



Accelerating solutions for highway safety, renewal, reliability, and capacity

Naturalistic Driving Study

Lifesavers National Conference
April 11, 2010

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SHRP 2

- Authorized by Congress in 2005 highway legislation
- \$170 million, 7 years (2006-2013)
- Administered by TRB under MOU with FHWA and AASHTO
- Four Research Focus Areas:

Safety	Reliability
Renewal	Capacity
- Stakeholder Governance: 400+ volunteers



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What is a Naturalistic Driving Study?

- Install inconspicuous cameras and sensors on vehicles
- Participants engage in normal driving
- Complements other methods: simulation, closed track, investigator-directed driving, epidemiology, etc.
- Such studies have been conducted for teens, adults, seniors, truck drivers



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Why do a Naturalistic Driving Study?

- **Collect data during ordinary driving**
 - Objective pre-crash data
 - More accurate crash data
 - Near crash/incident data
 - “Exposure” (ordinary driving) data
- **Determine relative crash risk for different factors**
- **Develop crash surrogates**



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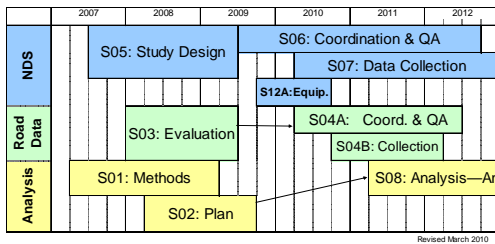
What is special about the SHRP 2 NDS?

- **Size**
- **Duration**
- **Geographic extent**
- **Inclusion of roadway data**
- **Development of analytical techniques**
- **Long-term access to data for research**



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Schedule



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Participants

- **Men and women in 7 age groups:**
 - Minor Teen (16-17)
 - Younger Older Driver (51-65)
 - Adult Teen (18-20)
 - Middle Older Driver (66-75)
 - Young Adult (21-35)
 - Older Older Driver (76+)
 - Middle Adult (36-50)
- **3100 participants**
- **Some participate for 1 year, some for 2 years**



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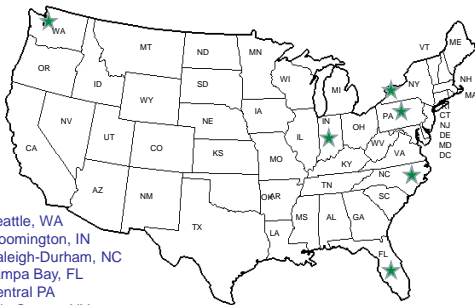
Driver Data/Assessment

- **Demographics**
- **Driving history**
- **Driving knowledge**
- **Driving behavior**
- **Medical condition**
- **Sleep habits**
- **Risk perception and risky behavior**
- **Sensation seeking**
- **Vision, strength, mobility**



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SHRP 2 NDS Study Sites



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How the Sites Were Chosen

- **July and September 2008: Requests for Qualifications**
 - Contractor qualifications AND proposed site
 - 19 responses; 11 deemed qualified
- **March 2009: Request for Proposals:**
 - Pre-bid meeting for all qualified proposers
 - 9 proposals received
- **May-June 2009 proposal review, contractor selection, negotiation**
- **March-April 2010: contract with 6 sites**



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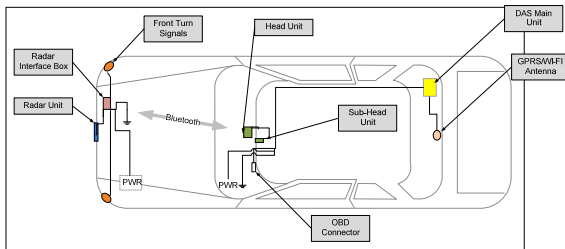
Vehicles

- 1950 vehicles on the road at one time
- 3900 data years
- Passenger cars, vans, SUVs, pick ups
- Cooperation from manufacturers:
 - Selection of makes, models, years
 - Advanced technologies



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DAS System Components



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Camera Views



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Examples of DAS Capability

- Machine Vision
 - Eyes Forward Monitor
 - Lane Tracker
- Accelerometer Data
- Rate Sensors
- GPS
- Forward Radar
- Cell Phone
 - Automatic collision notification
 - Health checks
 - Remote upgrades
- Illuminance sensor
- Cabin alcohol indicator
- Incident push button
- Video (4 camera views)
- 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 ...



DATA COLLECTION TRANSPORTATION RESEARCH BOARD
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Crashes

- Estimate 1,200 crashes
- Estimate 11,000 near crashes
- In-depth investigation of selected crashes:
 - Driver interview
 - Vehicle inspection
 - Site inspection



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Roadway Data

- **Inventory and assessment of existing data sources; acquisition of appropriate data**
- **Collection of new data by mobile data collection vehicles**
- **Will include, for example:**
 - **Geometry**
 - **Signage and pavement markings**
 - **Shoulder type, width, drop-off**
 - ...



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Data Summary

Collecting data from four sources:

1. Instrumented vehicles: continuous recording of video and sensor data
2. Driver assessment tests for primary drivers
3. Detailed crash investigations for selected crashes
4. Roadway characteristics and features from existing sources and new mobile data collection

Approximately 1 petabyte of data



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Use of the Data: Analysis & Answers

- **4 contractors worked on developing analytical methods for these**
- **5th contractor developed an analysis plan for SHRP 2**
- **In 2011 we will begin to advertise for analysis projects to address high-priority issues and demonstrate use of the database**



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Use of NDS Data: Examples

- Distracted driving: policies, laws on use of hand-held devices, texting, etc., for teens or broader population
- Drowsiness: policies, regulations for commercial drivers
- Vehicle design/technologies: integrate advanced technologies to minimize or reduce distraction, evaluate crash warning algorithms
- Roadway: improved design, operations, signage, hardware, etc.
- Other: planning, highway operations, fuel efficiency, environmental effects



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Projected Schedule

- **Installation of DAS begins Fall 2010**
- **First few months of data available by mid-2011**
- **Availability of roadway data not yet determined—maybe late 2011?**
- **Data collection complete in 2013**



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SHRP 2 Implementation Report: Summary of Recommendations

1. A SHRP 2 implementation program should be established
2. FHWA should serve as the principal implementation agent in partnership with AASHTO, NHTSA and TRB
3. Funding: \$400 million for first 6 years
4. Establish a formal stakeholder advisory structure
5. Develop detailed implementation plans



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Expected Data Sharing After SHRP 2

- **Report:** provide for long-term stewardship
- **Objectives:**
 - Provide researchers widest possible access to all data
 - Protect privacy of participants
- **Methods:**
 - Data sharing agreements consistent with privacy protections in approved consent form
 - Security
 - Institutional Review Board(s)
- **Report:** external stakeholder oversight committee



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Questions?

For more information:
www.trb.org/shrp2



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