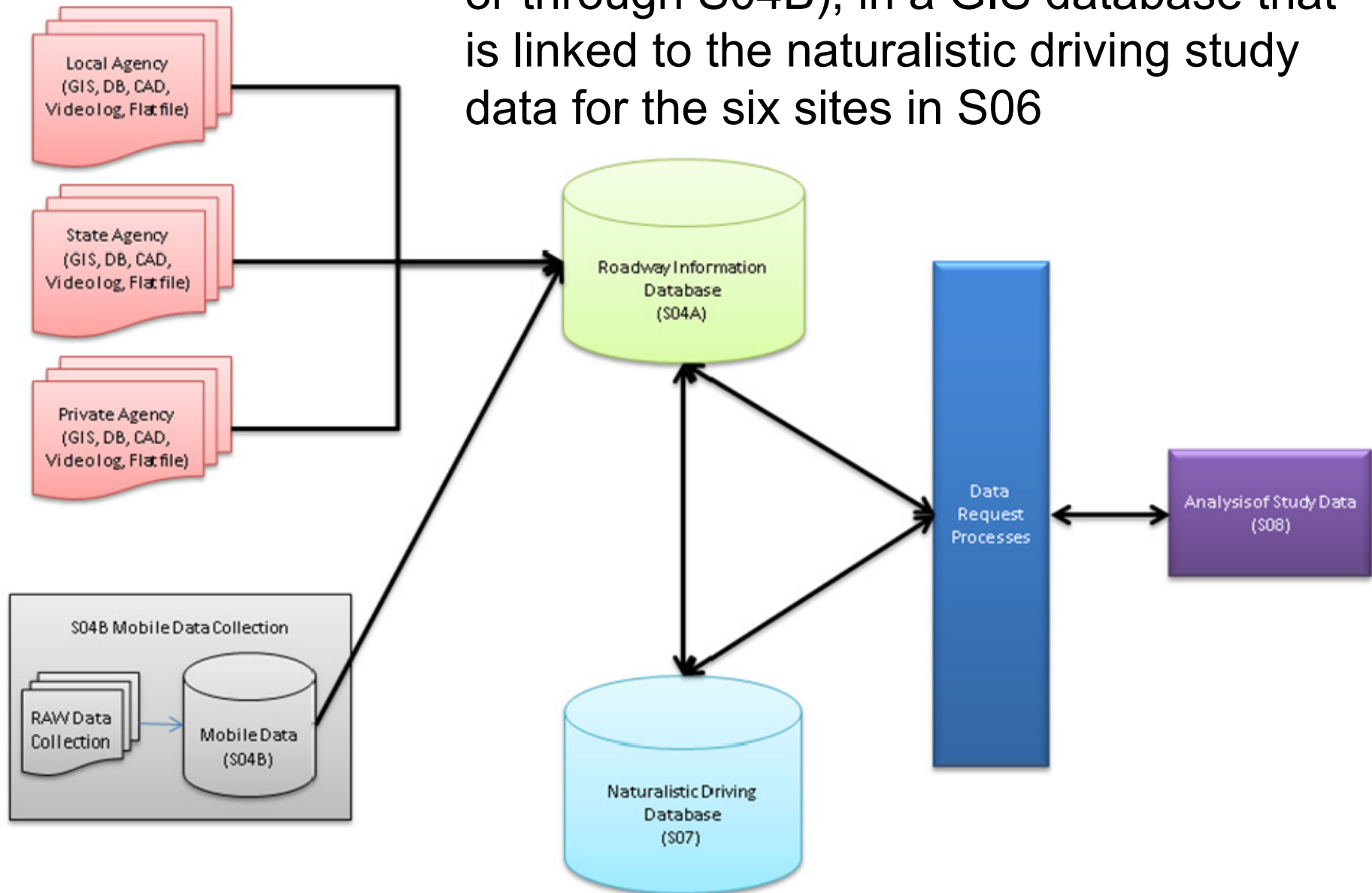
Approach

Approach

Our research approach will be guided by providing solutions to the following issues that have the potential to negatively impact the results from the S04A project:

- Location referencing and its impact on the data collection through the S04B project and data coming from different sources; this will also impact the database linkage to the S06 data
- Quality assurance of the S04B contractors
- The availability of additional data sources to supplement S04B data collection effort
- Data management

Provide the best quality data on roadway information (available from other sources or through S04B), in a GIS database that is linked to the naturalistic driving study data for the six sites in S06



Tasks 1 through 4:

Requirements Analysis and Data Collection Strategy (May to December 2010)

Task 1: Define Users' Data and Analysis Requirements

Task 2: Data Discovery

Task 3: Determine Capabilities of Mobile Data Collection Vendors

Task 3A: Evaluate additional data from S03 Rodeo participants

Task 4: Develop a Roadway Data Prioritization Scheme and the Overall Data Collection Strategy

Task 4A: Provide technical support to SHRP 2 to develop the S04B RFP&Q and review proposals

Roadway Information Database

Task 5: Database Design and Specifications

Task 6: Acquire Existing Data

Task 7: Build and Populate Database

Task 8: Database Management for Duration of SHRP 2

Task 9: Long-Term Data Management Plan (Beyond SHRP 2)

Tasks 10 through 13:

Data Collection and Quality Control

Task 10: Mutual Communication Plan with S04B

Task 11: Develop Data Collection Plan for S04B Mobile Data Collection

Task 12: Develop Quality Assurance Plan

Task 13: Technical Coordination and Quality Assurance for Mobile Data Collection in Project S04B

Project Management

Task 14: Project Management



SHRP 2 S-04A

**Roadway Information Database
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the Mobile Data Collection Project
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Roadway Data Discovery

**SHPR 2 S04a: Webinar to Prioritize
Data Elements**

**Zachary Hans
September 30, 2010**


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Methodology

1. Introduce S04a to data proprietors
 - Initially, state DOT
2. Share data discovery worksheet
3. Conduct site visit, meet with agency staff
 - May include multiple agencies
4. Request additional contact information
5. Repeat 1 - 4
6. Obtain & evaluate metadata, data

Data Discovery Worksheet

		Roadway System (Owner) & Data Extent											Agencies, Offices and/or Contacts				
		State			County			Municipal			Other		State	County	Municipal	Other	
		Compre- hensive	Road Class*	Sample	Compre- hensive	Road Class*	Sample	Compre- hensive	Road Class*	Sample	Compre- hensive	Road Class*					Sample
Roadway Characteristics	Number of lanes																
	On-street parking																
	Pavement markings																
	Median																
	Rumble strips/stripes																
	Speed Limit																
Roadway Features	Shoulder																
	Intersections																
	Driveways																
	Bridges/approaches																
	Rail crossings																
	Ramps																
Geometric Features	Grade																
	Cross slope																
	Horizontal curvature																
	Vertical curvature																
Roadside Features	Barrier systems																
	Obstacles																
	Sidewalk																
	Signs																
	Street lighting																
Pavement Features	Edge drop-off																
	Condition																
	Skid/friction																
Additional Data	Crashes																
	Roadway safety projects																
	Traffic																
	Workzones																
	Weather																
	Enforcement/education projects																

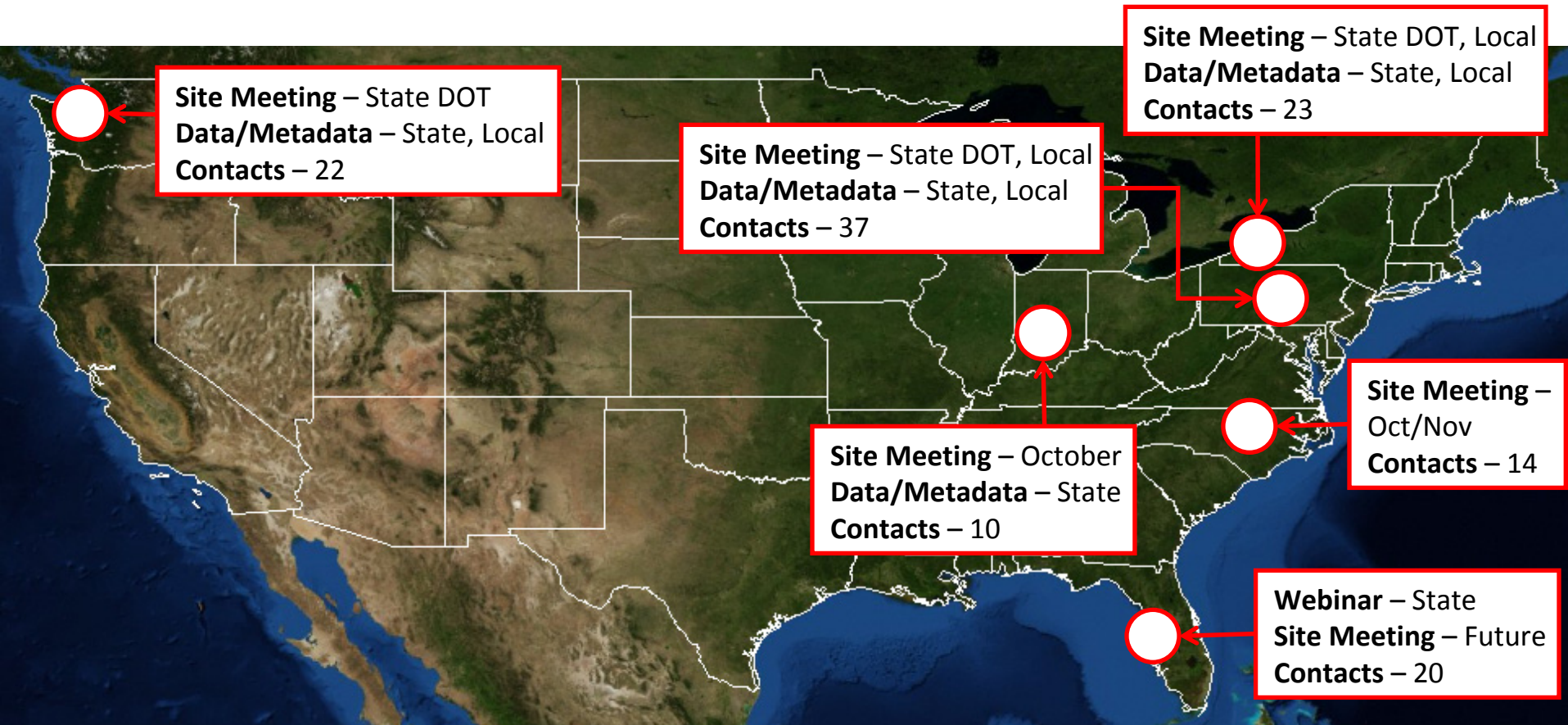
* Road class: Data may be available for certain classes or types of roadways only, e.g. only available for roadways of specific functional classifications.

- 1 - Interstate
- 3 - Other Principal Arterial
- 4 - Minor Arterial
- 5 - Major Collector
- 6 - Minor Collector (rural only)
- 7 - Local

Example Agency Involvement

Agency Type	Number of Agencies	Preliminary Contacts
Federal	1	1
State	1	15
County	7	8
City	1	4
MPO/RPO	4	5
Other	2	2

Data Discovery Status



Data Discovery Evaluation Criteria

- Existence
- Timeliness – with respect to NDS
- Consistency
- Completeness
- Accuracy – SHRP2 requirements
- Accessibility – licensing & data sharing
- Integration

...within and among sites

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Method to Identify and Initially Prioritize Roadway Data Elements for Mobile Mapping

**SHPR 2 S04a: Webinar to Prioritize
Data Elements**

**Shauna Hallmark
September 30, 2010**

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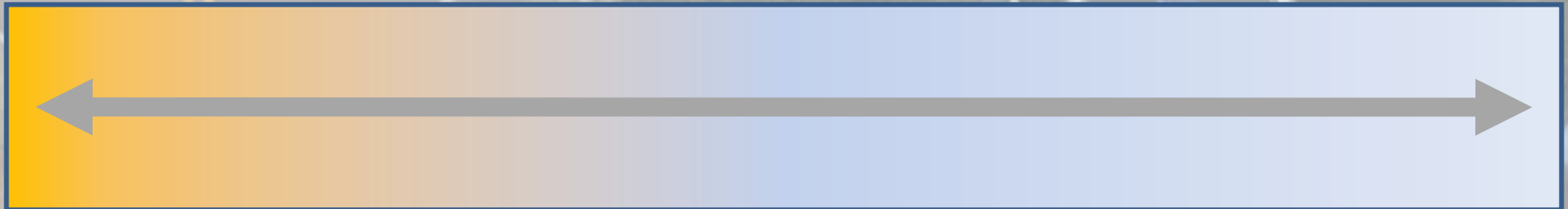
Objective

- Identify roadway data elements necessary to conduct analyses with the NDS data
- Meet user needs
 - Immediate users (S08 researchers)
 - Analyses relevant to stakeholders needs
 - Reduce severe crashes with emphasis on roadway departure and intersection crashes
 - Future users
 - Numerous types of analyses
 - Safety
 - Air quality
 - Asset management
 - Human factors
 - Travel demand
 - Traffic operations

Approach:

Identify User Groups:

- **Existing** users of roadway data
- **Future** users of roadway data



Those who focus on the roadway side and have a high level of familiarity with roadway data

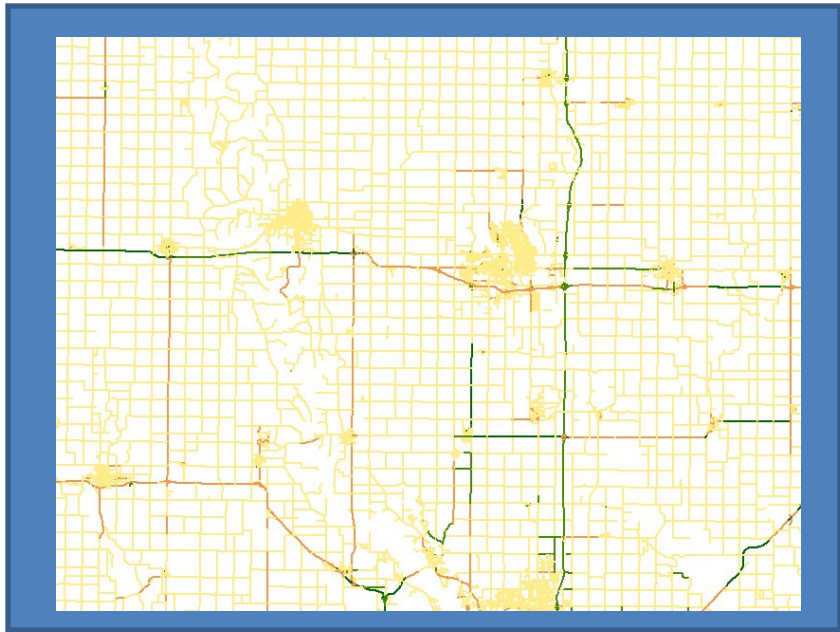
Other researchers (such as human factors, policy, and social science researchers) who likely have less experience or familiarity with roadway data

Sources of Roadway Data

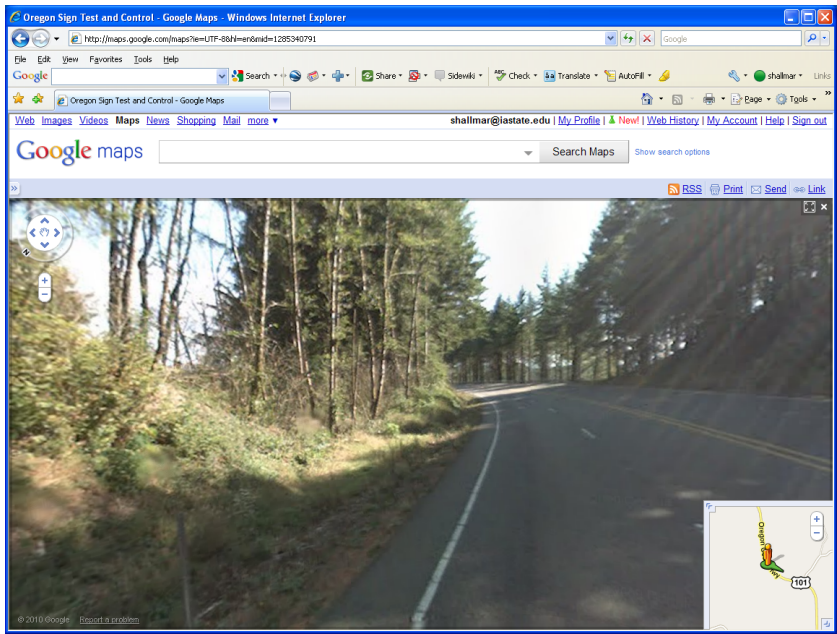
- State and local roadway data
- Mobile mapping data collected under S04a
- Reduced data & video log
- Reduced from DAS forward view
- Other sources (i.e. Google)



Forward view from DAS (Image source: VTTI)



Shoulder Type from Iowa DOT roadway data



Road view (Image source: Google)

Identification of Potential Roadway Data Elements

- Developed initial list based on team's expertise in roadway safety issues
- Reviewed 448 research questions from S01, S02, and S05
- Conducted comprehensive literature review on roadway departure and intersection safety

Identification of Potential Roadway Data Elements (cont)

- Reviewed elements included in:
 - Highway Safety Information System (HSIS)
 - Model Inventory of Roadway Elements (MIRE)
 - Model Minimum Uniform Crash Criteria (MMUCC)
- Identified users not represented, conducted survey directed at those users
- Developed final list of roadway data elements
- Collapsed items that were similar

List of Roadway Data Elements

- Previous steps resulted in master list of data elements

Data Element	Features	MMUCC	HSIS	MIRE	MMIRE Priority	Listed in Research Questions from SHPR 2 projects (S01, S02, S05)	Identified in literature
Horizontal curvature	length	X		X	1		Zeegeer et al (1992)
	location			X	1		within intersections -- Ye et al (2009), Maze et al (2006)
	presence and type of spirals	X		X	1		Council (1998)
	tangent length between adjacent curves			X	1	X	Fink & Krammes (1995)
	radius or degree of curve	X	X	X	1	X	Luediger et al (1988); Council (1998); Miaou and Lum (1993); Mohamedshah et al (1993); Vogt & Bared (1998); Shankar et al (1998); Zegeer et al (1992); Anderson et al (1999); Fink & Krammes (1995); Preston (2009); McLaughlin et al (2009); Zhang & Ivan (2005); Glennon et al (1985); Farmer and Lund (2002); Charlon (2007)
	presence and amount of superelevation	X		X	2	X	Zegeer et al (1992); Savolainen and Tarko (2005)
	direction of curve	X	X	X	1		
	horizontal curve deflection angle	X	X	X	1		

List of Roadway Data Elements

- Updated list
- Typically includes type and location of element
- Elements that can be obtained from other data elements removed (i.e. total paved width = paved lane width + paved shoulder width)

Need for Prioritization

- Meet needs of users (now and for the foreseeable future)
- Resource constraints for mobile mapping (\$\$)
 - Miles of data collected
 - Number of data elements collected
- Given limited resources, collect most important roadway data elements

Methodology to Prioritize

Not necessarily in order of importance

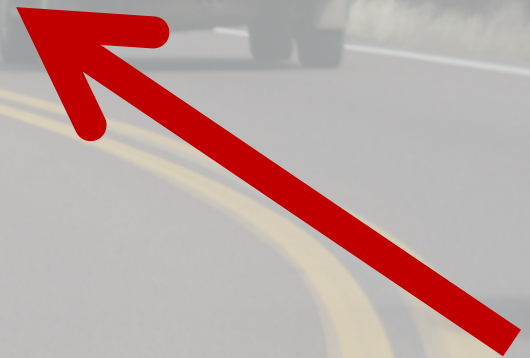
- Available with reasonable accuracy in state or local databases
- Highly relevant to preventable severe crashes
- Importance of data element in MIRE (represents large number of users)
- Included in MMUCC and HSIS
- Consensus in literature on importance

Methodology to Prioritize (cont)

- Difficulty/practicality of collecting
- Cost
 - Benefit of collecting to cost
 - Marginal cost
- Temporal nature of feature
 - changes in short-term
 - Features collected with mobile mapping possibly different when instrumented vehicles are on the road

Methodology to Prioritize (cont)

- Can be reasonably obtained from other data sources
 - Forward view of instrumented vehicle
 - Google
- Input from users/stakeholders
 - Purpose of webinar



Initial High Priority List

- Horizontal curvature:
 - Radius
 - Length
 - PC
 - PT
 - Direction of curve (left or right based on driving direction)
- Grade
- Cross-slope/Superelevation
- Center of intersection
- Lane information
 - Number
 - Width
 - type (turn, passing, acceleration, car pool, etc...)
- Shoulder type/curb (and paved width if it exists)
- Speed limit sign location (R2-4 Series) and speed limit

Next Steps

- Rank data elements based on prioritization
- Work with S04b vendors to determine final list based on priority and cost
- Identify accuracy for selected data elements

SHRP 2 S04A Data Elements Webinar Survey

1. Participant Information

<http://www.surveymonkey.com/s/shrp04a>



* 1. Contact info

Name (one contact per site)	Reg Souleyrette
Company/Agency	Iowa State University
Office name	CTRE
Phone number (optional)	515-294-5453
email address	reg@iastate.edu

* 2. Please check all that apply to participants at your site

- I (we) have some experience with *driver/user* focused traffic safety research (researcher, manager or sponsor of research)
- I (we) have some experience with *vehicle* focused traffic safety research
- I (we) have some experience with *highway/road* focused traffic safety research
- I (we) have some experience with collecting, providing, or managing road/highway data
- I (we) am (are) just here to observe/learn

Other (please specify)

SHRP 2 S04A Data Elements Webinar Survey

2. Horizontal and vertical curvature

<http://www.surveymonkey.com/s/shrp04a>

YOUR Ratings of the importance of these elements to future research.

* 1. Horizontal and vertical curvature

1. Most Important	2. Not as important, collect if cost-effective	3. Possibly useful	4. Not useful	5. I don't have enough info to rate
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specific location of PC and PT for horizontal curve

Horizontal curve length (if PC/PT not specified)

radius (or degree) of horizontal curve

design of transition curves (if any)

maximum superelevation for horizontal curve

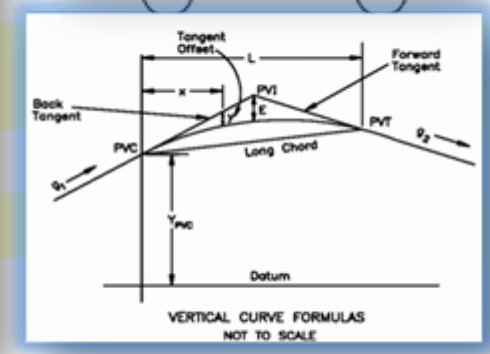
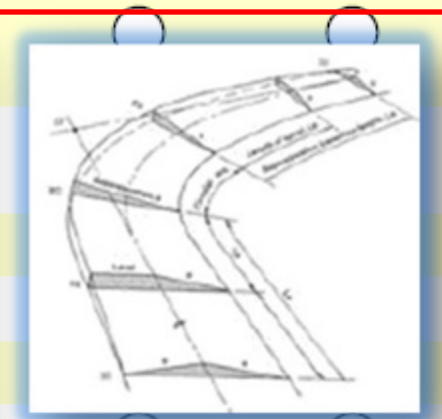
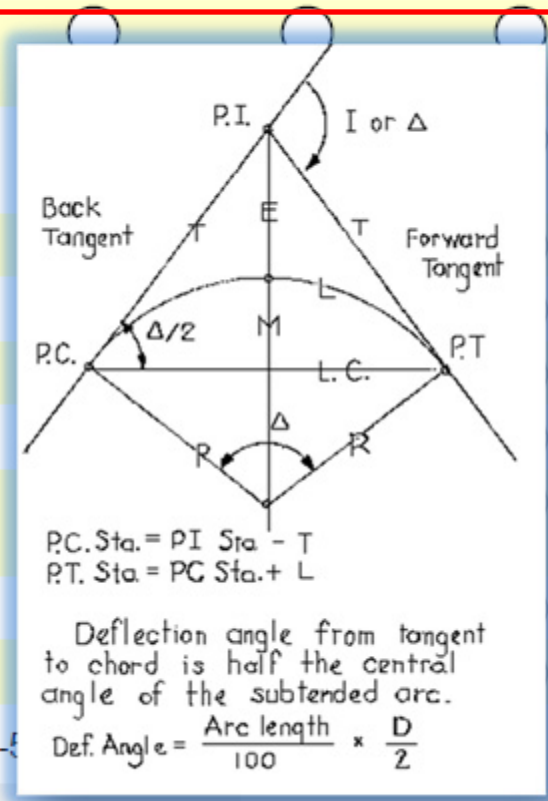
location of PVC and PVT for vertical curve

length of vertical curve (if PVC/PVT not specified)

grade (percent) along sections

type of vertical curve (e.g., sag)

Other (please specify and give rating number 1-5)



SHRP 2 S04A Data Elements Webinar Survey

3. Cross-section

YOUR Ratings of the importance of these elements to future research

* 1. Cross-section

- | | | | | |
|-------------------|--|--------------------|---------------|-------------------------------------|
| 1. Most Important | 2. Not as important, collect if cost-effective | 3. Possibly useful | 4. Not useful | 5. I don't have enough info to rate |
|-------------------|--|--------------------|---------------|-------------------------------------|

number of lanes

lane width

type (i.e. regular, RT, LT, TWLTL, parking, acceleration; HOV; reversible)

lane direction if not implied (i.e. one-way, reversible)

cross-slope

shoulder type

shoulder paved width

total shoulder width

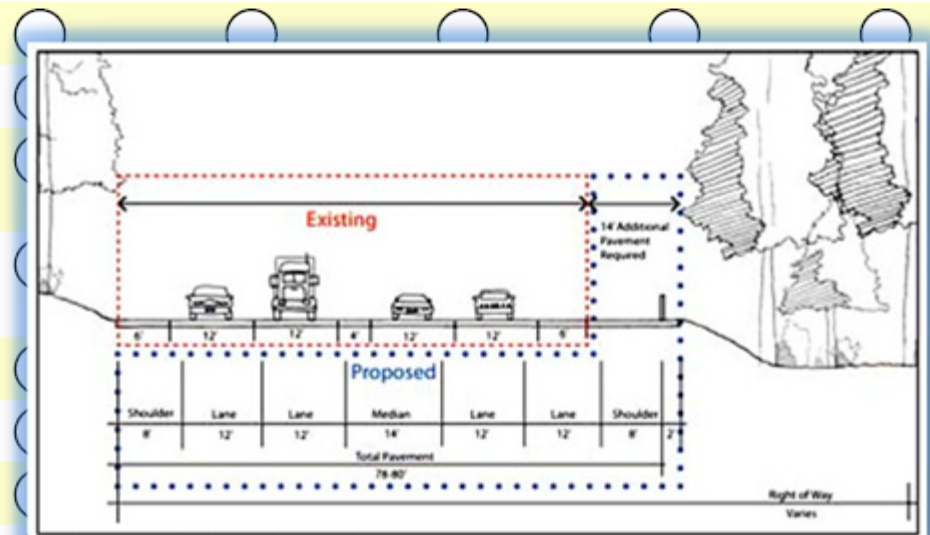


Figure 2-1: Widen to the North Alternative

SHRP 2 S04A Data Element (Continued from previous page)

3. Cross-section

YOUR Ratings of the importance of these elements to future research

* 1. Cross-section

1. Most Important	2. Not as important, collect if	3. Possibly useful	4. Not useful	5. I don't have enough info to rate
-------------------	---------------------------------	--------------------	---------------	-------------------------------------

shoulder slope

median type

median width

location of driveways

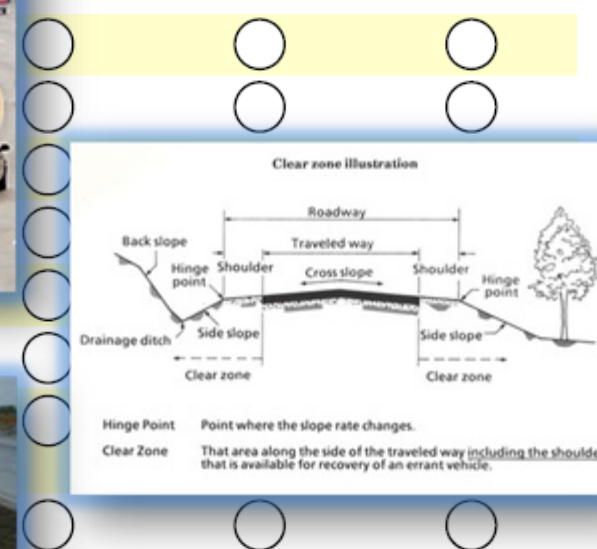
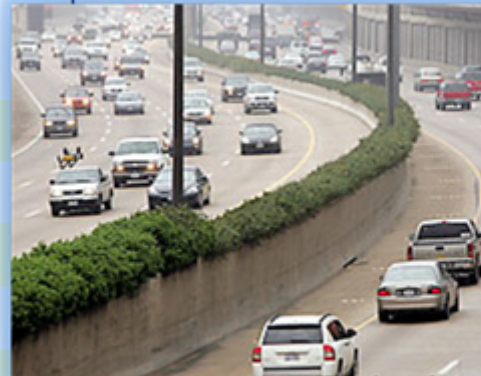
curb type and presence

turn lane length

type and location of objects within clear zone
(tree, utility pole, sign)

location and characteristics of sidewalks or bike facilities

Other (please specify and give rating number 1-5)



SHRP 2 S04A Data Elements Webinar Survey

4. Regulatory signs and warning signs

YOUR Ratings of the importance of these elements to future research

* 1. Regulatory signs and warning signs

speed limit (includes school speed limit)

pass/no pass zones

movement control (turn only, no turning, lane must exit, do not enter, etc)

direction guidance (pass with care, etc)

horizontal alignment signs and location (i.e. chevron, curve advisory speed)

other (pedestrian/school crossing, school zone, optional movement control, no parking, etc)

1. Most Important

2. Most important connection

possibly useful

useful enough info to rate

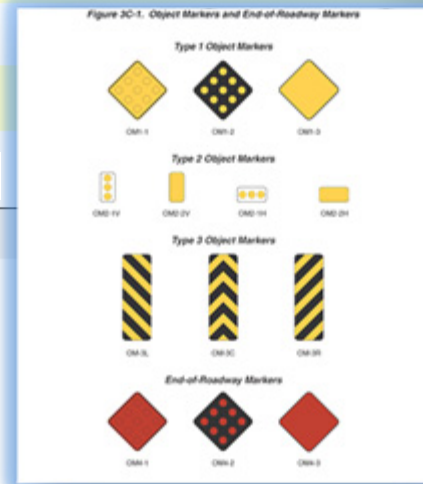
The image displays a grid of various traffic signs. At the top, two signs are highlighted: a yellow diamond-shaped warning sign for a pedestrian crossing and a yellow triangular 'NO PASSING ZONE' sign. Below these, a large collection of signs is shown, including: a red circular 'DO NOT ENTER' sign; a white rectangular 'ONE WAY' sign with a black arrow pointing right; a white rectangular 'SCHOOL SPEED LIMIT 25' sign with a yellow border; a shield-shaped 'ROUTE 66' sign; a red octagonal 'STOP' sign; a white 'X' shaped 'RAILROAD CROSSING' sign; a blue rectangular 'EAST INTERSTATE 294' sign; a white rectangular 'SPEED LIMIT 55' sign; a white triangular 'YIELD' sign; a white rectangular 'ONE WAY' sign with a black arrow pointing left; a white rectangular 'SCHOOL SPEED LIMIT 25' sign with a yellow border; a blue rectangular 'ONE WAY' sign with a white arrow pointing right; a white rectangular 'ONE WAY' sign with a black arrow pointing left; a red circular 'NO PARKING' sign; and a white rectangular 'SCHOOL SPEED LIMIT 25' sign with a yellow border. The signs are arranged in a grid-like fashion, with some overlapping.

4. Regulatory signs and warning signs

YOUR Ratings of the importance of these elements (Continued from previous page)

* 1. Regulatory signs and warning signs

	1. Most Important	2. Not as important, collect if cost-effective	3. Possibly useful	4. Not useful	5. I don't have enough info to rate
roadway cross-section or non-horizontal alignment changes (i.e., lane ends, road narrows, start divided, end divided, uneven lanes, low shoulder, no shoulder)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
non-vehicular warning (i.e. deer, pedestrian, snowmobiles)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
vehicular warning (i.e. horse and buggy)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
object markers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify and give rating number 1-5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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5. Pavement markings: type, condition, location

YOUR Ratings of the importance of these elements to future research

* 1. Pavement markings: type, condition, location

1. Most Important

4. Not useful
5. I don't have enough info to rate



longitudinal (edge-line, centerline, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
transverse (stop-bar, cross-walk, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
symbol (arrows, "SLOW", etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
raised pavement markings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify and give rating number 1-5)



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6. Road surface

YOUR Ratings of the importance of these elements to future research

* 1. Road surface

1. Most Important

2. Possibly Useful

3. Not useful

4. Not useful enough info to rate

surface type (i.e. gravel, asphalt, PCC)

pavement face shape (90 degree, rounded, safety edge)

pavement edge drop-off (presence, height)

pavement roughness/IRI

surface irregularities, rutting

surface friction or macro-texture

Other (please specify and give rating number 1-5)



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7. Countermeasures

YOUR Ratings of the importance of these elements to future research

* 1. Countermeasures

1. Most Important

5. Possibly Unimportant



type and location of centerline, edge-line, or shoulder rumble strips

location and type of advance stop-line rumble strips

crash attenuators/cushion

vertical deflection (speed tables, raised crosswalk, etc)

overhead lighting type and location

type and location of speed feedback signs , automatic speed enforcement, red light running camera locations

other longitudinal barriers type and location

Other (please specify and give rating number 1-5)

○ ○ ○

○ ○ ○

○ ○ ○

○ ○ ○

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8. Other

YOUR Ratings of the importance of these elements to future research

* 1. Other

1. Most Important

2. Not as important, collect if cost-effective

3. Possibly useful

guide signs

service signs

bridge location and type (overpasses, underpass, water crossing, etc)

bridge deck width

Other (please specify and give rating number 1-5)



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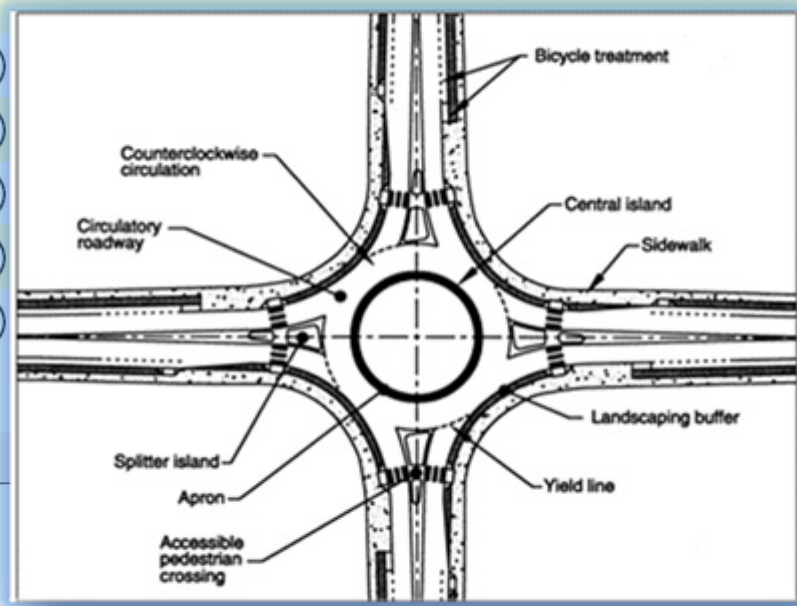
9. Roundabout characteristics (those different from regular intersection)

YOUR Ratings of the importance of these elements to future research

* 1. Roundabout characteristics (those different from regular intersection)

- 2. Not as important, collect if cost-effective
- 1. Most Important
- 3. Possibly useful
- 4. Not useful
- 5. I don't have enough info to rate

number of circulatory lanes in roundabout	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
circulatory width	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
entry width	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
number of exit lanes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
inscribed diameter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
splitter island width	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Other (please specify and give rating number 1-5)

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10. Intersection control

YOUR Ratings of the importance of these elements to future research

* 1. Intersection control

- | | | | | | |
|--|-------------------|--|--------------------|---------------|-------------------------------------|
| | 1. Most Important | 2. Not as important, collect if cost-effective | 3. Possibly useful | 4. Not useful | 5. I don't have enough info to rate |
|--|-------------------|--|--------------------|---------------|-------------------------------------|

intersection location	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
type of intersection traffic control (includes type of control for railroad, presence of overhead beacons;)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
signal characteristic (i.e. signal head configuration, lens size)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
signal structure (mast, pedestal mounted, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
pedestrian signal (type, location)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify and give rating number 1-5)



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11. interchange ramps

YOUR Ratings of the importance of these elements to future research

* 1. interchange ramps

1. Most Important 2. Not as important, collect if cost-effective 3. Possibly useful 4. Not useful 5. I don't have enough info to rate

ramp start and end	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ramp length	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
geometry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
merge type	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify and give rating number 1-5)



YOUR Ratings of the importance of collecting data for these road classes to future research

SHRP 2 S04A Data Elements Webinar Survey

12. Road Class

*** 1. Urban functional class:**

	High	Med	Low
Interstate 16,546 miles (2%), 483 BVMT (24%), 2,259 Fatalities (14%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Freeway and Expressway 10,979 miles (1%), 220 BVMT (11%), 1,505 Fatalities (9%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Principal Arterial 63,673 miles (6%), 470 BVMT (24%), 4,446 Fatalities (28%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minor Arterial 105,043 miles (10%), 378 BVMT (19%), 3,105 Fatalities (19%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collector 110,789 miles (10%), 175 BVMT (9%), 1,239 Fatalities (8%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local 750,632 miles (71%), 268 BVMT (13%), 3,402 Fatalities (21%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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12. Road Class

YOUR Ratings of the importance of collecting data for these road classes to future research

* 2. Rural functional class:

	High	Med	Low
Interstate 30,391 miles (1%), 256 BVMT (25%), 2,416 Fatalities (12%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Principal Arterial 94,819 miles (1%), 232 BVMT (22%), 4,358 Fatalities (21%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minor Arterial 135,528 miles (1%), 161 BVMT (16%), 3,515 Fatalities (17%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Major Collector 419,681 miles (1%), 193 BVMT (19%), 5,068 Fatalities (24%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minor Collector 263,144 miles (1%), 58 BVMT (6%), 1,423 Fatalities (7%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local 2,047,298 miles (1%), 134 BVMT (13%), 4,027 Fatalities (19%)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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12. Road Class

YOUR Ratings of the importance of collecting data for these road classes to future research

* 3. Urban AADT:

	High	Med	Low
- >110,000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 80,000-109,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 55,000-79,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 35,000-54,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 25,000-34,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 15,000-24,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 10,000-14,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 7,500-9,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 5,000-7,499	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 3,000-4,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 1,000-2,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- <1,000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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12. Road Class

YOUR Ratings of the importance of collecting data for these road classes to future research

* 4. Rural AADT:

	High	Med	Low
- >35,000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 20,000-34,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 15,000-19,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 10,000-14,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 7,500-9,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 5,000-7,499	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 3,000-4,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 2,000-2,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 1,000-1,999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- 500-1,000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
- <500	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>