



STRATEGIC HIGHWAY RESEARCH PROGRAM

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

SHRP 2 Safety

Making a Significant Improvement in Highway Safety

Second International Symposium on Naturalistic Driving Research

SHRP 2 Analysis Planning

Ken Campbell
SHRP 2 Chief Program Officer

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

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

SHRP 2

Naturalistic Driving Study

- 1950 instrumentation packages
- 3100 participants: some 1-year, some 2-year
- Two-year data collection
- 3900 vehicle-years of data
- Passenger cars, vans, SUVs, pick ups

SHRP 2 NDS Data

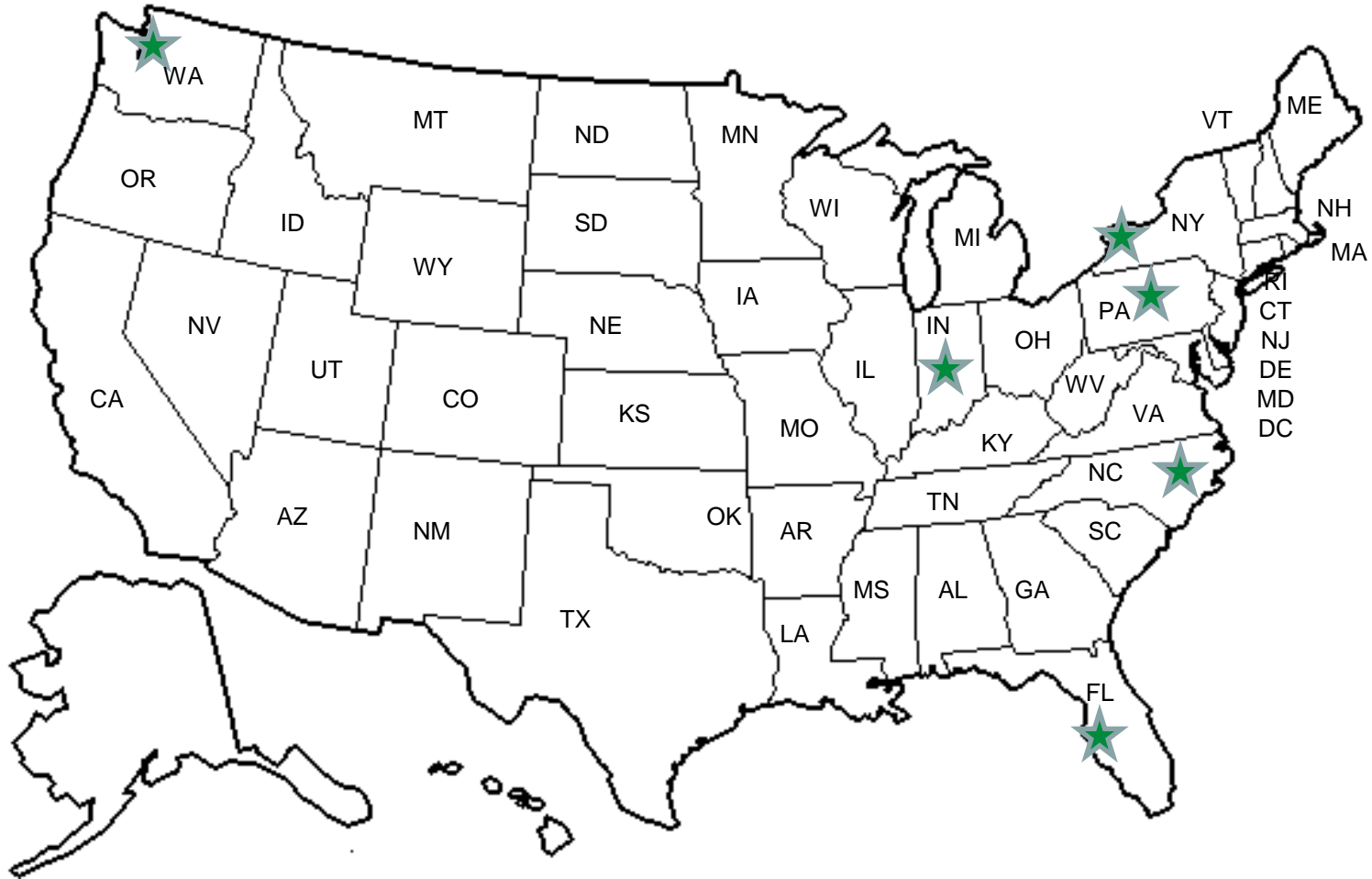
Sources of data being collected:

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

800 TB of video + 100 TB of vehicle sensor data + roadway data = ~1 petabyte of data

SHRP 2 Safety Focus Area

Naturalistic Driving Study (Project S07) Data Collection Sites



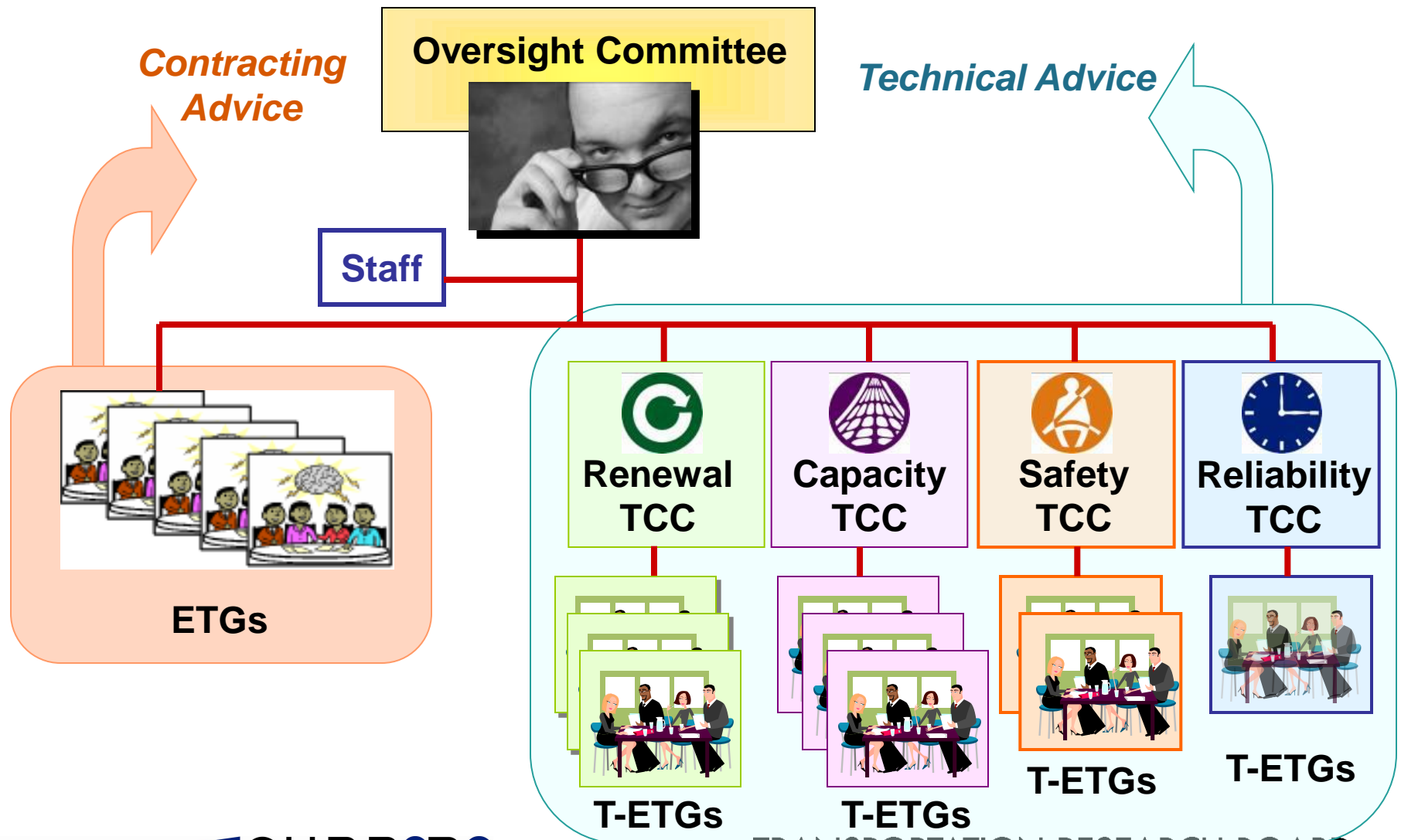
NDS Sites and Contractors

CONTRACT	CONTRACTOR	SITE LOCATION	DAS
S07A	INDIANA UNIVERSITY	BLOOMINGTON, IN	150
S07B	PENN STATE UNIVERSITY	CENTRAL, PA	150
S07C	CUBRC	TAMPA BAY, FL	450
S07D	CUBRC	ERIE COUNTY, NY	450
S07E	WESTAT	DURHAM, NC	300
S07F	BATTELLE	SEATTLE, WA	450

Participant Sample Design

Gender and Age Range	Age Range Description	One Year	Two Years	DAS units	Primary Participants	Data-Years
M 16-17	Minor Teen	72	28	100	172	200
M 18-20	Adult Teen	72	28	100	172	200
M 21-25	Young Adult	72	28	100	172	200
M 26-35	Adult	72	28	100	172	200
M 36-50	Middle Adult	72	28	100	172	200
M 51-65	Mature Adult	72	28	100	172	200
M 66-75	Young Old Driver	72	28	100	172	200
M 76+	Older Older Driver	72	28	100	172	200
F 16-17	Minor Teen	72	28	100	172	200
F 18-20	Adult Teen	72	28	100	172	200
F 21-25	Young Adult	72	28	100	172	200
F 26-35	Adult	72	28	100	172	200
F 36-50	Middle Adult	72	28	100	172	200
F 51-65	Mature Adult	72	28	100	172	200
F 66-75	Young Old Driver	72	28	100	172	200
F 76+	Older Older Driver	72	28	100	172	200
Any	Adv Vehicle Tech	0	350	350	350	700
Totals:		1,152	798	1,950	3,102	3,900

SHRP 2 Governance



Project S08
Analysis of the SHRP 2 Naturalistic Driving Study Data
Expert Task Group (ETG) members

- Jim Hedlund, Highway Safety North, Chair
- Jeff Caird, University of Calgary
- Promod Chandhok, Bureau of Transportation Statistics, USDOT
- Chou-Lin Chen, National Center for Statistics and Analysis, NHTSA
- Rich Deering, RK Deering and Associates
- Leanna Depue, MO DOT
- Joanne Harbluk, Transport Canada
- Dev Kochhar, Ford
- Chris Monk, FHWA
- Brad Overturf, CT DOT
- Mike Perel, NHTSA (retired)

First meeting July 12, 2010

Project S08

Analysis of the SHRP 2 Naturalistic Driving Study Data

Goals

- Answer high-priority research questions that haven't been answered before
 - especially questions leading to countermeasures and policy
 - emphasize questions related to run-off-road and intersection crashes
 - include research that uses all major SHRP 2 data – roadway, vehicle sensors, video, ...
- Produce data sets for broad public use
 - gain experience in data file use
 - Produce reduced/aggregate/de-identified data for broad access

Project S08

Analysis of the SHRP 2 Naturalistic Driving Study Data Resources

- \$5.0 M S08 NDS Analysis budget
- \$2.5? M NDS Data Dissemination Implementation budget (likely but not yet certain)

Project S08

Analysis of the SHRP 2 Naturalistic Driving Study Data

Background

- Project S01: Development of Analysis Methods for Naturalistic Driving Data
 - Gary Davis, University of Minnesota Center for Transportation Studies
 - Tim Gordon, University of Michigan Transportation Research Institute
 - Paul Jovanis, Pennsylvania State University Transportation Institute
 - Shauna Hallmark, Iowa State University Center for Transportation Research and Education
- Project S02: Development of the NDS Analysis Plan
 - Dan McGehee, University of Iowa
 - Phase I: high priority research questions
 - Phase II: Draft outline for the analysis plan
(suggested issues for analysis proposals to address)

Project S08
Analysis of the SHRP 2 Naturalistic Driving Study Data
Tentative Project Outline

- Analysis RFPs
 - multiple awards, probably multiple RFPs
 - differing levels of specificity
 - likely 2-phase: demonstrate feasibility of approach, proceed with full analysis only after approval
 - development/validation of surrogate measures
- Data Dissemination RFPs
 - data files for broad range of users
 - varying levels of complexity
 - issues of data access, confidentiality, user support, ...

Project S08

Analysis of the SHRP 2 Naturalistic Driving Study Data S08

Schedule

- Data availability
 - July 2011: 4 months of data from all sites
 - additional data in 4-month increments (next batch Nov. 2011 etc.)
 - full 2 years of data about March 2013
- Analysis RFPs
 - probable release spring and summer 2011
- Data Dissemination RFPs
 - probable release December 2010
 - perhaps also spring 2011

Project S08
Analysis of the SHRP 2 Naturalistic Driving Study Data
High Priority Research Questions

- Influence of roadway on lane-departure crashes?
- Driver interactions with intersection features
- Driver distraction
- Driver fatigue
- Driver impairment
- Aggressive driving
- Advanced driver support systems

Project S08

Analysis of the SHRP 2 Naturalistic Driving Study Data

Candidate Reduced Data Files

- Trip summary files
- Event files
 - categorical summary variables
 - time history data (30s)
 - reduced/de-identified face video
- Non-event files (exposure)
- Other?

Project S08

Analysis of the SHRP 2 Naturalistic Driving Study Data

Analysis Issues

- Collision surrogates
- Performance measures
 - headway keeping
 - lane keeping
- Traffic events
 - turning
 - lane change
 - following
- Within/between driver differences

SHRP 2 NDS Analysis Needs

- Give us your ideas !!
 - analysis RFP topics, structure
 - data file RFP topics, structure
 - send to any ETG member or to me
 - by Sept. 15, 2010
 - ETG meets in October to begin drafting RFPs
- Jim Hedlund
 - jhedlund@sprynet.com

THANK YOU

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