SHRP 2 Background
To address the challenges of moving people and goods efficiently and safely on the nation’s highways, Congress has created the second Strategic Highway Research Program (SHRP 2). 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 (Safety); rapid highway renewal (Renewal); congestion reduction through improved travel time reliability (Reliability); and transportation planning that better integrates community, economic, and environmental considerations into new highway capacity (Capacity). Under current legislative provisions, SHRP 2 will receive approximately $150 million with a total program duration of 7 years. Additional information about SHRP 2 can be found on the program’s web site at www.trb.org/shrp2.

Safety Focus Area
The SHRP 2 safety research plan includes two tracks: a large field study of driving behavior using volunteer drivers and a sophisticated instrumentation package installed in the volunteers’ vehicles, and a video system to record the movements of all vehicles at specific road sites such as an intersection. The SHRP 2 field studies are intended to support a comprehensive safety assessment of how driver behavior and performance interact with roadway, environmental, vehicular, and human factors and the influence of these factors and their interactions on collision risk, especially lane departure and intersection collisions. The accompanying chart lays out the main projects anticipated. The chart provides a general idea of the flow of work. The exact number, content, and timing of contracts are subject to change.

The in-vehicle driver behavior and crash risk study is shown across the top of the chart, beginning with a Study Design (S05) that leads to data collection starting in 2009 (S07). Project S05, the Study Design, includes the development of a complete data collection system, a field trial of the system, and the management plan for the full study. The Study Design is supported by Project S01 to identify analytic methods to address the research questions and by this project (S03) to evaluate mobile measurement systems collecting detailed and accurate roadway information in the study areas. Project S02 will integrate
the findings of the S01 projects to produce an analysis plan for the full study. The full driver study will be implemented in the third year in three to four study areas with an overall quality assurance and technical coordination contractor (Project S06). Roadway data will be collected in the study areas under a separate project, S04. Project S03 will evaluate vendors seeking to bid on S04. Vendors successful in the evaluation (rodeo) will be able to bid on S04. Multiple analysis projects (S08) are planned to address a wide range of research questions using the data collected.

A second track of research for the SHRP 2 Safety focus area involves site-based video instrumentation and is shown at the bottom of the chart. At this time, only the first project of this track, Project S09, Site-Based Video System Design and Development, is programmed. The purpose of this initial project is to improve the capabilities of existing systems. The Safety Research Plan continues this track with site-based field data collection starting in 2009 under Project S10 and the analysis of the field data in project S11. Execution of this track beyond Project S09 will depend on available funding and on the outcome of Project S09 to improve the capabilities of existing site-based video systems.

Contracts have been awarded for Projects S05 and S09 and five awards were made under Project S01. Approximate starting dates for these projects are reflected in the chart. The subject of this RFP is Project S03: Roadway Measurement System Evaluation.
**Project Background**

Comprehensive roadway data in a geographical information system (GIS) database has been identified as a critical need for the SHRP 2 safety program. Most states and metropolitan planning organizations (MPOs) are improving their base maps and incorporating them in a GIS. Some roadway data are generally included, however, the maps are not comprehensive in that they sometimes cover only roads under the jurisdiction of the state or MPO. More importantly, sufficient roadway data to support safety analysis focused on roadway issues that are critical for the planned study of the relationship of road characteristics to the risk of road departure (e.g., type and location of rumble strips) are generally not available—particularly information on the geometry and features of the road or on the shoulder. To achieve its objective, SHRP 2 will require the services of a commercial vendor(s) to provide accurate mobile data collection of roadway and roadside characteristics and features. However, before SHRP 2 procures these services (Project S04), an evaluation of existing commercial data collection capabilities is required. **The successful proposer for Project S03 will be excluded from proposing on Project S04. See Special Note 1.**

**Objective**

The objective of Project S03 is to develop, organize, and conduct a roadway measurement accuracy evaluation (rodeo). The rodeo will evaluate the accuracy of mobile road and pavement inventory services collected at highway speeds, and will serve as a pre-qualification stage for SHRP 2 Project S04: Roadway Data Collection Using Roadway Information Measurement Van. The objective of Project S04 is to produce a GIS database of roadway and roadside characteristics and features that can be linked with the SHRP 2 in-vehicle driving behavior field study (S07). Please see the [Safety Research Plan](http://onlinepubs.trb.org/onlinepubs/shrp2/SafetyResearchPlan0701.pdf) on the SHRP 2 website for program details. See Special Note 2.

**Tasks**

Task descriptions are intended to provide a framework for conducting the work. SHRP 2 is seeking the insights of proposers on how best to achieve the project objective. Proposers are expected to describe work plans that can realistically be accomplished within the funding and time constraints of this project. Proposals must present the proposers' current thinking in sufficient detail to demonstrate their understanding of the project and the soundness of their approach. See Special Note 3.

**Task 1: Project Work Plan and Quality Assurance/Quality Control Plan**

Develop a detailed work plan and a quality assurance and quality control plan (QA/QC) to meet Project S03’s objective. The proposal shall include a draft work plan that includes the tasks outlined below; an anticipated schedule; the budget required to develop, organize, conduct, and evaluate the rodeo; and a draft QA/QC plan. A final version of the work plan and QA/QC plan will be due no later than 30 days from contract execution.
**Deliverable(s):** Finalized work plan and QA/QC plan.

**Task 2: Determination and Prioritization of Data Elements**
In consultation with SHRP 2 and the active SHRP 2 Safety projects research teams, develop and prioritize the set of roadway data elements likely to be required in anticipated analyses using SHRP 2 data. For parametric data elements, recommended minimum values for precision and accuracy of the measurement should be provided. For all data elements, the reporting format should also be specified. This prioritization should also recommend a minimum set of data elements that must be collected by any participant in the evaluation rodeo. A list of potential data elements for consideration can be found in Appendix A. Appendix A is for illustrative purposes and is not necessarily complete.

**Deliverable:** A report recommending the set of data elements and their specifications that should be measured or identified in the evaluation rodeo, including a minimum set that should be collected by all participants in the rodeo.

**Task 3: Test Site(s) Criteria**
Establish a prioritized set of criteria for a test site(s) to represent the rural and urban conditions in which the S04 contractor(s) will be operating. Proposals shall address but not be limited to:

- What characteristics are required to adequately and fairly test the mobile measurement systems that will participate in the rodeo?
- How will image and geo-registration sensors be evaluated and what is required to test these sensors under differing conditions?
- Are there site characteristics that may introduce biases in favor of one type of system configuration and affect a fair evaluation?

Variations in terrain, vegetation, pavement and shoulder type, and road geometry are among, but are not the limit of, the features to consider. In addition, consideration should be given to attributes such as site availability, cost, contracting requirements, geographic location, and how weather or any other location-related factors might affect the project (see Special Note 4). Some state departments of transportation and other organizations may have access to existing test facilities with suitable attributes. A mechanism to identify suitable, pre-existing facilities should be a feature of the overall plan.

If a public road is used, address all necessary traffic control requirements (see Special Note 5) and responsible agency cooperation.

Appendix A provides a preliminary list of data elements to be included in the test site. Proposers are encouraged to provide their input on these elements and associated accuracies, as well as additional elements that should be considered as part of the rodeo to achieve the project objective. In order to include all the data elements in the rodeo, certain features may need to be added to the site (e.g., signage, rumble strips, guardrails, and other street furniture/assets). The test site(s) will include all the required features in a distance suitable for multiple runs and an adequate evaluation.
Deliverable: Report on test site criteria.

Task 4: Test Site(s) Evaluation and Recommendation
Evaluate test sites against the prioritized set of criteria and other attributes (e.g., site accessibility) from Task 3. Recommend, in ranked order, a list of potential test site locations for the rodeo (maximum 5). These may be existing test sites or a test site(s) at a new location. Thoroughly support your conclusions.

Deliverable(s): A report outlining the factors that support the choice and rank of sites. Provide any necessary documents in support of your conclusions as appendices—clearly indicate the salient information in the appendices. Provide a visual presentation to SHRP 2 on the site selection process.

SHRP 2 will make the final site selection. The contractor must get approval from SHRP 2 on site selection before proceeding with Task 5.

Task 5: Test Site Mapping and Surveying
Establish an accurate baseline of locational attributes of all required features on the test site. Some of the locations of the features may best be confirmed by manual field inspection and others located using photogrammetry or other survey techniques. A portion of the features may be ideally suited to location determination using photogrammetry with a combination of terrestrial methods. The proposal shall include the mapping/surveying procedures and clearly address ground truth requirements. All measurements, plans, and data will be certified correct by a Professional Land Surveyor (P.L.S).


Task 6: Organize and Conduct Rodeo
The rodeo must be completed by October 31, 2008, at the latest. The contractor will organize and conduct the rodeo while adhering to this time requirement. Both domestic and international vendors are anticipated to participate. As described above, the draft work plan and draft QA/QC plan shall include the proposers' current thinking regarding this task in sufficient detail to demonstrate their understanding of the project and the soundness of their approach. Proposals shall address, but not be limited to the following concerning the organizing and conducting of the rodeo:

- Experiment design for conducting the rodeo and data gathering processes
- A communications plan to advertise the rodeo, inform potential participants of requirements, logistics, etc., and, if necessary, coordinate project communications with those regarding any associated event
- A plan for coordination with test site owners to ensure all requirements for access and use of the site are observed
- All aspects associated with organizing the rodeo, including: registration, lodging, and other associated logistics.
• Possible intellectual property (IP) issues among vendors and ramifications concerning scheduling
• An anticipated schedule for the entire event, including any calibration and post-processing requirements of the vendors
• Prequalification requirements for vendors to enter rodeo
• Vendors’ requirements for formatting output data
• Public access to site and all safety and traffic management requirements
• Site security and preventing vendors from accessing the site prior to the evaluation
• Testing the sensing and image processing functions under differing conditions
• Transient environmental factors (e.g., variance in cloud cover and lighting conditions; wet weather conditions)
• Influence of traffic conditions and variations in speed of measurement device
• Vendors’ on-site calibration requirements
• Vendors’ on-site service requirements
• A contingency plan in case of inclement weather interrupting or cancelling the event
• A plan for dealing with vendor equipment failure or any other similar circumstance affecting performance

Task 7: Data Evaluation
Develop the data evaluation criteria and protocol. The proposal shall include a draft evaluation procedure. Consider any factors that might affect the data (the QA/QC plan will address these issues). Data will be formatted and standardized such that vendors’ performances can easily be compared to the reference measures and to one another.

Deliverable: A report documenting the results of the evaluation process and an assessment of individual vendors based on data collection and participation in the rodeo. This report needs to provide SHRP 2 with the necessary information on individual vendors’ performances to make an informed decision in the selection of vendors able to bid on S04.

Task 8: Final Project Report
The final report will document all aspects of the project. This report shall include: the finalized work plan and QA/QC plan; any circumstances or events that may have influenced the rodeo and/or data collection and assembly process; the assembled data set to be used for evaluation without vendors identified by name; an overall assessment of the state of the practice for data collection of the elements included in the rodeo. The report should also provide recommendations regarding the data elements to be collected in Project S04 and associated data specifications. Cost implications of this recommended data set should also be provided. A draft report is due at the end of month 12; the final revised version is due at the end of month 15.

Deliverables (See Special Note 6)
Task 1: Finalized work plan and QA/QC plan due no later than 30 days from contract execution.

Task 2: A report recommending the set of data elements and their specifications that should be measured or identified in the evaluation rodeo, including a minimum set that should be collected by all participants in the rodeo. The report is due no later than 45 days from contract execution.

Task 3: Report on test site criteria due no later than 45 days from contract execution.

Task 4: Report on choice and rank of sites; visual presentation to SHRP 2 on the site selection process. The visual presentation is due no later than 90 days from contract execution with the written report due 5 business days prior to the visual presentation. Approval is required from SHRP 2 on site selection before proceeding with Task 4.

Task 5: Survey plan and P.L.S. certification report due prior to the execution of the rodeo.

Task 6: Execution and completion of the evaluation rodeo.

Task 7: Evaluation report due by January 2009 at the latest.

Task 8: A draft final report is due at the end of month 12; the final revised version is due at the end of month 15.

Meetings
1. Site selection meeting in Washington, DC (see Task 4).
3. One interim meeting with the Safety Technical Coordinating Committee (TCC) either in Washington, DC; Irvine, CA; or Woods Hole, MA.
4. Two SHRP 2 contractor meetings (all SHRP 2 Safety contractors participate), dates and locations to be determined.
5. TRB Annual Meeting, January 2009 in Washington, DC.
6. Telephone conference calls, as needed.

Special Notes: [All Special Notes should be reviewed by proposers]
Note 1: The S03 contractor cannot propose on Project S04 (Roadway Data Collection Using Roadway Information Measurement Van).

Note 2: Qualified organizations planning to propose should be familiar with issues concerning road and pavement data collection, mobile mapping technologies, and able to provide Professional Land Surveyor (P.L.S.) services.

Note 3: The contractor will work closely with SHRP 2 on refining the tasks and schedule to meet the project and program objectives.
Note 4: A related event might be under development by North Carolina Department of Transportation and scheduled for fall of 2008. The S03 contractor may take this into consideration in the site selection process.

Note 5: While traffic control may be necessary for the test site(s), in Project S04 data will be collected under normal traffic conditions, without special traffic control.

Note 6: While an anticipated task schedule is provided in this document, SHRP 2 will consider revisions to the proposed schedule as long as the proposer adheres to the overall project time frame and the rodeo is completed no later than October 31, 2008.

**Funds Available:** $500,000

**Contract Period:** 15 months for the entire project

**Responsible Staff:** Charles R Fay cfay@nas.edu 202-334-1817

**Authorization to Begin Work:** February 2008, estimated

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**Proposals (20 single-bound copies) are due not later than 4:30 p.m. on September 18, 2007**

This is a firm deadline, and extensions simply are not granted. In order to be considered, all 20 copies of the agency's proposal, accompanied by the executed, unmodified Liability Statement must be in our offices not later than the deadline shown, or they will be rejected.

**Delivery Address**
PROPOSAL-SHRP 2
ATTN: Neil F. Hawks
Director, Strategic Highway Research Program 2
Transportation Research Board
500 Fifth Street, NW
Washington, DC 20001
Phone: 202-334-1430

Phone: 202-334-1430

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**Liability Statement**
The signature of an authorized representative of the proposing agency is required on the unaltered statement in order for SHRP 2 to accept the agency's proposal for consideration.

Proposals submitted without this executed and unaltered statement by the proposal deadline will be summarily rejected. An executed, unaltered statement indicates the agency's intent and ability to execute a contract that includes the provisions in the statement.

Here is a printable version of the Liability Statement (pdf). A free copy of the Adobe Acrobat PDF reader is available at [http://www.adobe.com](http://www.adobe.com).
**General Notes**

1. Proposals will be evaluated by SHRP 2 staff and Expert Task Groups (ETGs) consisting of individuals collectively very knowledgeable in the problem area. Selection of an agency is made by the SHRP 2 Oversight Committee, based on the recommendation from SHRP 2 staff and the ETG. The following factors are considered: (1) the proposer’s demonstrated understanding of the problem; (2) the merit of the proposed research approach and experimental design; (3) the experience, qualifications, and objectivity of the research team in the same or closely related problem area; (4) the proposer’s plan for participation by disadvantaged business enterprises—small firms owned and controlled by minorities or women; and (5) the adequacy of facilities.

2. Any clarifications regarding this RFP will be posted on the SHRP 2 Web site (www.TBR.org/SHRP2). Announcements of such clarifications will be posted on the front page and, when possible, will be noted in the TRB e-newsletter. Proposers are advised to check the Web site frequently until August 15, 2007, when no further comments will be posted.

3. According to the provisions of Title 49, Code of Federal Regulations, Part 21, which relates to nondiscrimination in federally assisted programs, all parties are hereby notified that the contract entered into pursuant to this announcement will be awarded without discrimination on the grounds of race, color, religion, sex, national origin, or disability.

4. The essential features required in a proposal for research are detailed in the *Manual for Conducting Research and Preparing Proposals for SHRP 2*. Proposals must be prepared according to this document, and attention is directed specifically to Section IV for mandatory requirements. Proposals that do not conform to these requirements will be rejected.

5. The total funds available are made known in the project statement, and line items of the budget are examined to determine the reasonableness of the allocation of funds to the various tasks. If the proposed total cost exceeds the funds available, the proposal is rejected.

6. All proposals become the property of the Transportation Research Board. Final disposition will be made according to the policies thereof, including the right to reject all proposals.

**IMPORTANT NOTICE**

Potential proposers should understand that the research project described herein is tentative. The final content of the program depends on the level of funding made available. Nevertheless, to be prepared to execute research contracts as soon as possible after sponsors’ approvals, the Strategic Highway Research Program is assuming that the tentative program will become official in its entirety and is proceeding with requests for proposals and selections of research agencies.
### Project S03 Appendix A:
Non-Exclusive List of Data Elements to be Considered for Evaluation

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Suggested for the evaluation</th>
<th>Suggested accuracies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency or interval (distance btw measurements)</td>
<td>Y</td>
<td>2 feet</td>
</tr>
<tr>
<td>Centerline location</td>
<td>Y</td>
<td>+/- 1 inch</td>
</tr>
<tr>
<td>Stationing, mile points</td>
<td>Y</td>
<td>+/- 1 foot</td>
</tr>
<tr>
<td>Number of lanes</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Extra lanes (lane drop/addition)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Lane width</td>
<td>Y</td>
<td>+/- 1 inch</td>
</tr>
<tr>
<td>Edge markings</td>
<td>Y</td>
<td>+/- 1 inch</td>
</tr>
<tr>
<td>Pavement edge</td>
<td>Y</td>
<td>+/- 2 inches</td>
</tr>
<tr>
<td>Shoulder type and width</td>
<td>Y</td>
<td>+/- 1/2 foot</td>
</tr>
<tr>
<td>Type and location of rumble strips</td>
<td>Y</td>
<td>+/- 1 inch</td>
</tr>
<tr>
<td>Grade</td>
<td>Y</td>
<td>+/- 0.05%</td>
</tr>
<tr>
<td>Curvature</td>
<td>Y</td>
<td>PT/PC within 2 feet</td>
</tr>
<tr>
<td>Median width</td>
<td>Y</td>
<td>+/- 1 foot</td>
</tr>
<tr>
<td>Median barrier(type)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Cross slope-rural (up to 100')</td>
<td>Y</td>
<td>+/- 0.05%</td>
</tr>
<tr>
<td>Cross slope-urban (up to 10 ')</td>
<td>Y</td>
<td>+/- 0.05%</td>
</tr>
<tr>
<td>Signs should be located and identified (e.g., speed limit, route, warning - curve ahead, school crossing, etc.)</td>
<td>Y</td>
<td>+/- 2 feet</td>
</tr>
<tr>
<td>Sight distance (stopping)</td>
<td>Y</td>
<td>PT/PC within 2 feet</td>
</tr>
<tr>
<td>Edge drop</td>
<td>Y</td>
<td>+/- 0.5 inch</td>
</tr>
<tr>
<td>Wedge for edge drop</td>
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<td></td>
</tr>
<tr>
<td>Driveways/access points (or access points per mile)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Feature</td>
<td>Requirement</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>-------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Guard rail, cable, attenuators, curb</td>
<td>Y</td>
<td>2 ft in line of travel, 1/2 ft edge pavement</td>
</tr>
<tr>
<td>Raised pavement markings</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Image (photolog, or stereoscopic with photogrammetry)</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Roadside obstacles (mailbox, poles, trees, buildings/ clear zone-Urban)</td>
<td>Y</td>
<td>2 feet in line of travel, 1/2 foot edge pavement</td>
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<tr>
<td>Roadside obstacles (mailbox, poles, trees, buildings/ clear zone-Rural)</td>
<td>Y</td>
<td>2 ft in line of travel, 1/2 ft edge pavement</td>
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<tr>
<td>Pavement type</td>
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<td></td>
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<tr>
<td>Pavement condition</td>
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<td>within standard</td>
</tr>
<tr>
<td>Pavement roughness</td>
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<td>within standard</td>
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<tr>
<td>Pavement macrotexture</td>
<td>Y</td>
<td>within standard</td>
</tr>
<tr>
<td>Bridges/approaches</td>
<td>Y</td>
<td>+/- 2 feet</td>
</tr>
<tr>
<td>Rail crossings</td>
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<tr>
<td>Street lighting</td>
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<tr>
<td>Sign reflectivity</td>
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<td></td>
</tr>
<tr>
<td>Vertical underclearance</td>
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<td></td>
</tr>
<tr>
<td>Pavement coefficient of friction</td>
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<tr>
<td>Intersections</td>
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</tr>
<tr>
<td>Intersection configuration and dimensions</td>
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</tr>
<tr>
<td>Pavement markings</td>
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<td>+/- 1 inch</td>
</tr>
<tr>
<td>Number access points</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>Controller cabinet/ Pole locations</td>
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</tr>
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</table>