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16. Abstract

In late 2009, The Texas Department of Transportation (TxDOT) proposed the development of a Strategic Research Program (SRP) to prepare the department for the transportation challenges likely to be faced in the next 10–30 years. This report documents the results of the work conducted by the Center for Transportation Research (CTR) at The University of Texas at Austin, the Texas Transportation Institute (TTI), and The Center for Multidisciplinary Research in Transportation (TechMRT*)* at Texas Tech University, to assist TxDOT in developing the elements of the SRP.

The scope of the proposed SRP is to complement the current technical research program by addressing longer-term and broader transportation issues that the State Legislature and TxDOT Administration foresee affecting the efficiency and viability of the statewide transportation system. It is envisioned that products would differ from standard research reports in that they would be more concise and audience-friendly, and would be disseminated in forms more appropriate to newer technologies. Research recommendations could require legislative action and/or internal departmental adjustments.

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Proposed TxDOT Strategic Research Program

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Chapter 1. Introduction

1.1 Background

In late 2009, the Texas Department of Transportation (TxDOT) proposed the development of a Strategic Research Program (SRP) to prepare the department for the transportation challenges likely to be faced in the next 10–30 years. TxDOT invited representatives from three university transportation research centers in the state, namely, the Texas Transportation Institute (TTI), the Center for Transportation Research (CTR) at The University of Texas at Austin, and The Center for Multidisciplinary Research in Transportation (TechMRT*)* at Texas Tech University, to assist in developing the elements of the SRP and outline its procedures. This report documents the results of the work conducted by the three institutions.

The scope of the proposed SRP is to complement the current technical research program by addressing longer-term and broader transportation issues that the State Legislature and TxDOT Administration foresee affecting the efficiency and viability of the statewide transportation system. The intent is that it should examine challenges and opportunities presented by social and economic trends, transportation funding, energy resources, likely changes in the natural environment, and technological advancements, among others. It is envisioned that products would differ from standard research reports in that they would be more concise and audience-friendly, and would be disseminated in forms more appropriate to newer technologies. Research recommendations could require legislative action and/or internal departmental adjustments.

1.2 Research Work Plan

The following tasks were conducted by the research team, which was led by CTR.

1.2.1 Task 1: Makeup and Role of Oversight Panel (TTI)

In this task researchers developed a proposed plan for an oversight panel. The primary product of this task was a set of matrices of criteria for panel selection and, where possible, identification of specific individuals who might meet those criteria. The research team had no contact with anyone other than TxDOT about panel membership. A secondary product was a set of scenarios for alternative panel roles. The research team developed a document to lay out the role and expectations of panel members, so that TxDOT, or the Texas Transportation Commission, could agree upon the assignment, and allow invitation letters to provide the individuals a clear picture of their possible assignment. This task was led by TTI.

Subtask 1.1. Panel Membership: Researchers identified alternatives for membership on the oversight group, including the stakeholders groups from which members could be selected and an approximate number of panel members to be selected. A key factor in panel membership was the expected audience of the research products. It was assumed that one important role of the panel will be to "validate" and support the research to key stakeholder groups, so the members could be chosen with that role in mind. As an initial step in the subtask, the research team interviewed TxDOT Administration and others as directed, to assure that TxDOT's intent for the panel is reflected in the membership.

Selection criteria were based upon the viewpoints that panel members are expected to bring to the panel. Viewpoints include geographically defined (Texas regions, or the U. S. or the world), industry-specific (heavy construction, manufacturing, retailing, transportation), or reserved to those providing transport services (such as ports, truckers, railroads, airports) or users of transportation services.

Subtask 1.2. Panel Institutional Issues: In this subtask researchers examined the potential term and rotation schedule of panel members. The product of the subtask was alternative schedules that will provide adequate time for members to become accustomed to the role, without creating an undue burden.

Subtask 1.3. Panel Role Delineation: The research team identified alternative roles for panel interaction with the research projects and the support necessary for each role. For example, one alternative explored was full panel involvement with each project, such that the panel becomes the "owners" and proponents of the research findings. This role would be similar to that played by the Texas 2030 Committee, but would be time and effort intensive for both the panel and the research teams.

On the other end of the involvement spectrum is a role wherein one panel member is designated as a liaison to the research team and is highly familiar with (but not an "owner" of) one project. Other panel members would be assigned liaison roles to other projects. In this scenario the panel members could see more meaningful involvement which could derive more interest in service on the group. This member role would be less time and effort intensive than the first alternative for the majority of member.

In this subtask researchers also examined other similar panels nationally and identified the potential roles and impacts for each of 3–4 alternatives.

Subtask 1.4. Panel Activities Determination: Researchers in this subtask fully described the expected panel member activities for performance of duties as envisioned by TxDOT and informed by work in previous subtasks. Panel activities include those that are relevant to the group as a whole, such as annual or semi-annual meetings for setting the research agenda and project selection, as well as possibly activities associated with individual research projects, corresponding to the project roles identified. Finally, researchers drafted a document that could be used for inviting membership on the oversight panel that fully describes expectations related to member involvement.

Subtask 1.5. Panel Support Requirements: In this subtask the researchers estimated the travel and support requirements and identified appropriate and allowable mechanisms to reimburse the panel members for expenses.

1.2.2 Task 2: Development of Alternative Project Management Approaches (TTI)

Because the new policy research program differs from the Department's established technical research program, researchers in this task provided an array of options for managing the work to be undertaken. This task was led by TTI.

Subtask 2.1. Identification of Program Management Scenarios: In this subtask, researchers identified alternative approaches used nationally to manage research programs, particularly policy research projects (e.g., TxDOT Research Management Committee (RMC) program, National Cooperative Highway Research Program (NCHRP), Texas 2030 Committee, other centers for policy research, etc.).

Subtask 2.2. Selection of Program Management Approach: Taking the information obtained in Subtask 2.1 researchers developed alternatives to reflect the panel roles determined in Task 1. Following a review of the alternatives by the appropriate TxDOT staff, a final recommended description of program management was developed, including a detailed implementation schedule. Researchers developed a schedule with the intent of initiating the first projects by September 1, 2010.

Subtask 2.3. Implementation Package for Program Management: In this task, based on the recommended role of the panel, the nuts and bolts of implementing that scenario were determined. Researchers provided the details for the day-to-day project management. Roles, by entities, and timelines were outlined, as well as the format for appropriate forms or other mechanisms for program management.

1.2.3 Task 3: Communicating Information (Texas Tech)

This task outlined the proposed method of internal communication for TxDOT's Strategic Research Program, regarding the collection of information for research needs, calls for research briefs/white papers, problem statements and project proposals, and evaluation and award of problem statements and proposals. This work was led by Texas Tech.

The following is a brief comparison of the methods other transportation research agencies use in their communications:

NCHRP regularly advertises for competitive proposals by releasing detailed project statements on the TRB website. Interested parties can browse the list of RFPs at any time, and can also sign up for listservs that will automatically notify them when new projects are posted.

Problem Statements and Request for Proposals are crafted by a Research Panel over the course of a two-day meeting, then staff posts the RFP on the website. The Research Panel meets again to select the winning proposal. TRB staff notifies the winning contractor, and the identity of the successful proposer is confidential until the contract is awarded.

FHWA's Exploratory Advanced Research (EAR) program includes foundational work that anticipates the questions and future needs in applied research or the application of innovations from other industries to the transportation sector. Currently in the third round of projects under the EAR program, six focus areas were selected. RFPs are announced via Broad Agency Announcement located on the FedBizOpps website. Peer review panels are comprised of federal, state, academic, and international scientific and engineering experts and frequently include multiple disciplines to better assess cross-applications and novel approaches to research. In addition to peer review, a multidisciplinary management group within FHWA also assesses the mission focus and overall balance of projects within a round of research funding.

In this research task, these practices were studied in greater detail, and adapted to fit the specific needs of long-range strategic research needs, in accordance with decisions made on the Topic

Selection Process and Review Panel Criteria tasks. Primary means of communication will be through a dedicated website, via email and newsletters. Similar to the process of NCHRP requests for proposals, projects will be posted on the website for anyone to browse, and interested parties will be able to sign up to be notified via email of all new projects as they are posted.

Evaluation of research needs statements and proposals could also be via a website, but with access necessarily restricted. A system similar to RTI's method used in 2009 for evaluation of RMC 5 (Structures and Hydraulics) problem statements is proposed, with readers able to make comments/ratings directly to the website.

In addition to electronic communication, an annual or semi-annual newsletter was proposed.

1.2.4 Task 4: Topic Identification Process (CTR)

The objectives of this task were twofold: (1) to develop a preliminary set of broad initial themes to get the strategic research program launched, and (2) to define procedures for acquiring, screening, and developing research topics. This task was led by CTR.

Subtask 4. 1: Develop broad themes for the strategic research program: The researchers surveyed a broad range of transportation professionals to gather 'big picture' transportation issues that they consider critical for the future. These issues were grouped into themes. In addition, the researchers looked at Strategic Plans from Mexico and Canada, other DOTs, the EU (FP7, COST,) Australia, Japan, China, the UK, etc. The researchers also talked with special interest groups to discuss what they see as future transportation issues. The results were organized as a base document for the governing panel to build on as the program is launched. In addition, issues were prioritized within each theme, and a total of about ten ideas were recommended to TxDOT for development as the first round of FY 2011 research statements.

As a follow-on process for updating the themes of the program, the researchers explored other ideas, such as "town hall" style meetings around the state to collect information regarding current concerns and the perception of long-term issues facing Texas' transportation system. These could be done in person or via webinar.

Subtask 4.2: Define procedures for developing research ideas: The research team outlined a set of procedures for soliciting research ideas from a variety of sources via the communication mechanisms developed in Task 3, for example through an online 'suggestion box' that is open all year round, in addition to a regular call for ideas from a selected group. Opportunities from transportation forums such the Annual Short Course and others were also considered. In addition, ideas that the regular Research Management Committee program considered 'far out' could get an opportunity for a second look. Procedures for reviewing inputs and notifying submitters of the disposition of their ideas were included. Procedures for fleshing out selected ideas were proposed, including the use of a new concept called a research brief.

1.2.5 Task 5: Topic Selection Process (CTR)

The objective of this task was to lay out procedures for screening and ranking research topics/ideas. This task was led by CTR.

The researchers proposed that ideas and discussions from Task 4 would be reviewed and ranked by a panel at a defined frequency, perhaps semi-annually. The review would also include ideas that did not make the cut in the previous review. Criteria for idea selection were developed, including their appropriateness to the needs of TxDOT and to the broad themes from Sub-task 4.1. Initially it was proposed that, for the assessment of each idea, a brief 'literature review' prepared by a TxDOT staffer would be required, listing the results of research related to the idea completed in the last 10 years or ongoing. The output from this screening would be a short list of about ten ranked ideas for presentation to the governing panel described in Task 1. The ranking procedure might be by vote, with discussion and re-vote in the case of ties.

However, the TxDOT research project panel preferred that the oversight panel rank the list of ideas directly. The panel's ranking procedure could be by consensus or by vote, at the panel's discretion. The panel will be able to add to the slate of ideas, and select 10 every six months for development of research briefs. From the research briefs, the panel would select those that merit funding as a full research project.

1.2.6 Task 6: Develop "White Paper" Concept (Texas Tech)

As originally proposed, white papers in the Strategic Research Program would be reports explaining a specific issue or policy. Each paper would be a heavily referenced document that explains research or arguments on a specific issue. Unlike more traditional governmental White Papers, the SRP white papers would not have the intent to persuade, but instead to cover the issues in a more complete yet succinct way, so that all sides of a topic are given full treatment. It might look at different tactics to handle a situation or problem and give evidence regarding the effectiveness of these plans, or it may simply sum up all of the previous arguments for a subject of importance. **However, during the research effort, the panel felt that the term "white paper" could be misinterpreted, and asked instead for a conceptual "research brief."**

The purpose of the research brief in the Strategic Research Program is to discuss broad issues facing Texas transportation over the next several decades. Research briefs will be used to explain the issues in layman's terms to legislators and stakeholders, and to present an unbiased "pro and con" look at the issues and possible resolutions. Research briefs will be an educational document similar to a problem statement, but broader in scope and more accessible to general readers.

The envisioned audience for these research briefs is the state legislature, the Texas Transportation Commission, the general public, and the research community; principally in that order. The broad directive for the SRP is to develop knowledge to meet long-term legislative concerns regarding transportation in Texas. In this proposal we envision that these papers would address issues that need forethought for about 20 years into the future, and would provide information and even guidance to the legislature.

An example of a "broad topic" could be motivated by a seemingly simple question: How will transport needs change if 40% of current daily commuters become full-time virtual workers?

Without even asking if this is a good outcome, there are issues of communications that must become more reliable, a whole change in the perception of work and face time, and whether the changed revenue stream will foster a deterioration of the transport infrastructure that must be in place for the kinds of work that cannot be virtualized (i.e., the communications tradesmen still need to be able to move themselves and material to maintain the virtual work environment, fuel, food, and medicine still need to move, and so on). A single question can spawn an intricate web of interactions that need explanation in order for the legislature, transportation commission, and the public to set a policy that is proactive rather than reactive. The research brief program is one component that would identify these interactions and explain interdependence and the possible consequences of change, and identify the uncertainties and unknowns—areas where research is needed.

These "broad topic" questions would be formulated by the guiding committee identified in Task 1 as well as from internal/external communications avenues identified in Task 3.

Several models were explored in the development of research briefs, including:

- Establish research panels to identify research needs, and seek experts in that area to write the research brief on the topic.
- Establish a research panel to identify need, and have one member of the panel write the research brief.
- Let a research panel outline the problem and collectively write the research brief.

The researchers envisioned a research panel consisting of two TxDOT employees appropriate to the topic, two university research personnel, and possibly two individuals from industry related to the topic (trucking companies, utilities, etc.). Subsequently, it was decided that university researchers would lead each effort.

In the context of Transportation Research these papers would be along the lines of a synthesis report, but broader in scope, performed on a shorter time frame, and targeted to the needs of the audience. Thus the panel of authors would be responsible for not only writing the actual paper but for review of the supporting literature, (where it exists) that explains the problem or position that is the topic of the paper.

The actual mechanics of writing would be based on guidance found in current business literature such as the essay by Michael Stelzner, "How to Write a White Paper—A White Paper on White Papers." He focuses on the successful elements of the marketing white paper, which include outlining a problem, evaluating the historical background of a problem, offering generic concepts that might pose a solution and the benefits, and finally introducing the unique solution to the problem, or in other words writing about the product or idea that will solve the problem. The SRP research brief concept can borrow heavily from such an approach to produce a reasonably unbiased explanation of a problem or policy issue. Naturally these research briefs could evolve after Strategic Research results are acquired, into a conventional, persuasive policy recommending report.

1.2.7 Task 7: Implement the Plan (CTR)

The objective of this task was to develop recommendations for implementing the Strategic Research Program. This task was led by CTR.

The recommendations from each research task were organized into a logical series of steps. The requirements for implementing them, (namely, resources, responsibilities, and timeline) were laid out in a work plan. The researchers worked with the designated parties to get the plan executed, and to have the program up and running early in Fiscal Year 2011. As the research evolved, the research team documented changes to the procedures and other outputs, and the final results are included in this research report.

1.3 Organization of This Report

This chapter presented the background and justification for this research effort, and the research tasks. At the completion of each task the research team submitted a technical memorandum to TxDOT. This report combines the various technical memoranda and other outputs of the research effort.

Chapters 2–8 present the results of Tasks 1–7 respectively. Conclusions and recommendations are contained within each chapter. Appendix A is a listing of almost 600 ‘ideas’ for strategic research gathered in this project, plus a shortlist of 35 selected for consideration to be developed as research briefs.

Chapter 2. Makeup and Role of the Oversight Panel

2.1 Introduction

The proposed TxDOT Strategic Research Program (SRP) is intended to prepare the department for the transportation challenges likely to be faced in the next 10–30 years. This chapter addresses Task 1 of the joint University project assignment to assist TxDOT in establishing the SRP. This task was led by TTI. Specifically, it contains observations and recommendations related to forming an oversight panel to oversee the program. Additional input on the Panel makeup will be obtained from Texas Transportation Commission members after September 2010.

2.2 Makeup and Role of Oversight Panel (Task 1)

Arriving at the primary product of the task was facilitated by developing matrices of criteria for panel selection, which were drafted and shared with the project management panel (PMC) prior to the project panel meeting of May 10, 2010. It resulted from individual conversations with each of the PMC members and a handful of other key TxDOT executive staff stakeholders, as well as a workshop that included TTI and CTR researchers. A copy of the matrix, amended by conversation in the May and subsequent PMC meetings, is included as Section 2.3 of this chapter.

The secondary product was to be one or more scenarios for panel roles. This product was also distributed to PMC members and discussed in several PMC meetings. A copy of that document, in its evolved state, is included as Section 2.4 of this chapter.

2.2.1 Panel Membership (Subtask 1.1)

The researchers delineated a range of options on the SRP goals, the possible roles of the oversight panel, and attributes or characteristics of its members, through discussions with TxDOT staff. These interviews/discussions were fully documented and sorted into categories for evaluation and consideration.

One of the major outcomes of the process undertaken is the recommendation that the initial oversight panel be purposely smaller in number than an eventual panel may become, and that the initial work to be developed be somewhat limited in scope so that the principals (panel members) are able to be thoroughly engaged in developing the body's role and the consideration of other points of view or expertise needed.

The researchers suggest to the Department that the preferred panel members would include one or more of the key characteristics. The Panel's blend of expertise, background, and involvements in organizations or enterprises is also of great importance. The PMC recommended visiting with individual members of the Texas Transportation Commission to request names of individuals who may best represent that mix. RTI Director Rick Collins and researchers briefed the Commission on August 25, 2010, and individual meetings with Commissioners to discuss the topic were arranged beginning in September 2010 to solicit input.

The researchers found that it is desirable to have individuals with the following characteristics in the collective panel membership:

- Private sector executives who are users of the multimodal Texas transportation system and experience with "what if" scenarios in their own businesses;
- Private sector finance/international business experts;
- Technical experts with a broad-base of transportation knowledge in one or more fields such as mobility, safety, economics, or demographics; and
- Public or private sector individuals of national standing and credibility in the transportation field.

Many of the other characteristics identified as benefitting the strategic agenda development could be made available through individuals or groups who may serve as additional resources to the panel. For example, representatives of statewide or national groups or individuals representing various transportation businesses (engineers, contractors, private venture developers, and others) could be called upon to provide briefings and background to the Panel. Likewise, other groups such as chambers of commerce, statewide and regional transportation advocacy groups (Transportation Advocates of Texas, Ports to Plains, Dallas Regional Mobility Council, Tarrant Regional Transportation Coalition, etc.) could be called upon as resources.

Just as a mix of expertise and perspective is required, researchers recommend that there be a secondary consideration of membership by geographic distribution. If possible, both urban and rural interests should be represented, as well as some attempt made for distribution throughout the state. For any major geographical area that does not end up with direct representation on the Panel, extra care should be put into seeking additional resources from that area.

2.2.2 Panel Institutional Issues (Subtask 1.2)

The researchers recommend that there be six original members on the Panel, each serving three-year, staggered terms. It is also recommended that in the initial year, there be up to four meetings. The number and conduct of meetings will be affected by the timing of appointment of the members and acceptance of recommendations on the roles to be undertaken.

Also, during the first year, it is anticipated that the Panel could wish to meet more often, for orientation to the challenges and to gain a solid understanding of the desired use of the strategic research to be undertaken.

While no TxDOT staff members are being recommended to serve on the Panel, there is a need for direct TxDOT RTI involvement. It is recommended that an RTI professional be assigned to the Panel for performance of fiduciary and operational duties associated with the program. RTI may wish to form an internal task force of TxDOT senior staffers and university researchers, as discussed below. There should be a direct, stated link to TxDOT upper management as well, so that the work undertaken is fully understood by the staff and resources provided to the Panel.

Additionally, it is important to establish a direct link to the Transportation Commission. After the first year, it is anticipated that the Panel should present an annual work plan for presentation to

the Commission. At this session, the Panel would present findings of the previous year's efforts, and review the anticipated work program and the benefits and costs associated with each undertaking.

2.2.3 Panel Role Delineation (Subtask 1.3)

The SRP Panel should direct the strategic research for the department by independently selecting and overseeing the research, much like the recent 2030 needs assessment exercise. This independence is seen to be of benefit in maintaining the reality and perception of unbiased, thought-provoking work.

This group would ideally bring their individual experiences to the table, yet be open to considering strategies that are not the norm for TxDOT. It also seems desirable that it participate with a focus on the goal of providing the state with better tools to address transportation challenges and the big picture future of the state's transportation needs and solutions.

The SRP Panel should be an "owner and promoter" of the research product. This could mean advocating for change with the Commission, other state agencies, or the Legislature.

Because of the independent nature of the group, it seems imperative that during its first year of existence, that it define the work program and be engaged in some way in the development of the work product. It may also wish to engage outside expertise to provide information or to become involved in commentary on work product. Depending on the nature of the chosen projects, individual members of the Panel could be considered as a "liaison" to individual projects, and then be considered the "champion" of that research project result.

In the first year of operations, the PMC that oversaw the process for establishing the SRP will act to select a variety of subjects for researchers to investigate. Brief research papers that summarize existing national, and perhaps international, knowledge on the subjects will be written and presented to the SRP Panel for further consideration. The Panel will then decide if additional information or research is needed on those, or other subjects.

The researchers have looked at alternative processes for panel member roles, and see that there may not be just one process used for all projects. The nature of strategic research is such that there are normally multiple facets to be considered. Thus, it could be that there is one project that would be well served by one Panel member being the liaison to it and become the champion of the project results; while there could be others that are more complicated and longer in time span and require the involvement of multiple Panel members. Providing the Panel the flexibility to decide the level of involvement is seen as desirable.

2.2.4 Panel Activities Determination (Subtask 1.4)

It is hypothesized that the greater the involvement of the individual Panel member, the better the benefit to the process. Researchers suggest above that flexibility is desirable because empowering the Panel to organize and evolve as it sees fit should result in a better program. However, the program must begin and cannot emerge fully matured from the first day. Thus, the Figure 2.1 chart reflects a suggested summary of initial year activities.

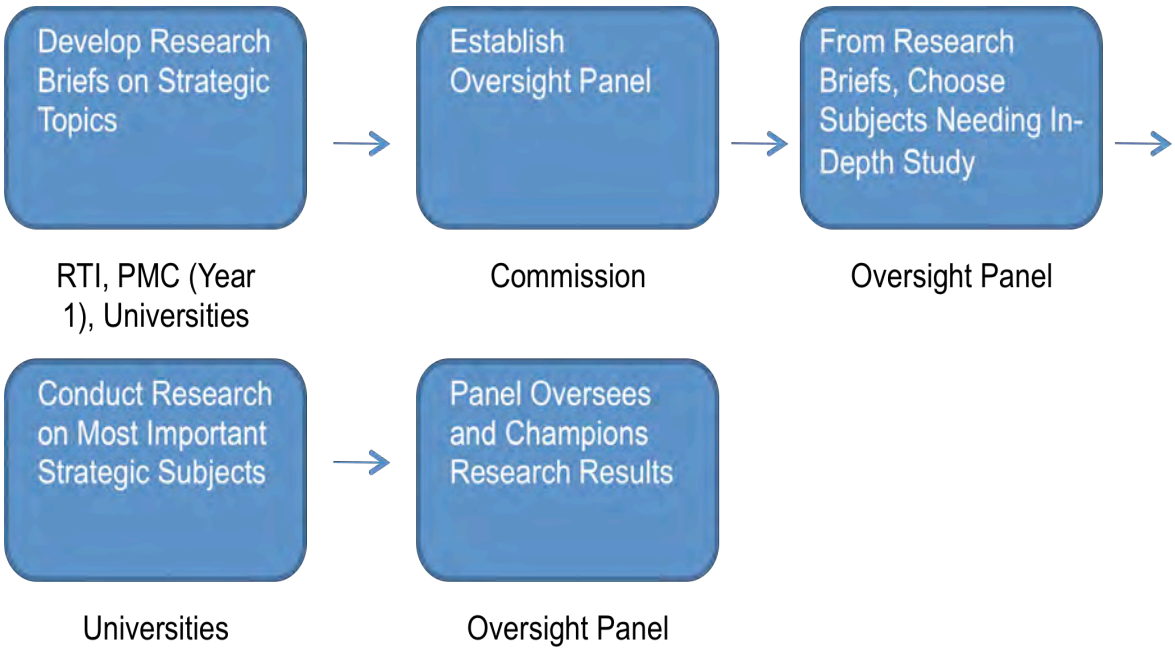

Figure 2.1: Summary of Activities in First Year of SRP

In the first year, the PMC will select the topics for Research Briefs to be developed by the participating universities. Thus, work will be underway on these briefs during the time taken to appoint the Panel. It is assumed that the Commission will name the Panel chair when making appointments to the group. It is recommended that an initial meeting of the Panel would include:

- An informal function or activity to allow for introductions to each other, executive staff, support staff, and experts;
- Briefings by staff and possibly outside experts (university members and perhaps a dynamic national figure concentrating on strategic and/or future studies;
- Consideration of the roles recommended;
- Evaluation of any research briefs completed prior to the Panel's first meeting and consideration of any briefing subjects requiring more in-depth research; and
- Development of a calendar for the remainder of the year, or at least six months.

For the in-depth research, assuming that the Panel agrees with the suggestion for individual members to be liaisons to individual projects, there should be meetings, either in person or via electronic (video) means, between the group to be executing the research and the Panel member involved as liaison to that project. At this first meeting, there should be agreement on the level of involvement throughout the project. That could be quarterly, or bi-annually, or more often depending on the project.

In the initial year, it may be advisable to have the Panel meet quarterly as a group, to receive more briefings on challenges, work underway in Texas and outside the state, or on the future year's work effort. It would also be informative for the Panel to attend the State Transportation

Forum in January. Exposure to the program could assist with its education, but also possibly provide a means to meet.

The Project 0-6661 scope of work calls for the drafting of a letter inviting the member to serve on the Panel. While that has not occurred during this project's time span, it is anticipated in the follow-on work to be undertaken. Table 2.1 lists the criteria for Panel membership.

2.2.5 Panel Support Requirements (Subtask 1.5)

The Panel will be supported by RTI, utilizing the assistance of CTR and other universities as needed. Individual researchers who develop strategic research briefs or research projects will be available directly for interaction with the Panel.

2.3 Matrix of Criteria for Panel Membership

Table 2.1: Criteria for Oversight Panel Membership

Group 1: Advocacy Groups and Affected Stakeholders

Characteristics	Positives	Possible Negatives
Texas Good Roads	Has good information to share; may have special access to state and national data	Possible perception of conflicts (however, could be a resource)
Texans for Safe and Reliable Transportation	Membership includes individuals with global and financial backgrounds in the field that could provide information to possible scenarios	Could be seen as having a particular answer in mind (public/private partnerships; CDAs; concessions) (however, could be a resource)
Transportation Advocates of Texas, Inc.	Could share common questions, challenges, and themes heard from around the state and multimodal entities—both public and private sector	Individual members could be seen as representing their own region's interests; generally reflects an urban emphasis; variable ideas about problems/solutions (however, could be a resource)
Local advocacy groups	Have special insights into challenges and possible solutions	Could be viewed as positioning one area over another one (however, could be a resource)
Chambers of Commerce	Good way to involve private sector/business community who are also local leaders	Viewed as promoting one area over another (however, could be a resource)
Associated General Contractors of Texas	Have good information to share; may have special access to state and national data	Possible perception of conflicts or seeking self-serving solutions (however, could be a resource)

Characteristics	Positives	Possible Negatives
Consulting Engineers Council	Have good information to share; may have special access to state and national data	Possible perception of conflicts or seeking self-serving solutions (however, could be a resource)

Group 2: Political Involvement

Characteristics	Positives	Possible Negatives
State elected officials	Could help assure understanding/education in the Legislature	Could be seen as promoting a particular political position; risk alienation of other legislators; could be challenging to schedule meetings
Local officials and business community leaders	Could provide insights into overall objectives of statewide economic vitality	Could be seen as promoting local agendas; could be challenging to schedule meetings

Group 3: Expertise

Characteristics	Positives	Possible Negatives
Technical experts in safety, mobility, preservation, economics, demographics	Broad-based, future-oriented experts could be helpful in identifying and prioritizing challenges	Individuals could have narrow or specific expertise and present a need for a steep learning curve to see the whole picture
Private sector executives who are users of the multimodal Texas transportation system and develop "what if scenarios" for their own businesses (such as FedEx, UPS, HEB, Walmart, etc.)	An understanding of how the private sector looks at the future and develops possible scenarios to react (or get ahead of the challenges) could be helpful in identifying the program; Because their business is dependent upon the transportation system, they have a personal vested interest in maintaining the system	Private sector executives may concentrate on the more immediate future scenarios (reacting to situations) rather than laying a solid foundation for long-term future solutions
Private sector finance and international business experts	Because of the rapidly increasing globalization of the economy, these individuals could be helpful in identifying the program and pointing out similarities to private sector efforts—possibly even some leveraging of the research work	Could require a lot of "catch up" backgrounding to make meaningful contributions

Characteristics	Positives	Possible Negatives
	for both parties	
Individuals who represent other groups competing for scarce State resources or have to do similar planning for other resource areas	Could help put perspective on challenges and possible solutions; Could assist in gaining support for research results	Could require a lot of "catch up" backgrounding to make meaningful contributions; perhaps not seen as helpful to the transportation situation
Individuals of national standing and credibility in transportation field (public and private)	Individuals with experience at the federal, or multiple state level, may be able to share perspectives and lessons learned elsewhere	Some individuals who established national credibility in issues while serving in the public sector have since joined the private sector and could be perceived as having possible conflicts of interest
Executives of private sector firms whose business is directly related to transportation (engineering, planning, or consulting firms; construction companies; etc.)	Could provide insights helpful in defining challenges and possibilities	Possible perception of conflicts or seeking self-serving solutions
AASHTO staff or directors	Could share relevant work/data/information from other peer states	Would be seen as being too close to the current situation to be unbiased

Group 4: Thinkers

Characteristics	Positives	Possible Negatives
"Architects of the future," futurists; big thinkers who would be "sails, not anchors"	Could help focus on making progress towards a better system rather than concentrating on more tactical efforts	Could emphasis work that is so "big picture" that the relevance to transportation is lost or minimal
Academics	Could offer regimen to the process and approach to research; Maintain an emphasis on rigorous evaluation and documentation of the subject matter	
Thinkers concentrating on the Texas future society, not just	Could put transportation into the context of all future needs; Could point to transportation	

Characteristics	Positives	Possible Negatives
transportation; including those from health care, public/private partnerships, water and other utility infrastructure concerns	needs in light of evolving society and possible scenarios of change that affect transportation needs	

Secondary Consideration of Member Candidates—Geographical Distribution

Characteristics	Notes
Distribution from each Commissioner's areas	Could contribute towards acceptance and/or credibility of the Panel; Should consider the urban/rural breakdown
Urban and Rural	Challenges to be addressed will affect both urban and rural areas, as well as the interaction of the two; Should reflect a variety of urban areas if possible

2.4 Recommendations for SRP Operations

2.4.1 Oversight Panel

1. After individual meetings with members of the Transportation Commission Chair and Members, researchers will present a menu of names for consideration of appointment.
2. General suggestions:
   a. Size: Six members
   b. Terms: Three-year terms, staggered in one-thirds.
   c. Meeting frequency: Up to four times the first year, with the possibility of some being via teleconference or webinar.
3. Have a TxDOT RTI representative assigned to the Panel to perform the fiduciary and operational oversight for the program.

2.4.2 Initial Year

1. Upon appointment and first meeting, engage the organization in a strategic planning session to confirm the roles and define challenges to investigate, with the initial strategic research briefs completed by the universities as a starting point.
2. Develop an initial year research program (limited to probably no more than three projects).
3. Likely the original research projects to be undertaken would come from the research briefs; however, additional or different projects could be directed by the Panel. Each of the state universities would be allowed to compete to accomplish the work, through submission of qualification statements demonstrating experience or knowledge of the subject matter. Determine if there is interest in one Panel member being responsible for

oversight of each of the limited number of original research projects, and solicit other members to volunteer to assist if interested. Allow the key Panel member who is liaison to the research effort to request additional assistance from outside the panel (who may represent exceptional expertise or interest), or from the organizations represented by the Panel members.

2.4.3 Subsequent Years

1. In subsequent years, follow the same course, or alternatively develop a two-tiered management program that includes a separate project oversight team for each project that would be made up of Panel members and outside experts. Allow the Panel the discretion to determine the direction and the process to be used.
2. Select all of the topics to be pursued, for either briefing papers or original research studies.
3. Request project-specific qualification statements open to any state university and its partners.
4. If desired by the Panel, use outside expertise in defining topics and/or commentary on projects undertaken.
5. Go before the full Commission in work session for discussion and defense of issues to be pursued, including the expected benefit to be gained from project work.
6. Engage other invited groups of experts or stakeholders as felt needed.
7. Add members to the Panel if desired by the Panel or the Commission.

Chapter 3. Development of Alternative Project Management Approaches

3.1 Introduction

The proposed TxDOT Strategic Research Program (SRP) is intended to prepare the Department to meet the transportation challenges likely to be faced in the next 10–30 years. This chapter addresses Task 2 of the joint university project assignment to assist TxDOT in establishing the SRP. This task was led by TTI. Specifically, it contains information about various research project management approaches.

3.2 Alternative Project Management Approaches (Task 2)

As initially conceived, the strategic research program would be managed differently than the established Department research program, with the SRP Oversight Panel responsible for project direction.

3.2.1 Identification of Program Management Scenarios (Subtask 2.1)

Researchers have summarized the major program management parameters for the following:

- TxDOT's current research program
- National Cooperative Highway Research Program
- Texas 2030 Committee oversight of the 2030 Committee Texas Transportation Needs Report
- Mineta Transportation Institute

Additionally, a survey was sent to each of the states who participate in the federally funded research program. Its intent was to identify which states may have a program in place that addresses strategic research in a way being considered by TxDOT. Unfortunately, there was not a meritorious model identified to emulate or examine.

Existing TxDOT Research Program

Types of Research: This is a cooperative research program, meaning that personnel from the sponsoring agency actively assist researchers as needed for development of practical solutions and products. The nature of program content is heavily oriented toward applied research.

Target Audience for Research: Research products are targeted for statewide application by personnel within the sponsor's organization.

Research Topic Selection: The general topics include transportation economics, planning, design, construction, maintenance, and operation of structures and facilities. Specific requests for proposals (RFPs) are issued. Research needs are solicited from multiple organizational levels of the sponsoring agency as well as from transportation academia from within the

sponsoring agency's state. Gathered research needs are prioritized by a panel composed of both agency technical experts and academia. Then, final project selection decisions are made by a research management committee composed exclusively of upper level agency managers.

How Research is Accomplished: Research is accomplished in a cooperative manner by researchers from academia with the guidance of sponsoring agency personnel. Researchers respond to a request for competitive proposals. The RFPs include objectives to be met, but no maximum budget is specified. Competing proposals are scored by panels of personnel from the sponsoring agency. The proposal garnering the highest score is selected. The panel selecting the winning proposal monitors progress and assists researchers throughout the term of the research project.

Researcher Eligibility: Proposals are accepted only from Texas State-supported senior colleges, universities, and research agencies. Researchers submitting the proposal must be in good standing with the sponsor based on performance during recently awarded research projects.

Schedule and Conduct of Research: The research is performed as described and according to the schedule of activities included in the approved project agreement. The research sponsor is invoiced monthly to reimburse research effort expenditures. Annual expenditures on the project are limited to the approved project agreement annual budget. Unused budget amounts from one fiscal year are not carried forward to the following fiscal year.

Prescribed Research Format: Work progress is monitored by the same panel of personnel responsible for selecting the best proposal. Semi-annual progress reports are required from the researcher. Research reports must follow the format prescribed by the sponsor.

Method of Research Dissemination: Findings and other research products are disseminated through detailed research reports and a two-page project summary report. When appropriate, researchers are included in implementation activities and compensated through the sponsoring agency's implementation program. In this manner researchers may work with agency personnel as research products are first applied in agency situations, they may teach training courses or host workshops, or they may assist in any other approved manner.

National Cooperative Highway Research Program (NCHRP)

Types of Research: Program content includes both applied and developmental research.

Target Audience for Research: Research products are targeted for nationwide use by personnel within sponsoring member organizations.

Research Topic Selection: The general topics include highway economics, planning, design, construction, operation, and maintenance. Specific RFPs are issued. Research needs are solicited from individual member agencies, from committees of subject matter experts representing numerous member agencies, and from the Federal Highway Administration (FHWA). Gathered research needs are prioritized by the Research Advisory Committee

(RAC) with these ratings being forwarded to the Standing Committee on Research (SCOR) for final deliberation and selection of projects for funding.

How Research is Accomplished: Researchers respond to a request for competitive proposals. RFPs include a maximum length of time in which to complete the work, objectives to be met, and a maximum budget allowable. Competing proposals are scored by a panel of personnel representing selected sponsoring agencies, the Federal Highway Administration, industry, and academia. The proposal deemed to be the best is selected.

Researcher Eligibility: Proposals are accepted from public and private agencies and organizations alike. Proposing organizations must be bonded to the required level. Researchers submitting the proposal must be in good standing with the sponsor based on performance during recently awarded research projects.

Schedule and Conduct of Research: The research is performed as described and according to the schedule of activities included in the approved project agreement. The research sponsor is invoiced monthly to reimburse research effort expenditures. Total expenditures on the project are limited to the approved project agreement budget.

Prescribed Research Format: Work progress is monitored by the same panel of personnel responsible for selecting the winning proposal. Brief monthly progress reports and detailed quarterly progress reports are required from the researcher. Research reports must follow the format prescribed by the sponsor.

Method of Research Dissemination: Research findings are disseminated through detailed research reports.

Texas 2030 Committee

Type of Research: In May 2008, the Committee was appointed by the Chair of the Texas Transportation Commission, at the request of the Governor, to provide an independent, authoritative assessment of the state's transportation infrastructure and mobility needs from 2009 to 2030. The report was completed in February 2009.

Target Audience for Research: The targeted audience for this research was the Texas Transportation Commission, the Texas Legislature, and Texans in general.

Research Topic Selection: The work of the Committee addressed the one topic, as stated above.

How Research Was Accomplished: Research was accomplished by a research team of transportation experts at the Texas Transportation Institute (TTI) at the Texas A&M University System; the Center for Transportation Research at The University of Texas at Austin; and the University of Texas at San Antonio. TxDOT staff and the state's metropolitan planning organizations provided input and support of the research team. The team was selected by TxDOT Administration.

Schedule and Conduct of Research: The research and work of the Committee was performed within a six-month timeframe. The Committee held multiple meetings in person, via teleconference and one-on-one with members of the research team. It also hosted six public meetings around the State.

Prescribed Research Format: A popular executive summary along with PowerPoint presentation slides and other materials suitable for posting electronically were developed. The full research report was comprehensive and thorough. All products, including public comments, were posted on the Committee website maintained by TTI.

Method of Research Dissemination: As mentioned above, copies of the executive summary were made available. Perhaps the most widely used method of dissemination was posting of the summary and full report on the website. Presentations were also made before a variety of audiences by members of the Committee and researchers.

Mineta Transportation Institute (MTI)

Types of Research: MTI emphasizes policy and management research, rather than technical research, and selects projects it deems to have immediate and practical value for transportation officials and practitioners. Emphasis areas include:

- Safety and security of transportation systems
- Financing public and private sector transportation improvements
- Transportation planning and policy development
- Intermodal connectivity and integration
- Sustainability of transportation systems
- Labor and workforce issues
- Transportation decision making and consensus building

Target Audience for Research: The targeted audience includes transportation officials and practitioners in California and elsewhere. MTI was established as the Norman Y. Mineta International Institute for Surface Transportation Policy Studies at San Jose State University (SJSU) in 1991 with the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA), reauthorized by the Transportation Equity Act for the 21st Century (TEA-21), and provided continued funding through the U.S. DOT University Transportation Center (UTC) program. Primary grant funding comes from the U.S. DOT Research and Innovative Technology Administration, with matching funds from the California Department of Transportation.

Research Topic Selection: Project selection begins through a needs assessment by MTI staff, with the additional input of Caltrans and the MTI Board of Trustees. The staff needs assessment also considers needs identified by federal agencies and the direct input from the U.S. DOT Western Resource Center. Following the needs assessment, the institute issues formal RFPs. The Institute's Research Associates Policy Oversight Committee (RAPOC)

that is comprised of the department heads or representatives of the SJSU academic departments with which MTI works; Caltrans; and representatives from the U.S. DOT subject all proposals to peer review and discussion before selection.

RFPs are not project-specific like in the TxDOT and NCHRP models above. Rather, the RFP presents the list of subject topics and receives proposals that address them. Proposals shall not exceed 10 pages, plus the required attachments. Seven specific criteria are employed for evaluation of proposals, primarily addressing the compliance with the stated goals described above and the utility of the research.

The time schedule for project selection runs from issuance of the RFPs in early April, to project initiation in June or July. Researchers are given two months to respond to the RFPs. Two weeks later, the schedule calls for the RAPOC and representatives from Caltrans and the U.S. DOT to meet and select projects.

MTI has also employed a separate "Seed Grant Program" to encourage university faculty members to participate in the research program. Small grants of $5,000 have been offered to allow exploration of potential topics. These applicants were not required to be certified. No submittal deadlines were used, and dollars were allocated on a "first-come basis" as funding allowed. While a written report was required, it could be in the form of a project proposal if the seed project demonstrated the viability of such a project.

How Research is Accomplished: Research projects may be carried out by individual certified researchers or teams of certified researchers. The project may be 100 percent funded by MTI, or MTI funds may be combined with funds from other sources identified in the proposal. The preference is for proposals with budgets of $75,000 or less. However, institute publication, distribution, and marketing costs of $3,500, plus a $4,000 allowance for approved conference presentation and published journal award is added making the preferred total $82,500. The proposal may address a phase of a multi-phase project but acceptance of one phase is not a commitment to subsequent funding. There must be substantive deliverables for each phase.

Again, at least one SJSU faculty member must be part of any project. That member must assure that the project complies with the SJSU Institutional Review Board (IRB) requirements if subject elements are part of the proposal.

Researcher Eligibility: MTI actively recruits academic involvement by San Jose State University faculty. However, the program differs from most other transportation centers because research teams may also include faculty from other colleges and universities, along with private sector consultants. Each team must include at least one SJSU academic member and one SJSU student. The Institute certifies all research associates prior to involvement in any project. Certification requires a completed application with references, a resume, and a sample of published research. The Institute's RAPOC reviews the applications and recommends certification where appropriate. Certification is approved by the executive director and must be reviewed every five years. Currently there are 145 certified researchers.

Schedule and Conduct of Research: The Institute prefers projects of no more than 12 months. All final reports are peer reviewed by two academics and one practitioner.

Method of Research Dissemination: Research is posted on the MTI website and each report is printed. The Institute has also developed other approaches that include sponsoring symposia, funding post-research travel for researchers to address professional conferences such as the Transportation Research Board, providing financial incentives for publishing in peer-reviewed journals, and developing research summaries for distribution to practitioners.

3.2.2 Selection of Program Management Approach (Subtask 2.2)

Through discussion among the universities and with the PMC, an agreed upon approach is recommended that draws upon several of the examples described in Subtask 2.1.

As related in Chapter 2 (Task 1), the general program process is represented in the Figure 3.1 chart.

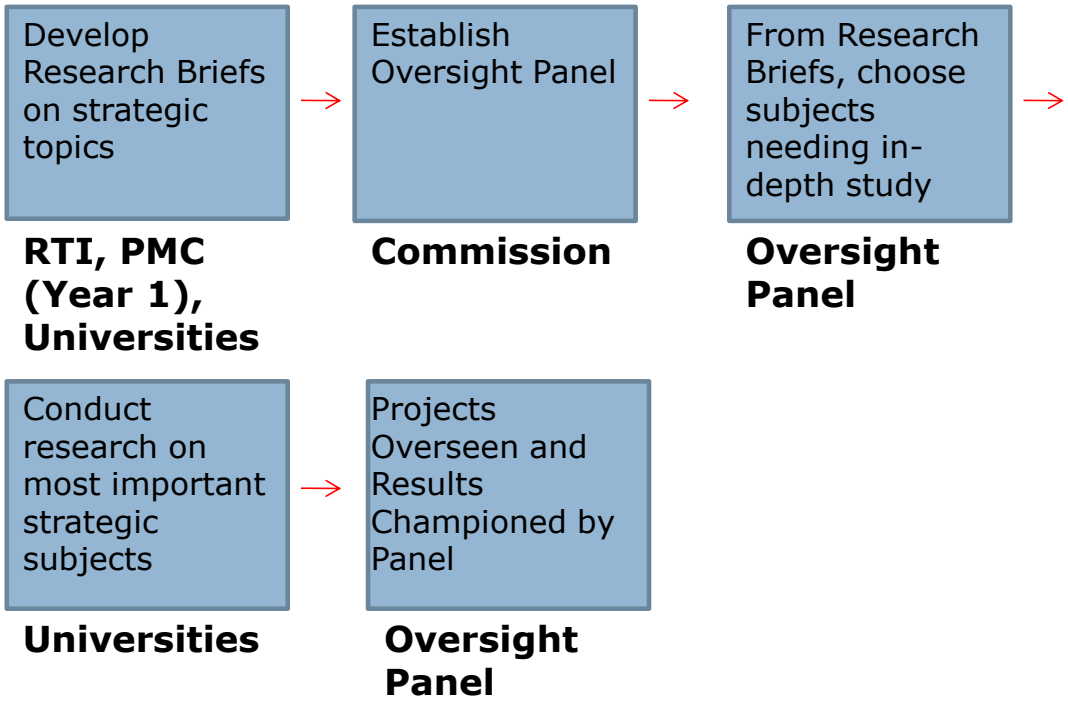

Figure 3.1: Summary of Activities in First Year of SRP

Strategic Research Briefs

Generally speaking, research briefs on strategic topics will benefit the Department by addressing long-term transportation issues of 10–30 years. This ongoing program of strategic briefs will summarize current knowledge on selected topics and also point to more in-depth research if needed. These briefs will allow TxDOT to prepare for and address scenarios and develop proactive approaches to manage outcomes.

Because of the activities required for naming an Oversight Panel, it is recommended that the Project 0-6661 PMC select the first list of strategic topics and the contracted universities undertake them during the time period during which the SRP Panel is being selected. CTR will present the PMC with alternative strategic topics for research briefs, for electronic ranking and selection by the PMC. Once topics are selected, CTR, CMRT, and TTI will confer and decide which entity has the expertise and availability to complete the work in the desired time period and seek concurrence from the PMC.

The strategic briefing papers will each utilize a common format drafted by CMRT and meant to share information in a concise and appealing manner.

Somewhat similar to the example of the Mineta Institute, it is recommended that this program be open to all state universities and there be a process provided for "self-certification" of expertise or experience in subjects of interest. This could be valuable to assist in encouraging the involvement of under-represented university researchers. RTI will be the key contact for that system, with assistance from TTI in drafting a survey to allow for submittal of background and experience in the relevant research areas.

Original In-Depth Research

Once the Panel is in place and receives its orientation and the results of the university strategic briefing papers, there will be an opportunity for calling for more in-depth original research in subjects felt of priority importance by the Panel. A call would be released by RTI for the submission of qualification statements from the universities to compete for these assignments. Submissions would include teaming between the major research programs and individuals from under-utilized programs whenever possible. The "self-certification" data mentioned above will contribute to the teaming effort.

Upon receipt of any research, the Panel would be seen as a champion of the results, much like the example of the 2030 Committee mentioned above. This independence and objectivity of individuals outside TxDOT is seen as a positive feature of the program.

3.2.3 Implementation Package for Program Management (Subtask 2.3)

Forms or tools necessary for implementation of the program management will be provided to RTI at the conclusion of this discussion. Among them are:

- Assistance in soliciting Panel members, if desired by the Commission or Administration
- A draft Minute Order appointing the Panel members
- A form to be used in requesting self-certification by all state university researchers who might be interested in the strategic research program
- A presentation on the suggested continuing SRP process for the Panel that would be confirmed or amended at its first meeting anticipated in late fall 2010.

Chapter 4. Communicating Information

4.1 Introduction

The Texas Department of Transportation Strategic Research Program (SRP) is intended to prepare the department for transportation challenges likely to be encountered in the next 10–30 years. This chapter documents the results of Task 3 of the SRP development project, Communicating Information. This task was led by Texas Tech University.

4.2 Communicating Information (Task 3)

Pursuant to this problem description the researchers at Texas Tech constructed a mock-up website to illustrate the concepts involved in internal and external communications. The choice of a web-based venue is economic; web delivery is considerably lower cost than paper-based notification, with the added benefit of being substantially more changeable than paper-based distributions.

The mock-up website was developed to learn how to structure such an informational website and how to facilitate two-way communication. A secondary feature of the development is a way to capture on-going thought as the SRP evolves.

The structure of the website mockup is organized into an unsecured (public portion) and a secured (internal portion), and a public-private upload portion. The secured portion of the mock-up uses a PHP script and login security model. The public-private portion uses an identical script, with an up-loader capability.

4.2.1 Results

The functioning website mock-up is located at http://www.rtfmps.com/SRPhome. The website, although a mock-up, is reasonably complex and is best illustrated with screen captures.

Figure 4.1 is a screen capture of the home page. This page is a "switchboard" to guide the visitor to different parts of the SRP. The general information link "What is Strategic Research?" is an informational link, with answers to some vague questions about the program and strategic research in general, and some links to external informational web sites.

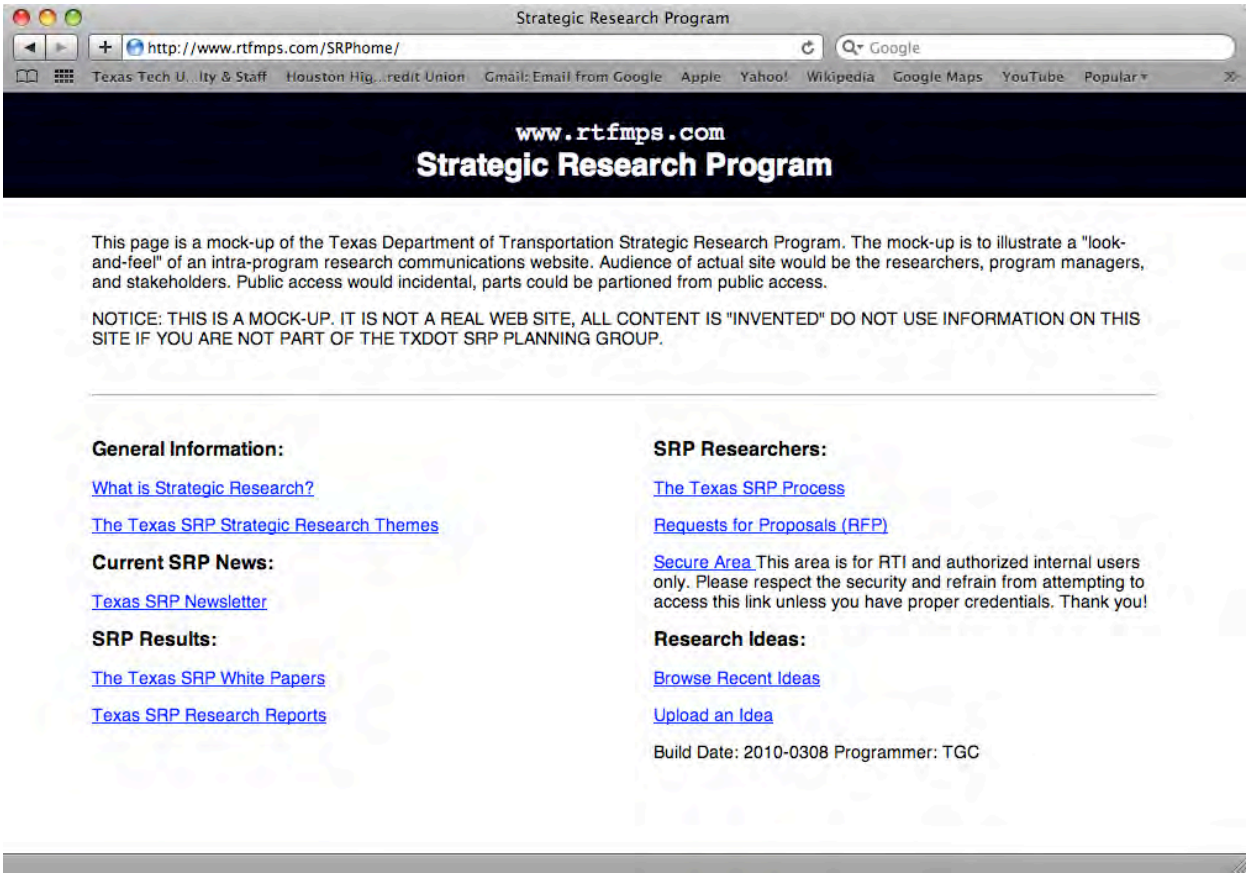

Figure 4.1: SRP Home Page (Mock-Up)

Figure 4.2 is the informational link page. The page answers the topic question as well as contains links to other informational material. This page would be of use to a first-time visitor and possibly to the advisory committee from time-to-time as they wrestle with the scope of the program in their discussions.

The external links in the mock-up are functional and link to some interesting on-line resources related to transportation history and energy considerations. These are just examples of how external links might work. It does not represent an endorsement of any of these sites.

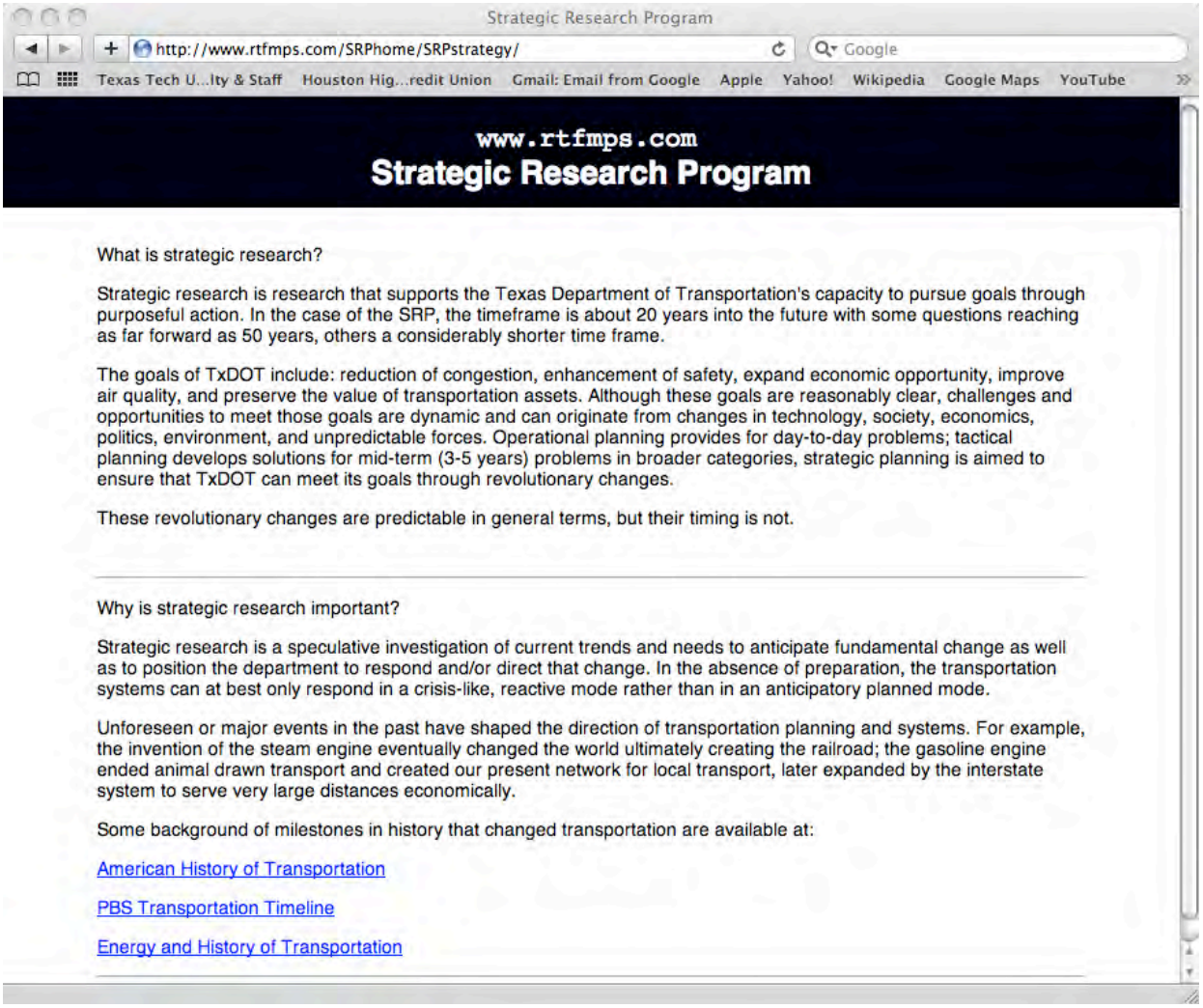

Figure 4.2: What is Strategic Research? page.

Figure 4.3 is the SRP research themes page, where the broad themes identified by the CTR Task 4 activity are listed. Each link connects to a page that defines the subthemes nested within the broad themes; eventually these would link to a theme-by-theme RFP listing (currently treated as a separate directory tree).

Notice the “escape routes” on the bottom left of the page. Most of the mock-up tries to have these routes on each index page. These are important in the secured portions of the website because if things go haywire, the visitor should be able to elegantly exit the failed process.

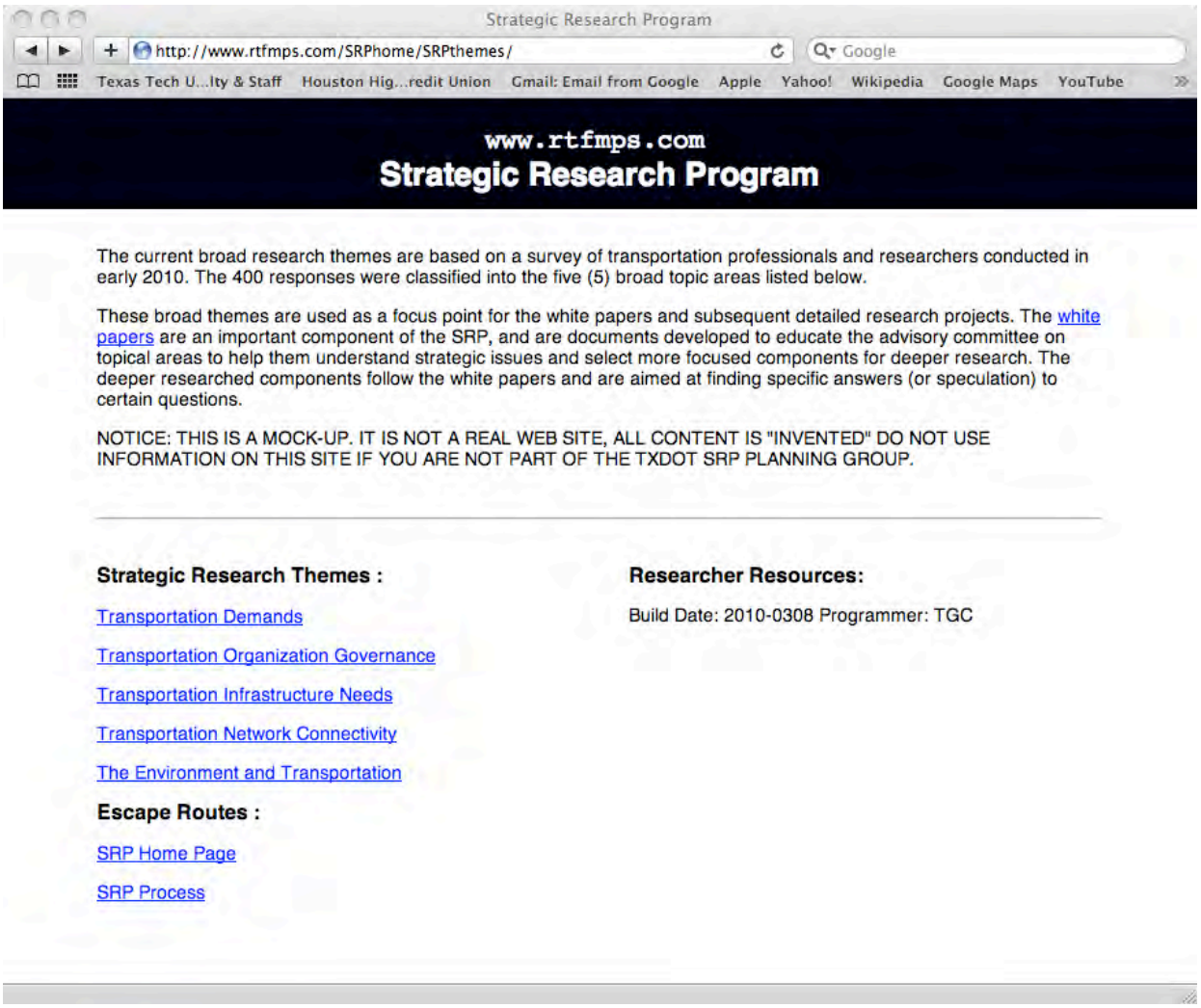

Figure 4.3: SRP Broad Themes

Figure 4.4 is the Network theme page with the three subthemes listed and some discussion (from the Task 4 draft Technical Memorandum) of each. Theme 4C is used by the researchers as a logical classification of where the motorway of the future strategic topic would logically fit.

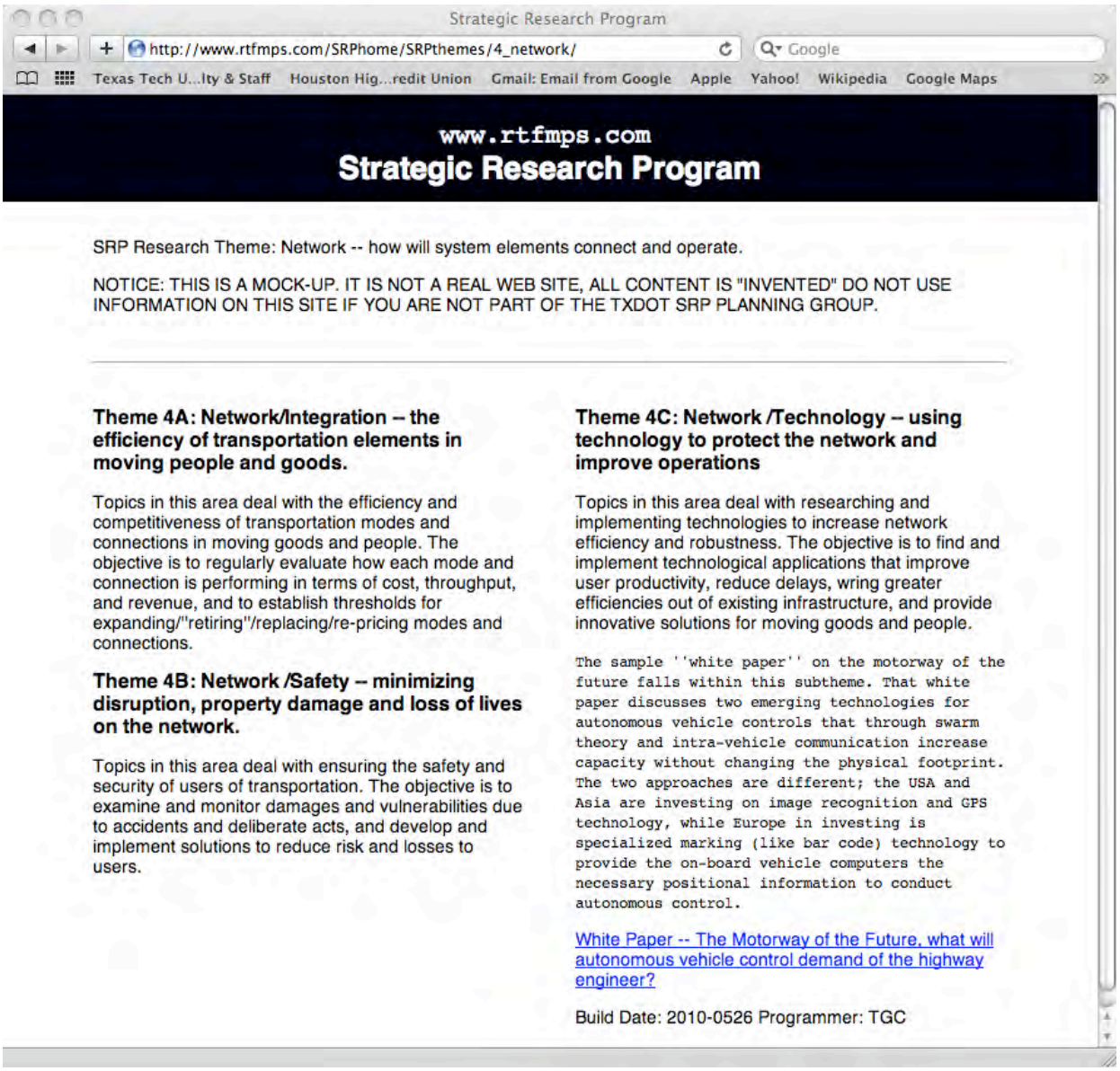

Figure 4.4: SRP Theme: Network

This page contains a link to a sample white paper that fits the theme (the white paper is discussed in more detail in Chapter 7. NOTE: The term "White Paper" was later re-named "Research Brief."

Figure 4.5 is the White Paper page. This page is intended to serve as a central repository for White Papers generated by the SRP. The mock-up suggests they would be organized by broad theme, but other structures might become sensible as the program evolves. The right column of the page contains links to researcher resources, including a "sample white paper" to guide researchers in how to write a white paper, and what a SRP white paper would be expected to look like. As a mock-up both the web page and the sample white paper were built/written hastily, but the general principle is well illustrated.

The research reports link (not depicted) would be organized in a similar fashion, but with completed project reports instead of white papers.

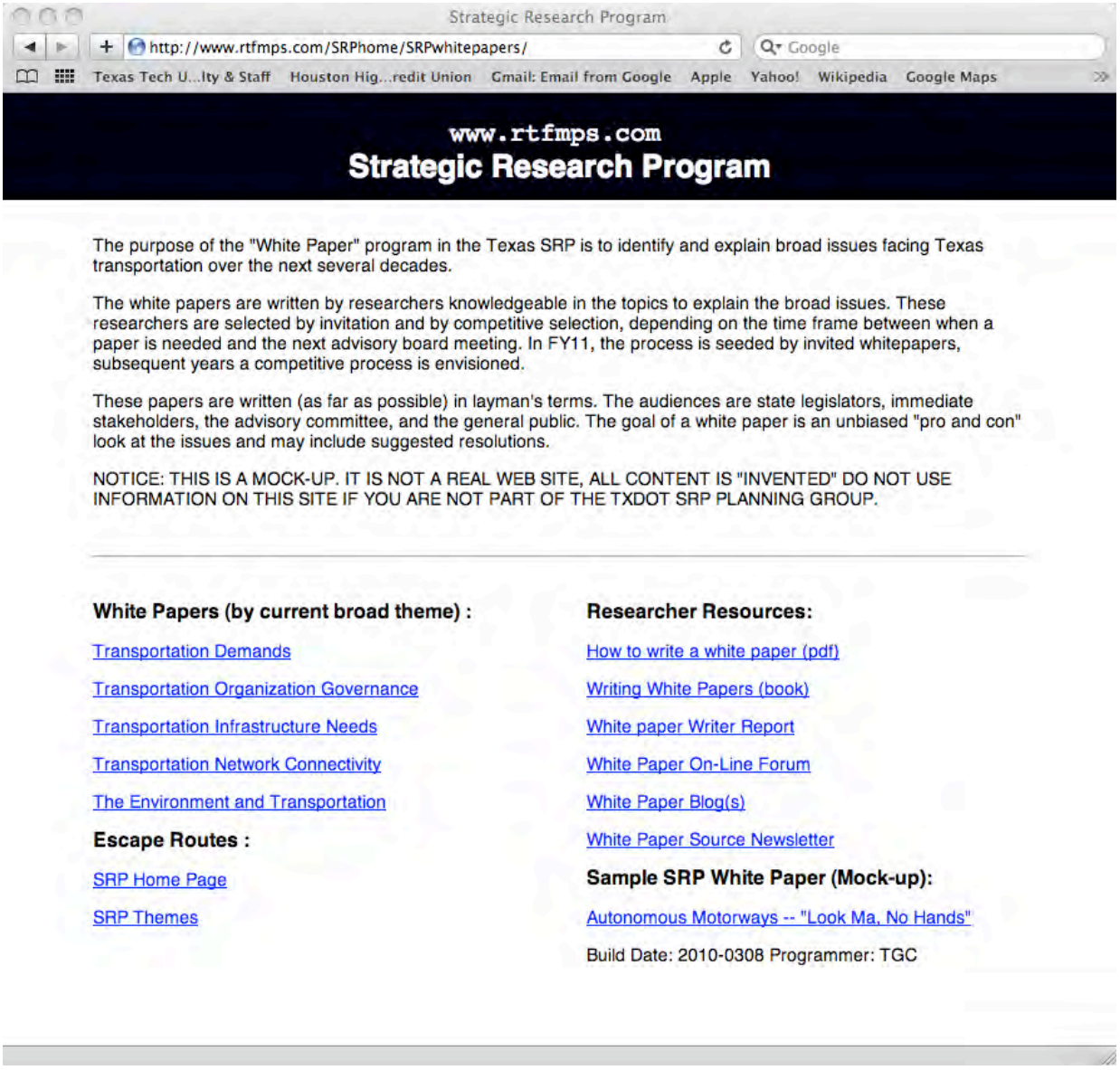

Figure 4.5: The White Paper page

Figure 4.6 is the SRP Process portion of the website. Currently this component is speculative, but would need to be populated with the actual procedure used to guide the process. The visitors who would find this page useful are the researchers who would refer to this page to guide their responses to RFPs and the "I Have an Idea…" submissions.

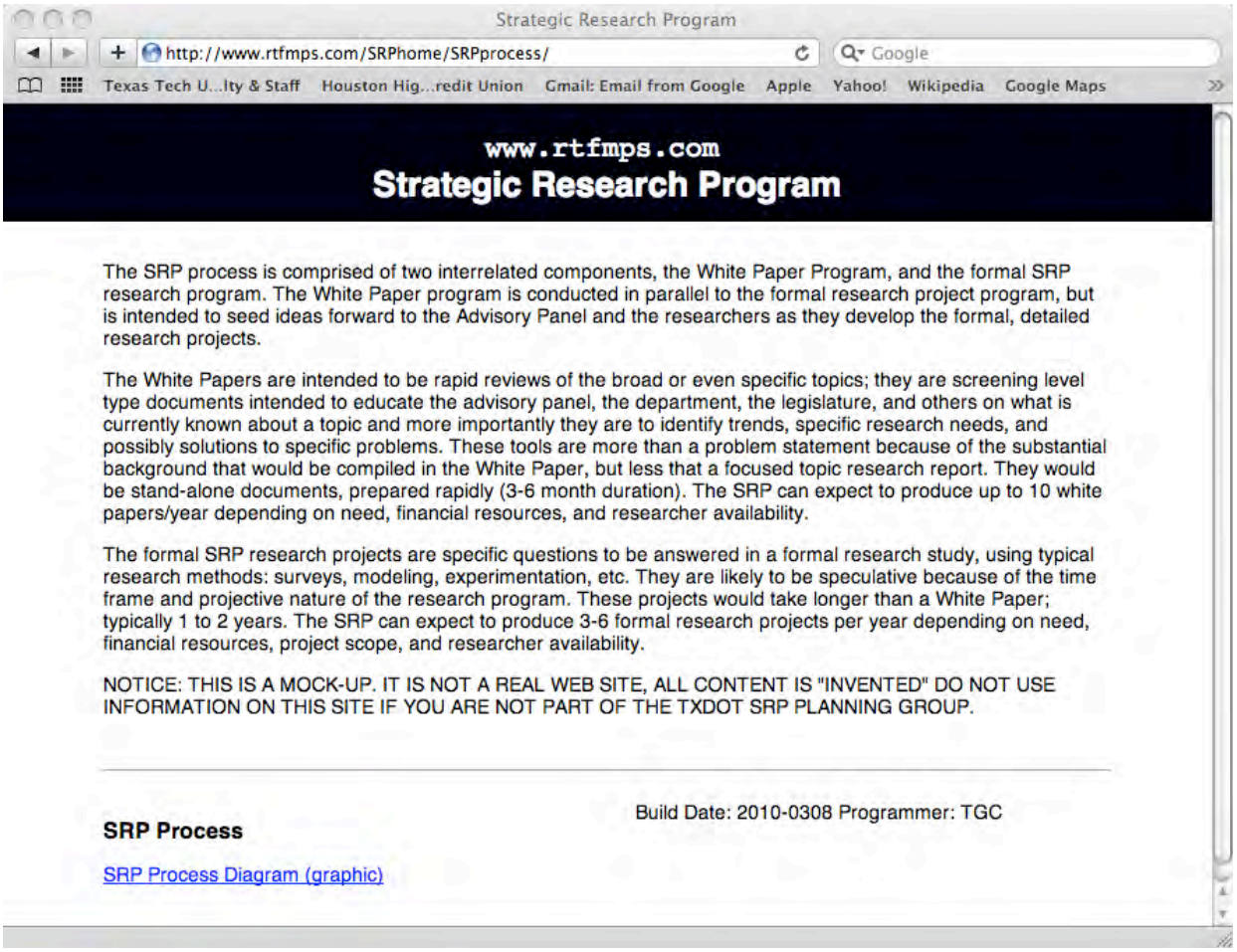

Figure 4.6: The SRP Process

Figure 4.7 is a process diagram (mock-up) that depicts the focus program (the several year research projects to focus on a particular idea) and the white paper program. These two interrelated programs are depicted as parallel cycles. This diagram is for illustration only. (NOTE: Final details of the process are in Chapter 8).

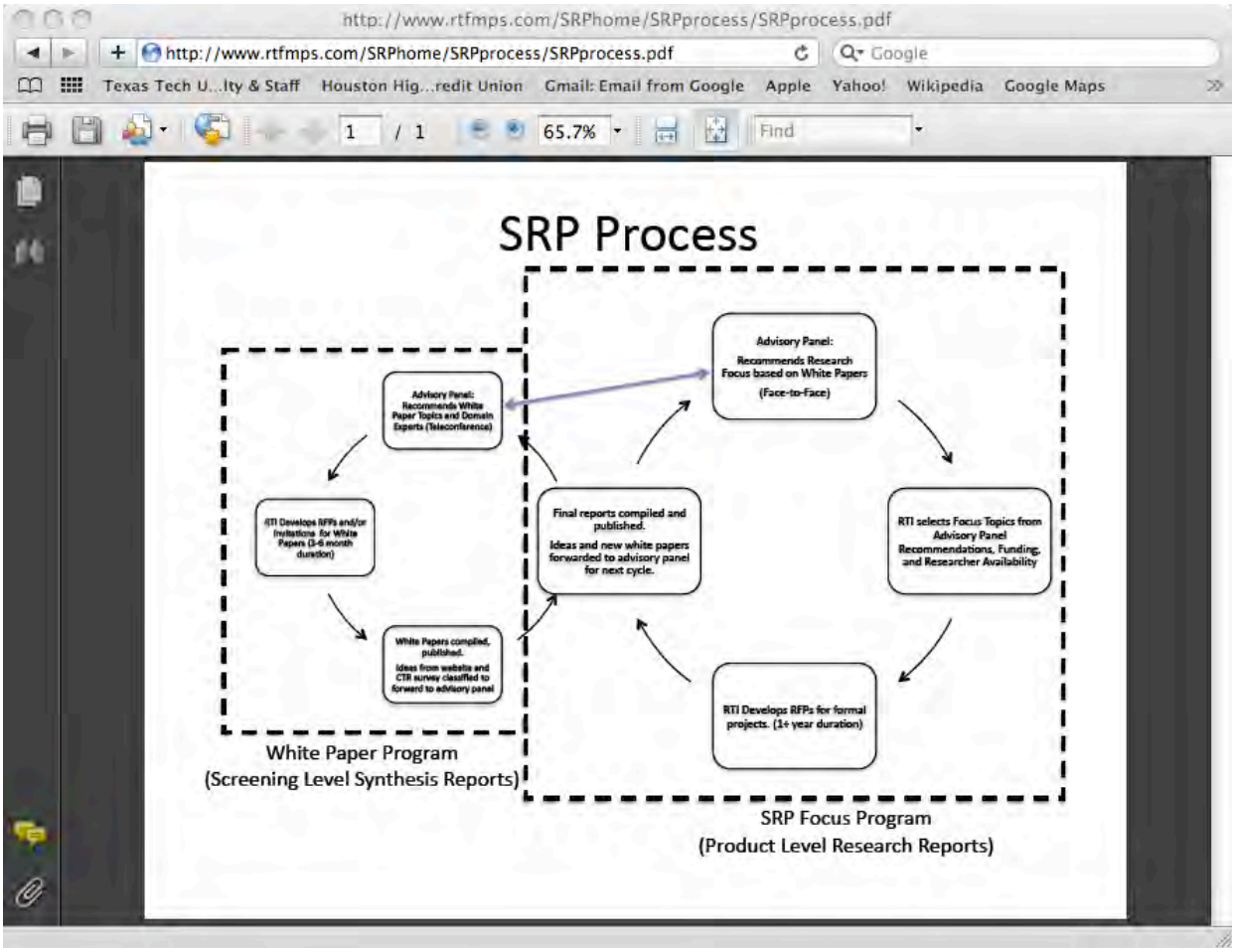

Figure 4.7: The SRP Process Diagram

The remaining unsecured area of the website is the RFP page where RFPs would be announced along with guidelines of how to respond to the RFPs. Both research focus and white paper solicitations would appear in this section.

The “Ideas” portion of the site is special because provisions to upload an idea are incorporated. Figure 4.8 is the Ideas Main Page. It presents the current thinking of how ideas can be submitted to the SRP, and most importantly, how to upload an idea. The visitor can browse recently uploaded ideas, and a specified format for an idea submission is suggested.

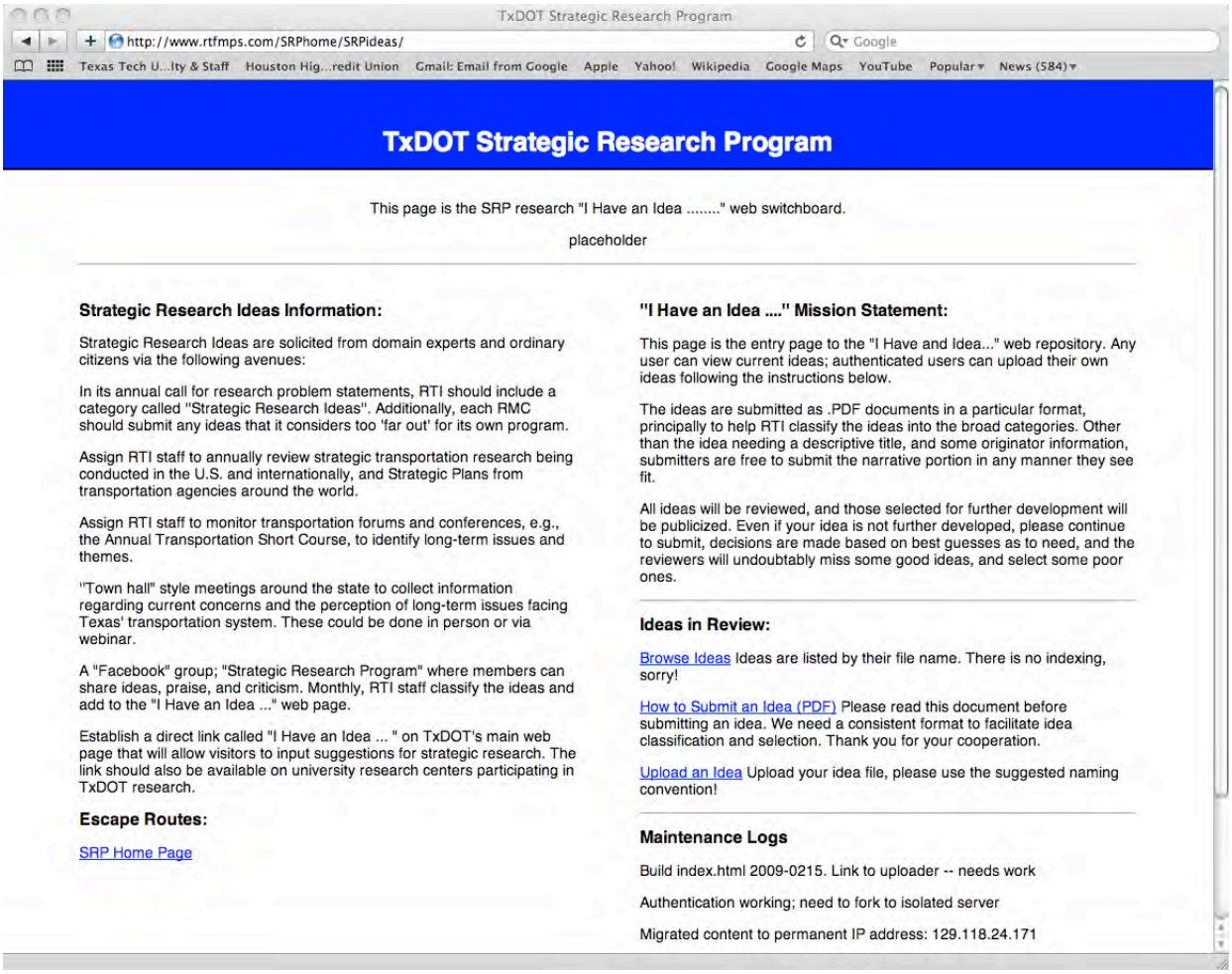

Figure 4.8: Ideas Main Page

A visitor can upload his or her own idea using the Idea Upload Authentication Page in Figure 4.9. The mock-up userid is `www.rtfmps.com` . The mock-up password is `SRPhome`. Using these credentials, the visitor can upload an idea to the SRPideas server, using the file uploader of Figure 4.10.

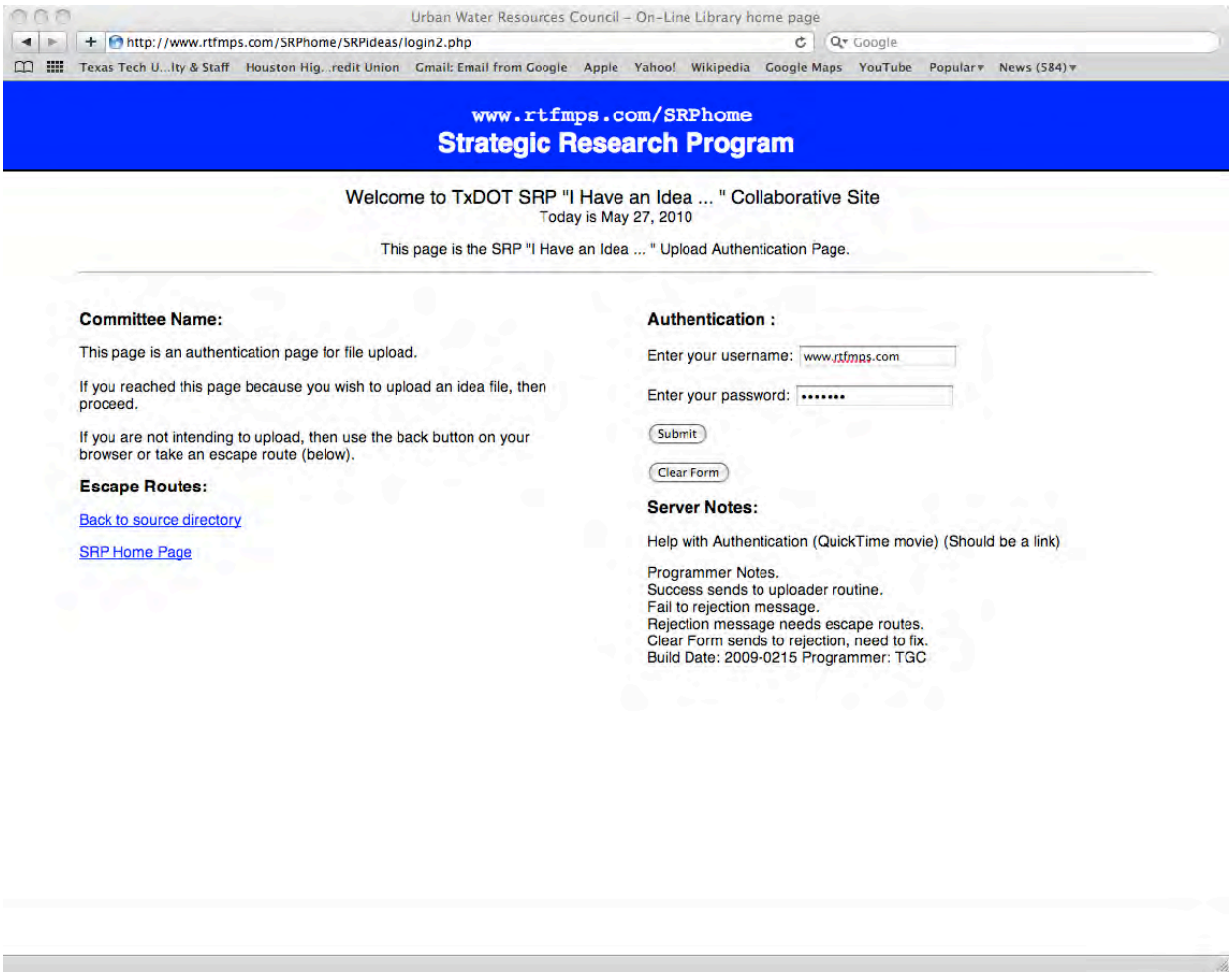

Figure 4.9: Idea Upload Authentication Page

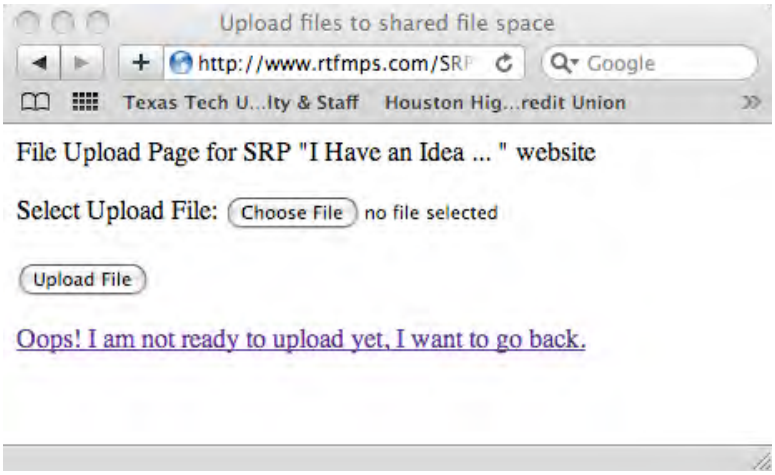

Figure 4.10: File Upload Selection Page

A second secured section of the site is also provided, as depicted in Figure 4.11. The userid/password combination for the mock-up is `www.rtfmps.com/SRPSecure.` The appearance of the authentication page is nearly identical to that depicted in Figure 4.9, except instead of linking to an up loader script, the authenticated user is sent to the secure area, depicted in Figure 4.12.

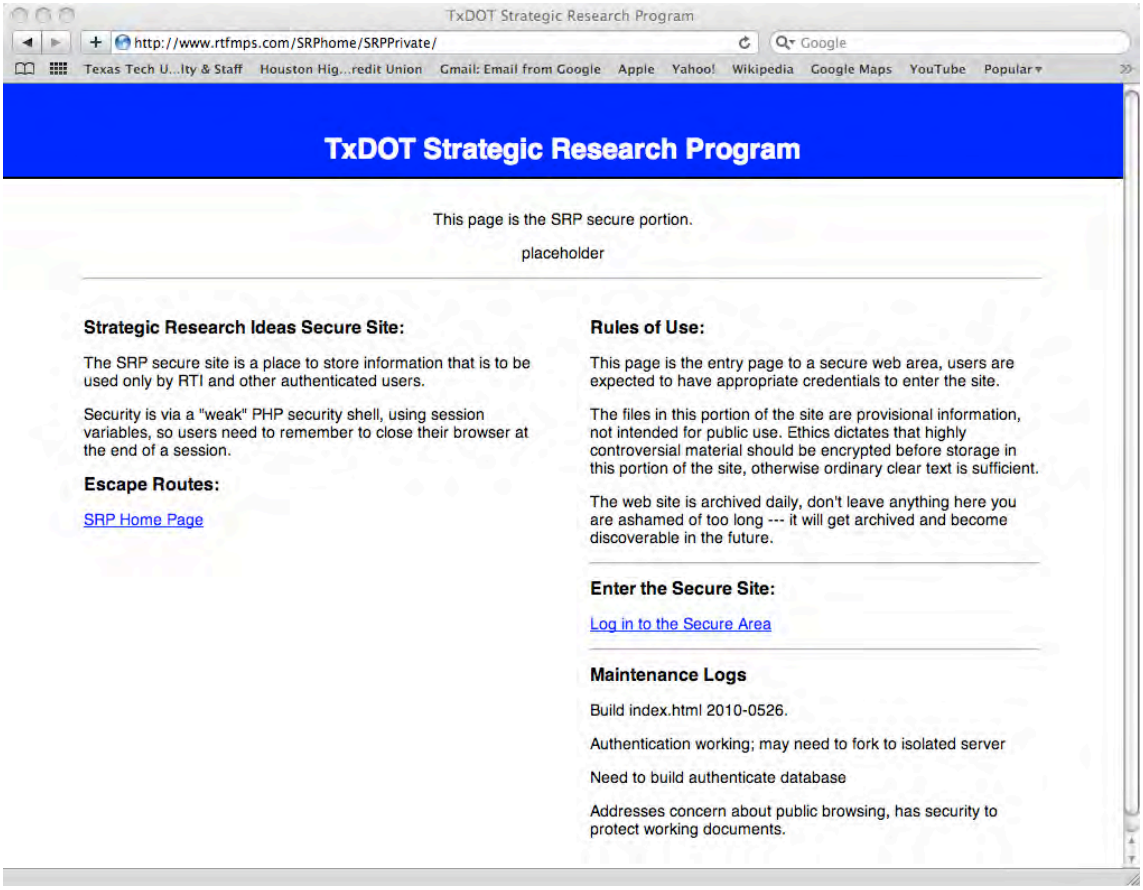

Figure 4.11: Secure Area Entry Page

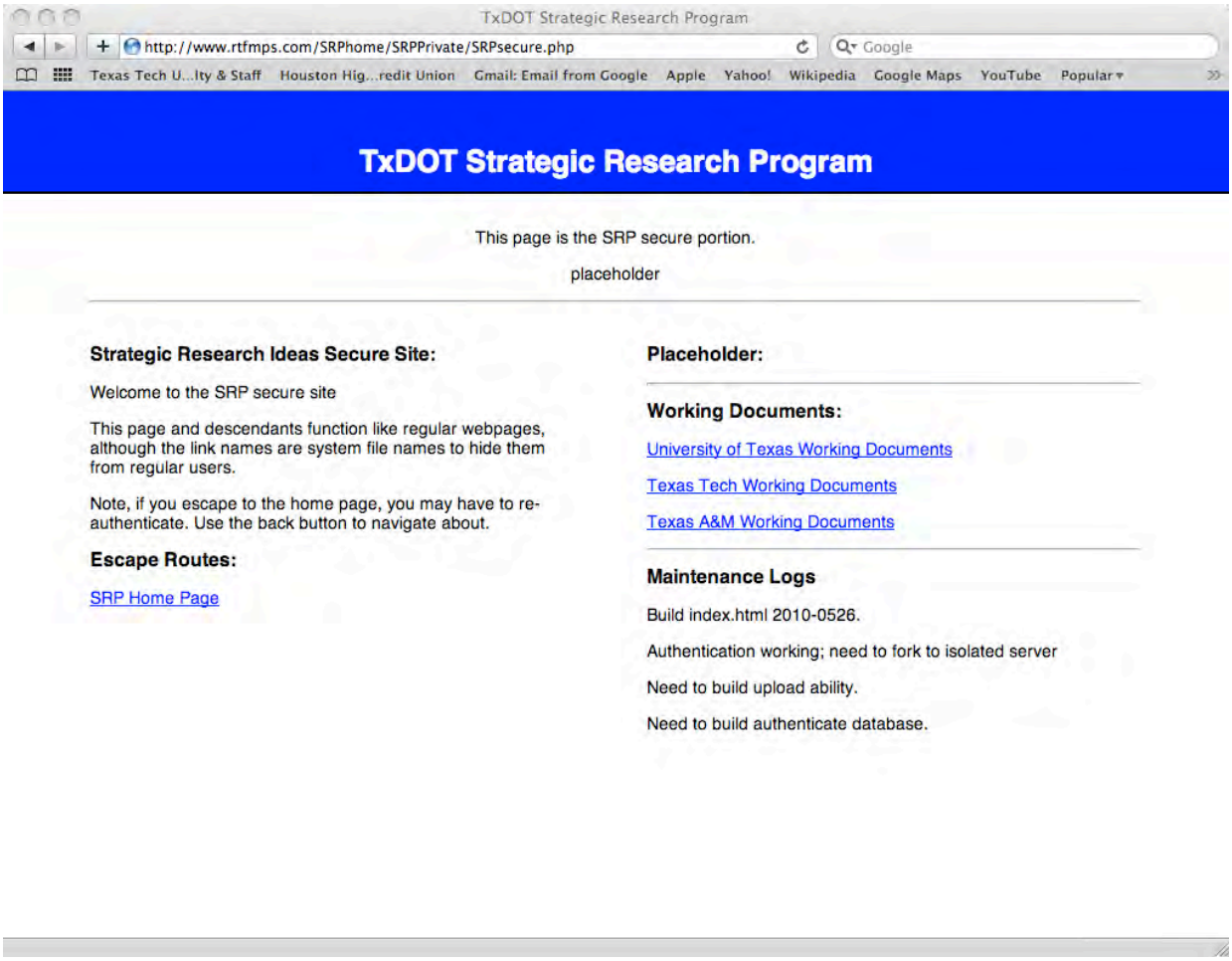

Figure 4.12: Secure Area Main Page (after authentication).

Once the visitor reaches this page, materials intended for RTI and researchers use (but not the general public) are available.

4.3 Recommendations

The researchers have constructed a mock website that mimics features on a professional website to serve technical content as well as solicit user feedback. Certain additional features need to be considered before deployment for actual use. These include:

- A functional user authentication database (the mock website uses a very simple authentication scheme for rapid prototyping)
- An e-mail feature to allow remote users to send short messages to the database administrator to correct broken components.
- An automatic archiving and file-naming scheme for user supplied research ideas.
- A file remover for the secured space.
- A use statistics feature to determine how much the website is actually used—this feature would allow unused portions to be eliminated in future revisions. The

informational website, as demonstrated, will facilitate rapid communication between the SRP, RTI, researchers, legislative assistants, and the general public. The ability to isolate portions of the website to authenticated users only allows a single locale of information for both internal and external sharing of information.

The possible ways to functionally implement this information site are to (1) task the TxDOT Technology Services Division with development and maintenance of such a website, and (2) task TechMRT (or CTR or TTI) with the responsibility to build and maintain such an informational website.

For this effort, the website was rapidly prototyped using PHP scripts and HTML programming, and the mock-up is not really suitable for a large user base. The annual cost to maintain such a website (using TechMRT as an example, cost would be in the $35,000/year range for the first year until the processes are automated and tested for robust use). The mock-up website author (Dr. Cleveland) would recommend that a senior level computer science student would have the functional skill set needed to operate such a website (with added tasks such as generating the use statistics, coordinating with RTI for updates, etc.). A self-trained person would also be feasible. By year two and onward, the website could become a part-time task for a trained system administrator.

4.4 Chapter References

1. Musciano, C and Kennedy, B. (1997). HTML: The Definitive Guide, Second Edition. O'Reilly & Associates. ISBN: 1-56592-235-2

2. A PHP Tutorial for Beginners. <http://www.tizag.com/phpT> (12 Feb 2009)

4.5 Appendix 4-A. Code Fragments for Authentication, File Upload, etc.

AUTHENTICATION

```
<html>
<head>
….. style defninitons go here, suppressed in this printout ….
</head>
<body>
<h1><tt>www.rtfmps.com/SRPsecure</tt> <br> <strong> Strategic Research Program
</strong> </h1>
<body>
<h1>
<tt>www.rtfmps.com/SRPhome</tt> <br>
<strong> Strategic Research Program </strong>
</h1>
<! BODY CONTENT HERE --- ABOVE IS BLUE BANNER>
<div class="content">
<div class="content-middle" align="center">
<?php include "header.php"; ?>
<p>This page is the SRP "I Have an Idea ... " Upload Authentication Page. </p>
</div>
<!END MIDDLE CONTENT>
<hr />
<div class="content-columns">
<!BEGIN LEFT COLUMN>
<div class="content-column-left">
<h2>SRP "I Have an Idea ... " Information:</h2>
<p>
This page is an authentication page for file upload. <br><br>
If you reached this page because you wish to upload an idea file, then proceed. <br><br>
If you are not intending to upload, then use the back button on your browser or take an escape
route (below).
</p>
<h2>Escape Routes:</h2>
<p><a href="http://www.rtfmps.com/SRPhome/SRPideas/">Back to source directory</a></p>
<p><a href="http://www.rtfmps.com/SRPhome/">SRP Home Page</a></p>
</div>
<!END LEFT COLUMN>
<!BEGIN RIGHT COLUMN>
<div class="content-column-right">
<h2>Authentication :</h2>

<form method="post" action="SRPupload.php">
 <p>
 Enter your username:
```

<input type="text" name="user">

Enter your password:
<input type="password" name="pass">

<input type="submit" name="Submit" value="Submit">

<input type="submit" name="Submit2" value="Clear Form">

</form>
<h2>Server Notes:</h2>
Help with Authentication (QuickTime movie) (Should be a link)
Programmer Notes.
Success sends to uploader routine.
Fail to rejection message.
Rejection message needs escape routes.
Clear Form sends to rejection, need to fix.
Build Date: 2009-0215 Programmer: TGC

<!END RIGHT COLUMN>
<!END COLUMNS>

<!END CONTENT>

</body>
</html>

4.6 Appendix 4-B. UPLOAD ACTION SCRIPT

(Here is where passwords are stored)

```
<?php
session_start();
$_SESSION['username'] = $_POST['user'];
$_SESSION['userpass'] = $_POST['pass'];
$_SESSION['authuser'] = 0;

// check username and password
// Use "Include" to build multi-user database
if( ($_SESSION['username'] == 'www.rtfmps.com' ) and ($_SESSION['userpass'] == 'SRPhome') )
  {$_SESSION['authuser'] = 1;}
else
  {echo "Sorry, you do not have permission to view this page"; exit();}
?>

<!HTML section below>
<html>
<head>
<title>Upload files to shared file space</title>
</head>
<! File upload page -- need to add session variables for authentication>
<body>
<p>File Upload Page for SRP "I Have an Idea ... " website </p>

<! TGC 2009-02-15 == Script adapted from http://www.tizag.com/php/phpT/fileupload.php >
<! TGC 2009-02-15 == HTML renders properly. Local (client) browse enabled.>

<!============================>
<! set form type, identify action, identify data transfer method >
<form enctype="multipart/form-data" action="uploader.php" method="POST">
<!============================>

<!============================>
<! Set max file size to 100KB, change when working, php will error trap to prevent user defeat>
<input type="hidden" name="MAX_FILE_SIZE" value="1000000"/>
<!============================>

<!============================>
<!select file, should allow client to browse local disks to locate PATH+FILENAME>
Select Upload File: <input name="uploadedfile" type="file" />
<br />
<br />
```

```
<!============================>

<!============================>
<! Send form to server >
<input type="submit" value="Upload File" />
</form>
<!============================>

<p> <a href="./login2.php/">Oops! I am not ready to upload yet, I want to go back.</a></p>

</body>
</html>
```

4.7 Appendix 4-C. UPLOADER SCRIPT

(Actually uploads the file and handles the server paths)

```
<?php
// PHP script to manage file uploads
// Adapted from script at http://www.tizag.com/phpT/fileupload.php

//============== Set Upload Path ================================
// == target path must exist?
$target_path = "/home/rtfmpsc1/public_html/SRPhome/SRPideas/working_files/";

//============== Add original file name to target path ==========
//============== Result is : "uploads/filename.extension ========
$target_path = $target_path . basename( $_FILES['uploadedfile']['name']);

//=========== Attempt to move the file to target location =======
// "move_uploaded_file" is PHP function to move file from temp locale to destination
//      the function also returns logical values: TRUE = success
if(move_uploaded_file($_FILES['uploadedfile']['tmp_name'],$target_path))
// TRUE
{ echo "The file " . basename( $_FILES['uploadedfile']['name']) . " is uploaded." ;}
// FALSE
else
{ echo "There was an error uploading the file.";}

//=========== Attempt to rename the file to move from /var/tmp ===
//echo "<br>";
//rename($target_path . basename( $_FILES['uploadedfile']['name'] ),
//  "/usr/export/html/UWRRC/uploads/" . basename( $_FILES['uploadedfile']['name']) ) ;

//========== DEBUG SECTION ===========
// Return variable contents
echo "<br>";
echo "File should be located at: <br>";
print("/home/rtfmpsc1/public_html/www/SRPhome/SRPideas/working_files/"                    .
basename($_FILES['uploadedfile']['name']));
//echo "<br>";
//print_r($target_path);
//echo "<br>";
// Attempt to create a file in target dir
// hardwire debug code, disabel if work
//$ourFileName = "/var/tmp/testFile.txt";


//echo "<br>";
```

```
//print($ourFileName);
//$ourFileHandle = fopen($ourFileName, 'w') or die("cannot open file");
//fclose($ourFileHandle);
//echo "<br>";
//print($ourFileName);
//echo "<br>";
?>
```

Chapter 5. Topic Identification Process

5.1 Introduction

The proposed TxDOT Strategic Research Program (SRP) is intended to prepare TxDOT for the transportation challenges likely to be faced in the next 10–30 years. It will complement the current research program by addressing longer-term and broader transportation issues that could affect the efficiency and viability of the statewide transportation system. This chapter contains the results of Task 4 of the research project, Topic Identification Process. This task was led by CTR.

5.2 Topic Identification Process (Task 4)

The objectives of this task were twofold: (1) to develop a preliminary set of broad themes to get the strategic research program launched, and (2) to define procedures for acquiring, screening, and developing research topics. This task was conducted over the period February–May 2010.

5.2.1 Develop broad themes for the strategic research program (Subtask 4.1)

In order to gather 'big picture' transportation issues that are critical for the future, the researchers disseminated an Internet survey to a variety of transportation stakeholders, including user and advocacy groups, trade organizations, the consultant and contractor communities, researchers, and the general public. In addition, the researchers looked at Strategic Plans from a number of DOTs in the U.S. and internationally. As opportunities arose, the researchers met with experts and interest groups to probe their vision of future transportation.

Almost 600 'ideas' were gathered, and are included as Appendix A. Not all are useful for strategic research, and in many cases are virtually duplicates. These responses were thoroughly reviewed and were found to cluster around five themes:

- Future use of transportation facilities (171 responses)
- Future management of the system (217)
- Future construction and maintenance (54)
- Future operations (104)
- Future environmental issues (43)

Within these five main themes, fourteen sub-themes were identified. The results are presented below, and are intended as a base document for the oversight panel to build on as the program is launched.

5.3 Proposed Themes for the Strategic Research Program

Strategic research is intended to prepare TxDOT to meet future challenges. If a challenge is already foreseen, it is very likely being addressed in the current Research Management Committee (RMC) program. So the SRP has to be structured to *foresee* challenges through *what-if scenarios*, to explore potential outcomes, and to propose appropriate responses. Therefore, the

program should not be themed along the lines of known challenges such as global warming and energy shifts. Instead, it should be structured along system analysis lines, namely, why do we need a transportation system, who provides it, what is built, how it operates, potential challenges, and how it responds to its environment.

5.3.1 Primary Themes for the SRP

The researchers recommend the following five primary themes for the SRP:

1. **Demand**: who will use transportation, where and how.
2. **Organization**: how the agency responsible for transportation will function.
3. **Infrastructure**: how will the transportation network be engineered and maintained.
4. **Network**: how will system elements connect and operate.
5. **Environment:** how will transportation interact with society and nature.

5.3.2 Sub-themes of the SRP

Sub-themes related to the five primary themes are:

Theme 1: Demand—who will use transportation, where and how.
A. Demographics: the composition and location of population, and required services.
B. Commuting: modes by which people will travel, routes, and volumes.
C. Freight: modes by which goods will move, routes, and volumes.

Theme 2: Organization—how the agency responsible for transportation will function.
A. Funding: how the transportation system is paid for.
B. Performance: how the agency provides required services to its customers.
C. Partnerships: how the agency works with others to achieve its goals.

Theme 3: Infrastructure—how will the transportation network be engineered and maintained.
A. Engineering: materials and methods for designing and constructing the system.
B. Maintenance: materials and methods for managing the condition of infrastructure.

Theme 4: Network—how will system elements connect and operate.
A. Integration: the efficiency of transportation elements in moving people and goods.
B. Safety: minimizing disruption, property damage, and loss of lives on the network.
C. Technology: using technology to protect the network and improve efficiency.

Theme 5: Environment—how will transportation interact with society and nature.
A. Ecology: minimizing impacts of transportation on natural resources.
B. Lifestyle: enhancing the quality of living, health, and prosperity.
C. Challenges: ability to respond to short- and long-term natural phenomena and other challenges.

5.3.3 Definitions of Sub-themes

Theme 1A: Demand/Demographics—the composition and location of population, and required services. Topics in this area deal with population changes over the next 50 years by sub-groupings, e.g., age, economic status, lifestyle, etc. The objective is to make projections of where people will live and work in the state, and transportation needs associated with the activities they will engage in. Activities such as education, health care, employment, business, leisure, etc., would be linked to transportation planning.

Theme 1B: Demand/Commuting—modes by which people will travel, routes, and volumes. Topics in this area deal with commuting patterns, modes, and volumes. The objective is to develop scenarios for the demand for commuting in the future in terms of modes, routes, and volumes, and the evolution of the transportation system that would be necessary.

Theme 1C: Demand/Freight—modes by which goods will move, routes, and volumes. Topics in this area deal with freight patterns, modes, and volumes. The objective is to develop scenarios for commodity movements in the future in terms of modes, routes, and volumes, and required changes to the transportation system.

Theme 2A: Organization/Funding—how the transportation system is paid for. Topics in this area deal with the costs of providing a transportation system, and the best options for a reliable funding stream. The objective is to investigate alternative revenue and investment models, including those from other industries such as manufacturing, services, utilities, etc., and scope out feasible options for funding transportation in the future.

Theme 2B: Organization/Performance—how the agency provides required services to its customers. Topics in this area deal with performance measurement and staffing of the transportation agency. The objective is to define what the agency is supposed to produce, establish standards of quality, measure its performance, and communicate/implement feedback from users of the transportation system.

Theme 2C: Organization/Partnerships—how the agency works with others to achieve its goals. Topics in this area deal with collaborating with public and private entities to ensure that transportation planning meshes with the strategic plans of major statewide entities. The objective is to understand the strategic plans of public and private organizations, and gain their participation in transportation planning, funding, construction, and operations.

Theme 3A: Infrastructure/Engineering—materials and methods for designing and constructing the system. Topics in this area deal with technical aspects of engineering and constructing infrastructure economically. The objective is to examine and adopt materials and technologies that incorporate the best technical knowledge available for construction of transportation infrastructure.

Theme 3B: Infrastructure/Maintenance—materials and methods for managing the condition of infrastructure. Topics in this area deal with technical and economical aspects of maintaining infrastructure. The objective is to examine and adopt materials and technologies that incorporate the best technical knowledge available for life-cycle maintenance of transportation infrastructure.

Theme 4A: Network/Integration—the efficiency of transportation elements in moving people and goods. Topics in this area deal with the efficiency and competitiveness of transportation modes and connections in moving goods and people. The objective is to regularly evaluate how each mode and connection is performing in terms of cost, throughput, and revenue, and to establish thresholds for expanding/'retiring'/replacing/re-pricing modes and connections.

Theme 4B: Network/Safety—minimizing disruption, property damage, and loss of lives on the network. Topics in this area deal with ensuring the safety and security of users of transportation. The objective is to examine and monitor damages and vulnerabilities due to accidents and deliberate acts, and develop and implement solutions to reduce risk and losses to users.

Theme 4C: Network/Technology—using technology to protect the network and improve operations. Topics in this area deal with researching and implementing technologies to increase network efficiency and robustness. The objective is to find and implement technological applications that improve user productivity, reduce delays, wring greater efficiencies out of existing infrastructure, and provide innovative solutions for moving goods and people.

Theme 5A: Environment/Ecology—minimizing impacts of transportation on natural resources. Topics in this area deal with interactions between transportation and the natural environment. The objective is to examine the effects of transportation on natural resources, and develop solutions to increase synergies.

Theme 5B: Environment/Lifestyle—enhancing the quality of living, health, and prosperity. Topics in this area deal with interactions between transportation and human activities. The objective is to explore the effects of transportation on human life (e.g., health, activities, economics), and develop transportation solutions that improve the quality of life.

Theme 5C: Environment/Challenges—ability to respond to short- and long-term natural phenomena and other challenges. Topics in this area deal with potential changes in climate, natural phenomena, and other challenges that could impact future transportation. The objective is to outline various scenarios and prepare contingency plans for continuing operations.

5.3.4 Ten Ideas for the First Year of the SRP

Using the numbers of ideas submitted in the Internet survey in each category above as a rough guide for priorities, a 'shortlist' of 35 ideas was selected (Appendix A). The following ten ideas in eight categories were recommended for exploration in the first year of the SRP:

1. 1A Demand/Demographics: "Many people are deferring retirement and extending their working careers into their 70s or 80s. What will be the transportation demands and options associated with a larger number of elderly workers?"

2. 1B Demand/Commuting: "What measures can be taken to reduce peak hour congestion and more efficiently use system capacity? What can TxDOT do to encourage flex hours, flex days, and telecommuting? Is pricing the answer?"

3. 1B Demand/Commuting: "Examine the European model for mass transit and the conditions under which public transportation can play a larger role in reducing congestion in Texas."

4. 1C Demand/Freight: "We need a comprehensive freight strategy that figures out the most efficient way to get products from source to consumer. Right now we have modes competing, with various levels of taxpayer subsidy. This is wasteful. Instead we should figure out a way to optimize supply chains, save some money, and invest it in increasing our freight capacity."

5. 2A Organization/Funding: "The consequences and costs of underfunding transportation."

6. 2A Organization/Funding: "Innovative ideas for funding transportation. For example, is there a way for Texans to invest directly in infrastructure much like they own stock in corporations? What about divesting segments of the system that are more important to local interests if the local residents agree to fund their maintenance?"

7. 2B Organization/Performance: "Develop a new framework for organizational performance measures based on what users want of the transportation system, i.e., how is TxDOT doing in satisfying user needs."

8. 2C Organization/Partnerships: "Develop a partnership with the freight moving industry. Learn about their short- and long-term goals and the technologies that they plan (or want) to incorporate in 2015, 2020, and 2025. Understand how the transportation system can function as an economic engine."

9. 3B Infrastructure/Maintenance: "Currently, most reconstruction projects that result in added capacity involve removing the existing infrastructure and then replacing with new infrastructure. There is a need to encourage the incorporation of existing infrastructure in such projects. For example, pavements that are still structurally adequate can be used as base material in the reconstruction, or simply overlaid with concrete or asphalt materials. The potential cost savings can be significant (possibly up to 50% savings over the current strategy of removing and replacing)."

10. 4A Network/Integration: "Explore the potential for building better connection yards between rail and trucking so that it would be easier to move trailers by rail where economical, and then distribute by truck tractor nearer to destinations."

5.3.5 Define procedures for developing research topics (Subtask 4.2)

The research team examined a range of options for the program to continue gathering strategic research topics. The resulting recommendations are presented next.

Procedures for Gathering Research Topics

The researchers recommend that TxDOT establish a process for continuing to gather research topics on a continuous basis. The process could include the following:

1. Establish a link called "I Have an Idea…." on TxDOT's website that will allow visitors to input suggestions for strategic research. The link should also be available on university research centers participating in TxDOT research.
2. In its annual call for research problem statements, RTI should include a category called "Strategic Research Ideas." Additionally, each RMC should submit any ideas that it considers too 'far out' for its own program.
3. Assign RTI staff to annually review strategic transportation research being conducted in the U.S. and internationally, and Strategic Plans from transportation agencies around the world.
4. Assign RTI staff to monitor transportation forums and conferences, e.g., the Annual Transportation Short Course, to identify long-term issues and themes.
5. Consider "town hall" style meetings around the state to collect information regarding current concerns and the perception of long-term issues facing Texas' transportation system. These could be done in person or via webinar.

Chapter 6. Topic Selection Process

6.1 Introduction

The proposed TxDOT Strategic Research Program (SRP) is intended to prepare the department for the transportation challenges likely to be faced in the next 10–30 years. It will complement the current research program by addressing longer-term and broader transportation issues that could affect the efficiency and viability of the statewide transportation system. This chapter presents the results of Task 5 of the research project, Topic Selection Process.

6.2 Topic Selection Process (Task 5)

The objective of this task was to lay out procedures for screening and ranking research topics/ideas, and developing them into research projects. This task was led by CTR. The results are presented below.

6.2.1 Review of Approaches to Strategic Research

European approaches to strategic transportation research were reviewed. The latest publication, "Trans-Visions: Report on Transport Scenarios with a 20 and 40 year Horizon," was released in March 2009. It analyzed information on transportation long-term scenario forecasting and suggested long-term objectives for transport policies with a focus on how to create a more sustainable network. The following are some of the trends in European strategic research:

- Moving away from the traditional case-by-case funding of projects towards more holistic research programs that would be dedicated to common strategic research targets.
- Funds a program with a multi-pronged and long-term focus rather than individual projects. For example, planning, transportation, energy, and environment are often reviewed together.
- Fostering greater cross-collaboration in the areas of economic competitiveness, employment, and growth. The broad objectives have been grouped into four categories: **Cooperation, Ideas, People,** and **Capacities.**

The researchers recommend that the European holistic approach be adopted, namely, focus on strategic targets such as those enunciated in Chapter 4, create and study scenarios, and move away from individual project RFPs.

6.2.2 Updating the Program Themes

In Task 4 (Chapter 5), five program themes were proposed, namely:

1. **Demand**: who will use transportation, where and how.
2. **Organization**: how the agency responsible for transportation will function.
3. **Infrastructure**: how will the transportation network be engineered and maintained.
4. **Network**: how will system elements connect and operate.

5. **Environment**: how will transportation interact with society and nature.

It is recommended that these 5 themes and the 14 associated sub-themes be revisited annually at one of the semi-annual Oversight Panel meetings. Care should be exercised to not add too many themes and sub-themes. Instead, the existing headings might be re-named and re-scoped to reflect new realities.

6.2.3 Gathering and Screening Research Ideas

In Chapter 5 the researchers provided recommendations for gathering research ideas. Alternatives include a link to a 'suggestion box' from TxDOT's website, monitoring national and international research forums, webinars, and annual calls for ideas.

Screening the ideas will require regular effort. It is recommended that as ideas are received they be categorized under one of the sub-themes. The responsible party should be the same one managing the suggestion box webpage. Semi-annually, all ideas under a sub-theme should be reviewed and ranked in a meeting with RTI engineers. A total of 10–20 ideas should be selected, with the number from each sub-theme based roughly on the numbers of ideas received in each sub-theme, thus reflecting the relative importance of that issue.

6.2.4 Selecting and Developing Research Ideas

The ideas selected should be presented to the Oversight Panel semi-annually by the TxDOT representative. The Panel may select ideas from among those presented, or add new ones based on their own priorities. The Panel would then authorize researchers to develop the selected ideas, perhaps 10 new ones per year:

For each selected idea, the researchers would conduct a brief study to examine:

- What is already known (literature review)
- What current research is on-going on the topic
- What can be researched (scope of required research)
- Potential applications/benefits (implementability)

The researchers would prepare a brief report (10–20 pages) and recommendations to the Oversight Panel, and present them at one of the semi-annual meetings. The Panel would decide whether an idea should be advanced to project(s).

6.2.5 Contracting with Researchers

It is recommended that TxDOT contract with a university consortium for the Strategic Research Program, somewhat along the lines of the University Transportation Centers model. The primary benefit would be reduction of time and effort in getting from idea to research product by eliminating the RFP process for so many small projects. Instead RTI would have a single, renewable support contract with the consortium, and the consortium would handle the selection of researchers based on their skills and track record. The consortium would be governed by a panel comprising one representative each from TTI, CTR, and TechMART, plus two rotating members from other institutions.

6.2.6 Initiating and Continuing the SRP

It is recommended that in the first year of the SRP, 10 ideas be selected and funded for development as outlined earlier. At the semi-annual meeting of the Oversight Panel, the researchers would present their results and recommendations. The Panel would decide which ideas should be terminated or further refined, and which should become full research projects. The Panel would also add new ideas for development. Within a month after the new program is approved by the panel, the research consortium and TxDOT would review the consortium budget and modifications.

In subsequent years, at the semi-annual meetings of the Oversight Panel, the researchers would present their results and recommendations. The program would be modified as outlined earlier, and new research projects would be initiated by the consortium. Project management would be in accordance with the procedures described in Chapter 3 (Task 2).

Chapter 7. Develop White Paper Concept

7.1 Introduction

The Texas Department of Transportation Strategic Research Program (SRP) is intended to prepare the department for transportation challenges likely to be encountered in the next 10–30 years. This chapter documents the results of Task 6—Develop White Paper Concept[2], which was led by Texas Tech. Note: The term "White Paper" was subsequently changed to "Research Brief."

7.2 Develop White Paper Concept (Task 6)

The problem description for Task 6 was to investigate a "White Paper" program.

7.2.1 Methods

The research team with considerable input from the PMC was tasked to explain how the White Paper program fits into the overall SRP. The researchers at Texas Tech examined three components:

1. A "mock-up" white paper to illustrate the scope of what such a paper might contain. The mock-up is intended to serve as a model for the "look-and-feel" of the white paper, and to illustrate functional features (text layout, graphics, and excerpts) that will be common to all such white papers generated by the SRP.
2. Discussion in project meetings of who would actually write the white papers.
3. Determination of where the white paper program might fit into the overall SRP program.

7.2.2 Results

This section works backwards through the list of components in the research methods.

How Does the White Paper Program Fit Within the Broader SRP Program?

Figure 7.1 is a conceptual diagram of how the white paper program fits within the larger SRP program[3].

Starting in the upper right portion of the diagram, an SRP research cycle starts when the advisory panel meet and recommend focus topics (formal research activities in the usual sense, based on idea-generation as described in Task 4, and white paper review). This meeting is a major component of Task 5, the idea selection process. RTI then selects a subset of the focus topics based on funding, researcher availability, and perceived urgency.

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[2] The process depicted is a "placeholder" and has not been vetted by the CTR or TTI partners. The graphic is intended to illustrate that the White Paper Program is an independent, but interacting component of the broader focus program.

During the advisory panel meeting and in a subsequent conference call meeting, the advisory panel can also suggest to RTI that certain topics be examined by a white paper activity before focus topics are identified. This communication and the separate program are depicted as the smaller cycle of activity to the left of the main program. RTI would then solicit white papers from researchers either by competitive contracting if there appears to be sufficient expertise and time in the research community, and occasionally by invitation of an identified domain expert. The invited papers should be relatively rare, but the flexibility to do so should be articulated in the program.

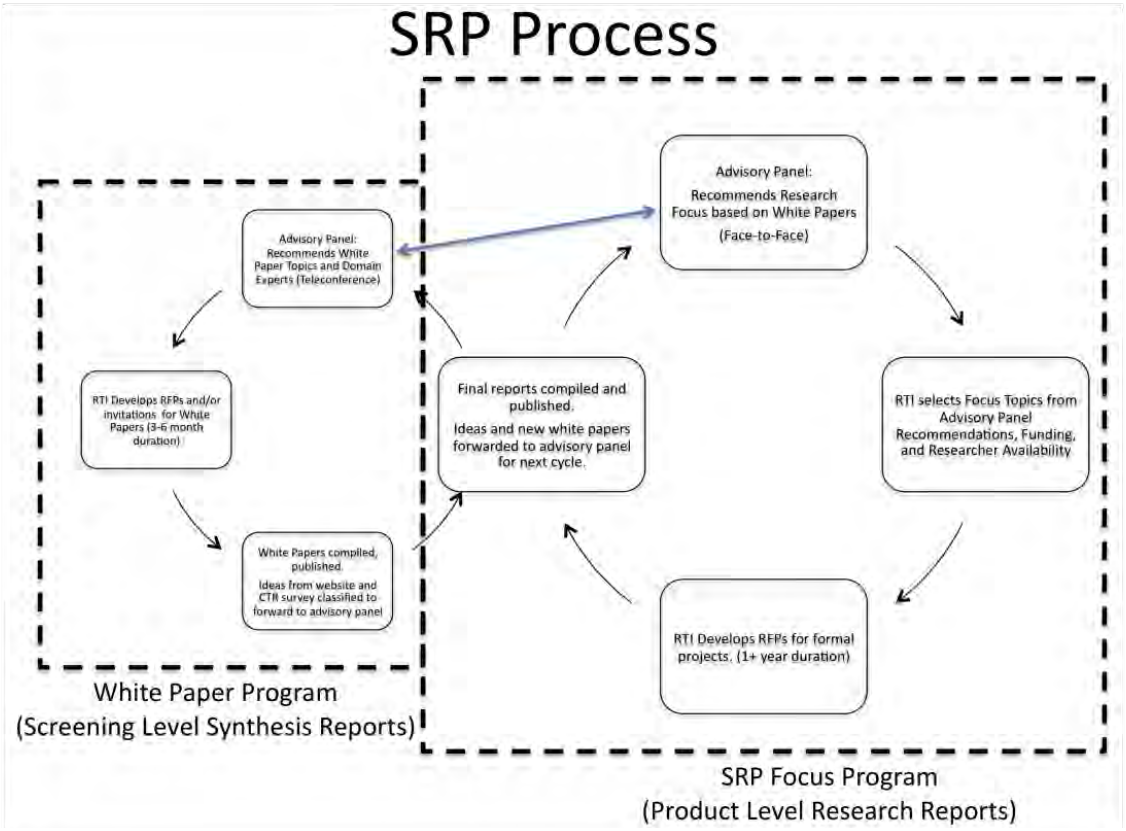

Figure 7.1: The SRP Process—Broader Focus Program and White Paper Program Relationship

This white paper cycle would eventually be about 3–6 months ahead of the focus topic identification cycle; primarily to generate an authoritative, referenced document on a topic of interest to the advisory panel to help them understand an issue, the research needs of that issue, some idea of anticipated research costs, duration, and outcomes to help them (the panel and RTI) select a focus topic for formal conversion into an RFP.

Important to the white paper program would be a twice-yearly classification of submitted ideas, and the advisory panel requested papers. The researchers suggest that 10–12 white papers per year could be generated by current research institutions at reasonable cost per paper.

Who Writes the White Paper?

The researchers suggest that white paper authors be domain experts (researchers mostly, but others by invitation also make sense)[4]. The white papers would be written as a contracted report, along the lines of a synthesis report, extensively researched as far as practical in a 3 to 6 month research and writing window.

Some white papers would result from a researcher attending an advisory panel meeting taking copious notes in "blue-sky" discussions, and compiling a white paper request for panel review with nearly an overnight turn-around. These requests would then be forwarded to RTI for formal white paper solicitation.

Other white paper requests would be generated from the "I Have an Idea…" sources outlined in Task 4. A quick summary of this component: white papers would be written by researchers, topics would come from the advisory panel and the "I Have an Idea…" sources. Most papers would be contracted activities (short term contracts); some would be invited (i.e., specific writers with specialized focus).

What Would a White Paper Look Like?

For lack of a better descriptive term, the white papers would be comparatively short topical discussions, conducted over a short time frame (3–6 months from solicitation to completion), and be about 3–12 pages long, excluding references. A mock-up white paper, authored by Mr. Wesley Kumfer, a graduate student at Texas Tech University, is attached as an appendix to this chapter.

Some comments on the mock-up are in order. First the topic was selected after reading an article on changing passenger rail trends. Secondly, the white paper author was tasked with putting the mock-up together in less than two weeks; the formal white paper program would assuredly use more time. Nevertheless, the mock-up does contain the type of information that the white paper program should convey: the issue, the possible impacts on society, and some research needs.

The actual mechanics of the mock-up were based on guidance found in Stelzner (2007), Bly (2006), and Kantor (2009). These references are primarily aimed at the business audience, but are relevant to this research and the program in general.

Appendix 7-A is a full-text template for constructing a white paper. This template addresses only the mechanical specifications and some of the psychology of making a white paper readable. Actual content of a real white paper is topic dependent.

Appendix 7-B is a sample of what a white paper could look like (this paper is also a mock-up and borrows heavily from briefings in *The Economist* magazine for structure and in this mock-up, content.).

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[4] The researchers envisioned a panel of researchers, TxDOT personnel, and advisory panel members. Based on the PMC meetings, this model was deemed infeasible, and the recommended approach is discussed in this report.

7.3 Recommendations

The researchers recommend that a white paper writing cycle be included as a part of the broader SRP research program with the important distinctions listed below:

1. The white papers are rapid reviews of a broad topic as directed by the advisory board, RTI, and the "I Have an Idea…" program.
2. The white papers are intentionally out-of-phase with the focus program by about 6 months; their purpose is to provide information to help the advisory board and RTI select focus topics.
3. The white papers can be contracted competitively (and should be most of the time), but RTI should maintain the right to select domain experts in specialized topics or in time-sensitive cases. This "invited" mechanism should be articulated in advance, but should be comparatively rare.
4. White papers are short-term projects, on the order of 3–6 months. Some mechanism should be investigated to allow for academic researchers to effectively participate (and hence would need to be over summer months).
5. The first year of the program will need a set of topical seeds (i.e., RTI should select some topics for the first cycle, so white papers could be ready by December 2010, for a topic identification meeting shortly afterwards[5].
6. Pursuant to 5 above, RTI will also need to seed some focus projects, as much to start the SRP program running as well as to address at least a few topics already identified as worthy strategic research topics elsewhere in this scoping project.

7.4 Chapter References

1. Stelnzer, M.A. "Writing White Papers" http://www.writingwhitepapers.com/ (25 May 2010).
2. Stelzner, Michael (2007). Writing White Papers: How to capture readers and keep them engaged. Poway, California: WhitePaperSource Publishing. pp. 214. ISBN 9780977716937.
3. Bly, Robert W. (2006). The White Paper Marketing Handbook. Florence, Kentucky: South-Western Educational Publishing. pp. 256. ISBN 9780324300826.
4. Kantor, Jonathan (2009). Crafting White Paper 2.0: Designing Information for Today's Time and Attention Challenged Business Reader. Denver, Colorado: Lulu Publishing. pp. 167. ISBN 9780557163243.

[5] This timing is a suggestion only; the CTR and TTI framework are not included in this report. However, the three partners are likely facing similar issues with short-term activities and some mutually effective approach (to TxDOT and the researchers) probably exists.

7.5 Appendix 7-A. White Paper Outline

TECHMRT

Crafting White Papers:

A Handy White Paper Template

Wesley Kumfer, Theodore G. Cleveland, Philip T. Nash, and Kim Harris

8/1/2010

Title[6]

Develop a brief title that will hook your audience using the principle of 3-30-3; 3 seconds on title, 30 seconds of introduction, 3 minutes to read to the end of the paper. The title must be interesting enough to make the reader want to read the white paper. It should also be reader-oriented—addressing an implied or acknowledged need for the reader.

Introduction

The first page is the most important part of the white paper, so make sure it is well written. The reader will often scan the first page before reading the rest of the document, so it should be interesting enough to hook the reader's interest.

Stelzner's formula for crafting a first page is[7]:

1. Identify the ideal reader.
2. State the challenges facing the ideal reader (these are the pain points the reader faces that make them interested in your paper).
3. State the general solution to the challenge (this should be generic enough to seem that you are not promoting an individual product or technology).
4. State the goal of the paper. This helps readers understand why they should read the paper.

The principle of 3-30-3
Title: 3 seconds
Introduction: 30 seconds.
Narrative: 3 minutes

Following these steps builds affinity with the readers and keeps them interested in the paper. The author must avoid becoming too specific with the solutions to prevent a perception of selling a product.

A formal abstract is NOT used; instead the introduction supplies the needed information.

Market Drivers[8]

This section should simply discuss the current state of affairs in relation to transportation topics as determined by the paper title. This discussion could be both a general statement about the nation and a more specific statement about Texas. This section is used to boost the problem/solution credibility by showing market trends that lead to the general solution and research questions you've provided in the introduction.

Two methods that are used to create this section are use of third-party evidence and use of logical arguments.

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[6] This document is a distillation of the major points of Chapters 6, 7, and 8 of Stelzner's book.

[7] The first three listed items comprise the "bait" for the paper. The author should design this section to be readable in 30 seconds. The last item is a 5-second component; that is, assume the reader will read the goal and decide within 5 seconds to keep reading.

[8] This section will earn up to three minutes of attention. The text extracts (to the left of the main narrative) are selected quotes from the document—they exist on purpose to help force the reader through the document. The large amount of white-space is also a design feature to make the document easier to read rapidly.

Third-party evidence is used to provide credible information to readers in order to allow them to reach the conclusions you want them to reach. Be as specific as possible, especially with regards to dates. Exact date specification can sometimes be replaced with an era (e.g., circa 1990).

Speculative research will likely depend on such logical arguments.

Logical arguments are used if the topic has not been covered before, so there is no prior evidence to cite. Speculative research will likely depend on such logical arguments (e.g., it is a logical extension of current trends that…)

These claims should be based on commonly understood information that the reader will know without having an actual source.

A possible outline for this section could be as follows:

1. Current state of market
    a. Specific trend 1
        i. Third party evidence
        ii. Logical argument
        iii. Tie argument to solution
    b. Specific trend 2
        i. Third party evidence
        ii. Logical argument
        iii. Tie argument to solution
    c. Specific trend 3
        i. Third party evidence
        ii. Logical argument
        iii. Tie argument to solution
2. Future technology
    a. Third party evidence
    b. Develop specific solution from evidence

WHITESPACE: A white paper uses a lot of whitespace. The psychology is that it makes the paper appear less difficult to read than a three-page, text-dense document. The paper is intended as a working document, so that readers feel free to make notes directly on the document.

Figure 7A.1: Generic Picture Example 1

The graphics should be relevant, but need not be technical.

Use of figures (graphics) is appropriate in this and other sections. The graphics should be relevant, but can be non-technical. A traffic jam image depicting congestion, frustration, and air pollution could be appropriate in a white paper that addresses any of those three issues.

The graphics are a tool to help maintain reader attention and break up text rather than display firm relationships (the white paper is a different type of document than a technical paper).

Problem Development

The SRP white paper at this point should segue into problem development. The best way to approach this section is to focus on problems your readers have without the general solution described earlier.

Focus on problems your readers have without the general solutions described earlier.

This section is an embellishment of the challenges introduced in the introduction, and builds credibility with the readers by showing that you are interested in their problems and not simply attempting to sell solutions.

Ensure that whatever problems listed are relevant to the ideal readers. There are multiple kinds of problems you can address:

1. People problems
2. Process problems
3. Quality problems
4. Absent problems.

If possible, it can be a good idea to list about three problems, but make sure they all have a common thread so you can maintain the relevance of the higher-level problem.

These problem statements may typically be of a "for example…" structure—certainly at the specific problem level, but even at the high-level structure.

A structure for the problem development section is:

1. High-level problem statement
    a. Specific problem 1
        i. Supporting data for problem
        ii. Clarify risks of problem
        iii. Hint at solution
    b. Specific problem 2
        i. Supporting data for problem
        ii. Clarify risks of problem
        iii. Hint at solution
    c. Specific problem 3
        i. Supporting data for problem
        ii. Clarify risks of problem
        iii. Hint at solution
2. Conclusion and restatement of solution

Historical Overview

This section addresses the fact that readers need a solution by providing reasons for why that solution is needed and showing how other solutions are outdated or ineffective. This section sets the context for research questions into a historical perspective—it answers "how did we get to where we are today?"

This section sets the context for research questions into a historical perspective—it answers "how did we get to where we are today?"

This section is a transition to your general solution, so it may be a good idea to begin as historically early as possible and develop a timeline, culminating in the generic solution as the future. Be as historically accurate as possible.

In the SRP White Paper Program, this section could be combined with the problem development section without loss of continuity, but a separate section might be of value in some cases.

A sample outline for this section could be as follows:

1. Origin of solution
    a. Development 1
        i. Impact on industry
    b. Development 2
        i. Impact on industry
    c. Development 3
        i. Impact on industry
2. Current state of market
    a. Why the need for generic solution

Figure 7A.2: Generic Picture Example 2

Solutions: first general, then specific—this layout reduces appearance of provider agenda.

Generic Solution
It is more palatable for readers to be given a generic solution before a particular one. This section is useful because you establish the type of solution a reader would need without appearing biased.

A possible outline for this section could be as follows:

1. Define the category
2. Differentiate from alternatives
3. Explain the solution

Benefits
Focus on the benefits to the reader of your generic solution. Benefits should not be features of the product, but rather should address the problems mentioned earlier. Differentiate between:

1. Business benefits
2. Technical benefits
3. Process benefits

A possible outline for this section could be as follows:

1. Overview of benefits
    a. Benefit 1
        i. Pertinence to reader's problems
    b. Benefit 2
        i. Pertinence to reader's problems
    c. Benefit 3
        i. Pertinence to reader's problems

Specific Solution
Explicitly introduce the specific solution but tie it into the rest of your document, demonstrating how it fulfills the qualifications of the generic solution, the benefits, and what to look for list. If there are any unique advantages you have not yet listed, provide them here.

A sample outline for this section could be as follows:

1. Specific solution
    a. How it works
    b. How solution meets requirements of generic solution
        i. Detail 1
        ii. Detail 2
        iii. Detail 3
    c. Advantages of solution
        i. Advantage 1
        ii. Advantage 2
        iii. Advantage 3
2. Tie specific solution to problem development

Figure 7A.3: Generic Picture Example 3

This section is where specific research questions are listed; these questions must not be buried, but should be clearly stated as part of the proposed solution.

Call to Action
The call to action is where you convince your readers what they should do now. This should be a clear conclusion that persuades them to follow a certain action rather than simply passing over the white paper. The call to action should be:

1. Visible
2. Clear
3. Compelling
4. Urgent

5. Direct

This section is where specific research questions are listed; these questions must not be buried, but should be clearly stated as part of the proposed solution.

A sample outline for this section could be as follows:

1. Generic call to action
    a. Solution 1
        i. Research Question 1
            1. Cost
            2. Duration
        ii. Research Question 2
            1. Cost
            2. Duration
        iii. …….
    b. Solution 2
        i. Research topic 1
            1. Cost
            2. Duration
        ii. Research topic 2
            1. Cost
            2. Duration
        iii. ……
2. Generic conclusion

TEXT EXTRACTS: A tool to keep a reader scanning the document interested; generally the extracts are quotes directly from the narrative to lure the reader into reading the full document. Magazines and brochures use this technique, and you are already familiar with and have undoubtedly read an article because of a single interesting quote.

Conclusion

Standard white papers do not feature a conclusion, but the SRP White Paper Program this section is recommended because of the intended audience.

The author(s) of this template anticipate that readers of these white papers are likely to read the introduction, and then skip to the conclusions, and then "backfill" their problem understanding with the intermediate but important contextual material in the middle of the white paper—hence a conclusion is vital.

The conclusion would concisely state the problems faced, the solutions proposed, and the research questions that need to be answered to facilitate the solutions[9].

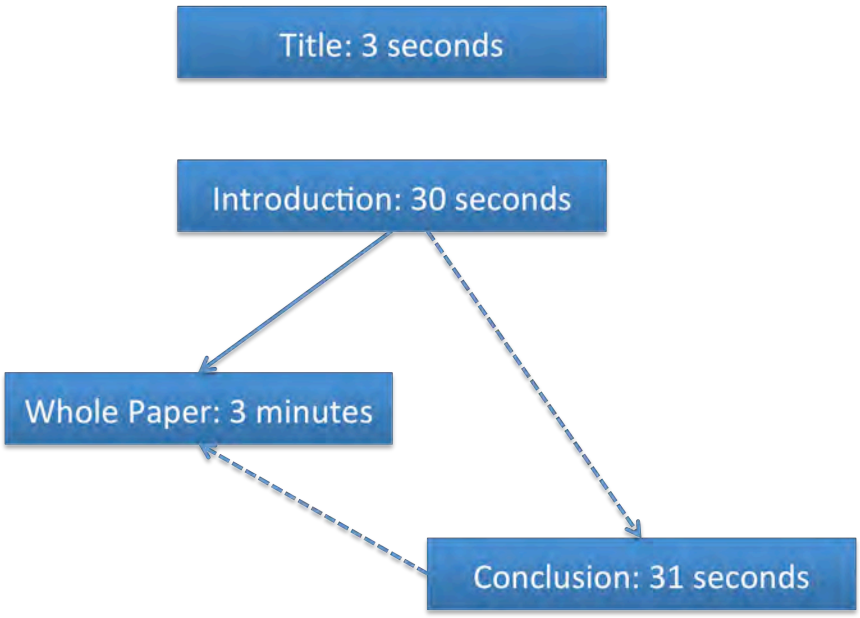

Figure 7A.4: Reader Attention Span for SRP White Papers. Many readers will jump to conclusions before reading the entire document; hence the need for this section.

[9] Arguably this section is really the abstract, it is physically located at the end and will essentially distill the contents of the white paper, but should be well written enough to convince the reader to read the supporting materials.

7.6 Appendix 7-B. White Paper Mock-Up

(http://www.rtfmps.com/SRPhome/SRPwhitepapers/HighSpeedRailroads/source_files/)

The Mass Transit Crisis

Solving the Transportation Dilemma in Texas

by Wesley Kumfer

Introduction

Texas legislators and government officials are seeking means of improving transportation in Texas. Highways have become crowded, leading to stop-and-go traffic on interstates between Texas' metropolitan areas. Additionally, urban streets are congested. Air traffic does little to alleviate congestion, with ticket prices increasing. However, Texas officials are taking steps to solve this dilemma by investing in alternative means of transit, especially passenger rail transportation. This white paper will demonstrate the need for passenger rail transit, differentiate between different modes of transportation, and highlight various research paths that can be undertaken to better improve passenger rail transit in Texas.

This action demonstrated that the State was willing to investigate alternative modes of transportation.

Market Drivers

Numerous states around the country are embracing alternative modes of transportation, and Texas is struggling to compete. Over the last few years, Texas has taken numerous steps to implement additional transportation modes, especially passenger rail. While these are important steps, additional progress is needed.

In 2009, Texas applied to the Federal Railroad Administration (FRA) to receive approximately $1.8 billion through the American Recovery and Reinvestment Act (ARRA) to improve passenger rail systems in Texas (Texas Rail Advocates, 2009). This action demonstrated that the state was willing to investigate alternative modes of transportation to alleviate transit issues. However, in 2010, the State found out that the FRA denied its $1.8 billion request because of what Karen Rae, Deputy Director of the FRA, called a lack of unified voice. It was implied that there is a lack of unity in Texas because the governor, legislators, and cities were not united in support of passenger rail. The FRA did endow Texas with around $11 million to improve certain rail projects, but the State missed a large opportunity to improve transportation systems (Texas Rail Advocates, 2010).

Historically, there has been little support from the federal government for high-speed rail.

However, the State has since taken steps to improve organization and better coordinate to improve transportation conditions. TxDOT developed a rail division to better coordinate rail projects, as the department now sees that rail is vital to the state (Texas Rail Advocates, 2009). Deirdre Delisi, chair of the Texas Transportation Commission, said that

TxDOT is in the process of including passenger rail in their strategic plan to improve air quality and to reduce congestion on roads (Texas Rail Advocates, 2010). As part of this new vision, the state is currently working on a State Rail Plan and has recently joined the States for Passenger Rail Coalition (Texas Rail Advocates, 2010). Clearly, the State is interested in improving current transportation conditions, with passenger rail as one alternative to research.

The Obama administration has recently allocated a large amount of funding for passenger rail.

Historically, there has been little support from the federal government for high-speed rail systems as shown in Figure 7B.1. States often had to rely on their own funding, and systems such as Amtrak were often given only a minimum of support. However, the Obama administration has recently allocated a large amount of funding for passenger rail services through various programs, including the ARRA. The federal government now views rail as a viable system that can be used to solve many of the transportation problems America currently faces. As such, there has never been a better time for States to implement their own rail projects and systems (FRA, 2009).

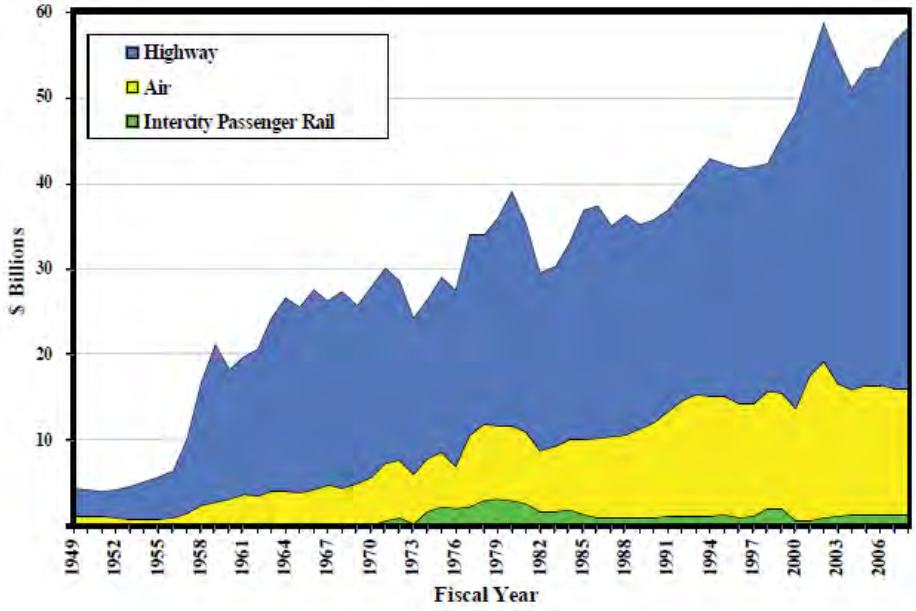

Figure 7B.1: Federal Investment in Intercity Transportation, 1949–2008 (Source: FRA, 2009)

Problem Development

Travel around Texas has become difficult and tedious. Commuters are likely to either pay large sums of money for short trips, or pay little for very long trips. Both cost and length are likely to increase as well as demand increases. Airlines and passenger vehicles alone are unlikely to meet the commuting needs of future generations. Texas should investigate and research new or undeveloped modes of transportation.

One of the two main means of transportation in Texas is air travel. However, air travel can be expensive and inconvenient. The price of airline tickets can vary greatly, and travelers often must

In many states and communities in the United States, passenger rail became obsolete.

rely on sheer luck to find a cheap ticket. For example, a ticket for a one-way flight between Lubbock and Houston, a 464-mile distance (Travel Math, 2010), can range from $138 to $966 for a travel time of a little over one hour (Cheap Tickets, 2010). However, this estimate does not take into account the time spent checking-in at an airport and waiting for a flight. Texas commuters may be willing to have a slightly longer trip in exchange for a less expensive and more convenient means of travel.

In contrast to flying, commuters may choose to drive long distance, such as the trip between Lubbock and Houston. This trip would be less expensive, based on the average price of gasoline in Texas, $2.58/gallon (Energy Information Administration, 2010). Assuming that a vehicle's gas mileage is around 20 miles/gallon, this trip would cost around $60, significantly cheaper than the cost of a flight. However, this trip by car may take up to nine hours (Google Maps, 2010). Considering the long travel time, commuters would likely desire a greater balance between cost and time.

If left unchanged, these commuting conditions are likely to worsen. A large cause of this will be Texas' growing population. The population of Texas is expected to reach between 32 and 41 million in 2030 (Gaines, 2008). This will lead to an increased number of commuters, increasing congestion and raising the cost of travel. Texas needs new modes of transportation to meet future demands.

Historical Overview

The United States has utilized railroads since the 1800s for commercial and passenger transportation purposes. Early steam railroads were used in the 1950s, quickly surpassing America's primary means of transportation. In 1869, the first transcontinental railroad was completed, beginning a new era of transportation in America. However, in the 1900s, a desire for more personalized transportation inevitably led to the mass production of the automobile. Automobiles then became the primary mode of transportation, and in many states and communities in the United States, passenger rail became obsolete (Natural Museum of American History).

Although passenger rail has largely become underutilized in the United States, other nations, and even certain communities in the United States, have further developed railroad technology in order to improve passenger transportation by rail. In 1964, Japan built the world's first high-speed railway, and numerous nations began developing and implementing high-speed rail projects to alleviate congestion and improve transportation (Takagi, 2004). High-speed rail is similar to normal railroads, consisting of a wheeled locomotive that travels at high speeds on rails. An example of a high-speed rail locomotive is shown in Figure 7B.2.

Figure 7B.2: High-Speed Rail Locomotive (Source: Texas Rail Advocates)

Other nations, particularly in Europe, began building their own high speed rail systems in the last few decades of the twentieth century, with France as Japan's chief competitor (Takagi, 2004). New technology emerged, and new speed records were set, with a top speed of 245 miles per hour being recorded in 2008 (Railway Gazette International, 2008). Through further development, high-speed rail lines have become convenient, comfortable, and fast, with speeds often rivaling commercial airliners (Davey, 2001). Among the numerous technologies developed to improve high-speed rail use are:

- Cab signaling control systems for high speeds (TGVweb, 1998)
- Fully automated control systems for lower speeds (Railway-Technology.com, 2010)
- Tilting trains that accommodate higher speeds around curves (Railway-Technology.com, 2010)
- High passenger capacity (Railway-Technology.com, 2010)

While numerous advances have been made to improve high-speed rails, various nations have developed another form of rail technology. Magnetic levitation (maglev) trains are essentially wheel-less trains with linear motors that hover through the air along a magnetic track (Maglev Development Division, 2004). A maglev train and track are demonstrated in Figure 7B.3.

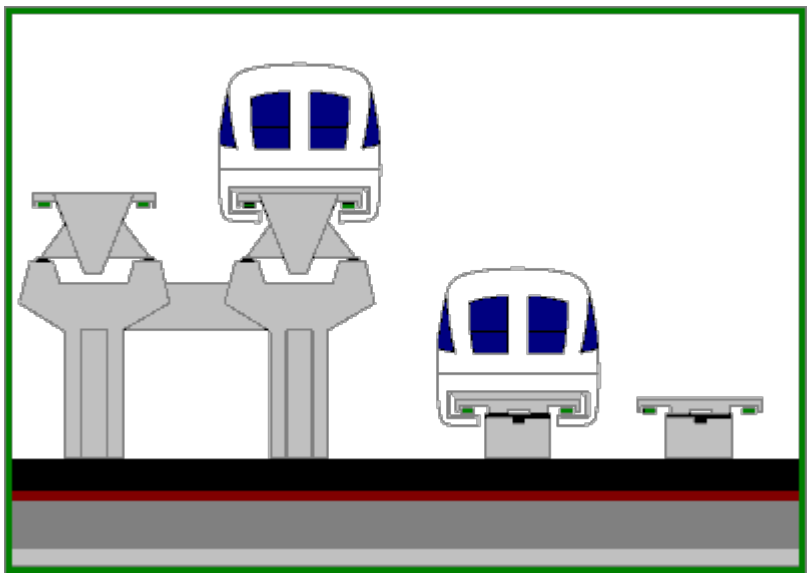

Figure 7B.3: Maglev Train and Track Design (Source: Keating)

While all maglev systems essentially work to levitate a train and propel it through the air, there are several different systems that are used to achieve this:

- Electromagnetic suspension (EMS) systems that use passive springs and electromagnetic fields to levitate and regulate the floating height of a vehicle (Ireson, 2008)
- Electrodynamic suspension (EDS) systems that use superconductors to levitate and propel a vehicle (Cotsalas, 2000)
- Inductrack systems that use permanent magnet fixtures in special arrays to lift and propel a vehicle (Post, 2000)

The first maglev train with longstator propulsion and designed for passenger transportation was developed and tested in Germany and licensed in 1979 (Transrapid International).This maglev train, called the Transrapid 05, is shown in Figure 7B.4.

Figure 7B.4: Transrapid 05 (Source: Transrapid International)

Since the development of Transrapid 05, numerous other nations have tested and developed maglev technology. In fact, Japan developed a maglev train capable of operating at 361 mph (The Globe and Mail, 2009). However, only a handful of maglev trains in the world are currently used for commercial purposes:

- An urban maglev system operating at lower speeds in Nagoya, Japan (BNET, 2004)
- A commercial maglev system in Shanghai, China (Zhong, 2007)
- A maglev train operating between a science museum and Expo science park in Daejeon, South Korea (Railway Gazette International, 2008).

Both maglev and regular high-speed rail systems are constantly undergoing research, and new technology that may render these systems more effective and useful looms on the horizon:

- Positive Train Control System to reduce train risk on high-speed rail systems (FRA, 2009)
- Maglev trains propelled through magnetic rings suspended in the air (Bright, 2010)
- Air-cushioned trains that hold up to 1,400 passengers at speeds up to 500 mph (Hsu, 2009)

All of these developments point to increased interest in utilizing passenger rail technology to solve transportation problems in the United States.

The current systems of transportation have been deemed insufficient.

Generic Solution

The United States currently employs numerous modes of travel to accommodate commuters. However, due to congestion and environmental concerns, the current systems of transportation have been deemed insufficient. Passenger rail systems are one solution to this dilemma. Passenger rail systems differ from other means of transportation in that they use dedicated right-of-way and specific infrastructure to transport large numbers of people on the ground. Able to combine comfort, speed, and safety, passenger rail systems are often preferable to both air travel and personal vehicle use (Davey, 2001). Passenger rails are able to accomplish this by featuring lightweight designs and reliable parts that propel numerous train-cars full of passengers (Takagi, 2004). By implementing passenger rail systems, Texas can take advantage of this effective technology and greatly alleviate the poor transportation conditions that currently exist in the State.

Specific Solution

There are two main forms of passenger rail systems that Texas should consider implementing: high-speed rail and magnetic levitation trains. Both systems have advantages and disadvantages, and one system could prove more effective and beneficial in a certain location or situation than the other. This section will discuss the differences between these systems, and the next section will provide various research topics that could be undertaken to test which system would prove more effective under various circumstances in Texas.

High-speed rail systems have several advantages over other forms of transit.

High-Speed Rail

High-speed rail systems essentially function similarly to standard trains except that they operate at much higher speeds. They accomplish this by being deliberately designed to haul passengers rather than freight and operate on tracks specially designed for high speeds (The Economist, 2010). If implementing high-speed rails, the various, benefits, disadvantages, and applications should be carefully considered.

Benefits

High-speed rail systems have several advantages over other forms of transit. These include

- High speed of travel thanks to light-weight chassis (Takagi, 2004)
- Safety due to redundant systems (TGVweb, 1998)
- Environmentally beneficial due to energy efficiency (Environmental law and Policy Center, 2010)
- Reliable due to lightweight chassis and safety protocols (Takagi, 2004)
- Able to move large numbers of people (Railway-Technology.com, 2010)
- Economically beneficial by creating numerous jobs to drive and service locomotives (Environmental Law and Policy Center, 2010)
- Multifunctional due to ability to use existing railroads at lower speeds (The Economist, 2010)

Many of the disadvantages are outweighed by the advantages.

These benefits make high-speed rail systems a very advantageous proposition, especially when compared with the two primary modes of transportation, personal vehicles and airplanes.

Disadvantages

Although there are numerous benefits to using high-speed rails, this system does have some disadvantages when compared to other modes of transportation. These disadvantages often come as trade-offs for the benefits and include:

- Negative environmental impacts due to noise pollution (Takagi, 2004) and building vibration (Davey, 2001)
- Low speeds and congestion when using non high-speed rail lines (The Economist, 2010)
- Little total trip time decrease at expense of less energy efficiency (Takagi, 2004)
- Concern over negative economic impacts on freight rail (The Economist, 2010) and airliners (Davey, 2001)
- Trips can be as costly as airline tickets and more expensive than car travel (Preuitt, 2009)

Although there are clearly disadvantages to using high-speed rail systems, many of these disadvantages are outweighed by the advantages and can likely by overcome with future research and development.

Applications

There are numerous locations and situations in which high-speed rail can be applied to improve current transportation conditions. These include:

- Urban areas where high-speed passenger trains can use local or freight rail lines (The Economist, 2010)
- Congested corridors between cities, such as the I-35 Corridor in Texas (Texas Rail Advocates)
- Long stretches of land where no current rail exists

The High-Speed Rail Strategic Plan calls for use of high-speed rail in these situations throughout the country, and Texas could greatly benefit from considering these systems to improve transportation condition (FRA, 2009).

Maglev systems possess numerous benefits.

Magnetic Levitation Trains

Maglev trains also operate at high speeds, similarly to high-speed rails. However, they are different in that they use their own dedicated infrastructure and specially designed systems to propel themselves (Maglev Development Division, 2004). Because they operate differently than traditional locomotives, they have their own distinct advantages and disadvantages. However, applications for maglev trains are very similar to those of high-speed rails.

Benefits

Although there are some differences between high-speed rails and maglev trains, maglev systems possess numerous benefits. These include:

- Higher speed of travel than high-speed rails due to design (Keating)
- Safety due to design wrapping around infrastructure (Transrapid International) and not needing to cross at grade
- Reliability due to possessing its own infrastructure
- Durability due to a lack of moving parts (Keating)
- Able to move large numbers of people (Maryland Transit Administration, 2003)
- More energy efficiency than high-speed rail due to frictionless design as demonstrated in Figure 7B.5 (Transrapid International)
- Environmentally friendly due to producing few Carbon Dioxide emissions (Transrapid International)

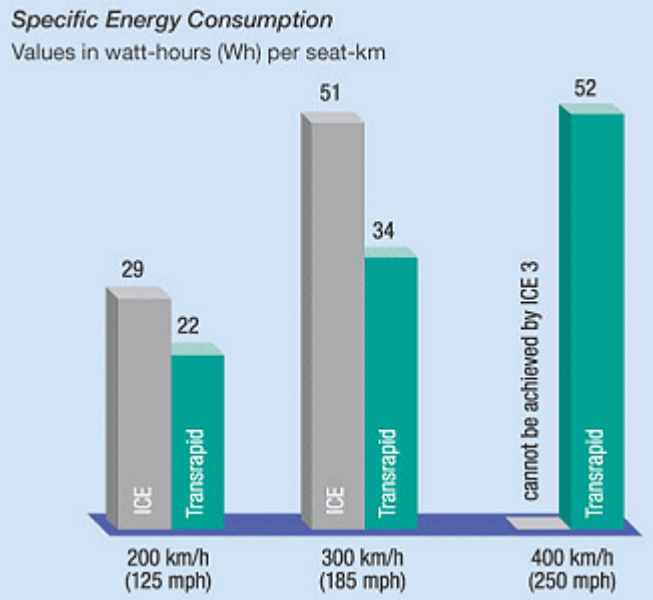

Figure 7B.5: Energy Consumption for High-Speed Rails and Maglev Trains (Source: Transrapid International)

Many of the benefits of maglev trains are very similar to those of high-speed rails. However, there are some notable differences.

Disadvantages

Like high-speed rails, maglev trains also have some limitations and disadvantages that must be considered. These disadvantages include:

- Incompatibility with standard tracks due to lack of wheels (Keating)
- Higher cost to construct rails than standard high-speed rail (Keating)
- Negative environmental impacts due to noise pollution (Acoustical Society of America, 2004)
- Tickets can be costly for short trips (Zhong, 2007)
- Possible negative economic impact to relocate businesses to construct rail (Maryland Transit Administration, 2003)

Although some of these concerns may be overcome through future research and development, serious consideration should be taken when implementing maglev systems due to the need for specific infrastructure. The reliance on their own rail structures can be seen as both a benefit and a disadvantage for maglev trains, so conditions should be studied carefully.

Applications

Situations in which maglev trains can be implemented are similar to those in which high-speed rails can be used. However, the special rail structures used can create some differences for viable conditions. Suitable conditions for maglev trains include:

- Urban areas where rail congestion creates problems of using high-speed rail because there is limited space (Transrapid International)
- Areas where grade or radii are too extreme for standard rails (Transrapid International)
- Longer distances in areas where no additional transportation infrastructure exists

The necessity of dedicated infrastructure creates unique situations for maglev trains, but when applied appropriately, the technology can solve numerous transit dilemmas.

Passenger rail systems can be used to solve the transportation dilemma in Texas.

Call to Action

Passenger rail systems can be used to solve the transportation dilemma in Texas. However, various aspects and conditions of these systems should be researched in order to allow the State to make use of the most effective technology. Various research paths for both systems are discussed below.

High-Speed Rail

Numerous aspects and impacts of high-speed rail systems can be studied in order to create a better understanding of the implications of implementing such systems in Texas. These include safety, environmental impacts, and feasibility with existing rail structures.

Safety

Two particular topics should be researched if studying the safety of implementing high-speed rails. These are safety of at-grade crossings and the safety of various control systems. The FRA recently conducted a study of safety at private highway-rail grade crossings because such locations create substantial hazards for both locomotives and private vehicles (FRA, 2010). Researchers could expand upon this research by studying proposed rail corridors and surveying existing at-grade crossings. Researchers could then attempt to find alternative routes that do not create dangerous crossings or eliminate at-grade crossings altogether. This research could be conducted for one year for $100,000.

Another safety issue to investigate is the relative safety of different train control systems. Again, an FRA study on this topic could be used as guidance, although the lack of abundant evidence indicates a greater need for research (FRA, 2009). While multiple systems are available to control trains, more data should be acquired before commissioning high-speed trains to be built. This research project could be conducted for two years for $200,000 per year.

Environmental Impacts

Although passenger rail systems can be considered more environmentally beneficial than other modes of transportation, there are still some environmental concerns that should be addressed. These topics include noise pollution and adverse impacts on land where proposed high-speed rail would be built. Noise pollution is a major concern for high-speed rails (Davey, 2001). Researchers could therefore test acoustic panels or other noise-dampening systems to eliminate noise pollution. Research on this topic could be conducted for one year for $200,000.

Another topic to investigate would be the environmental impact of developing high-speed rail in certain areas. Care should be taken to minimize adverse effects on animal life, waterways, and plant life. The State should also avoid introducing invasive species when constructing high-speed rails (USDOT, et al., 2008). Research could be conducted on this topic for one year at a cost of $200,000.

Feasibility with Existing Rail

Researchers should explore various situations where high-speed locomotives may need to make use of standard rails and study the impacts on congestion, speed, and other industries in these situations. A possible solution for situations where new rails cannot be constructed is shared use with freight lines (Prozzi, 2006). Although this situation could benefit passenger rail systems, it could easily harm rail freight in the area (The Economist, 2010). Therefore, a feasibility test should be conducted for proposed rail corridors and routes to determine if alternatives exist to sharing with freight lines. If alternatives do not exist, research should be conducted to minimize inconvenience to both parties. A study conducted by the Center for Transportation Research (CTR) on shared rail feasibility and effective policies could be used as a base model for research (Prozzi, 2006). Figure 7B.6 displays a map of freight and high-speed rail corridors that demonstrates the extent of rail that could be shared. This research project could be conducted for two years for $200,000 per year.

Figure 7B.6: Freight Lines and High-Speed Rail Corridors (Source: The Economist, 2010)

Magnetic Levitation Trains

Research should also be conducted as to the efficacy of implementing maglev systems. This technology is currently used very sparingly, so extensive data about maglev systems may be unavailable. Therefore researchers could study environmental impacts, the most effective propulsion system, and interactivity with other rail structures.

Environmental Impacts

Research on the environmental impacts of maglev systems could be conducted on similar topics as those that relate to high-speed rail systems. Researchers could investigate noise pollution and environmental impacts on native areas. Noise from maglev trains has been cited to be worse than

standard intercity trains, so researchers could study sound-dampening equipment and sound barriers (Acoustical Society of America, 2004). Research on this topic could be conducted for one year for $200,000.

Researchers could also investigate the environmental impact of developing maglev infrastructure in certain areas. Care should be taken to minimize adverse effects on animal life, waterways, and plant life. The State should also avoid introducing invasive species when constructing maglev rails (USDOT, et al., 2008). Research could be conducted on this topic for one year at a cost of $200,000.

Efficacy of Propulsion Systems

As mentioned before, maglev trains can use various systems for levitation and propulsion. These include EMS, EDS, and Inductrack systems. Researchers could investigate the various technologies used in each system and compare these technologies with each other. Examples of technology to investigate as listed by the Magnetic Development Division in 2004 include:

- Durability of superconducting magnets
- Aerodynamic brakes
- Ground coils
- High power supply system for pulse width modulation (PWM)
- Inverters using gate turn-off thyristors
- Turnout for high-or-low-speed passing

The sheer scope of this project would entail numerous years of research and multi-disciplinary collaboration. However, the findings of this research could prove critical in which, if any, maglev system is implemented in the state. This research could be carried out for 5 years for $300,000 per year.

Interactivity with Other Rail Systems

Maglev systems require their own infrastructure to operate, so if maglev trains could be designed to interact with and use other rails at lower speeds, they could become far more practical. Attaching wheels to maglev trains could be one possible solution (Keating). Experiments have already been conducted to utilize auxiliary wheels for lower speeds or power failure scenarios (Post, 2000). Therefore, researchers could explore using wheels at slower speeds and the feasibility of connecting maglev rails to standard rails. Adverse effects of wheels on maglev systems could also be studied. Research could be conducted on this topic for four years at a cost of $200,000 per year.

Transportation is at a critical point in Texas.

All of these research topics could prove greatly beneficial to the state of Texas by determining likely corridors and routes for passenger rail systems, as well as which rail system to adopt. It is highly advised that Texas undergo some research program in order to take advantage of current market trends leaning towards the implementation of high-speed rail systems.

Conclusion

Transportation is at a critical point in Texas. As the population grows, the cost of the current largest modes of transportation—air travel and personal vehicle use—increases. Highways are becoming more congested and air travel less convenient. However, Texas has the potential to alleviate some of these issues by adopting a relatively underused form of transportation. Passenger rail could easily become a highly beneficial mode of transit for Texas citizens. Two main types of passenger rail systems exist: high-speed rail and magnetic levitation trains. Both systems have their own benefits and disadvantages, so research should be undertaken to determine the practicality of each system. If Texas invests in one of these systems and performs the necessary research for proper implementation, it could greatly improve living conditions in the state and take advantage of the current support for multi-modal systems.

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Chapter 8. Implement the Plan

8.1 Introduction

The proposed TxDOT Strategic Research Program (SRP) is intended to prepare the department for the transportation challenges likely to be faced in the next 10–30 years. It will complement the current research program by addressing longer-term and broader transportation issues that could affect the efficiency and viability of the statewide transportation system. This chapter presents the results of Task 7 of the research project, Implement the Plan. NOTE the use of the term "Research Brief" instead of "White Paper."

8.2 Implement the Plan (Task 7)

The objective of this task was to develop recommendations for implementing the Strategic Research Program. The recommendations from the previous tasks were organized into a logical series of steps. The requirements for implementing them, (namely, responsibilities and timeline) are presented in this memorandum.

8.2.1 Proposed Program Cycle

The first year of the program (August 2010–July 2011) is proposed as an initiation phase, with a number of Research Briefs to be developed in the first six months under the supervision of the existing 0-6661 Project Management Committee (PMC). During that time the program's Oversight Panel (OP) will be appointed, and the existing PMC will transition over to that panel. Allocation of research briefs to researchers will be handled by the existing three-university consortium. More research briefs may be authorized in the second six months by the PMC so that the OP will have sufficient material to decide on potential research projects. At a proposed formal meeting in July 2011 the OP will take charge of the program and launch research projects and additional research briefs.

Generally, the Panel would have one formal face-to-face meeting in July and one informal meeting (via webinar or teleconference) in January. Additional meetings may be held as needed. Research projects could originate from research briefs or from the Oversight Panel directly, and could be started at any time. At the panel meetings researchers will present their qualifications to conduct proposed research projects, and the panel will decide on the awards. RTI will handle the contracting of research projects, and the panel will assign project panels to monitor the research.

Table 8.1 outlines the proposed program cycle for the first and subsequent years.

Table 8.1: Proposed Program Cycle for First and Subsequent Years

Timing	Responsibility	Activity
August 2010	RTI	Contract with Universities for Research Briefs and research
	Universities	Establish format for Research Briefs; begin identifying Oversight Panel members
	PMC	Select ideas for Research Briefs
September 2010	RTI	Develop skill set for Universities involved in program
	Universities	Assign Research Briefs to researchers; identify Oversight Panel members
October–December 2010	Universities	Open website for RTI use. Develop research briefs and submit to PMC for review
	PMC	Review research briefs and identify potential research projects
	TxDOT/ Commission	Appoint Oversight Panel for Strategic Research Program
	RTI	Solicit ideas for Strategic Research. Select at least 20 ideas for presentation to PMC, with universities' help as needed
January 2011	PMC	Review first round of research briefs. Identify research projects for Oversight Panel. Select ideas for second round.
	Universities	Prepare orientation materials for Oversight Panel
February 2011	Panel	First Oversight Panel meeting; briefing from PMC
	Universities	Assign second round of research briefs to researchers
March–June 2011	RTI	Solicit ideas for Strategic Research. Select at least 20 ideas for presentation to Oversight Panel, with universities' help as needed
	PMC	Transition to Oversight Panel
	Universities	Develop research briefs and submit to Oversight Panel; prepare statements of qualifications for proposed research projects
	Panel	Review research briefs and select potential research projects
July 2011	Universities	Present research briefs and qualifications to Oversight Panel
	Panel	Formal meeting. Select ideas for new research briefs, and new research projects. Review researcher qualifications and authorize research projects.
August 2011+ subsequent years	RTI	Renew contract with Universities for research briefs and research projects
	Panel	Award research projects and assign project panels
	Universities	Assign research briefs to researchers; contract for new research
September 2011+	RTI	Update skill set for Universities involved in program
	Universities	Kick off research projects and research briefs

Timing	Responsibility	Activity
October–December 2011+	RTI	Solicit ideas for Strategic Research. Select at least 20 ideas for presentation to Oversight Panel, with universities' help as needed
	Universities	Develop research projects and research briefs and submit to Oversight Panel; prepare statements of qualifications for proposed research projects
	Panel	Monitor research projects; Review research briefs and select potential research projects
January 2012+	Panel	Informal meeting. Select ideas for new research briefs, and new research projects Review researcher qualifications and authorize research projects.
	Universities	Present research, research briefs, and qualifications to Oversight Panel
February 2012+	Panel	Award research projects and assign project panels
	Universities	Assign research briefs to researchers; contract for new research
March–June 2012+	RTI	Solicit ideas for Strategic Research. Select at least 20 ideas for presentation to Oversight Panel, with universities' help as needed
	Universities	Develop research projects and research briefs and submit to Oversight Panel; prepare statements of qualifications for proposed research projects
	Panel	Monitor research projects; Review research briefs and select potential research projects
July 2012+	Panel	Formal meeting. Select ideas for new research briefs, and new research projects. Review researcher qualifications and authorize research projects.
	Universities	Present research, research briefs, and qualifications to Oversight Panel

These steps are also diagrammed in Figures 8.1 and 8.2.

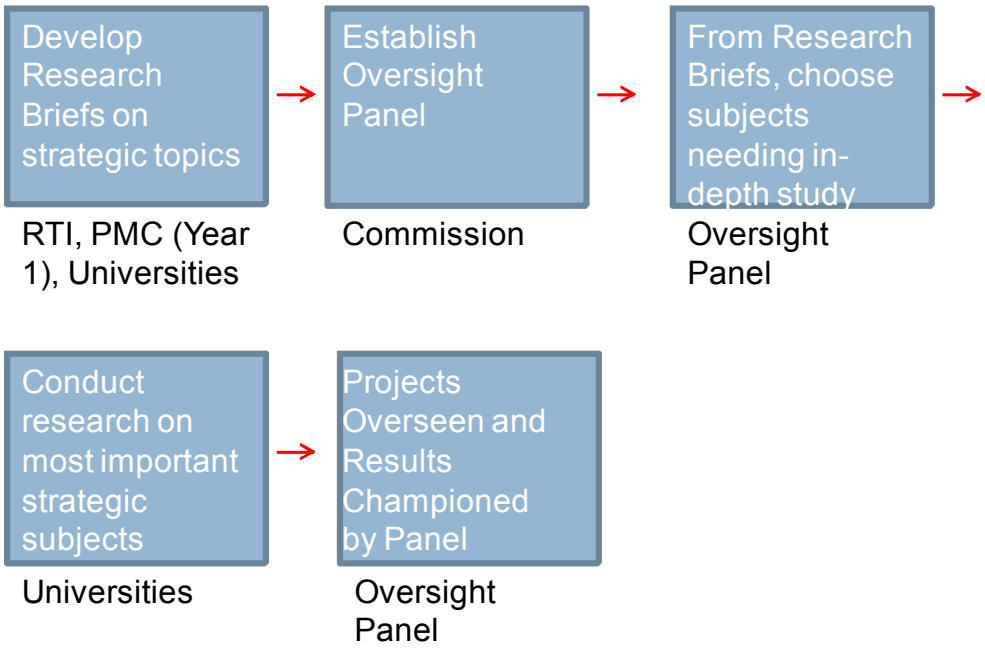

Figure 8.1: Strategic Research Program Process

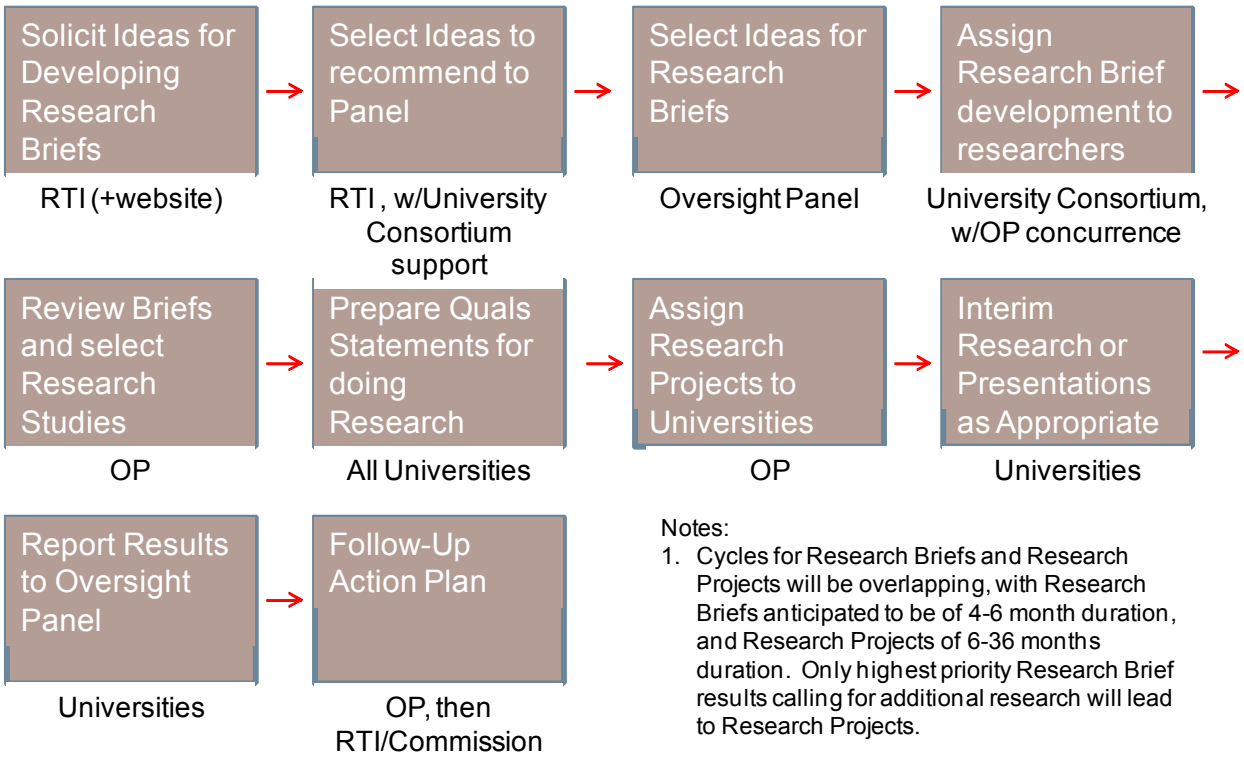

Figure 8.2: Detailed Strategic Research Program Process

8.2.1 Presentation to Commission

In addition to developing the implementation plan, the researchers prepared a PowerPoint presentation and a 5-page white paper for the Texas Transportation Commission workshop on August 25, 2010. The critical action item is identification of Oversight Panel members in the next few months and appointment of the panel.

Appendix A

Strategic Ideas Gathered via Survey in March–May 2010

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Commuting	*Connecting the Gulf Coast and South Central High Speed Rail corridors. Texas needs to take the lead in higher speed regional trains that would serve our major cities and metro areas with speed (up to 120MPH) and frequency (more than one train per day.)
Demand	Commuting	*Good article: http://www.forbes.com/2010/04/08/ford-commute-2020-technology-data-companies-10-transportation.html Competition and Changing Social Norms Right now surface transportation systems are part of the state-owned monopoly but it is not inconceivable that private systems could be developed to replace the state. I'm not referring to public/private partnerships to building and operating roads but true competitors. At what point do the ever increasing commute, the chore of driving and their negative effects on a life/lifestyle become intolerable? What if this "green" thing really takes over and people start choosing to drive electric cars, living downtown near their jobs, riding bikes, walking and leaving the suburbs in blight? Eventually the sci-fi of today will become the reality of tomorrow.
Demand	Commuting	*Looking into flexible work options. Most congestion is a result of mandatory 8-5 work hours. Flexible work options such as flex hours or telecommuting could reduce congestion and make the most of existing infrastructure. It is possible additional infrastructure may not be as necessary if these options are implemented on a broad basis.
Demand	Commuting	*More of the issue for 5-10 years plus, how will people move around when they need to, and how far will they go? How much will the Internet continue to diminish the need for local shopping? How will local development rules spread the population out, as opposed to artificially concentrating it in small pockets as they do in most urban areas now? Or will development rules concentrate it even more? Development rules in the US tend to cause long commutes. Will that continue? I don't know. What's the best guess???
Demand	Commuting	*New technologies, virtual offices, telecommuting The ability of new technologies to reduce the need for new highway capacity and restructure our existing travel patterns. More than just telecommuting, the Internet is reshaping retail distribution, which in turn may alter our needs and demand for mobility projects.
Demand	Commuting	*Reliability in transport: researchers & practitioners are finding the uncertainty in travel times is impacting behavior in significant ways, and unreliability is exerting a very serious toll on system costs. Finding ways to moderate unreliability, and appreciate its effects, are important; these include variable tolling & ITS.
Demand	Commuting	*We need to use Europe as a model to establish an infrastructure for mass transit that works for an ever increasing population. The single rider vehicle is just not viable now or in the future.
Demand	Commuting	1. I am in an urban district. We have congestion, but not to the level of metro districts. We can't compete with them for mobility dollars, but need added capacity. 2. Increase truck haul through my district which affects road conditions and mobility. 3. Increased public expectations.
Demand	Commuting	A shorter commute; Roads that are well maintained so my property value increases or stays steady; improving or at least maintaining good transportation systems that attract business & industry so that my city/region/state's economy stays healthy.
Demand	Commuting	A transportation system (and Agency) that enhances my travel/commute experience instead of frustrating it. I want an increasingly less expensive, more pleasant and efficient travel experience. I want an increase in commute/travel options that are all truly viable and competitive.
Demand	Commuting	Accessible rail travel between cities, along with a model of intermodal public transportation at the end points.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Commuting	Again, mass transit system. Intermodal transport. Regional connectivity. Air Quality. As a statewide strategic issue, connections between major population centers will become of key interest to the citizens of Texans. The new mass transit systems being incorporated into Houston, San Antonio and Austin will lead to transportation without the necessity of personal automobile transportation. Personal transportation may be reduced to electric vehicles, mopeds/scooter, electric bicycles, Segways, etc. Mass transit could incorporate these vehicles to provide point B to C connections. Air Quality will improve with the efficiency of personal transportation devices and mass transit since the efficiency is improved.
Demand	Commuting	Alternate modes, local and long distance options. Creative thinking is necessary as local and long distance travel by other than cars is not best served by the same options.
Demand	Commuting	Alternative transportation - Further incentives for alternative transportation - both automobile alternative fuel vehicles, and rapid transit solutions that work with the independent Texas mindset.
Demand	Commuting	Alternatives to the daily commute. Congestion is becoming a major productivity and quality of life issue for me personally. Would like to see this addressed through feasible transit options, telecommuting, policy changes, and intelligent transportation systems.
Demand	Commuting	Background Global economic conditions suggest that a major, world-wide depression could occur in the next 1 - 5 years. This could result in long-lasting changes in the job market such that a large proportion of individuals work multiple jobs each providing 25% to 30% of their income needs. An Individual's 'career' would switch from working one 40 hr/wk job to two, three, or four 10, 15 or 20 hr/wk jobs. Strategic Research: The need for public transit commuter trips could increase dramatically for a large percentage of the working population. Commute from home to park and ride....use the bus or other transit to move from job to job inside the city core, then back to park and ride. Develop an economic / job market tool that analyzes and reports trends for major Texas' cities and identifies patterns which suggest that the above scenario is in progress. Develop a set of transportation strategies that incorporate public/private transportation to address future commuter needs.
Demand	Commuting	Commute to work. I want to maintain to decent travel time to my office.
Demand	Commuting	Congestion - Austin seems to be getting more congested, with little relief in sight.
Demand	Commuting	Congestion - congestion - congestion - in urban areas, and on major corridors, along with a realistic financial assessment of what is doable. We turned our back on rail in this country 50+ years ago, both passenger and freight. We can't just pretend we didn't do that, and hope to look like Europe (who chose a different route) in a couple of decades. We need a rational, coordinated look at both public and private elements of the US transportation system - as a system, and more coordinated public policy! For instance - trucking industry is heavily subsidized by public highway funds. Rail not only builds and maintains their system, they get to pay property taxes on it. Let's decide - do we have a transportation system, or various ones in competition with themselves.
Demand	Commuting	congestion - congestion - congestion in Austin
Demand	Commuting	Congestion It will increase pollution, waste gas, decrease safety, and waste time.
Demand	Commuting	Congestion Since I drive a long distance to work sitting in traffic can lead to wasted time and money
Demand	Commuting	Congestion reduction Air quality Climate change transportation financing
Demand	Commuting	Congestion, expansion of key roadways and metro arterial roadways.
Demand	Commuting	Congestion. Improvements to I-35 from Austin to Hillsboro.
Demand	Commuting	Congestion. Time lost with family while stuck in traffic.
Demand	Commuting	Congestion.... we are sunk when the wheels are not turning because we are stuck in traffic. Raising costs, delaying the deployment of inventory, frustrating drivers...already in short supply.
Demand	Commuting	Cost effective mass transit for long haul or commuting; aesthetically pleasing highways for quiet, pollution free personal vehicles.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Commuting	Creating a viable high speed rail option for transportation with good connecting in city transportation option. Moving more trucks to trains as well.
Demand	Commuting	Develop bus operation and route integration strategies and methodologies to have reasonable and effective mass transit. Currently the passenger rail transport systems are a waste of money.
Demand	Commuting	Development of the TxDOT HSR plans - Promoting the construction and use of new High Speed Rail Lines across the state connecting major cities
Demand	Commuting	Ditto from No. 1
Demand	Commuting	Ditto from No. 2
Demand	Commuting	Driver attitude - at some point we are going to have to educate people away from one vehicle - one person, and develop viable mass transit alternatives within and between major metropolitan areas.
Demand	Commuting	Economic recovery. With traffic levels expected to rise continually, the economy's recovery over the next 5 years will have a direct impact on Texas transportation; more freight, more people. A key to handling this will be our ability to take advantage of intermodal (i.e., road-to-rail) transportation.
Demand	Commuting	Effective mass transit systems. I feel this is the biggest issue for both the near and long term. While the building industry has already embraced "sustainable" principles, these concepts are now being applied to planning. This will mean a general migration back to the urban core for many. The roads are already clogged and a great deal of productivity is lost during peak commutes.
Demand	Commuting	Efficient urban transit.
Demand	Commuting	Flying cars would be cool. Seriously, CalTrans have been working on a self piloted car lane for over a decade. We got anything on the shelf like that?
Demand	Commuting	Free road construction
Demand	Commuting	Fuel Efficient Alternative Travel: My retiree budget will not stretch as far when carbon fuel costs rise. Austin, like most Texas urban areas, does not have a local transit system capable of meeting demand when the economic elasticity of travelers is broken by $4 -5 a gallon gasoline costs. And transit service outside peak commute times is a particular challenge.
Demand	Commuting	High speed rail between Houston, Dallas, San Antonio, etc.
Demand	Commuting	High Speed Rail Intercity Connectivity - Obviously the federal government has placed a big emphasis on this, but TxDOT has lagged behind tremendously. This will transform Texas travel and the economy if Texas ever figures it out.
Demand	Commuting	High speed rail is a must between major cities.
Demand	Commuting	High speed travel modes: Texas will need more high speed intercity connectivity, both in-state (rail?) and beyond our borders, people and freight. Perhaps the air and rail passenger terminals can be co-located as the freight hubs are doing? Also need to find a way to add new, major air hubs, given ground congestion. The Killeen-Ft Hood Regional Airport is an excellent example to replicate through much of the Texas Golden Triangle / Crescent.
Demand	Commuting	High-Speed Rail As more people move into Texas on already overcrowded roads, and with no money to build more, a means of moving large numbers of people over longer distances becomes imperative.
Demand	Commuting	I have no public transportation option to commute to work from Smithville. There is a CARTS bus that costs more than gas to drive and it is a short-haul shuttle vehicle not designed to cover that distance, therefore unrideable.
Demand	Commuting	I spend a lot of time in traffic going less than the speed limit cost me a lot of time. Increasing capacity of heavily traveled roads should be of some importance.
Demand	Commuting	I think that the primary issue of importance to Texas transportation in the next five years is the accessibility and utilization of the existing public transit systems in major metropolitan areas. If this is optimized and marketed, it could significantly reduce congestion in the short term.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Commuting	I travel the IH 35 corridor regularly and would like to see the widening projects funded.
Demand	Commuting	I'm hoping my income will rise to let me buy a house closer to downtown where I work. If not, we need more toll roads.
Demand	Commuting	Improve Diversity of Choices for Transportation - choices such as local transit, bicycles, walking. Also long distance choices such as air versus high speed rail. Right now it feels like we're stuck in a pattern of thinking that will not address long term needs.
Demand	Commuting	Improve Diversity of Choices for Transportation - choices such as local transit, bicycles, walking. Also long distance choices such as air versus high speed rail. Right now it feels like we're stuck in a pattern of thinking that will not address long term needs.
Demand	Commuting	Improve mobility
Demand	Commuting	Improve the flow of traffic so as to reduce the energy cost and safety associated with transportation. This includes reducing bottlenecks to traffic flow... These exist or will exist in most regions of the state... but in major metropolitan areas and in the secondary roads in rural areas.
Demand	Commuting	Improve upon highway congestion in our urban State highways/arterials
Demand	Commuting	Improved facilities for non-motorized transportation - Driver education, and facilities for alternative forms of transportation, included but not limited to bicycles and walking.
Demand	Commuting	Improving mass transit in metro areas
Demand	Commuting	Improving mass transit in metro areas
Demand	Commuting	Improving mass transit in metro areas
Demand	Commuting	Improving overall traffic congestion - traffic congestion on our roads and freeways is an ever present and continuously increasing problem
Demand	Commuting	Increased facility for fast transportation among urban areas. It would be advantageous to be able to live in one city and have a job in another city 200 miles away and make the commute in an hour. Hint: Rapid Transit.
Demand	Commuting	Increased mobility options and utilization of all transportation modes.
Demand	Commuting	increased nodal or centers concept development Need for increased multi-model system Price of oil air quality issues
Demand	Commuting	Increasing capacity of heavily traveled roads
Demand	Commuting	Increasing the capacity of our highway system/providing alternate routes to absorb our increasing population. As a resident of the Houston area, we waste significant time, fuel, and money stuck in traffic.
Demand	Commuting	Infrastructure I need to have viable alternative to current corridors to be more mobile
Demand	Commuting	Intercity high speed rail between major cities - major being more than 1 million in population.
Demand	Commuting	Intercity transportation. Develop a transportation system that will connect the major cities between San Antonio and Dallas-Ft. Worth and reduce the traffic on IH 35.
Demand	Commuting	lack of mobility caused by urban traffic congestion
Demand	Commuting	Major cities like San Antonio, Austin, Dallas-Fort Worth, and Houston should be connected with regularly scheduled passenger trains. Smaller cities can be linked with regularly scheduled bus services. Rural communities can be reached with ad hoc micro-bus systems. Larger cities need to start developing comprehensive rail systems within their own city limits.
Demand	Commuting	Managed lanes-this potentially will provide an easier, more reliable commute on my most regular route making transportation more efficient for me personally.
Demand	Commuting	Management of traffic congestions in urban areas.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Commuting	Mass transit system. Intermodal transport. Regional connectivity. Air Quality. As a statewide strategic issue, connections between major population centers will become of key interest to the citizens of Texans. The new mass transit systems being incorporated into Houston, San Antonio and Austin will lead to transportation without the necessity of personal automobile transportation. Personal transportation may be reduced to electric vehicles, mopeds/scooter, electric bicycles, Segways, etc. Mass transit could incorporate these vehicles to provide point B to C connections. Air Quality will improve with the efficiency of personal transportation devices and mass transit since the efficiency is improved.
Demand	Commuting	Mass transit, Maintenance. I am concerned about the lack of utilization of mass transit (rail) in the state of Texas. TxDOT should be a leader and take charge of making Texas the most efficient and environmentally friendly state. Maintenance of our highways is of vital importance to the success of our state. The section of IH35 between Austin and Dallas is the worst portion in the state. I'm not sure if the private maintenance (VMS?) in that section has anything to do with it.
Demand	Commuting	Mobility and congestion Population, number of highway vehicles, and highway vehicle-miles traveled are increasing a lot faster than the transportation system is being expanded.
Demand	Commuting	More and continued development of mass transit and high speed transportation
Demand	Commuting	More Rail. Move towards car-independence.
Demand	Commuting	More readily available and choices for public transportation in the city in which I reside and statewide.
Demand	Commuting	More train travel both for goods and people moving through Texas. We need passenger train service back in the Texas panhandle.
Demand	Commuting	Need high speed rail. Our corridors (especially I35) are saturated with traffic and need some relief. Get some cars off the roads and people into trains to get them there safer and quicker.
Demand	Commuting	Non auto transit among the key Texas cities of Dallas/ft. Worth and Arlington and Austin, Houston and San Antonio and Corpus Christie.
Demand	Commuting	Non-auto transportation. I think the train commuter system needs to be expanded so that it's a viable transportation alternative. Additionally, the mandatory inclusion of bike lanes on non-highway roads would provide a safe alternative to cars. Promoting cycling to increase awareness and acceptance of cyclists should accompany this.
Demand	Commuting	Reduction of congestion in the big cities that slows down everything to a crawl.
Demand	Commuting	Providing more options to the daily commuter or weekend traveler. Roads for personal vehicles and mass transit options within cities and between cities.
Demand	Commuting	Public mass transit private mass transit Buses trains light rail regional mass transit intercity intracity Significant funds to develop and improve all forms of mass transit will (not may, but WILL) alleviate traffic, injuries, emissions, and personal well-being.
Demand	Commuting	Public mass transit private mass transit Buses trains light rail regional mass transit intercity intracity Significant funds to develop and improve all forms of mass transit will (not may, but WILL) alleviate traffic, injuries, emissions, and personal well-being. THIS CAN NOT BE STRESSED ENOUGH. WE NEED ALTERNATIVE FORMS OF TRANSPORTATION MORE WIDELY AVAILABLE. WE ARE BEHIND EVERYONE ELSE!
Demand	Commuting	Reduced Traffic Congestion Although freeway system allows faster movement of goods and traffic, they are becoming congested during peak hours and need to have a better system to flow traffic faster during rush hours
Demand	Commuting	Reducing congestion in Houston. Congestion causes me to waste time and money.
Demand	Commuting	Regional mass transit Funds and importance centered around personal automobiles should be less than 50% at this time. Regional and local mass transit are the smart choices.
Demand	Commuting	Regional transit Bicycle integration I want my children to travel to their grandparents on mass transit instead of a stressed and dangerous ride along IH-35.
Demand	Commuting	Relieving congestion in urban areas

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Commuting	Same
Demand	Commuting	See Item 1 - I think it will take a long time to change the mindset of Texans to be more accepting of other modes of transportation, and that it will take an ongoing media campaign with our leaders leading by example. Also, I realize that adding room for rail on all highway projects means more right-of way is required, but can you imagine the benefit if the people who obtained the ROW for LBJ/635 had thought to do this?
Demand	Commuting	Statewide commuter rail system, partially or fully privately funded and operated- eventually the feasibility of more roads will not exist so it will be important to look for other ways to move people while maintaining funding for the infrastructure that already exists.
Demand	Commuting	The ability to continue to exercise regularly and to recover time wasted on commuting. Cycling commute options could help convert my time lost to commuting into the cardio element of a daily work out. In order to bike to work, I need a safe, dedicated bike trail (not lanes on existing surface streets), and end use facilities including safe bicycle storage and showers/lockers for personal clean-up. Improved public transit options: For transit to work for me regularly, I would need quarter-hour service in the morning and at night, as well as service closer to my home (currently .9 miles away). Both of these options would take me and others like me off the road in urban areas and contribute to reducing congestion, carbon emissions, etc.
Demand	Commuting	The availability of transportation options, including alternative routes, rail options, and other public transportation alternatives to being stuck in traffic.
Demand	Commuting	The continued encouragement and promotion of car-free and car-lite lifestyles. This includes using a combination of trains, buses, and bicycles for intra-city travel, reserving the automobile for inter-city travel when trains and buses are unavailable or impractical. Continued expansion and improvement of public transportation.
Demand	Commuting	The following idea was discussed at the 2nd Annual Transportation Forum July 19-20, 2007 by Alan Pisarski Background Texas is a microcosm for the nation in terms of commute trips. 80% of trips are single occupancy. Growth in commuters will be reverse commutes: people living in the city commuting to the suburbs or rural areas. Carpooling has increased, primarily due to immigrants - this trend will change over time as immigrants become more affluent. Strategic Issue: Evaluate the impact of changes in commute trips patterns for major Texas cities considering a reverse pattern of greater commuting from the city to suburban and rural areas and increasing numbers of single-occupancy commuter trips.
Demand	Commuting	The following idea was discussed at the 2nd Annual Transportation Forum July 19-20, 2007 by Alan Pisarski Topic: Estimated time value of money will be $50 per hour in 2030 (3x the value in 2007). 7% of Texans have over 1 hour commutes with 6.1% in Austin, 7.2% in Dallas and 9.7% in Houston. The majority of workers still have 20 minute commutes which are reasonable. Strategic Issue: How can commute times be maintained at current levels 5-20 years from now?
Demand	Commuting	The Hwy 71/290 Y at Oak Hill. Traffic is horrendous with folks trying to get out of Austin; whether onto 71 or to 290. The Y becomes severely congested due to the narrowing down of traffic into Oak Hill. The construction that stopped in that area needs to be finished to alleviate that bottleneck.
Demand	Commuting	The population of many cities in Texas (most notably, Dallas-Fort Worth) has grown too large for its chosen method of transportation. Our commitment to the personal automobile is making these cities so stressful and unsafe, they are becoming unlivable. As petroleum reserves become increasing limited, it is time to transition to smarter methods of transportation.
Demand	Commuting	The separation of non motorized vehicles and pedestrians from roadways.
Demand	Commuting	Traffic in Austin, TX In the 16 years I've lived in Austin, traffic has gotten progressively worse, which is a surprise to no one. Unfortunately there does not seem to be much consideration in the planning horizon to address future congestion issues. Budgeting is a

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		high priority.
Demand	Commuting	Traffic, traffic, traffic
Demand	Commuting	traffic, traffic, traffic
Demand	Commuting	Transit systems other than highways.
Demand	Commuting	Transportation other than by automobile will become critical as the size and density of many of our cities reaches the point where the number or vehicles on the road overwhelm the system. Light rail within cities and commuter rail between cities must be included in transportation planning and funding. Due to the long lead time needed to develop light rail the time to begin the planning and start procuring the funding is now. No, busses will not do for they compete with cars on the same over crowded system.
Demand	Commuting	Trucks, border, - more trucks on the road could impact traffic. Urban sprawl - the further out we build from our cities, the more roads we need gas prices - if the price were to increase then less vehicles will hit the road community - whether the local community accepts the new toll roads. when they don't, then the purpose of the toll road takes a lot longer to become effective to alleviate traffic I apologize for giving more than 1 opinion here :)
Demand	Commuting	TxDOT should encourage a web of light rail throughout the City of Austin and between all the major cities at an affordable cost. Don't limit the ridership schedule from the start like CapMetro has done. We'd love to ride their lite rail but not necessarily during the rush hours.
Demand	Commuting	Uncongested road travel in metro areas.
Demand	Commuting	Urban congestion as related to commuting to work.
Demand	Commuting	US 75 north out of Dallas: Dallas is one of the few rapidly growing metroplexes. Traffic in McKinney will come to a halt soon if not widened. Sherman is only a few years behind. Traffic across the Red River must be at least as great on US 75 vs. I35 at the Red River. But US 75 traffic in Sherman will grow faster than Gainesville.
Demand	Commuting	Viable public transportation is needed. With the increasing cost of fuel and the reduction in supplies, a viable public transportation system is needed for the major urban centers in Texas.
Demand	Commuting	We need more roads that offer commuters choices. That could be toll roads or light rail.
Demand	Commuting	Weaning ourselves off the highways and onto mass transit.
Demand	Commuting	Yet again, mass transit system. Intermodal transport. Regional connectivity. Air Quality. As a statewide strategic issue, connections between major population centers will become of key interest to the citizens of Texans. The new mass transit systems being incorporated into Houston, San Antonio and Austin will lead to transportation without the necessity of personal automobile transportation. Personal transportation may be reduced to electric vehicles, mopeds/scooter, electric bicycles, Segways, etc. Mass transit could incorporate these vehicles to provide point B to C connections. Air Quality will improve with the efficiency of personal transportation devices and mass transit since the efficiency is improved.
Demand	Demographics	- changing demography - user fees/transportation financing - congestion reduction - climate change - changing energy sources
Demand	Demographics	*Baby Boomers: An increasing share of Texas drivers will be retired in the next 5 years, including me! Our traveling will be change demand in many areas of the state. As we age even further, alternate transportation will be required for my safety and for that of younger Texans.
Demand	Demographics	*Rural transportation initiatives. There is a growing research trend in the United States toward identifying areas which could benefit from rural transportation initiatives. These areas are most often dominated by the farming, logging, mining, or oil industries. The general rationale is that, in some areas, increased transportation avenues pay for themselves through increased economic activity.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Demographics	*Strategic Issue: I anticipate that my working career will extend into my 70s or 80s due to the unstable US and world economic conditions. I will need to alter my work / travel patterns to maintain work productivity and viability within the next 5 - 10 years or potentially longer. Background: US government actions with regard to the US and Global banking crisis including the use of hundreds of billions of dollars in Government funds for bailouts, the collapse or instability of 401Ks, banking, insurance and investment firms (AIG, etc) major US corporations (ENRON, Saturn, Chrysler, SAAB) and other factors suggest that even Government retirement income(s), savings and/or investments may be undependable. I may need to continue working in a full-time or part-time position for at least the next 10 years and possible the next 20 years to provide a stable, reliable income for my family. This could be coupled with changes regarding work location, how I get to work (if office is not also home), work hours, and associated transportation options/activities. What options will be available in 10 years to ensure that I can travel to / from work; to / from meetings at different locations around Austin / UT / CTR / TXDOT which can be addressed through the use of a personal vehicle or possible future Public Transportation Options. Strategic Issue: As I age, what transportation options will be available that I can depend on when planning life / career choices in the next 5-10 years?
Demand	Demographics	1. Increasing population 2. Decreasing available funding due to decreased revenue 3. Continued rising fuel efficiency of vehicles 4. Increased truck hauls 5. Increased public expectation.
Demand	Demographics	Adequately planning for expanding population and employment and providing the funding stream and predictability that will maintain an acceptable of system (all modes) functionality.
Demand	Demographics	anticipation of greatly increased volumes and population grows
Demand	Demographics	continued development will overload existing roads
Demand	Demographics	Corridor development and water issues. Economic development along a major transportation corridor may put tremendous stress on water supplies in the state of Texas, particularly along the Ogallala Aquifer.
Demand	Demographics	Demand vs. Resources Population growth is occurring as funding is shrinking, and Texas will have to determine whether it will take a passive or active approach in determining its priorities for transportation and the corresponding economic development and quality of life issues that are directly related to it.
Demand	Demographics	Demographic shifts. I am least confident in this suggestion. However, I would think that TxDOT would want to study demographic shifts within the state of Texas before tackling new transportation projects in the next 10-20 years.
Demand	Demographics	Family: Continue to be gainfully employed to provide for my family.
Demand	Demographics	How do we get people off the system, not just to mammoth (public transportation) vehicles that bottleneck traffic in urban areas and reduce flexibility for travelers. What will future development look like? Where will people live and work? We can't sustain a model that means everyone gets up and "goes" to work every morning, in an over-populating world.
Demand	Demographics	Increased collaboration between land use planners, transportation planners, and technologists to intelligently accommodate the expected population increase to the state.
Demand	Demographics	Increased population: Demographers say the Texas population will grow significantly in the next few years and for decades to come. How do we provide adequate transportation in the short term, let alone over the longer term?
Demand	Demographics	Increasing the capacity of our highway system/providing alternate routes to absorb our increasing population. As a resident of the Houston area, we waste significant time, fuel, and money stuck in traffic.
Demand	Demographics	Infrastructure We need to continually add lanes and routes
Demand	Demographics	Maintaining mobility in retirement, i.e., affordability of mode and fuel.
Demand	Demographics	Mobility As Texas continues to grow, and the populace (including me) continues to age, options need to be explored for helping our society remain mobile.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Demographics	Need to get aggressive on rail service: TX Data Center / Census data says the North/South Corridor will continue to increase causing a great deal of the TX population to live in a 50 mile wide area in the vicinity of I35. Houston/San Antonio to DFW to Sherman/Gainesville even into OK (Lake Texoma resources will continue to grow at a rapid pace).
Demand	Demographics	Developing infrastructure to meet expanded population.
Demand	Demographics	The failure of gasoline taxes to meet the challenge of a growing population and almost stagnant infrastructure development to handle it. Passenger rail commuting to relieve highway congestion. Aging infrastructure reaching its wearout date. Mass transit not being developed to meet growing population. No planning to prevent diversions of gas tax money at legislative level.
Demand	Demographics	Population forecasts and continued economic growth. Both will place additional demands on the transportation network.
Demand	Demographics	Population growth - staying abreast of the population and providing transportation to those areas. Planning areas for growth and still preserving open space and farmland
Demand	Demographics	Population increase and roadway access.
Demand	Demographics	Population increase, urban sprawl, increased trade traffic. Texas will add more people who require further commutes and have to compete with freight movements on the state's highways.
Demand	Demographics	POPULATION. The state's population growth will drive the demand for transportation infrastructure. The location of the major population centers and the ability to connect these centers efficiently and effectively will impact the economic livelihood of the state.
Demand	Demographics	Raising my kids and taking care of my aging mother: Teaching kids values that will help them be the leaders of tomorrow while taking care of the ones that raised me.
Demand	Demographics	Recognizing growth centers. I think TxDOT needs to take a look at where growth is projected in the state and focus their new projects, or maintenance of roadways in those areas. Side comment: Tourism. It seems lately people have less ability to vacation far from home, so TxDOT could work with the Parks Dept to encourage local tourism.
Demand	Demographics	State demographics. Lost institutional knowledge and experience due to retirements.
Demand	Demographics	Strategic Issue: My Mother is aging and is having increasing problems maintaining a mobile, independent life style. Background: My mother is approaching her 80th Birthday and wants to maintain an independent, mobile lifestyle. She drives a van and makes short trips that range from 4 to 20 miles (round trip) two or three times a week. Currently, she is able to drive herself partly because she lives in a city of about 100,000 people which offers several lower speed, low traffic volume route options to the destinations she typically wants/needs to access. Her preference would be to make even longer trips, of 300 or more miles at her choosing. However, safety, physical limitations, and other factors currently limit her options. I have concerns about her ability to drive safely on higher-speed roadways and in lower speed, but complex, urban traffic conditions. She would not be able to personally handle a road emergency such as a flat tire or other mechanical problem. Due to the fact that we live in different cities that are hundreds of miles apart, it is not feasible for me to provide direct assistance to ensure she is able to safely make trips to the store, Doctor's office, Pharmacy and other destinations. My sisters live even further away and look to me for solutions. Merging households or at least relocating one household is a potential option, but would present a new set of issues. Her mobility and independence would be even further limited if she had to drive in the large metro-plex in which my family lives. Also, she would not have access to a military base (my Father is deceased / and was career military), her personal doctor or other services on which she currently depends. My ability to provide for my family would be severely limited if we moved to the small city in which she lives. Moving to an 'assisted living' facility is also not a option that my mother would currently consider due to cost; loss of independence and a major lifestyle change (moving from the home she owns and the neighborhood she has lived in for nearly 40 years.) It is anticipated that within the next 5

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		years, her ability to drive a van will be even further limited or possibly no longer an option. She does not live near a bus stop and, in any case, public transportation - even taking a cab is viewed by her as limiting her 'independent lifestyle' Strategic Issue: Identify strategies to help my mother maintain independence and mobility as she continues to age.
Demand	Demographics	The following idea is loosely based on a series of comments at the 2nd Annual Transportation Forum July 19-20, 2007 by Alan Pisarski and discussions with Dr. Dar Hao Chen and Dr. Moon Won regarding Asian University / faculty job amenities. Topic: Based on the Census Bureau 3 US states including Texas and California will see 50% of the national population growth by 2030 - this presents challenges when forming a national transportation program. UT's ability to attract talented faculty, researchers, support staff, and students will be directly tied to UTs curriculum and technological advancements as well as amenities (unique to the area) and ease of movement from home to the campus. Strategic Issue: Evaluate the concept of providing a housing option to faculty, researchers, and staff in downtown Austin as part of a salary / compensation package. This could encourage a portion of the UT community to live close to work, use transit to move from home to work and reduce congestion on major roadways (MOPAC, IH 35, US 183 etc.). Similar in concept to the military - may use housing stipend to live "on base" or use it to buy or rent off base. UT could buy a condominium complex and use for UT faculty / worker housing. Many details to work out. Need to look at Asian Universities that provide housing to faculty. Although this idea addresses UT issues - it also would impact Austin's future transportation / congestion picture as well as TxDOT's planning and project programming due to changes in commuter trips to UT (52,000 + population on 40 or so acres).
Demand	Freight	*Freight Movements: Texas' importance for international and cross-USA transportation will increase substantially in the next few years. At the same time, the increased Texas population will create dramatic further needs for access to efficient, timely goods movements. How will Charles Butt deliver my daily bread?
Demand	Freight	*Strategic Issue: Develop and enhance TxDOT / Trucking Industry Communications & Partnerships to identify and enhance State freight movement Strategies. Background: The nation's roadway system and short- & long-haul trucking industry carry over 70% of the nation's freight: and possibly a higher percentage of the freight value. TxDOT leads the nation in terms of annual Truck VMT and is a portal through which the majority of NAFTA truck traffic flows to manufacturing regions to the north and north east. However, to date, DOT / Trucking industry relations have been adversarial or non-existent at best. Strategic Research: UT/CTR should lead a Strategic research effort to identify short and long-term actions that TxDOT should consider to address State, regional and national Highway Infrastructure and trucking industry freight movement. One key priority of this effort will be to identify existing or new venues through which TxDOT and other DOTs can interact with major trucking industry leaders to A) create unified DOT - trucking industry partnerships, B) learn about, trucking industry short- and long-term goals and the technologies that major US truck and truck component manufactures plan (or want) to incorporate in 2015, 2020 and 2025 heavy trucks, and C) learn about Highway Infrastructure issues that can act to enhance or restrict the US economic engine, trucking industry profits and Infrastructure Condition / maintenance needs.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Freight	*The following idea was discussed at the 2nd Annual Transportation Forum July 19-20, 2007 by Nathan Asplund (economist) - General Director - PPP Burlington Northern Santa Fe RR Background Since the Staggers Act of 1980 BNSF productivity has increased 100% while revenues have decreased by 10–15%. Rail currently spends 18% of revenue on capital expenditures (greater than many other industries). BNSF spent $1.5 B in 2002 and about $2.7 B in 2006 on infrastructure upgrades. Capital improvement costs still continue to increase even if the rail industry loses market share. Current trends suggest that rail will lose market share. Other modes of freight movement such as trucking and barges pay less than their share for use of infrastructure. The trucking industry is BNSF largest customer - best value is long haul of truck trailers - trucking industry picks up and drops off. Currently rail bears investment risk -- Senator Kent Conrad has proposed a 25% tax credit for rail capital improvements. Passenger rail or direct government subsidy isn't attractive based on studies we've conducted regarding rail in Eastern Europe and Russia. Strategic Research: To meet future US freight demands Rail needs to increase capacity - this means more track, facilities and support capacity. How can TxDOT work with Rail and Trucking industry to support increased freight capacity?
Demand	Freight	*The separation of commercial trucks and public transportation from small cars/trucks.
Demand	Freight	1. Freight transportation (truck, rail) 2. High-speed rail development 3. Interstate 69 4. Safety 5. System maintenance and preservation
Demand	Freight	1. Alternatives to roadway freight to accommodate expected increased in international trade across the state; 2. Targeted roadway pricing schemes; 3. Integrated, intelligent transportation systems and services, customized and personalized to individual needs; 4. Emphasis on and support of local economic development in agriculture and manufacturing to grow local economies and reduce the need for foreign import and burden of the existing surface transportation system.
Demand	Freight	A long term vision for multi-modal freight movement is critical, and the movement of people will be facilitated by this long term planning.
Demand	Freight	As cars get more MPG each year and people drive more - got to consider traffic - no matter the cost of gas. This is TX you will cause political nightmare if you try to limit drivers to how/where they drive. Get the pass through trucks off the roads. Use rail freight - put the trailer if not the whole rig on a rail freight car and ship it across TX - automate it - technology is surely there already. May have to lay some dual tracks or bypass cities - Think out of the box.
Demand	Freight	Convince truckers to take 130. Relieves congestion on I-35.
Demand	Freight	Freight patterns, especially in light of increasing congestion (triggering travel time losses & more crash incidents). Modeling these at a statewide & national level, to get a sense of how Texas should manage its system, including tolling, expansion, etc.
Demand	Freight	Improved focus on high speed transit rail and freight rail throughout Texas.
Demand	Freight	Improved movement of heavy freight that reduces congestion and safety concerns for urban areas.
Demand	Freight	Inter city corridors to allow increased truck traffic from south of the border and among production (rural) and consumption (urban) areas
Demand	Freight	More rail construction
Demand	Freight	Of extreme strategic importance to sustain economic competitiveness is a multi-modal transportation system with an emphasis on freight movement and supply chain management.
Demand	Freight	Partial state support of railroads--mainly passenger trains, but to the degree that the freight railroads are serving a common good, infrastructure improvements there, too.
Demand	Freight	Rail. Despite ongoing debates about the cost-effectiveness of rail, the reality is that historic investments are now being made in rail and Texas needs to position itself to compete successfully for these funds and projects. This will be a long-term endeavor, and the state will have to be committed to that process in order to implement rail effectively.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Freight	Road and bridge structure across the Rio Grande River. Pursue the building of the Universal Freight Shuttle to assist with the ever growing cargo movement across the border. The Universal Freight Shuttle will speed up cargo crossing the border and will also assist in securing the border.
Demand	Freight	Same.
Demand	Freight	The development of transportation methods that move freight long distances efficiently from and through urban areas.
Demand	Freight	The use of railroads.
Demand	Freight	Topic: The following discussion is meant only as a 'what if' Scenario to set the stage for discussion of the Strategic Research Topic. Major earthquake(s) in California destroy or seriously disrupt a large percentage of ocean shipments to the west coast. In the aftermath, Asian shippers divert freight to the Panama Canal to ports in Texas and Louisiana. For a period of 3 - 5 years that it will take to repair/rebuild California's port facilities. Texas ports must handle 5 times the normal number of containers. Major routes in Texas such as IH 35, IH 45, and US 59 are required to carry 3 times the number of trucks and rail is called on to quadruple capacity to move freight inland. Even after California's ports are back to 60 - 75% capacity changes in freight handling at Texas ports results in a sustained 100% to 150% increase in container delivers over pre-Earthquake freight levels. Strategic Issue: What steps can Texas and the Nation take to provide for "rapid" response to a natural disaster such as a major earthquake in California that requires for major short-term increases in Texas port, rail, and truck shipments? The solutions could be part of an accelerated, step-wise capacity building plan to address future anticipated freight shipments in 2030. Under such circumstances, shippers may not be free to choose routes out of Houston, Brownsville or Corpus Christi, but may either be assigned routes based on available capacity or might have to pay a fee to take a preferred route. The fees would be used to pay for the rapid expansion of port and highway system facilities.
Demand	Freight	Truck mobility through urban areas Our major highways pass through urban areas where the highways are already extremely heavily congested. Traffic is delayed by hours passing through these cities. Severe economic impact to economy from
Environment	Climate	- climate change - user fees/transportation financing - increased trade
Environment	Climate	Air quality Climate change transportation financing
Environment	Climate	Climate change policy. Personally, I am interested in the effect of new highways on CO2 emissions across the state of Texas.
Environment	Climate	Energy & Environmental Impacts: The planet is headed on a very tragic course, & Texans & other Americans are playing almost no role in reining in carbon emissions from sprawling land use patterns & excessive fuel use. Creative policies are needed, along with simulations of various urban and exurban futures, to get a sense of -- and better control -- our destiny.
Environment	Climate	Green As a Pavement Engineer, I have to fight my urge to believe Highways are the only real effective form of transportation. As a father (and soon to be grandfather) I feel a greater responsibility to help investigate all options for preserving our environment for generations to come.
Environment	Climate	Policy, technological shifts, climate change induced shifts on transportation.
Environment	Climate	Rapid incorporation of comprehensive and mandatory assessment requirements for all State- and locally-sponsored transportation projects and programs on potential climate-change impacts, both specifically for Texas and the broader global climate as well. If not, continued business-as-usual practices could render parts of Texas extremely unpleasant and potentially unlivable by the end of the 21st Century.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Environment	Climate	Topic: There is much discussion about the environment and the need to reduce emissions and conserve resources. Although, 'preserving the environment' is a concept that anyone could endorse, it is hard to visualize how any personal contribution I might make in terms of conservation or 'going green' might impact the environment in consideration of scale. Does driving my Corolla rather than taking the bus make that much difference to Austin's environment? Strategic Issue: How can I get a better understanding of how transportation impacts the environment and how I can personally make a difference (or if I really don't) based on choices I make in a future car purchase, using a bus rather than driving my car to work, etc. Since I expect it will take thousands or hundreds of thousands of individuals making the same choices to make any kind of difference, what is the impact of individual choices or even corporate investment choices in say, windfarms? Recently heard that the windfarm off Cape Cod would reduce emissions equivalent to a reduction of 750,000 tons of coal.....what does this mean in terms of health or in relation to the total amount of emissions? It is hard to understand what's really going on with the environment and climate change since there are conflicting news reports. I don't really know what my 'carbon footprint' is or how reducing will change anything.
Environment	Ecology	Assurance and integration of native seed in vegetation management and right of way stabilization practices is needed. Development of economical native seed markets, cessation of use of exotic grass seeds, and refinement of specifications for native seeding and plant establishment are extremely important to lessen environmental and agricultural impacts of the growing transportation system in Texas.
Environment	Ecology	Cumulative and lasting effects of past vegetation management techniques and land fragmentation of rural landscapes concern many Texans. Past use of exotic vegetation on roadsides has exuberated exotic invasive grass problems statewide, TxDOT should lead the effort to manage and mitigate these problems. Fragmentation of agricultural landscapes, and natural ecosystems should become a priority concern in the development of transportation infrastructure.
Environment	Ecology	Destruction of economically and ecologically important landscapes should be addressed. Urbanization already threatens thousands of acres of important rangelands and wildlife habitats in Texas. Over the next two decades, TxDOT could help lessen this impact by working with researchers to select, plan, and prioritize activities with these ecosystem and agricultural concerns in mind, and conduct research to insure that when habitats are fragmented and damaged, the best and most ecologically sustainable restoration and reclamation activities are conducted afterward.
Environment	Ecology	environment - restoring the habitats that were taken to build a road construction zones - mark them accordingly
Environment	Ecology	Environmental quality demands - mitigating the impact of roads on water, soil, and air quality.
Environment	Ecology	Improved planning of highway expansion, including effective scoping and contracting to insure native seed and plants are readily available for reclamation required after transportation infrastructure development is a future necessity. Lessening the impact of roadways on natural ecosystems should become one of the most important considerations of the agency.
Environment	Ecology	Increasing vegetation management costs - Develop vegetation that his lower cost or provides a return such as a biofuel crop that provides the department with its own fuels source
Environment	Ecology	Minimize the negative impact on wildlife, including wildlife-auto impacts, land fragmentation, and planting of ground-cover that might attract wildlife to the roadside. This will improve the safety of travel and reduce the number or road kills along our highway system.

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Environment	Ecology	Mitigation of highway and rights of way impacts on Texas' wildlife habitats and rangelands is critically important. The use of native vegetation and seed in reclamation activities, and increased efforts to minimize direct and secondary impacts to rural agricultural lands are necessary to maintain public support of TxDOT activities, and responsibly develop needed transportation infrastructure.
Environment	Ecology	Plant and animal management - Managing the spread of noxious weeds on roadsides, increased wildlife traffic and consequent damage, roadside weeds that harbor damaging insects and plant disease.
Environment	Ecology	Reduce the maintenance cost of highway right of ways. Mowing of roadsides is a major annual cost that could be better spent on planting ground cover that does not require annual or more frequent mowing and ultimately saved money could be spent on other priorities.
Environment	Ecology	Stop the proliferation of invasive plants. As the term implies, these plants do not stay where planted, and are further spread by mowing and scattering seeds for miles up and down the right of way.
Environment	Ecology	Stormwater as a Resource The population of Texas and demands on water continue to grow. The transportation system represents a collector of sorts for stormwater. Increasingly, cities in at least the western half of Texas will see stormwater as a resource to utilize for select supply purposes or even general municipal augmentation. Hydrologic practices for appropriate design storm (risk-to-infrastructure) are of questionable utility in consideration of more frequent yields from storms.
Environment	Ecology	WATER/NATURAL RESOURCES. The ability to provide water and other natural resources will impact the state's population growth and sustainability. As indicated in issue #3, this will impact transportation.
Environment	Lifestyle	Biofuels No-mow areas Noise abatement Renewable construction materials Sustainable deployment of perennial grasses within TxDOT offers potential savings through lowered management input costs, reduced noise issues, and biofuel production.
Environment	Lifestyle	Carbon footprint Production of HMA requires energy which creates global warming. Although WMA has reduced carbon generation, it is not enough. More needs to be done to reduce carbon footprint either by increasing the life expectancy or reducing the production and construction temperature further. Similarly, PCC requires good amount of energy to create Portland cement and the energy consumption should be reduced as well.
Environment	Lifestyle	Electric vehicles with a 300 mile range to eliminate dependency on foreign oil.
Environment	Lifestyle	Embedded energy Life-cycle analysis Sustainability (economic & environmental) Rising costs and demands of energy will greatly impact construction & maintenance of Texas transportation systems.
Environment	Lifestyle	Energy The change in energy transportation in the alternative fuel area.
Environment	Lifestyle	Environmental controls and the possible use of public transportation to be a possible solution to reduce environmental impact.
Environment	Lifestyle	Environmental impacts of transportation-As environmental regulations become more stringent and more people are on the roads environmental impacts of transportation materials, volume, etc will need to be study to come up with the best solutions to minimize these impacts.
Environment	Lifestyle	Environmental protection. I am interested in the intersection of transportation interests and environmental protection nationwide.
Environment	Lifestyle	Greenhouse Gas emission regulations Any type of GHG control will affect the cost and logistics decisions of potential shippers, possibly causing modal shifts or a restructuring of the freight distribution network.
Environment	Lifestyle	I want a better quality of life for my children and grand children.
Environment	Lifestyle	If we can address funding then it is useful, in the longer horizon, to look into the demographic shift created by new urbanism types of development that combine shops and housing with the intent of more walkable communities. The initial appearance is that the change to new urbanism has potential to modify the current suburban to urban travel

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		dynamic if it grows substantially.
Environment	Lifestyle	increased nodal or centers concept development Need for increased multi-model system Price of oil air quality issues
Environment	Lifestyle	Pollution - everywhere you put roads people will go and pollution will become more widespread. pollution from vehicles will affect our health in the long term and later we'll be blaming transportation for our environmental and health problems
Environment	Lifestyle	Strategic Issue: Texas population and vehicle usage is predicted to increase dramatically in the next 20 years. The resulting increase in traffic, including heavy trucks will necessarily also increase air quality and noise concerns associated with highway corridors. Strategic Research: Develop a state-of-the art synthesis regarding noise and air quality issues that have been implemented or are under development in the developed countries. Prepare a summary that discusses new pro-active ideas to address noise and air quality issues in Texas.
Environment	Lifestyle	Sustainability, green construction, green house gases Reduce energy, emissions and conserve materials associated with construction, rehabilitation, and maintenance of pavements.
Environment	Lifestyle	The state's economic vitality. I am concerned that short-sighted approaches to addressing the state's (and nation's) transportation issues will have a negative impact on our economic growth potential, which can limit opportunities on a personal level.
Environment	Lifestyle	To wean myself of oil dependency: 1. I want an alternative transportation energy source for daily travel needs. A future of continued oil dependency for me personally looks expensive and treacherous. I want to use a renewable source (light, wind, food calories,) to power my personal mobility. Affordable home capture and storage systems could support my regular transportation needs. 2. Non-oil powered rail options like commuter rail, inter-state rail and affordable, reliable national rail service would provide less stressful and hopefully less expensive options to meet my personal needs. Increased rail would also lessen the burden on the surface transportation system.
Environment	Lifestyle	Topic: The following is based on comments made at the 2nd Annual Transportation Conference by John Esparza (Texas Motor Transportation Association) and Kathleen Hartnett White (TCEQ). John E. "The trucking industry has developed more fuel efficient and effective trucks that are more fuel efficient during idling. This saves fuel and emissions [Do truckers still let their trucks idle when they've pulled over for a long rest stop? mrm] Another new concept is an Idler Facility. This is like an old drive-in movie. You can drive in and hook-up to shore power, internet, telephone etc. There are not enough of these facilities around. http://readme.readmedia.com/Turnpike-to-Build-No-Idle-Clean-Air-Facility-for-Truckers-at-New-Stanton-Service-Plaza/1221810 http://www.shorepower.com/ Kathleen Hartnett White “This is a good time for TxDOT and its partners to evaluate how we can use TERP with the $170 million fund to [reduce emissions]. One idea is the timing of road construction to prevent construction during peak periods...that has not been a popular idea.” http://tceq.net/implementation/air/terp/index.html In addition, a past TxDOT Director mentioned that he had driven from DFW to Austin during the evening and saw that every rest area was filled with 18-wheelers even parked along the shoulders. Strategic Issue: Consider using TERP funds for low interest or no interest loans for private entities to build Idler Facilities for heavy trucks. These facilities would not only reduce pollution, but would also free up rest areas along heavy truck routes and also provide a safer place for the truckers to park. This would also help reduce emissions. Unsure how many trucks an Idler Facility could accommodate - would it be feasible for TxDOT to build these as 'rest areas for truckers only'? Fees to park would need to be lower than the cost to park a truck and run at idle.

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Environment	Lifestyle	Topic: Will stricter pollution / environmental standards result in higher safety inspection, registration fees and other taxes for older cars that do not meet standards? I drive a 1999 Toyota Corolla. Currently residents in the Austin metroplex pay an increased inspection fee because we are a non-attainment area. Although I could see the logic in increasing the registration fee in connection the amount of pollution a car generates: older car = more pollution = higher inspection fee cost; likely this one fee would not encourage me to buy a newer used car or a new car unless the fee was exorbitant such as $500 to $1000 a year. However, fees at this level would likely cause a general protest among many Texans since many are forced due to economic circumstances to drive older cars, or just prefer to drive an older car; however, the cost to obtain a vehicle inspection should somehow be linked to how much pollution a car generates - someone driving a new fuel / emission efficient vehicle should not pay the same fee as someone driving a 1987 Dodge 4x4 truck or even a 2010 Dodge Viper. Note: During the 2nd Annual Transportation Forum, Kathleen Hartnett White (Chair TCEQ) said that "We have worked to eliminate the large point sources (of emissions) along the Houston Ship Channel and the kilns in Dallas, however, we found that these improvements have had little impact on ozone emissions....it's mobile sources...idling, stopping and starting." Strategic issue: Tie the State Vehicle inspection fee to factors related to vehicle emissions across the state regardless whether in / outside a non-attainment area. Newer, less polluting vehicles would pay lower inspection fees; older more polluting vehicles would pay higher fees. The fees could be established such that a net increase of $x million would be generated sufficient to fund key projects that would relieve congestion.
Environment	Lifestyle	Transportation spaces that are "greener" and better-looking, especially in urban areas. Want to see interstate highway corridors that lack the decorative or landscaped amenities enjoyed by other Texas cities? . . . come to Amarillo.
Environment	Lifestyle	Use of alternative vehicles and fuel sources in order to reduce environmental impacts.
Infrastructure	Engineering	Alternative to Asphalt Most of the highways are constructed with Asphalt and it is a by-product of fossil fuel. Since rest of the world has also need for the fossil fuel, the cost of asphalt will increase significantly which will increase the cost of production. An alternative to the asphalt needs to be identified and implemented
Infrastructure	Engineering	Changes in the design and performance of the overall vehicle fleet - the range of vehicle sizes and capabilities on the roadway will likely increase in the future as emphasis on green transportation and other forces act upon the vehicle offerings provided. This will have significant safety ramifications relative to roadway and roadside designs, vehicle-pedestrian interactions, etc.
Infrastructure	Engineering	Creating mobility: limited funding, maximizing return, utilizing existing investment, working without additional funding. Taking advantage of the existing facilities in future improvements, using appropriate design life for maximum value to the traveler are options which are not being considered.
Infrastructure	Engineering	Durability and sustainability. Roadways using recycled or reclaimed materials. Use of more non-petroleum-based materials where possible.
Infrastructure	Engineering	Evolution of the vehicle fleet: Anticipating adoption & use of new vehicle designs, including PHEVs, HFCEVs (hydrogen fuel cell EVs), etc. How will their charging & use patterns impact air quality, congestion, gas taxes, and other issues of interest to the DOT & broader community.
Infrastructure	Engineering	High Cost of "Forever: Designed Facilities: The trend for TxDOT seems to be to design all roadways with deep stabilization, asphalt, and thick concrete paving systems all working together. I have witnessed nicely performing asphalt being completely removed and replaced with the asphalt/concrete paving system for a simple widening when the existing asphalt paving could have been amended and the entire cross section overlayed for a fraction of the cost. I believe that a return to paving systems such as asphalt pavement that are easily resurfaced, added to, and modified for an economical cost will allow more work to be completed on more roads.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Infrastructure	Engineering	Hydraulics, Hydrology, Stormwater Cost-effective and risk-commensurate hydrologic and hydraulic design remains an important topic of drainage design work by TxDOT. Several open problems in tuning fundamental hydrologic practices remain; although many have been closed in past 10 years. Stormwater quality treatment through BMP and other means also remains important.
Infrastructure	Engineering	Hydrology Final marriage of the appropriate rainfall hyetograph from the suite of hyetographs available to TxDOT to now closed hydrology problems in Texas; these are loss models, watershed timing, and unit hydrographs. We do not know which hyetograph(s) coupled with Texas-understanding of losses, timing, and unit hydrograph will produce peak discharge most consistent with the state-of-practice flood frequency equations.
Infrastructure	Engineering	intersections, design of intersections should make allowance for increase demand beyond the road itself
Infrastructure	Engineering	Issue 1 Quality of Aggregate. At this point, the good quality aggregates have depleted or will be depleted in certain parts of Texas. Cost of transportation is too high. We need to find an alternative. Although, TxDOT is using RAP but the increase in population will require new roads which will require new good quality aggregate sources.
Infrastructure	Engineering	Materials and Manpower If the previous issues are overcome then the ability to build the needed improvements as quickly as possible becomes paramount. Ensuring there are sufficient contractors, manpower and materials to build projects faster than the rising need.
Infrastructure	Engineering	Pavement engineering at TxDOT has regressed significantly. Designers are no more than technicians and the fundamental principals are not even being considered. Thickness does not compensate for poor support. Pavement designs need to assess the critical stress/strains in each of the pavement layers along with the durability of the layers. Quality construction materials are becoming expensive and scarce; a lot can be done to maximize the use of local materials by the development of objective tests that identify the benefits of various forms of stabilization and treated bases to fit the materials and the conditions.
Infrastructure	Engineering	Plain Concrete Pavements Plain concrete pavements slightly thicker than reinforced concrete pavements carry the same loads for roughly 40% less cost. Plain concrete pavement are more durable because there is no steel to corrode and expand. Use diagonal joints for load transfer to reduce faulting.
Infrastructure	Engineering	Poor urban transportation planning. TxDOT does not consider the impact of its major highway projects on the local City street network, which increases congestion and cut-thru traffic in residential neighborhoods. Frontage road intersections with neighborhood streets lack turn lanes and cause traffic backup.
Infrastructure	Engineering	Strategic Issue: Vehicle technologies and the rate of technological advancement will result in major portions of the current TxDOT (US) IH and Arterial roadway Infrastructure becoming obsolete, unviable, and unsustainable due to the future Global Economic environment. Background: For purposes of this discussion, a vehicle may be either a personal vehicle meant to convey people or light cargo; a Public/commercial vehicle primarily meant to transport people; or a commercial vehicle meant to transport cargo. Manufacturers are currently designing 'concept vehicles' that incorporate increasingly sophisticated technologies. The time from vehicle 'concept' to full production has decreased from approx. 15 years to around 5 years compared to design/manufacturing capabilities of 20–30 years ago. These timeframes will continue to decrease and will continue to consider vehicle appearance and style, but will focus more on vehicle flexibility regarding 'driver' options, efficiency, speed, maneuverability, occupant survivability, and related technologies. The entry of Chinese vehicle manufacturers such as FAW, Hong Qi, and Geely into the World automotive and truck markets will further increase pressure to compete through the development of technologically sophisticated vehicles. The rate of future 'civilian' technological advancement and implementation will

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		be similar to that of national technological advancement and implementation rates in times of war. Vehicle-driver technical interfaces will be standard - the driver and the car will be 'linked' together to take advantage of the best capabilities of both systems (human / machine). The use of 'wearable' personal computing systems will be common, and in fact, personal "skills and capabilities" will take on a new meaning --- an individual's ability to compete in an extremely competitive Global Economy will be inexorably linked to their ability to buy and 'interface with' advanced technologies. New technologies will include in-vehicle systems for modes of vehicle-to-vehicle and "driver-to-driver" communications during a trip as well as enhanced "driver" visual acuity and significantly shortened driver/vehicle reaction times. These technologies will also significantly increase the ability of individuals in all age categories to travel from anywhere to anywhere in their personal vehicle. In this case the 'driver' could potentially be 1) in the vehicle with the passengers; 2) at home 'driving' the vehicle remotely using a Driving-Station coupled with very reliable wireless in-vehicle technical assistance; 3) a driver located anywhere in the world at a Driving-Station, who is hired on-line by the occupant(s) from a pool of Corporate or independent, highly computer competent / licensed 'drive-by-wire' operators. These Company 'drivers' will interact with and drive the vehicle to its destination - much like the relationship between a pilot sitting in his office in California and a Predator drone flying a mission in Iraq or Afghanistan or a Navy Pilot on board an Aircraft carrier remotely flying a Grumman Joint Unmanned Combat Air Systems X-47B. Although these technologies are very expensive and currently are only available to the military -- they will, by necessity, be made available to the US private sector to help ensure the Nation's Global Economic Viability. The National Defense - Military Industry Research & Implementation funding engine will become increasingly important to ensure Private Sector competiveness across multiple industries. The technological leadership that the US has demonstrated in military equipment development will be a major factor in maintaining US Global Economic viability. As has been the case from WWI to the present - the air freight transport, air passenger and related industries will benefit from military research of aircraft engines, materials, and aero-dynamics. Emerging driver/vehicle technologies will require changes in roadway geometric design criteria including horizontal and vertical geometry, lane width, the concept of Design Speed; sight distance; PIEV among other currently used design concepts. Future driver/vehicle technologies will not only change Roadway Design Guidelines, but will also mean that Roadway design technologies will necessarily need to be developed/altered within very short conversion timeframes of 3–5 years to take advantage of new vehicle / driver technologies. Strategic Research: CTR will review current and proposed future auto and truck technologies that would substantially change roadway Infrastructure design guidelines, criteria, and concepts. Attention will be given to driver/vehicle interfaces, the impacts of wearable computers on driver capabilities and the use of remote vehicle 'driver' concepts currently employed by the military for aircraft but available in the future in civilian personal and commercial vehicles. Additional work will be done regarding 'state of the art' military and defense systems developments that can be incorporated into the US / TxDOT transportation Infrastructure systems to maintain future economic competiveness.
Infrastructure	Engineering	Sustainability As resources continue to diminish for use in providing quality transportation, greater emphasis needs to placed on recycling (or reuse) of the existing materials and/or investigation into alternative materials for mitigating these concerns.
Infrastructure	Engineering	The majority of highway construction in Texas is for rehabilitation yet very little has been done to develop a mechanistic empirical solution. In the '70s and '80s CTR was very progressive in the development of mechanistic assessments and predicting the performance of treatments based on the performance of existing pavements...what happened!
Infrastructure	Engineering	To be able to expand my expertise in structural loading to deal with complex loading scenarios such as mixed highway traffic and train on bridges.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Infrastructure	Engineering	To emerge as an expert who can deal with structures subjected to complex dynamic loading, such as the combination of rail and highway traffic
Infrastructure	Engineering	TxDOT design methods. TxDOT's geotechnical design methods are out of sorts with the rest of the world. They are odd, and based on well meaning - but ill considered - notions of soil behavior. It's time for someone at TxDOT to recognize this and get rid of the Rexas Cone et al.
Infrastructure	Engineering	Use Quiet asphalt instead of noisy concrete or asphalt. Much more pleasant to travel.
Infrastructure	Engineering	We need better protection for cyclists and pedestrians both physically and legally. Physically, cyclists and pedestrians need safe places to bike and walk. This means bike lanes and sidewalks separated from the street with medians. I have heard the idea referred to as "complete streets." Also, I would like to see more car-sharing companies, like Zipcar, in Texas cities.
Infrastructure	Maintenance	*Maintain: Use pavement preservation planning tools to determine what % of overall funding should be applied to preservation vs. re-hab. Maximize the available funding by applying the dollars to areas that will provide the highest return on investment.
Infrastructure	Maintenance	*Maximizing the use of existing infrastructure for reconstruction and added capacity projects. Currently, most reconstruction projects that result in added capacity involve removing the existing infrastructure and then replacing with new infrastructure. There is a need to encourage the incorporation of existing infrastructure in such projects. For example, pavements that are still structurally adequate can be used as base material in the reconstruction, or simply overlaid with concrete or asphalt materials. The potential cost savings can be significant (possibly up to 50% savings over the current strategy of removing and replacing)
Infrastructure	Maintenance	A secure supply of strategic materials to maintain the highway system TxDOT maintenance does a great job of economically and efficiently maintaining the highway system. Highway designs dictate the type of maintenance treatments and materials needed to maintain the system. These materials (asphalt and diesel fuel) may not be available or affordable. Of particular concern is the supply of seal asphalt. Spikes in the price of petroleum, as occurred two years ago, will be back and may be much more severe. Need a plan for addressing shortage of strategic materials and severe price increases.
Infrastructure	Maintenance	Again funding, but also the replacement and or repair of structurally deficient and functional obsolete structures. Also air quality, non-attainment, will become more of an issue in more cities.
Infrastructure	Maintenance	Bridge and Highway repairs - Too many bridges and roadways are in dire need of repair to keep them in safe and useable conditions
Infrastructure	Maintenance	Continued maintenance of the every expanding highway systems in major metropolitan cities. Many of the large cities are expanding their freeways to 5 or more lanes and with that comes maintenance of those roadways. It is of concern to me that budget/funding will be consumed by future maintenance of those roadways and there will be little to no funding available for our ever expanding population growth
Infrastructure	Maintenance	Hydraulic infrastructure Maintenance of the hydraulic infrastructure (mainly bridges) and the role of the infrastructure on maintenance of sediment transport or channel forming processes. I do not see scour as a serious problem for TxDOT designs. Also, as hydraulic model reportedly become more reliable or accurate, the detailed influence on hydraulic infrastructure on flood plains will be increasingly more important.
Infrastructure	Maintenance	Improved maintenance of State Highways and funding of critical maintenance programs.
Infrastructure	Maintenance	Improvement and maintenance of current road infrastructure.
Infrastructure	Maintenance	Infrastructure Many bridges (and roadways) in Texas were constructed throughout the 20th century. Even the best engineering and design has a limited lifetime (excluding the Greek Parthenon, of course). As Texas moves into the 21st century, the time quickly approaches where Texas must consider the enormous task of funding, designing, repairing, and constructing new infrastructure to even maintain the transportation capacities Texas has today.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Infrastructure	Maintenance	infrastructure condition - Maintaining the roads, bridges etc. and keeping up with needed projects
Infrastructure	Maintenance	Infrastructure maintenance If we don't do a better job of maintaining our highways and bridges, Texas is going to put itself at a distinct disadvantage in terms of quality of life and business competitiveness.
Infrastructure	Maintenance	Key words: Digital image processing, condition assessment, advanced technology, and inspection and assessment Applying advanced technologies like digital image processing will develop the methods of infrastructure condition assessment and inspection and facilitate TxDOT to make an efficient decision on a short-term and a long-term maintenance plan.
Infrastructure	Maintenance	Maintain the rural transportation system at its present level of service.
Infrastructure	Maintenance	Maintaining the highway system in a safe and efficient condition Pavements are maintained in good condition, including safety issues. Bridge structures are well maintained to prolong life. Roadways are kept open with minimal disruption to traffic from lane closures.
Infrastructure	Maintenance	Maintaining the road system in an efficient manner
Infrastructure	Maintenance	Maintenance of physical plant in place plus new additions.
Infrastructure	Maintenance	Maintenance of the existing transportation system.
Infrastructure	Maintenance	Maintenance, Maintenance, Maintenance. Enough said.
Infrastructure	Maintenance	Maximizing the use of existing infrastructure for reconstruction and added capacity projects. Currently, most reconstruction projects that result in added capacity involve removing the existing infrastructure and then replacing with new infrastructure. There is a need to encourage the incorporation of existing infrastructure in such projects. For example, pavements that are still structurally adequate can be used as base material in the reconstruction, or simply overlaid with concrete or asphalt materials. The potential cost savings can be significant (possibly up to 50% savings over the current strategy of removing and replacing)
Infrastructure	Maintenance	New or improved methods for bridge and pavement rehabilitation techniques to extend the life of our current infrastructure.
Infrastructure	Maintenance	Preservation of our existing system. Impact - will not meet expectation of the commission and the public.
Infrastructure	Maintenance	Preservation of our existing system. Impact will be further deterioration of the system resulting in greater costs and more safety issues.
Infrastructure	Maintenance	PRESERVATION OF THE FM/RM HIGHWAY SYSTEM. Within the next five years, the FM/RM Highway System will be of upmost importance to me personally. I will need a safe and reliable rural road system for my family in addition to moving agricultural supplies and products.
Infrastructure	Maintenance	Preserving the system: With the near term funding shortfall it is imperative that we maintain our infrastructure investment.
Infrastructure	Maintenance	Replacement of key road infrastructure to ensure that drivers are safe. As the road system continues to age, continue to make improvements that ensure reliability and safety of drivers.
Infrastructure	Maintenance	Right of way asset management. Recent research resulted in a prototype architecture for the management of right of way assets (including parcels) at TxDOT. It would be strategic to pilot the architecture using data from a sample district (e.g., Austin).
Infrastructure	Maintenance	The continued development of a comprehensive asset management system to meet the ever changing goals of TxDOT is needed to provide accountability and to readily demonstrate needs and the affects of various funding levels and strategies.
Infrastructure	Maintenance	Transportation infrastructure is aging and showing its distressed physical condition. Many of the aging facilities are among the state's busiest corridors. Construction cost of rehabilitating the facilities is enormous. Cost to user delay and safety is equally of concern. How are we going to rehabilitate or reconstruct the oldest, busiest, and most congested corridors under traffic conditions? How can we afford not to?

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Infrastructure	Maintenance	TxDOT has taken a Band-Aid approach to rehabbing their pavements. Their pavement management system needs to be improved to meet the major challenges facing it, which include: 1- How best to spend their limited funds; 2- Provide supporting pavement performance information for life cycle cost analysis so that pavement designs can be optimized; 3-identifying where operations need to be improved and where they are working.
Infrastructure	Maintenance	TxDOT needs to review current maintenance plans on transportation systems and revise or improve them in a more cost-efficient way.
Infrastructure	Maintenance	Use rehabilitation and maintenance strategies on pavements the reduce life cycle costs.
Network	Efficiency	*Building intermodal support of increased Panama Canal traffic.
Network	Efficiency	1. Getting high-speed rail off the ground as a viable alternative to moving people and goods in this state. 2. Safety - dealing with an aging population and finding better ways to reduce alcohol-involved crashes. 3. Getting managed lanes to be more acceptable and allowing for conversions of existing lanes for better traffic management. 4. Managing CDA projects in the Dallas-Fort Worth area effectively so that they are viewed positively by the traveling public.
Network	Efficiency	Building of port and inland waterway structures to handle 2014 Panama Canal increases.
Network	Efficiency	Global trends and implications for Transportation Systems
Network	Efficiency	Multimodialism: Texans will have to rely less on the highway system especially in metropolitan areas. The congestion will soon overwhelm the infrastructure and the ability to expand. High speed rail has limited potential to solve the problem. Other affordable and available options need to be available.
Network	Efficiency	Permitting process The permitting process (especially for port-related projects) is so lengthy that it is almost impossible to respond in a timely fashion to changing market conditions.
Network	Efficiency	Port capacity Do we have enough capacity to handle the volume of trade that will occur when the economy recovers?
Network	Efficiency	Security issues in freight transportation Are the security measures that are in place and proposed--especially at ports--really making a difference or just making it more difficult to do business?
Network	Efficiency	US Mexico Border Congestion. With increased border security, it is becoming more difficult for people and cargo to cross into the US and Mexico. Mexico is Texas biggest international trading partner, and the third largest trading relationship with the US. Without the free flow of people and commerce the border can strangle economic viability for both Texas and the US.
Network	Integration	*Explore the potential for building better connection yards between rail and trucking so that it would be easier to move trailers by rail where economical, and then distribute by truck tractor nearer to destinations
Network	Integration	*Freight rail, high speed rail, light rail, passenger heavy commuter rail Examine the new role of rail, particularly freight and high speed passenger rail, and the potential impact to improve the efficiency of our existing surface transportation system.
Network	Integration	*increased nodal or centers concept development Need for increased multi-model system Price of oil air quality issues
Network	Integration	*working on multi-modal approach projects that are looking at sustainability, national, state, regional and community visions and values and considering environmental issues in a meaningful way.
Network	Integration	1. High speed rail.
Network	Integration	A transportation plan that addresses all needs. The rural areas that produce food, fiber and recreational areas must not be ignored due to their loss of political clout.
Network	Integration	A transportation plan that addresses transportation needs in rural areas.
Network	Integration	Adequate level of funding to ensure improvement and maintenance of the Texas Airport system.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Network	Integration	An east-west highway across Austin. To move traffic more quickly.
Network	Integration	Better connectivity between traditional roadways and rail systems for moving goods through Texas.
Network	Integration	Bike lanes and lockers. The fact that I can't ride my bicycle to a point less than 5 miles from home because there is no safe way to do so is irritating.
Network	Integration	Border traffic between Texas and Mexico and other states. Inter-cooperation with Mexico and other states to invest in transportation infrastructure will be essential.
Network	Integration	Building a strong commercial and security relationship with Mexico. Without a strong working relationship with Mexico, the state of Texas will be disadvantaged.
Network	Integration	Complete the Hwy 99 loop from I-10 to I-45.
Network	Integration	Completion of the SH99 / Grand Parkway in Houston, TX
Network	Integration	Completion of the SH99 / Grand Parkway in Houston, TX
Network	Integration	Connectivity. I need the ability to travel to other cities on reliable roads.
Network	Integration	Construct: Connect Interstate 27 South to Interstate 20. This roadway becomes a US highway South of Lubbock. It is one of the few Interstate highways that does not maintain a link to other interstate highways.
Network	Integration	Construction of planned highway connections. Complete the construction of local and regional roadways that have already been planned and approved.
Network	Integration	Continued expansion of major interstates. More mass transportation. High speed rail between major cities.
Network	Integration	Continuing to focus on the transportation needs and looking at alternatives to address those needs, such as utilizing all modes of transportation and making the most efficient and effective use of current assets.
Network	Integration	Develop additional transportation routes to meet driving needs (i.e., complete I-69 corridor - bypass around Houston and section to Texarkana).
Network	Integration	Developing a realistic plan and fundable plan utilizing multi-modal transportation.
Network	Integration	Development of fuel efficient vehicles and solar and wind power development to charge electric vehicles.
Network	Integration	Extend SH 130.
Network	Integration	Flyovers connecting Hwy 290 and Mopac Loop 1 in Austin are necessary. Expansion of capacity for North/South routes in Austin (I-35, Mopac).
Network	Integration	Given the constraints of the development of new capacity in urban areas, the existing network needs to be operated and managed to its fullest effectiveness to maintain mobility There are many opportunities for TXDOT to improve systems ITS/operations and management (and improve up to the national best practice level)
Network	Integration	Grade separation of the rail intersections in Tarrant county controlled by station 55. Elimination of HOV lanes for additional traffic lanes.
Network	Integration	High Speed Train, Mixed Traffic With the national looking into expanding the role of rail transportation, there might be a need to look in advance the possibility of mixed traffic. If extensive rail expansion does come to Texas, we might need to consider how to deal with high speed rail crossing existing highways and the possibility of these rails sharing existing or future bridges with highway traffic.
Network	Integration	Improve congested transportation routes (i.e., widen I-10 to 3 lanes from Sealy to San Antonio).
Network	Integration	Improve the I-10 and Hwy 99 intersection in Katy, Texas
Network	Integration	Integrated transportation. We need to provide better integration for air, rail, bus, and automobile transportation. We also need to push long distance truck transportation onto rail wherever possible.
Network	Integration	local option transportation funding increased nodal or centers concept development Need for increased multi-model system Price of oil air quality issues
Network	Integration	Long-term/strategic thinking. We need to look at rail, buses, and highways, and make sacrifices now to enable the next generation to move.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Network	Integration	Mobility Safety Efficiency Without optimal use of existing resources, safety, and mobility of the system are compromised.
Network	Integration	More East to West modes of transportation through and around the City of Austin
Network	Integration	More free roads and faster methods to go from Austin to Dallas, Austin to Houston such as light rail. Amtrak isn't option when it takes 6 hours to go to Dallas and 7 to return.
Network	Integration	Multimode transportation systems Build new high-speed rail connected with highway system, and city transit system to improve public transportation access.
Network	Integration	Of importance to me personally is the promotion of safe bicycle transportation in urban centers. This would entail the creation of a network of safe bike lanes that are appropriately distinct from motor vehicle and pedestrian zones. This would give people an option of a safe method of transportation that would reduce congestion.
Network	Integration	Rail and public transportation. With the current Administration emphasis in Washington, mass transit will be viewed as more viable for funding.
Network	Integration	Rail service between Houston/San Antonio to DFW to Sherman
Network	Integration	Rail service like Europe - take the best ideas of their high density and apply then to the Houston / Sherman Corridor. After-all it is a long way from Rome to Berlin or London (~1,000 miles) - It is only 300 from Houston to DFW to Sherman. Do better PR and explain how TX is just hiring a contractor to do some work on a road (toll) like they do in Europe - it certainly seems to work great - But you got to get citizens involved - this questionnaire is a good start
Network	Integration	Regional transit Bicycle infrastructure Bicycle integration A regional transit system connecting major cities such as San Antonio, Houston, Austin, Waco, Fort Worth, and Dallas are urgently needed. Intracity infrastructure needs to be developed and reevaluated for its safety to pedestrians and bicyclists.
Network	Integration	Stepping out of the transportation box: Decreasing our dependency on highway transportation and increasing our investing in other freight modes...such as rail and waterway.
Network	Integration	still need something like Trans Texas Corridor
Network	Integration	Texas Transportation Corridor, the Governor's 30 year plan (as was called 2 years ago). Robust connection of all cities and rural areas in Texas will be essential for the economic development of the State.
Network	Integration	The construction of SH 45 from IH 35 and MoPac to facilitate the increasing traffic volume between Austin and Hays County.
Network	Integration	the delineation of high volume, high capacity express transit to move goods and people long distances efficiently, versus good feeder roads designed to service living areas and avoid sprawl.
Network	Integration	The I-35 Corridor. Expansion is a must, but tolling must be considered.
Network	Integration	The potential of competition between rail and highway transportation.
Network	Integration	To be able to coordinate highway and rail traffic.
Network	Integration	To define and fund alternative transportation solutions (high speed rail, system connectivity, etc.).
Network	Integration	Topic - This topic actually should be addressed now. The Federal Aviation Administration has implemented NextGen which is a plan to convert control and management of the National Air Space from a ground based system to a satellite based system. NextGen is expected to improve efficiency, economy, and environmental impacts of air travel. http://www.faa.gov/about/initiatives/nextgen/ Explore the concepts incorporated in NextGen and determine how these concepts can be applied to improve operations and management of ground based Transportation assets. Will implementation of NextGen impact ground transportation in the vicinity of airports (increased air traffic?)

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Network	Integration	Topic: Although air travel still provides the most rapid means of getting from Texas to other major cities in the US, security and other issues (e.g., volcanoes in Europe) can disrupt air travel or make air travel less desirable. Strategic Issue: How can other modes of transportation such as cross country passenger rail travel be reinstated to allow travelers a choice. Cross country travel by bus or car are options but are more time consuming for long trips and may not be practical in many cases.
Network	Integration	Transportation corridors for multiple users: vehicles, bicyclists, and pedestrians.
Network	Integration	Transportation Corridors to ease statewide travel congestion. I-35 is a dangerous nightmare to travel with a family, yet even remotely direct alternatives are unavailable.
Network	Integration	TxDOT does not plan with other modes of transportation in mind. The Port of Houston saw a drastic increase in freight due to the demise of the Port of New Orleans. If access to and from the Port of Houston via other modes of transportation can be improved to make the port more competitive then the Port of New Orleans will not be able to regain much of the freight business it has lost.
Network	Integration	upgrade some roads to interstate highway standards, for example, US 77, FR 665 etc.
Network	Integration	Viability of high speed rail alternatives to reduce vehicle demand on the existing system. Funding availability to maintain the system. Public expectations transportation system maintenance; what the sers private and public want and are willing to support.
Network	Safety	*This Strategic issue is of immediate, Urgent importance. Strategic Issue - Develop a Strategic plan for continuing key TxDOT / State Transportation operations that support military, medical, emergency, and civilian transportation needs in the event of a major terrorist attack against Austin. Background: Post 9-11, US intelligence agencies have studied various Scenarios in which terrorists could utilize US transportation infrastructure to attack and destroy key civilian or military targets. News reporters have shown that gaining entrance to rail yards with tanker cars containing: a. Liquefied Natural Gas (LNG), b. Liquefied Petroleum Gas (LPG), c. Chlorine Gas, d. Anhydrous Ammonia, e. other toxic / explosive gases, is relatively easy, as evidenced by a reporter who entered an unguarded rail yard and left his business cards on tanker cars carrying these potentially deadly chemicals. This demonstration was intended to show that, instead of business cards, he could have just as easily have been attaching plastique explosive charges to the rail cars which would have caused detonation of the tank car contents (using a timing device...). Few security measures are in place to safe-guard rail cars located in a yard or a train of rail cars carrying toxic/explosive gases traveling through densely populated urban areas. NOTE: next time you travel north on MOPAC - and pass a train, note how many rail cars are covered in graffiti: this shows 1) how easy it is for unauthorized personnel to access these rail cars; and, 2) illustrates a potential, unanticipated method for transmitting information and orders, from city to city to "interested parties" --- including on the train to be used for a terrorist attack. It has also been noted that: * detonation of a single LPG tank car can cause fires, catastrophic structural damage, death, and serious injuries over a wide area. To illustrate, if an LPG rail car was detonated, 2nd degree burns would occur at the outer fringes of the blast zone within a one-mile radius of the epicenter. * it has been hypothesized that detonation of a rail car or 18-wheeler tanker truck carrying 40,000 - 70,000 lbs of Chlorine chemicals could result in 18,000 fatalities and over 100,000 injuries depending on the placement of the tanker in a densely populated urban area or near a heavily attended sporting event. * the military has developed a family of weapons based on the Fuel-Air-Explosive (FEA) device concept in which a high pressure gas cloud is emitted from the delivery vehicle (bomb or missile) in a fraction of a second and then detonated to create a high pressure concussion front of 4,000 psi or greater. This blast front can result in a massive, destructive (infrastructure) and fatal (people) concussive blast accompanied by fire and toxic fumes. FEA weapons have been used with devastating effect on enemy fortifications, bunker and subterranean communications / supply / and logistics cave complexes during the Iraq / Afghanistan war. It is important to note that the following commentary is only meant as a detailed description of events that

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		could happen. This graphic illustration is intended to provide the ground work for later discussion of pro-active Strategic / Tactical / Technical - Research Planning and Implementation steps that must take place now. ++ Background Texas law does not limit train lengths and Union Pacific trains up to 3.5 miles in length have travelled from Texas to destinations outside the state including California - which required crossing several other states. Trains of this size have caused concerns among State Law makers as evidenced by information available on the web with regard to 1) impacts on traffic flow at at-grade rail/roadway crossings; 2) safety concerns associated with operating a train of this size at speeds up to 70 mph; and, 3) security concerns. It is noted that different 'What-If' Scenarios could be considered regarding rail lines adjacent to the Austin CBD which also cross major north-south and east-west highway corridors. Examples would be the rail line that crosses the Colorado River between the Lamar Ave and S. Congress Avenue Bridges and parallels the Amtrak station west of Lamar. Another possible route which could be used to deliver a lethal rail-launched attack against Austin would be the rail lines that pass under IH 35 near the Fiesta Mart and travel south and east toward the Austin Bergstrom Airport. This line travels north serving several major businesses and passes under US 183 and other major highway corridors in the Austin metro-plex. However, for purposes of this 'What if' Scenario, the Colorado River - Amtrak - MOPAC rail line will be considered as the rail attack route for reasons that will not be detailed in this document. 'What - If' Colorado River Crossing rail line attack Scenario: In Austin - a train composed of hundreds of pressurized tank cars including LPG, LNG and other explosive / toxic gases travels through the city core, along the rail bridge that crosses the Colorado River and around the train track curve that will take the train over Lamar. The train stretches from the last car, located nearly one-half mile south of the Colorado River, around the rail line curve and then west, over Lamar Avenue, to a point where the locomotives, at the head of the train, are positioned just past the MOPAC FM 2222/Koenig Lane Interchange. The positioning of the train, at the planned time of detonation, is determined based on the objectives to destroy the Austin City Central Core, to destroy major and minor transportation corridors within the city and to destroy the National Guard armory adjacent to 35th and MOPAC. As an obvious consequence, NAFTA trade flow would be immobilized for an extended period. The radial distance from the State Capitol Building to the rail tank cars rounding the rail track curve adjacent to West 3rd Street is approximately 3,500 ft. Just past this curve, the rail cars would be parallel to the Amtrak station west of Lamar. Near simultaneous detonation of the rail cars along the entire length of the train is effected not by explosives attached to the cars, but rather by hollow charge weapons that were previously installed in the railroad ties along this route; extending well past the Anderson Lane / MOPAC interchange. The installation of these ties was completed in spring, 2010. The hollow charges were installed in the ties during their manufacture and therefore did not require any 'suspicious' activities during the installation of the ties. The hollow charge weapons are linked, wirelessly using a sophisticated command/control communications system which is designed to detonate the charges simultaneously. Detonation of the hollow charge weapons would direct jets of high velocity gases vertically into the underside of every tank car at multiple entry points. The high pressure gas streams would penetrate the undersides of the steel pressure vessels and cause molten metal to penetrate and spray into the tank car contents resulting in detonation. The result would be a massive explosion, along a 3 + mile corridor in the Austin CBD core which would also destroy key bridges at points where the rail line and other modes of transport intersect (Cross Roads); the concussive blast and resulting fires would destroy down town Austin, the Capitol building complex, and other State and Federal government buildings and private businesses in the vicinity. Neighborhoods, schools, hospitals, emergency services such as EMS, police and fire stations would be destroyed within 1/4 - 1/2 mile on either side of the rail line - with additional damage, fatalities and injuries occurring inside a 1/2 mile to

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		1 mile corridor parallel to the tracks. Fatalities and injuries would occur both from blast, concussion, fire, toxic gases and resulting, secondary fires and traffic accidents in the mayhem that would follow. The concussive blasts and resulting fires would destroy the rail bridge across the Colorado River, the adjacent
Network	Safety	As a local inventor here in Austin Tx, of course to see my product succeed. Also mostly importantly to change and saves lives, I'm implementing Safety.
Network	Safety	Finance: Roadway condition: Safety:
Network	Safety	improve safety of rural highway network, including low-water segment, sharp curves, no shoulder available etc.
Network	Safety	improve safety of rural highway, especially of Two-way-two-lane highway's improvement, e.g., shoulder widening project etc.
Network	Safety	Improvement of safety within our existing system and providing the overall tangible benefits to companies looking to move and invest within Texas. A stagnant Texas does no good for me or my family.
Network	Safety	It is essential that the field of human factors be incorporated into Texas transportation research and initiatives. Human factors consider the limits and capabilities of the driver when designing roads, signals, collision warning systems, signage, etc. Incorporating human factors will allow reduction in injuries and fatalities and thus improve safety. Currently Texas transportation has disproportionate emphasis on operations. Examples of initiatives that need human factors include reduction of driver distraction and design of in-vehicle collision warning systems.
Network	Safety	Live in a state that protects its citizens on the roads and in their community.
Network	Safety	Reduce injuries and/or death at intersections. Not just in Texas but on a National level. Alert oncoming traffic at INTERSECTIONS/CROSS-COLLISIONS preventing T-BONE/SIDE-IMPACTS. Intersections will be the primary application to FLASH IT FORWARD. However, it will serves in several other areas of usage such as Commercial - SCHOOL BUSES. STOP&GO TRAFFIC, and POWER OUTAGES ETC. FLASH IT FORWARD is also going green we in a new green economy. Now green lights added onto our vehicles for safety. Safety is ours!
Network	Safety	Safety and reliability of the road systems. Ensure that bridges and road infrastructure are well maintained and safe for drivers.
Network	Safety	Safety on the roadway. I feel that semis should be on alternate roads, not mixing with passenger vehicles. We should, as various Scandinavian countries have, institute a target of 0 crashes and do all possible to support achieving such a goal.
Network	Safety	Safety. Driver inattentiveness and distraction. Today's driver is bombarded by information available while in a vehicle and lured by a multitude of distractions outside the vehicle.
Network	Safety	Safety: Enhance the safety of existing roadways. FM roadways are carrying more and larger vehicles than they were designed for. Although they do not compete well for limited transportation dollars they can't be ignored either. It has been proven that adding / widening narrow roads increases the life of these roadways. Develop a statewide initiative to widen narrow roadways through in-house and contract forces.
Network	Safety	Securing the Texas-Mexico border. The border needs to be secure so that the violence in Mexico does not spill over into Texas cities, such as El Paso and Laredo.
Network	Safety	The proper education of people on how to drive, not just the rules of the road - training similar to race car drivers. This would reduce the number of drivers by over 60% I'm sure and make the ones on the road exponentially safer.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Network	Safety	This issue is of immediate importance. Strategic Issue: Improve safety of the traveling public in light of in-car cell phone and text messaging usage as well as use of in vehicle navigation and visual entertainment systems while driving. Published information to date suggests that accident rates for cell phone users are as great as for drivers who are intoxicated. Negative press and the passage of laws in some states prohibiting cell phone usage while driving has done little to curtail usage in states without laws. Cell phone usage while driving is still practiced in states with laws that prohibit cell phone usage. Strategic Issue: Develop new approaches for educating and training current drivers and the next generation of drivers on the dangers of using a cell phone while driving.
Network	Safety	This issue would is in the 5 year window of importance. Strategic Issue: Evaluate the use of real time variable speed limit signs. Strategic Research: Evaluate how other states have developed and implemented real time speed limit signs. Make recommendations on potential use in Texas including how to proceed in changing laws or creating new laws and policies to permit use of variable speed limit signs.
Network	Safety	To have Flash it Forward become not just an optional safety feature, but standard on every vehicle/make and model in the auto industry. Safety is Ours!
Network	Safety	Topic: The Panama Canal project is due for completion in 2014 and is expected to substantially increase freight movements to Texas from China, Korea, and Japan. At the 2nd Annual Texas Transportation Conference, John Esparza stated that currently there are 20 million trucks on the road, by 2030 there will be 30 million trucks. Currently Texas has the highest Truck VMT of any State. Heavy trucks are a concern to my wife and she purposely chooses to drive on Frontage roads or side streets to avoid routes carrying heavy trucks. I am mainly concerned about traveling on major routes with heavy trucks through construction zones when concrete traffic barriers are used --- this causes me to feel squeezed in by the CTB especially when a heavy truck is next to you. No room for error - either by me or the trucker..... Strategic Issue: Heavy trucks consume more highway capacity and have different operating characteristics than cars. Accidents involving heavy trucks can block major routes for several hours. What types of safety steps can TxDOT take in the short and long-term to help reduce perceived and real safety impacts due to a 1/3 increase in heavy truck traffic? How can construction zones be designed to reduce driver's concerns about being squeezed in between the CTB and heavy trucks?
Network	Safety	Use of improvements in signage, striping, marking, and illumination of roadways as I get older.
Network	Technology	Building Information Modeling (BIM). BIM is quickly emerging as a powerful, effective tool to understand, model, and manage building data during its life cycle. Recently there has been interest in applying BIM concepts to roadway design and construction. It would be strategic to develop guidelines for the use of BIM-based techniques for the management of the entire right of way, including transportation assets as well as any other assets located within the state right of way.
Network	Technology	Building more bypass to some multilane rural highway intersection. Promote safety, and mobility. create a new Green Transportation Systems with the help of ITS technologies and strategies
Network	Technology	Guidance systems integrated into the roadway. Electronic speed regulation. Tax incentives for carpooling. Move to electric vehicles and new funding source for highway maintenance based on usage of system.
Network	Technology	Intelligent transportation - We should work toward a system where the transportation system and vehicles can intercommunicate to optimize trips for all travelers, and reduce the human element that often is the cause for accidents and delays (due to rushing and poor navigating/planning).
Network	Technology	Intelligent Transportation Systems Examine the role of advanced monitoring and communications technologies to improve the efficiency and safety of the existing surface transportation system

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Network	Technology	ITS. Intelligent Transportation Systems. We need to be a forefront of this technology
Network	Technology	Keeping up with increasing traveler demands for real-time information - the tremendous growth in GPS-enabled devices and travel information applications that can run on them means that regions must be able to adequately support such applications or risk being placed at an economic disadvantage
Network	Technology	Maintenance of our surfaces and bridges. New technologies for moving people and freight. Texas Freight Shuttle, light passenger rail in metro areas (I don't think intercity rail will be economically justified.
Network	Technology	New vehicle technologies, safety Examine the role of advanced vehicle features and technologies in reducing our overall number of traffic fatalities and injuries. Crash avoidance, electronic notification of motor vehicle crashes, smarter air bags, advanced electronic stability control, etc
Network	Technology	Provide wireless internet capability along key routes.
Network	Technology	Research on new technology for our infrastructure that would be both functional and save money, including new pavement types and techniques; new water quality treatment techniques, and new maintenance techniques to extend the life of our current infrastructure.
Network	Technology	Same as 1 and development of alternative fuel/propulsion choices (which will impact funding if not addressed with alternative tools).
Network	Technology	Technological Adaptation Technology is making some transportation components smarter/more efficient and transportation systems must match the increases in innovation. Commuters will grow increasingly frustrated with old systems. They want the kind of leaps and bounds they've seen in the private sector. Their cars are getting smarter but the roads aren't. We cannot continue to just make a better propeller plane; we have to invent the jet engine's equivalent in surface transportation. Citizens will continue to seek out work-arounds (there's an app for that). If we cannot provide the technology or a product that works, consumers will find ones that will.
Network	Technology	That my Product be Researched to the fullest by CTR standards and clearly see that it has merit for many years to come... on personal and commercial vehicles.
Network	Technology	The advent of GPS, GIS, and technologies such as Google Maps, Google Earth, and Bing are rendering artificial constructs such as reference markers and route centerlines obsolete. In a world that is quickly becoming 3-D (i.e., latitude, longitude, and elevation), it would be strategic to develop a roadmap and implementation plan for the conversion of business processes at TxDOT from linear to truly geographic in nature.
Network	Technology	Using technology to better handle traffic jams and problems along with proper build out.
Organization	Funding	- climate change - user fees/transportation financing - increased trade
Organization	Funding	"Sell" the toll roads program TXDOT needs to develop a vigorous program of PPP toll road development, given the constraints on the development of new capacity TXDOT needs this type of investment to finance major new capacity It needs to regain the credibility for public-private financing of toll roads (lost in politics last year) Key issues will be developing a business case and procedures that can (re)secure public and political support.
Organization	Funding	*Can Texans actually own and prosper from transportation investments? Is there a way for Texans to invest directly in infrastructure much like they own stock in corporations?
Organization	Funding	*Funding Examine the short term consequences of our inability to fund our mobility needs, particularly for our most congested metro areas.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Funding	*have in place a long term funding solution for national, state and regional long-term funding realities and corresponding visioning as related to trends and solutions and to accomplish the following based on this funding reality and where we need to be in terms of trends for needed transportation improvements: --clear roles and responsibilities as related to funding -clear roles and responsibilities as related to infrastructure maintenance --finalize framework for roles and responsibilities as related to project development; construction; operations. --better understand the unintended consequences of not dedicating funds towards long-term transportation solutions. --require that transportation projects be prioritized and worked on considering needs and resource limitations --start implementing aspects of the strategic sustainable transportation plan that focuses on more than just highway infrastructure to address short-term; mid-term and long-term solutions to transportation issues and based on the funding realities and future trends. --refine performance measures --report on expenditures and various 5 or so performance measures per term --have in place a deinvestment framework --eliminate earmarking
Organization	Funding	*Long term strategies for funding and implementing transportation projects. How to pay for highway improvements? How to distribute travel efficiently between the different modes of travel?
Organization	Funding	*Reestablishment of a predictable and stable funding stream: With improved technology traditional gas tax becoming less reliable.
Organization	Funding	*The impact of electric vehicles and other alternative fuel vehicles on funding for transportation.
Organization	Funding	*Topic: TxDOT is considering the possibility of implementing a Multi-Tier Goal system for pavement conditions that will reduce funding for rural districts. There are concerns that rural low volume FM roads would not receive sufficient funding and might end up as 'dirt roads'. The State Legislature is unwilling to consider a 5 or 10 cent a gallon gas tax to increase revenues to maintain the current system. Strategic Issue: TxDOT might consider bundling certain rural FM roads that are important to a county and allowing the county to adopt these roadways based on the County residents agreeing to a local County gas tax increase or other funding source sufficient to cover future maintenance needs. This strategy would likely not work if the roads remained on the state system. The county would likely need to take ownership - a different form of 'adopt a highway.' The Department could continue to collect data on these roads and provide annual reports on conditions so that the County Engineer and residents would know how the roads are performing and could also use this information to help determine when maintenance might be needed. TxDOT District Staff could possibly provide analysis support for Counties which do not have an engineering staff. The amount of gas tax necessary to maintain the roads 'adopted' by the County and its residents would vary depending on the number of lane miles adopted; number of residents; traffic levels on each route and other factors.
Organization	Funding	*Transition away from the motor fuel tax. Current transportation funding is misaligned with other priorities of the nation - reduced emissions and reduced reliance on foreign oil which have lead to higher MPG standards.
Organization	Funding	1. Funding - how to implement effective projects in a limited resources environment. 2. Safety - public still expects a first-class, safe transportation system. 3. Interstate 35 - improvements from Mexico to Oklahoma. 4. System maintenance and preservation. 5. Getting legislative support for new funding sources (e.g., ending diversions, CDA authority, gas tax indexing, etc.)
Organization	Funding	A dependable and long term funding plan must be implemented so funds can be spent wisely on the most needed projects.
Organization	Funding	A funding system that focuses on transportation and reflects a taxpayer’s ability to use the road without becoming a Kings highway.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Funding	Adequate funding. The current lack of adequate funding and the lack of executive and legislative leadership to address the funding short fall holds the potential to negatively impact the quality and dependability of our transportation infrastructure and therefore the continuing economic vitality and quality of life for the traveling public.
Organization	Funding	All efforts need to address how to get the funding to develop the responses or the strategic effort will be how to best close down.
Organization	Funding	All the above items, but mostly funding for maintenance and construction of our current transportation system, including highways, bridges, and local streets.
Organization	Funding	Alternative financing for transportation projects. The impact is obvious; either we have the money to do the projects that are needed or we don't. The way projects are currently funded is not sustainable.
Organization	Funding	Alternative Funding sources. The infrastructure in the state of Texas will continue to deteriorate if our legislators do not come up with additional funding sources, including alternative sources like allowing private financing for toll roads, local taxes, and raising the gas tax that has been the same since 1991.
Organization	Funding	Availability of transportation funding to maintain the current State transportation system.
Organization	Funding	Budget is always a concern, but thorough planning needs to be underway now to accommodate the transportation needs of Texas' citizens as populations are expected to greatly increase over the next 50 years. Budget planning in the next 5 years will greatly influence the State's capabilities in the next 50 years to address these concerns.
Organization	Funding	Budget. Texas needs to correct the budget problems and issue more work for design consultants and construction letting.
Organization	Funding	Budget. We have great need for augmented transportation systems throughout the growing state. Texas needs to correct the budget problems and issue more work for design consultants and construction letting.
Organization	Funding	Compensation of Revenue lost due to fuel efficient cars The gasoline tax is the main source of income for TxDOT (recently toll roads have been added to the infrastructure). The increase in vehicle efficiency has reduced revenue and needs to be compensated for in the future.
Organization	Funding	Complete reorganization of transportation funding mechanisms at both the State and local levels, starting with a thorough audit of motor fuels taxation at the State level by integration of POS retail data with the wholesale-market collection and fuel shipment databases held (separately) by the State Comptroller, Dept. of Agriculture, TxDOT, and the TCEQ. A thorough overhaul of the property tax assessment system which would place a higher value and assessment rate on vehicle parking areas rather than building sites which support public transport access vs. private MVs is critical, as well as elimination of the premise that agricultural and undeveloped lands are essentially worth nothing in comparison to developed lands.
Organization	Funding	Considering the lack of political will to raise taxes and the negative views toward tolling and private investment, what are alternative revenue sources, and more specifically, how much projected revenue could be raised from these sources in the next 5 years, on both the state and federal levels. The impact to TxDOT is huge, without additional funding, given the current FTE levels and production metrics, TxDOT will be a much smaller organization.
Organization	Funding	Continued focus of increasing funds for transportation projects
Organization	Funding	Continued funding for maintenance of all transportation infrastructure
Organization	Funding	Continued refinement of funding solutions and the ability to address growth and preservation of the transportation system.
Organization	Funding	Cost of maintaining the infrastructure. It would appear we need to find innovative funding mechanisms beyond the gas tax for funding infrastructure support, as fuel usage declines.
Organization	Funding	Decisions on Funding
Organization	Funding	Determine how VMT fee structure can be implemented to reduce the overall capacity needed for the transportation system. Encourage off-peak travel and discourage peak hour

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		travel.
Organization	Funding	Determine solution to address antiquated funding model for accommodating transportation needs relative to reducing congestion and preserving the existing transportation infrastructure.
Organization	Funding	Develop a long-term phased program to introduce VMT fees as the means for highway finance (given the difficulties with federal and state tax increases)
Organization	Funding	Developing a fully intermodal system and a funding mechanism to support it. Proliferation of alternatively fueled vehicles will diminish utility of fuel taxes for revenue generation. By 2030, we need to have developed a simple NON big-brother VMT based funding system for vehicles, and system to fund both passenger rail and freight rail.
Organization	Funding	Developing a transportation funding strategy beyond gas tax.
Organization	Funding	Direct impact of alternative fuel vehicles and the State's legal ability to tax or collect road use fees?
Organization	Funding	Don't understand the "to me personally" stipulation. Another major near term issue is fixing the funding gap for low volume roads. The new fed restriction on use of fed funding for low volume roads, coupled with tight inhouse maintenance funding, has effectively left these roads without a source of funding. I heard this in district after district. In my opinion, this is another area where we can get by for awhile, but buying this time will cost taxpayers a whole lot more in the future, more than they will be able to handle.
Organization	Funding	Finance. How will we modify the way we finance transportation projects in the future?
Organization	Funding	Finance: How can we fund maintenance and construction of our infrastructure in transportation? Tolls, Taxes: A gas tax replacement that adjusts to congestion, and lane miles traveled seems fair to all concerned. Land use planning: Cities should not let new developments come to their communities where the transportation infrastructure is already over capacity and congestion occurs.
Organization	Funding	Financing How are we going to pay for all of our transportation needs?
Organization	Funding	Financing We have financing troubles now so if we don't find a way to collect more money for infrastructure, then work will be limited in 5 - 10 years as well. A healthy infrastructure is important for our economy and the constituents need to be informed of this. The taxpayer should be aware, just as everyone in our business is, that investing in infrastructure is necessary and important.
Organization	Funding	Financing critical multi modal transport systems all multifarious dimensions and associated linkages. Moving to proactive assessments.
Organization	Funding	Financing for projects.
Organization	Funding	Finding the monies to fund the billions of dollars of (multi-modal) projects we need to be built to keep pace with growth.
Organization	Funding	Fixing the finance problem. I've visited numerous districts this spring, talking to those planning PM and rehab projects. I've driven their highways to look at what they are doing. In my opinion we aren't even close to keeping up. The severe winter has made the situation even worse, particularly in west Texas. Too often we are having to use seal coat funding where the road needs rehab, because we don't have enough rehab money. The result is poor utilization of seal coat money where used in this way. But it's a political necessity to hold the road another year or two. Then, we can't seal many roads where a seal would be highly cost effective in the long term. All of this is building an ever larger snowball of funding need for the future. We are buying time, but the cost of buying the time is extremely expensive, to be paid in the future. This can't wait five years in my opinion.
Organization	Funding	Formulation of new transportation funding models to replace or supplement existing funding strategies. Identification of innovative project delivery methods to achieve efficiency and cost saving measures.
Organization	Funding	Free/tax road travel vs. toll road travel.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Funding	Funding
Organization	Funding	Funding
Organization	Funding	Funding
Organization	Funding	Funding
Organization	Funding	Funding - Can we count on Federal Transportation Funding or not? If not, can we raise funds for major transportation projects (highways & transit) from sources inside the state? Deterioration of Infrastructure - when we see report cards on condition of infrastructure, there are serious needs for our bridges and roadways.
Organization	Funding	Funding - funding mechanisms for building new, or rehabilitating existing facilities
Organization	Funding	Funding - there is inadequate funding for all types of transportation projects. There needs to be a dedicated source that will not be diverted.
Organization	Funding	Funding - TxDOT cannot operate effectively because they have no idea what funding will be available in the medium or long term.
Organization	Funding	Funding While there may be some room for fiscal adjustments, with current funding levels, it is difficult to envision how Texas can expect to maintain the current quality of transportation in the State.
Organization	Funding	Funding Without a reliable revenue stream for transportation improvements, congestion, and a deteriorating system will fall hopelessly behind the needs of the travelling public.
Organization	Funding	Funding and organizational structure.
Organization	Funding	Funding and revenue. TxDOT needs stable, reliable, and sufficient funding to meet the state's needs.
Organization	Funding	Funding for highways: Significant gains in population and both per capita income have contributed to much higher vehicular traffic. However, the percentage of Texans' per capita income spent on fuel taxes has decreased by 50% since 2003. The best way to fund additional highway construction for the next 20 years is to increase the fuel tax a dime (fully dedicated to transportation) and increase the vehicle registration fee $24/yr
Organization	Funding	Funding for infrastructure. Texas maintains a vast network of roadways and current budgets barely cover maintenance in a state where 1000 people a day are moving to Texas. We must be able to utilize alternative financing mechanisms to fund highway building in order to keep apace with growth.
Organization	Funding	Funding for needed transportation projects
Organization	Funding	Funding for new projects and maintenance of existing infrastructure.
Organization	Funding	Funding for road improvements, relieving congestion.
Organization	Funding	Funding for the entire transportation infrastructure, as well as implementation of a true high-speed railroad line throughout the state (at a minimum connecting the Texas Triangle.)
Organization	Funding	Funding of projects - both for maintenance and for safety improvements. There is no viable public transportation in the area where I live. It is vital for my ability to go to work, that our Texas road system be maintained.
Organization	Funding	Funding of projects - both for maintenance and for safety improvements. With the potential for a prolonged economic downturn, reduced funding for maintenance and safety highway projects can further damage our state's economy.
Organization	Funding	Funding, Gasoline Tax, Revenue Increasing the revenue stream, by possibly several avenues, including increasing the gasoline tax, is of the highest importance for TxDOT to be able to provide its core services, that being planning, designing, constructing, and maintaining the transportation system for the citizens of the State of Texas.
Organization	Funding	Funding, Gasoline Tax, Revenue The maintenance of a transportation system of the highest quality that will serve as an inducement to persons looking for a place to do business.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Funding	Funding, Gasoline Tax, Revenue To continue to have the foresight necessary, to assure that the revenue stream necessary to keep the great State of Texas ahead in this country, in planning, designing, constructing and maintaining a transportation system, of the highest order, and that gives the great State of Texas a competitive edge over all other states in this great country, is available.
Organization	Funding	Funding, Gasoline Tax, Revenue To take the bold steps required to gain a measure of independence from the federal government in obtaining the funding necessary to keep up with the needed improvements to our transportation system that plays a key role in economic development in this great State of Texas.
Organization	Funding	Funding, Gasoline Tax, Revenue TxDOT obtaining the funding necessary to maintain the existing infrastructure, at a high level of service, as it has in the past, and not at a mediocre level as it appears to be now.
Organization	Funding	FUNDING. As available funding for all transportation modes declines, the ability to preserve the existing system and address the mobility needs of the state will be our greatest challenge.
Organization	Funding	Funding. It would appear the gas tax will no longer support the demand for transportation improvement. Rail while a useful component only handles about 6% of the demand for movement on any corridor and then only people not goods, and only for those with access to a particular corridor. Urban areas need more capacity and to fund it we either rely more on tolls or on a combination of tolls and vehicle miles traveled user fee. In effect the strategic issue is how do we move transportation to a utility like funding mechanism.
Organization	Funding	Funding. The next five years without sufficient funding will only increase the need s and build up a backlog of needs that will need funding.
Organization	Funding	Funding. Without sufficient funds we cannot address any strategic solution of any strategic problem.
Organization	Funding	Funding. Funding shortfalls will have far-reaching effects on the transportation system in the very near future if the state's officials do not take a leadership role on this issue.
Organization	Funding	Funding: My business employed 117 people in 2008; we now employ 77. Significant staff layoffs occurred in transportation design and survey staff. A significant portion of my retirement is tied up in my firm value, which has declined significantly due to diminished revenue and profitability.
Organization	Funding	Funding; fuel tax increases; alternative funding mechanisms; ending diversions. Funding for infrastructure has not kept up with demand. This is the root cause of crisis at TxDOT and for the public unhappiness with the agency as it has struggled to find ways to meet demand that have included politically unpopular options. Funding is the single greatest issue facing transportation.
Organization	Funding	Funding-funding has to be addressed/increased because that is the basis for the transportation system's structure, efficiency, and viability.
Organization	Funding	Getting the state's politicians to do the right thing for our states long term needs. APPROPRIATE FUNDING.
Organization	Funding	I want to travel safely (so things like median cable barrier are nice). I want to have transportation choices (local transit, bike lanes, walking, roadways). I am willing to pay more gas tax to fund the improvements and see the condition of infrastructure improve.
Organization	Funding	Increase funding for transportation projects.
Organization	Funding	Increase funding of State Highways in our urban cities to avoid increased congestion and accidents related to high traffic congestion, particularly in the Dallas and Austin areas where congestion is already very high.
Organization	Funding	Increased funding for all surface transportation modes. Efficient movement of goods and people are critical to the economic well being of the State of Texas.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Funding	Khali, FUNDING. I wish I had the numbers but a conservative estimate is that TxDOT spends up to 20% of its budget satisfying federal mandates. Quit sending money to FHWA and keep all the funds in Texas to address Texas issues. Fire all the paper pushers. Unfortunately, you are one of those pushers. Your survey, analysis, dissertation, etc. does nothing to further the main purpose of TxDOT...build roads! Doesn't anyone get it? Money does not grow on trees. Take a stand and cut everything across the board. Quit using the federal handout as an excuse.
Organization	Funding	Lack of funding. The state's inability to adequately fund our transportation needs will result in adverse economic impact. We will Californicate our state.
Organization	Funding	Lack of funding. Unless the Texas Legislature, with real leadership from Governor Rick Perry, addresses transportation funding soon, our major roads will see gridlock soon.
Organization	Funding	Lack of funding. Without proper funding, discussions on improving, expanding, or diversifying our transportation infrastructure are a meaningless academic exercise.
Organization	Funding	local option transportation funding increased nodal or centers concept development Need for increased multi-model system Price of oil air quality issues
Organization	Funding	Long term transportation funding
Organization	Funding	Acquiring more funding to handle the needs of maintenance and construction development where needed. Developing a taxing structure to meet the development of new non-gasoline technology vehicles which use and wear out roadways, while raising gas taxes on those vehicles using gas.
Organization	Funding	Developing more infrastructures to meet growing population. Developing mass transit and rail as alternative to personal vehicles.
Organization	Funding	Once #1 is established then funding.
Organization	Funding	Politics of funding, incorporation of the non-fuel tax paying vehicles, alternative modes. There are several options to fund future transportation improvements. Is one better than the rest? Or, do we need them all and more?
Organization	Funding	Providing priced toll roads that offer a guaranteed speed limit (reliable) trip
Organization	Funding	Reliable Transportation Funding There is a need for a reliable funding source to expand the transportation system matching the increase in population, number of and vehicle miles traveled. Infrastructure is needed in advance of growth. Mobility declines, time and money wasted, and the economy is impaired.
Organization	Funding	Reliable/Secure funding source. Impact - deterioration of the system will result in greater costs and more safety issues.
Organization	Funding	Reliable/Secure funding source. Impact - deterioration of the system will result in greater costs and more safety issues.
Organization	Funding	Same as above. With added emphasis that once accomplished we will be in a position to attack the funding issues.
Organization	Funding	Secure stable, long term, broad based funding for roads, highways and other conventional transportation. Broad based means no toll roads. Ideally, this will come from an increase in the fuel tax, but TxDOT needs to make sure they reduce bureaucracy and make good use of the taxpayer money they receive.
Organization	Funding	Short Term and Long Term Financing In the short term, determine a hierarchy of construction needs and address the most important issues immediately. Long term, work with everyone from congress, local governments, and private industry to determine financing options for the future.
Organization	Funding	Sustainable funding sources. We do not have funding sufficient to maintain and improve our transportation infrastructure to meet the demands of a growing population base and to support future economic development and commerce.
Organization	Funding	Tax rates for funding transportation. I support both fuel tax increases and vehicle taxes.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Funding	Texas is in need of a new funding mechanism for maintaining and expanding their roadway system. The portion of the funding dependent on the gasoline tax is currently insufficient for the needs. A raising of the gasoline tax would be a useful stop gap measure but with cars using less gasoline for the miles traveled and electric cars now being sold there needs to be a better way to raise the necessary funds outside of the gas tax. A road user fee based on speedometer readings would be more equitable. Those who use the system more, pay more. Barring electronic tracking and tolling the easiest way would be to have the mileage checked during the state inspection, then reported to TxDOT. Who would bill the vehicle owner? (Monthly payments could be set to alleviate the burden of one big tax bill.) One would not be able to renew one's license tag until the fee was paid. A formula to split the revenue between the cities, counties, and state would need to be researched and developed.
Organization	Funding	The ability to properly fund transportation needs across the state. The revenue system must be completely overhauled and adjusted to provide for increased revenues that will accommodate future growth and changing fuel consumption. The TxDOT organization and structure needs to change to accommodate the future direction of the department. This is not an engineering organization any longer as it is a management and maintenance of highways agency.
Organization	Funding	The legislature is unwilling to provide resources to handle our current needs, much less future needs.
Organization	Funding	The rate of adoption of more fuel efficient vehicles. With a static motor fuel tax rate more fuel efficient vehicles will serve to reduce the revenue from the motor fuel taxes at a time when demand on the system (miles driven) is expected to continue to rise.
Organization	Funding	Topic: Fuel prices are unpredictable - it is uncertain if a gallon of gasoline will remain between $2–$3 in the next five years or if the cost will increase to $5–$10 a gallon. The price seems to be impacted more by Wall Street investor uncertainty than by normal market forces of supply and demand. These same conditions impact TxDOT since uncertainty in future prices or unexpected large increases in fuel costs directly impacts revenue and construction costs. Strategic Issue: How can the cost of fuel or at least the future predicted cost of fuel be made more predictable and stable in an unstable Global economy. Can the impact of Wall Street speculation on fuel costs be reduced? How much of the cost of fuel is related to Wall Street profits due to the commodity market? Is there anything the average citizen can do to in response to speculation other than 'take the bus'?
Organization	Funding	URGENT NEED TO DECLARE WAR ON TRANSPORTATION AND INFRASTRUCTURE FUNDING. IF WE DO NOTHING OUR ECONOMY WILL FAIL.
Organization	Funding	We need a long-term sustainable new revenue source.
Organization	Funding	WE NEED TO FUND ALL TRANSPORTATION AND INFRASTRUCTURE WITH THE SAME VORACITY THAT LBJ DID WITH THE INTERSTATE SYSTEM IN THE 60'S AND 70'S.
Organization	Funding	What is the best way to pay for transportation improvements over the next 5-10 years? How can transportation funding be enhanced so that needed PM/Rehab/and Mobility projects can be constructed. The PM and Rehab projects need to be built before the transportation facility requires reconstruction. Identification of funding while the facilities can be preserved through PM or Rehab will be much less construction cost than when they will require total reconstruction.
Organization	Funding	With increased funding, the opportunity for economic development is enhanced. Everyone benefits from good economic development.
Organization	Partnerships	*Develop a partnership with the freight moving industry. Learn about their short- and long-term goals and the technologies that they plan (or want) to incorporate in 2015, 2020 and 2025. Understand how the transportation system can function as an economic engine.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Partnerships	*education of internal and external audiences on project prioritization based on resource constraints; realistic project schedules; performance measures; environmental requirements; the value of the environmental and public involvement process; and, sustainable transportation solutions and techniques. If everything is number one--nothing is number one. All must realize that in order to deliver needed transportation projects that we must establish priorities and direct our resources towards those priorities. Many times, the environmental process is blamed for project delivery delays when in actuality, the problem is poor project planning coupled with predetermined decisions that circumvent the environmental and public involvement process. There is value in considering the environmental and social implications that result from transportation solutions. Transportation improvements are public investments. Decision-makers should evaluate and consider the related environmental and social consequences that result from those transportation investment decisions. This includes approaching transportation solutions using a multi-modal and sustainable approach which might include a combination of rail, sidewalks, roadways and other public transportation and the use of more visioning with the community and the use of more environmentally sensitive materials and techniques in constructing those solutions. *work towards reorienting environmental requirements and public involvement based on outcomes rather than just on process. As a public entity, it is process that helps bring transparency to the work that is performed and decisions that are made by public employees. However, it is important that how we perform our work is not just process driven. It is important that we establish related process goals to ensure that we are following a process that can be evaluated to determine if it is resulting in something good and with unintended bad consequences. For example, meeting minimum requirements for public involvement may result in meeting the public involvement process but may result in ineffective public involvement and as a result, may result in public opposition or unaddressed concerns in the project. Another example, the permitting process requirements may require impacts be mitigated in a certain way. However, in the long-term towards sustainability--the mitigation may really need to be accomplished differently.
Organization	Partnerships	1. Dialogue, education and multimodal and technological experimentation in specific, strategic areas to raise awareness about the need for a transportation paradigm shift. Work across disciplines to discover and educate about transportation's effects on personal and collective economies, and personal and environmental health. 2. Research about using the power of the market place to get individuals to personalize transportation and come up with solutions they want to support.
Organization	Partnerships	1. TxDOT maintaining a strong commitment to research and technical support through IACs. 2. Commitment by management to be more operations focused. What are ways to manage traffic and other key resources more efficiently and cost-effectively? 3. Renewed commitment by TxDOT to implement low-cost, short-term improvements to remove freeway and arterial bottlenecks
Organization	Partnerships	Are too many public and private institutions making transportation decisions as the sole owners and operators of our infrastructure (e.g., road systems, freight rail, transit systems, airports, etc.)? Does this model still work well or can it still really cope with today's and tomorrow's demands?
Organization	Partnerships	Contracting with professional engineers is costly for governmental entities and for the professional engineering firms. Current contacting methods are statutory and imbedded in business practices. The appropriate resources are not allocated efficiently making transportation solutions more costly and less timely.
Organization	Partnerships	Credibility of TxDOT. The state needs to unite behind its transportation leaders and to do so TxDOT must regain the trust of the public and elected officials.
Organization	Partnerships	Environmental impacts and public transportation throughout the state

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Partnerships	Fragmentation - The fragmentation of transportation planning and service delivery must be reversed! Planning must be done without the local bickering, arguing, and gear shifting that had been taking place for the last 20+ years. And service must be delivered as a system, not as separate components competing with each other for funding.
Organization	Partnerships	Increasing the public understanding of the actual costs of highways and transportation -- a lack of public support for increased funding initiatives will continue to hamper efforts to maintain and improve the system
Organization	Partnerships	Minimize impact on landowners that abut the highway system. Includes noise, invasive plants, runoff, wildlife issues, and land fragmentation. At the same time, the system needs to be easy to maintain and blend into the natural surroundings. Use low maintenance but durable ground cover, such as low growing native plants.
Organization	Partnerships	Mobility: Enhancing public transportation availability in metropolitan areas of the state Determine how ridership can be increased (thinking outside of traditional methods) use customer surveys. Determine how much ridership can be increased and to what affect on congestion.
Organization	Partnerships	Non-TxDOT Planning Organizations and Districts. I think a key strategic impact will be matching planning organizations (MPOs, RPOs, etc.) with TxDOT districts. The goal would be a single, statewide approach to project selection and priorities with these entities where TxDOT is an advisor and partner as the policy body determines what projects to construction while TxDOT focuses on a more primary role of project delivery.
Organization	Partnerships	Proliferation of utilities in the right of way. The state right of way is becoming saturated with utility installations. TxDOT has the legal obligation to manage the state right of way efficiently and cost effectively. It is strategic to develop the capability to capture locational data (including 3-D data, e.g., using LIDAR and other innovative technologies, which are now much more affordable than ever before) at the time utilities are being installed. After dirt "covers" the pipes and cables, it is usually too late.
Organization	Partnerships	Public education-educating Texans on how transportation projects get funded, what their motor fuels tax pays for, processes projects have to go through before being coming to fruition, how much projects cost, roles and responsibilities of TxDOT vs. MPO's vs. RMA's. Public knowledge and by-in of the transportation system will make a difference.
Organization	Partnerships	Reconciliation of the roles and responsibilities between TxDOT and the various toll road agencies and RMA's. I'd like to determine how these entities, all with appropriate and important goals, can truly work together to develop and deliver unified transportation improvements. It seems we spend a lot of energy trying to figure out who should be doing what part when the public might think that energy better spent solving transportation issues. I'm thinking that the truest of partnerships will be developed when there is shared risk between the entities.
Organization	Partnerships	Respect TxDOT needs to restore the trust and respect levels with our elected leadership.
Organization	Partnerships	Topic: The TxDOT Research program RFP process consumes a large amount of time, energy and resources to produce Proposals based on the concept of Universities or teams of Universities 'competing' for a limited number of research projects. This process also results in an unpredictable funding platform even for successful, competent researchers and also impacts a University's ability to attract and retain top engineering students due to future funding uncertainty. Strategic Issue: How can TxDOT and the Universities work together to create a more efficient cooperative process for preparing proposals that maintains the competitive aspect that TxDOT requires while at the same time eliminating unnecessary waste of Faculty and Researchers time and energy?

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Partnerships	Topic: TxDOT has an excellent web system in place (Share Point) that can be used to share reports, photos, surveys, meeting agendas, meeting calendars and other information relating to a project, including research projects. The Share Point site also provides a means for archiving materials for future use. However, this feature is part of TxDOT's Cross Roads Intranet and cannot be accessed by University Personnel. Other types of information such as Archived constructions plans and pavement design files are also posted on Cross Roads but are also unavailable to University personnel. Although TxDOT and the University need to maintain a strong firewall system to ensure security and integrity of their webspace; this system also presents a barrier for sharing information that could be used by University personnel to support TxDOT research or to generate new ideas. Strategic Issue: Develop ideas for creating "decompression chamber" or "clean room connection" that would unite the secure TxDOT and secure University webspaces so that certain types of TxDOT sites could be accessed freely by 'certified' University personnel. In essence the 'clean room area' would essentially be inside both the TxDOT and the University firewalls and therefore would be doubly secure. Envision a Venn diagram with two circles intersecting.....the intersecting space would be the 'clean room'.
Organization	Partnerships	Topic: Development of sub-orbital space travel becomes practical (financially and technologically) as the primary means of rapid travel between continents. Travel from major cities in Texas such as Houston, DFW, Austin and San Antonio to any other major city in the world takes 2 hours maximum one-way. Development of practical sub-orbital space travel means that professionals can live anywhere in the world and work anywhere in the world where a sub-orbital aircraft handling facility exists. It will not be uncommon for someone to live in Rome, but work in Austin (or vice versa) for example. For individuals who adopt this life style, ownership and use of a personal vehicle will change and could be based more on using either a small vehicle for space-port to home trips or use of rapid transit from space-port to a park-n-ride where a 'SMART 4-two' type vehicle is shared for the trip home. Strategic Issue: Begin now to develop dialogue with those who are offering sub-orbital space flights as a recreational / tourist experience for wealthy travelers. Learn about the technology and begin developing plans regarding how this technology can be integrated into Texas Transportation System in 20 years or less.
Organization	Performance	*continue to bring to light and addressing the national, state, and regional short-term, mid-term, and long-term funding realities, including funding roles and responsibilities. *an understanding of the importance of alternative fuels; energy independence; alternative modes and fully investigate funding strategies for all modes based on national; state; regional; and local importance. *shed light on the pros and cons in earmarking projects *start identifying national, state, regional and local transportation long-term transportation trend needs and long-term where we want to or expect to be and establish related goals. Examples include: Trend towards telecommuting; moving long-haul freight through rail; commuter rail; high speed rail for travel; intelligent vehicles that might result in less accidents; other vehicle technology; population and related migration trends; etc *start identifying goals (short-term, mid-term and long-term) and develop no more than 5 or so outcome based performance measures maybe for each term. *within the next five years, accomplish the following based on this funding reality: --reporting on the condition of the existing infrastructure --reporting operational issues of the existing infrastructure --maintenance of the existing transportation infrastructure --address existing safety issues --develop a financially constrained transportation improvement program --start the effort of prioritizing and working on transportation projects considering needs and resource limitations --addressing how funding will occur for national, state, regional and local needs. --start formalizing roles and responsibilities as related to project development; construction; maintenance and operations. --start saving money to dedicate towards long-term transportation solutions --initiate the development of a strategic sustainable transportation plan that focuses on more than just highway infrastructure to address short-term and long-term sustainable solutions to transportation issues and based on the funding realities. --report on project expenditures and the various 5 or so performance measures

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
		for each term. Transportation improvements cost money to develop and implement. Many times, money and personnel resources are expended on projects regardless of the purpose and need of the project and whether or not the project can realistically be funded. As a result, many times, projects are constructed that are of limited value and there are inadequate resources to develop and implement important projects. It is important to manage expectations by bringing to light the funding realities and then basing transportation improvements based on those funding realities. It appears that it is coming to light that TxDOT did not concoct the funding crisis and it is important that the momentum not be lost on developing real solutions for the funding crisis. In addition, it appears that there is confusion regarding what the intent of the federal and state gas tax were intended to serve. Many times, local governments expect federal and state assistance although they have been remiss in their duties as related to the infrastructure or that the project is not really of national, state, or regional importance. And finally, it is important that we start visioning towards future transportation needs rather than trying to solve transportation problems using outdated models based on the past rather than trends and national, state, and regional visioning.
Organization	Performance	*Develop a new framework for organizational performance measures based on what users want of the transportation system, i.e., how is TxDOT doing in satisfying user needs
Organization	Performance	*Strategic Issue: The concept of 'DOT' as a government Transportation agency will change - the UK/Canadian/Euro 'Quango' concept will become more accepted in the US and possibly adopted by Texas and TxDOT. A Quango is a Quasi- non-governmental agency that has the authority to raise revenue through taxes, fees and tolls but also incorporates the advantages of a private company to market, advertise, and solicit increased revenue directly from the population under the direction of a Board. Strategic Research: Evaluate how facets of the Quango concept can be adopted by TxDOT now to enhance performance. Consider how TxDOT might function as a Quango by 2020. What are the advantages / disadvantages?
Organization	Performance	Ability of the Agency to maintain the current system with existing resources; human, capital and financial. Impact of the "new" federal cafe standards on the gas tax revenues per year, 2012-2035. Impact of metropolitan planning efforts to promote "sustainable living" on the existing transportation system. Will the new developments reduce sov demand on the system and replace with desirable hov/rail/public alternatives?
Organization	Performance	Ability of the organization to implement effective change to adapt to changing conditions.
Organization	Performance	After we apply more resources to communication/education and affect increased funding, the communication emphasis should shift to planning/policy for future needs and societal requirements for a diverse multi-modal transportation system.
Organization	Performance	Anticipating roads that will be in a similar situation
Organization	Performance	Balancing the need for maintenance, improvement, and new construction. Failure to strike the right balance will alienate voters and erode political support for TxDOT
Organization	Performance	--be based on national, state, regional local transportation goals to include long-term vision; mid-term and short term needs --require national, state, regional and local transportation planning --have funding roles and responsibilities clearly established
Organization	Performance	Being a civil engineer, I know that when TxDOT has projects, and is running smoothly, there is work for everyone. This economy has been devastating to some civil engineers, myself included. So, working on new projects (hopefully including rail) will help us all.
Organization	Performance	Can we transform our transportation systems into strong economic-growth generators? Do we know how to invest in and contribute to a vibrant future of rising living standards and national leadership? How do we deliberately plan for and reach that place?
Organization	Performance	Capability to afford the property taxes at my rural homestead of roughly 45 acres in the face of a county Commissioner's Court which (with full TxDOT support) is hell-bent on turning Williamson County into the 21st Century equivalent of 20th Century Orange County, California by lying about the intended longer-term land development effects of its road-building program.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Performance	Communication/education The ability to communicate and educate the public and elected leaders regarding transportation and the impact/cost of delay vs. cost of addressing the issues is emergent. Without effective education we can't garner support for sufficient funding to address transportation needs.
Organization	Performance	Continuance of a business environment in Texas which allows me to grow the business and create more jobs, not fewer.
Organization	Performance	Consistent Work load As a bridge engineer, I want to be employed in 5 years so work coming from TxDOT statewide or locally and other clients, i.e., Toll Road Authorities, Counties and Cities, is crucial to my livelihood.
Organization	Performance	Consistent work load and an economy that is still growing in Texas. Poor infrastructure could hurt the growth of our state.
Organization	Performance	Consultant funding. TxDOT has cut the amount of consultant funding over the last 3 years which has resulted in lost jobs.
Organization	Performance	Consultant work. Consultants overcharge for minimal work of questionable or outright BAD quality resulting in major costs to TxDOT.
Organization	Performance	Corrected priorities That elected leadership move transportation to the top of their priorities and recognize it as the foundation that all other civilized programs are dependent. Where we live, work, shop and recreate, as well as education, emergency and security are all connected by our transportation system which has the broadest and deepest impact on our quality of life and national prosperity.
Organization	Performance	Create change - Get vehicles onto a more sustainable fuel source. Enact a way to allow electric and natural gas already coming to homes and businesses to be used for automobiles, and replace "gas tax" with vehicle energy tax.
Organization	Performance	Credibility As an advocate for the importance of Quality transportation, and realizing the need we all must face to do more with less, greater steps should be taken to help the public realize/understand what Texas is doing to make better use of the limited funds available.
Organization	Performance	Developing a design staffing model that determines (a) production level for the major project types developed by the department, (b) determines the appropriate level of support needed by each designer. The idea is to develop a design staffing model that can be applied to any level of funding or work. The production level would be stated in terms of $M of construction dollars per year per designer.
Organization	Performance	Developing statewide transportation project priorities through some objective criteria, publishing those priorities and then using cash flow or abnormal infusions of funding (ARRA, Prop 12) to develop and construct those priorities. Provides a sensible process in advance of abnormal infusions of funding and maximizes the benefit. This is especially important for connectivity projects outside of MPO boundaries but my idea is to also rank the MPO projects statewide....
Organization	Performance	Devoting adequate resources to the environmental planning process. Many complain that the process is slow and that it needs to be streamlined. However, the level of resources and level of priority given to the process need to be explored. Transportation engineers drive the process for moving a project forward and may overlook that environmental approval is supposed to be a process that starts with the question "Is there a need for this project," and should include the public in that process before a project is designed.
Organization	Performance	During this time I will hopefully be retiring, so our economy and a reasonable tax structure going forward is critical. Transportation and funding are closely linked to these.
Organization	Performance	Efficiency and effectiveness of the department.
Organization	Performance	Finishing - finish projects that were started. FINISH THEM!!!
Organization	Performance	Funding and organizational structure. The economy will improve and the agency is not positioned to adjust to the future. Increasing revenues, reducing costs, and improved management of the services provided will make transportation dollars stretch further. Doing more with less has not been actively applied in recent years.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Performance	Having an Agency/Department that is capable of moving with the times and as such, understanding that their role is not the 'doer' of past times. They can no longer afford to be bending over drafting boards or terminals designing RFC drawings. They need to be Financial and Program Managers and learn to manage billions of dollars of projects with fewer, smarter, more capable staff.
Organization	Performance	How does Texas prioritize expenditures on transportation projects in rural, urban, and metropolitan Texas areas so that the maximum level of preservation can be achieved? How does Texas invest its limited resources to preserve a maximum amount of its transportation infrastructure for as long as possible or until more resources are available?
Organization	Performance	I am old and wish to see a realistic and workable plan in place. I believe TxDOT is going to have to change the components of a project. For instance delete the fancy pavers and rock bridge abutments i.e., SH 317 and Lake Road in Bell Co. Nice but not essential. Turn TxDOT over to hwy. engrs. and not the politicians as has been done. The head of TxDOT should be an engineer and not a political hack for the governor.
Organization	Performance	I believe raising more competent transportation people and retaining them in the organization needs to be seriously considered. Continuous development would not be possible without high-quality people.
Organization	Performance	I believe TxDOT needs to study various contract methods when they start a new project. There are several new ways of contracting like warranty contracts. We need to conduct a research on the effectiveness and operations of non-conventional ways of contracting.
Organization	Performance	I hate toll roads and I don't like to use them so I will avoid them at all costs
Organization	Performance	I just want the soundwall that TxDOT promised me five years ago.
Organization	Performance	I work in the construction industry and obviously use Texas roads. I don't give a damn about public transportation. It's a drain on the economy and doesn't give anything back. Quality of life is not measured by how many poor people are transported from point A to point B. It's measured by the cost that you and I pay for products, services, and goods. (Notice the reference to the TxDOT mission statement)
Organization	Performance	If you toll, don't tax. We are tired of paying more than one way to travel.
Organization	Performance	Institutional honesty in acknowledging, assessing and addressing the mutual interaction between market-driven land use changes and public-sector decisions involving transportation decisions at both the strategic (metropolitan) level and project development level. The deliberate failure by TxDOT and its cronies at MPOs around the state to develop and employ integrated transport-land use forecasting models for long-range plans and project development EA/EIS activity represents nothing less than a consistent pattern of high-level fraud over the past 30+ years.
Organization	Performance	Invest in Infrastructure - Build roadways and other transportation infrastructure to meet and anticipate growth demands, while planning for the future.
Organization	Performance	Is the agency's current organizational structure and current agency culture positioned to address future transportation needs?
Organization	Performance	It is critical to growth and well being of all citizens...more growth, means more jobs, more jobs means more opportunities, and more opportunities means a better quality of life for all.
Organization	Performance	Less seemingly frivolous spending on overdesigned and built infrastructure.
Organization	Performance	Matching resources to transportation funding and plans.
Organization	Performance	More transparent operations and planning- distrust, lack of honesty and lack of teamwork on a local (city, county) to legislature-based level is at all time low and continues to erode. Our transportation system cannot be addressed much less fixed without a mutual trusting relationship of us outside of TxDOT. Truth, Trust and Teamwork are missing link to ribbon cuttings.
Organization	Performance	Moving toward a true transportation department with the focus on safe and efficient mobility regardless of mode. There are obvious funding issues but perhaps the first issue to address is a mindset change from "build more highways" to "how can we move people and goods."

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Performance	My personal interests in the next 5 years are based on career interests, and they related to innovative finance opportunities at TxDOT, which have been very limited up to this time.
Organization	Performance	Optimize expenditures on transportation.
Organization	Performance	-Planning processes which are integrated in regard to multi-modal systems (transit, highways, freight and other modes) and responsive to reauthorization. -Sustainable transport systems and strategies (climate change implications) -
Organization	Performance	Politics/Policy/Perception If Perry is not re-elected, or key transportation lege members change, then transportation policy will likely be altered/shift. After an initial lag for transition, the newer policy will begin to direct TX transportation differently. Hard to predict what the direction is. Right now TxDOT is bending and altering its internal structure to please the current politics/policy bosses. More attention is being paid to that than to transportation growth (not that there is any money to make things grow). The internal contortions are also a factor of a poor perception of TxDOT. I hope this will improve in the next 5 years. I fear if can't shake off the current perception soon, it will stick and we will endure many years of being seen as ineffective, corrupt and lame.
Organization	Performance	Process improvement While the previous issues are being overcome we must improve/streamline the project planning and development process. By the time a 20 or 30 year project comes to fruition it often no longer meets the needs of the community it serves.
Organization	Performance	Professional development With Departmental hiring restrictions, we will have a gap in hiring and subsequent experience levels.
Organization	Performance	Quit spending money on side issues. Identify and fund critical needs and forget about new computers, secretaries for department heads, and fancy offices. You are state, federal, and municipal employees. Accept lower salaries and ammonites. If you were worth it, you would be working in the private sector where the real world exists. Your job and benefits would not be guaranteed and you would have to compete on a daily basis.
Organization	Performance	Reduce my time in traffic. Reduce the cost of operating the agency and use my contribution to the revenue stream more efficiently.
Organization	Performance	Remain focused on a core mission of delivering safe, reliable roads and bridges. Do not get dragged into political fads in areas like intercity rail. This will suck the budget dry and divert money from the core mission. The train lovers are a small minority and they do not pay your bills. Drivers pay the bills so listen to your customers.
Organization	Performance	Research funding should be open to private universities. We are all paying the same amount of taxes that support these research activities. Improve competition and empower transportation research with resources from private institutions.
Organization	Performance	Restore respect and integrity for TxDOT.
Organization	Performance	Restoring state government credibility: Texans' resistance to funding highways (and other modes of transportation) is substantially rooted in distrust of government (primarily TxDOT). If we are to develop new sustainable revenue streams for rail and mass transit, state govt credibility must be restored.
Organization	Performance	Retention of institutional knowledge. TxDOT will soon lose another large percentage of experienced personnel in technical and managerial areas across the board. While a knowledge management system is in place in TxDOT's i-Way, including a method of capturing and indexing "legacy knowledge," there is little to no information going into it since the originating research project placed in it about 200 legacy knowledge documents concerning pavement forensic study methods about 4 years ago. So the hard part of developing a knowledge storage and retrieval system is done. Just need to start capturing knowledge before people retire.
Organization	Performance	Review and correction - I am less of an engineer and more of a babysitter.
Organization	Performance	Safe, secure, reliable roads and bridges. This is what I expect from TxDOT. Make sure you deliver on your core mission.
Organization	Performance	Same as issue 3: my net worth is significantly tied to infrastructure development and rehabilitation.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Performance	See above. Strategy...quit wasting money. Cut spending by 50% but not just at the lowest level. All levels! The Governor should make $100K. Everyone else proportionately below that amount.
Organization	Performance	See TXDOT develop national leadership in systems operations and management
Organization	Performance	Strategic planning, common sense We need a common sense approach to the strategic planning that needs to be done and implemented to head off the stifling traffic problems we are having and will have.
Organization	Performance	Strategically, the goal of TxDOT should be to prepare for future chronic petroleum shortages by preparing Texas transportation infrastructure for life without personal automobiles.
Organization	Performance	The above in Issue 4 and a realistic view of needs and fundings. Think of the $ wasted on the Dal to SA corridor. A realistic plan utilizing the multi-modal components could be implemented but for the interference of politicians (GOV. and his hacks) and foreign funding. I am a conservative and have voted for Gov. Perry but ????????.
Organization	Performance	The decisions behind where and how to put in light rail transportation has been based on those with political and economic gain. The decisions have not been made on what is best to move large volumes of individuals in and out of congested areas on a daily/weekly basis. Mass Transportation should be based on moving mass amounts of people, no generating revenue for my political supporter that owns a piece of property along a certain available or proposed route.
Organization	Performance	The lack of adequate funding for transportation will affect the number and quality of engineers who work for TxDOT and its consultants. The lack of funding is causing engineers engaged in transportation to either move into other fields in order to remain employed or to relocate to other states or countries. Also, the extensive yearly changes and complexity of these changes to the codes engineers use to design roads and bridges is becoming more and more burdensome to keep up with. With the ability to use spreadsheets and engineering programs the brute force method of investigating all loading permutations has replaced logic and common sense in engineering design. This generates a lot more paper and takes a lot more time to evaluate all the paper. The designs of today are really not that much better than those decades ago but they require a great tracking and book keeping system.
Organization	Performance	The Trans Texas corridor was a good plan, and should have been approved. But TxDOT did not address local issues (see comment above)
Organization	Performance	This issue is of immediate importance. Strategic Research Issue 'Evaluate methods for obtaining Public Opinion on Transportation Infrastructure Conditions and Management Practices' - 'Restore and enhance strong public confidence in TxDOT as the State's Transportation Leader' Background The purpose of this study is to evaluate methods for obtaining public opinion on specific roadway features, improving communications and educating civic and business leaders and the public. Different methods will be evaluated with a focus on Road Rallies. Strategic Research to be conducted. The study would involve the following general tasks: Task 1. Evaluate methods used by other DOTs to obtain information from the Legislature, MPOs, business leaders, and the Public on various aspects of the TxDOT Transportation System. • Public Meetings • Telephone surveys • Web surveys • Field surveys • Road Rallies • Other options Task 2. Determine how these options have been used to obtain Public Opinions for use in determining: • Public priorities on system features (Safety, Preservation, Aesthetics, Economy) • Performance Measurements • Public expectations for different route types • Use of public opinions in evaluating current management practices Task 3. Evaluate the comparative value of Road Rallies to other options. • What are the benefits / disadvantages of conducting Road Rallies? • Have Road Rallies had a positive / negative / no impact on DOT image? • How have Road Rally results been used to change DOT performance measures? • How have Road Rally results been used in short- and long-range Transportation planning? Based on the results of Tasks 1–3, prepare report summarizing

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		findings and a recommendation whether implementing Road Rallies in Texas would support DOT Management Goals. Based on a positive response from the Strategic Plan Steering Committee and TxDOT, develop a Plan for conducting a Road Rally on one or more of the following topic areas: * Considering current budget restrictions, how do civic and business leaders and the public prioritize transportation system maintenance practices? • Considering current budget restrictions, how do civic and business leaders and the public prioritize transportation system features (safety, maintenance, congestion, appearance etc)? • What is public opinion regarding ride, pavement surface condition, lane width, paved / unpaved shoulder, shoulder width, striping, signing and other features on different routes. (IH, US, SH. FM) • What is public opinion regarding Bus on Shoulder operations along MOPAC. • From the perspective of Bus Riders • From the perspective of Bus drivers • From the perspective of car / truck drivers on MOPAC • Considering current budget restrictions, how can Road Rallies help in evaluating pavement conditions on Rural Roadways? On Urban Roadways? • How Road Rallies be used to better educate civic and business leaders and the public on transportation management issues. Based on an evaluation of these and other options presented to the Steering Committee and TxDOT; develop a Work Plan for conducting a pilot Road Rally to obtain information a selected topic. Based on approval of the work plan, prepare detailed plans to conduct a Road Rally in one or more regions of Texas and collect Public Opinion information. Analyze results and prepare findings for presentation to TxDOT and the Steering Committee.
Organization	Performance	Topic: Changes in Top TxDOT management occur roughly every 4 to 5 years. High profile programs which consume $$$ and personnel resources sometime seem to come to a screeching halt or are severely curtailed even if successful or even partially successful: 1) Total Quality Management 2) TxDOT Engineer Training Program 3) Graduate Degree Program 4) Research Management Committee and TAP 5) Trans-Texas Corridor 6) Public Private Partnerships (PPP) Strategic Issue: Assist TxDOT in identifying, establishing and developing management strategies for Enterprise Level Programs that are Sustainable over a 10 - 20 year period.
Organization	Performance	Topic: Current truck size and weight regulations and permitting rules, including rules for oversize / overweight and superheavy loads are considerably different between different US states. The permitting process and enforcement varies substantially which can result in delays in delivery of vital & expensive equipment or machinery that impact industry and state economy. Strategic Issue: Uniform truck size and weight - permitting is needed - on the NHS system as a minimum to ensure more efficient movement of goods and services. This particularly applies to oversize / overweight and superheavy loads which often involve very valuable and time-sensitive cargoes.
Organization	Performance	Topic: TxDOT has implemented a 4-year pavement management plan that consists of programs (project lists) for PM, Rehab and Mobility projects as well as Routine Maintenance Activities. However, a method currently does not exist to determine the benefit/cost ratio for projects to aid in ranking / prioritization. During development of the ARRA program list - several Billion dollars in potential projects were submitted by the Districts and CTR / TxDOT PMIS staff worked with David Casteel to develop a ranking index based on ADT, Project Cost, and Project Length. However, the results were not actually used in project selection. The MTG DOT Survey has indicated that several states use benefit/cost formula to help prioritize projects. Strategic Issue: Develop a benefit / cost prioritization system that helps maintain consistency in how projects are selected for inclusion in the 4-year plan. This method could also help in making tough decisions about which projects are delayed due to funding cuts.

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Organization	Performance	Top-to-bottom restructuring of the Texas Transportation Commission, TxDOT, and the MPOs for all major city regions. The institutional system that evolved during the 20th Century and embodied by "The Dance," premised on the adages "Dance with Them that Brung You" and "Go Along to Get Along (and Get Ahead)", has to be killed, plain and simple. TTC membership should be elected according to regional boundaries (perhaps 6 districts), plus one (and ONLY one) position appointed by the Governor with the TTC Chair elected by the full commission membership on a rotating basis.
Organization	Performance	Transitioning to a strict oversight role. TxDOT needs to become a design & oversight supervisor agency similar to other DOTs. This will decrease their overhead given their retirement pension commitments and allow them to specialize in their expertise.
Organization	Performance	TxDOT has nearly ceased issuing projects to consultant firms in recent years. This has caused a massive reduction in staffing levels in the private sector that may remain for quite some time.
Organization	Performance	TXDOT is Dysfunctional. The state's agency responsible for planning and implementing our transportation program needs a major redo. Having been at one time the premier agency in the country, is now archaic and unprepared to deal with today's world.
Organization	Performance	TxDOT/Consultant Workshare TxDOT has chosen to do work in-house, but they are typically slower, moving deadlines at their whim and are limiting the design projects from consultants. This is inefficient and decreases the quality of design.
Organization	Performance	TxDOT's reputation as a leading transportation agency. TxDOT used to be considered a highly regarded agency in Texas. Unfortunately, following a national trend, TxDOT has seen its standing among state agencies deteriorate, to the point that many even question whether TxDOT should exist. State DOTs in other countries (e.g., in Australia) are considered among the best agencies in their states. TxDOT should develop and implement strategies to regain its position of leadership (before it is too late!).
Organization	Performance	We can't keep up with demand. There just isn't enough money. I live in the Austin area. If we want trucks off IH35 then eliminate the tolls on TR130 and TR45 for trucks. Also, get rid of the idiots who send out bills and answer the phones for those bills. Put it on an honor system and let that be the end of it. Most of the bills are forgiven anyway so what is the use of implementing this huge infrastructure to collect $1.39? Eliminate the Toll Authority NOW.
Organization	Performance	What influences our ability to deliver transportation? There is no set of data or trends that high-level transportation decision makers consistently utilize to plan the future. Everything from the price and availability of fossil fuels, to commodity price trends, to business and population growth patterns to decisions made in Latin America and Asia. Planners do not look at these factors as much as they respond to local government pressure or assume what occurred in the past will work for all future decisions. Providing a set of data and projections to plan against and to predict future needs would be ambitious but helpful.
Organization	Performance	What is customer service and can it be delivered? The customer is the user, whether it's someone driving to work or a trucker hauling products across the state. What does customer service look like to the users of the system and can it be delivered to them? How do you measure it and how do you deliver it? For instance, if a toll road driver doesn't get from point A to point B in a certain amount of time, can the driver receive a partial refund to his or her toll tag? Can we create value for our customers?
Organization	Performance	Wheel loads. It is important to change the way trucks are designed and fees are levied, and begin to encourage much lower per-axle loads. This will make our investments in pavements last much longer.

35 Ideas Shortlisted for the First Round of the SRP

THEME	SUB-THEME	RESPONDENT INPUT (UNEDITED)
Demand	Commuting	**Looking into flexible work options. Most congestion is a result of mandatory 8-5 work hours. Flexible work options such as flex hours or telecommuting could reduce congestion and make the most of existing infrastructure. It is possible additional infrastructure may not be as necessary if these options are implemented on a broad basis.
Demand	Commuting	**We need to use Europe as a model to establish an infrastructure for mass transit that works for an ever increasing population. The single rider vehicle is just not viable now or in the future.
Demand	Commuting	*Connecting the Gulf Coast and South Central High Speed Rail corridors. Texas needs to take the lead in higher speed regional trains that would serve our major cities and metro areas with speed (up to 120MPH) and frequency (more than one train per day.)
Demand	Commuting	*Good article: http://www.forbes.com/2010/04/08/ford-commute-2020-technology-data-companies-10-transportation.html Competition and Changing Social Norms Right now surface transportation systems are part of the state-owned monopoly but it is not inconceivable that private systems could be developed to replace the state. I'm not referring to public/private partnerships to building and operating roads but true competitors. At what point do the ever increasing commute, the chore of driving, and their negative effects on a life/lifestyle become intolerable? What if this green thing really takes over and people start choosing to drive electric cars, living downtown near their jobs, riding bikes, walking and leaving the suburbs in blight? Eventually the sci-fi of today will become the reality of tomorrow.
Demand	Commuting	*More of the issue for 5–-10 years plus, how will people move around when they need to, and how far will they go? How much will the Internet continue to diminish the need for local shopping? How will local development rules spread the population out, as opposed to artificially concentrating it in small pockets as they do in most urban areas now? Or will development rules concentrate it even more? Development rules in the US tend to cause long commutes. Will that continue? I don't know. What's the best guess???
Demand	Commuting	*New technologies, virtual offices, telecommuting The ability of new technologies to reduce the need for new highway capacity and restructure our existing travel patterns. More than just telecommuting, the Internet is reshaping retail distribution, which in turn may alter our needs and demand for mobility projects.
Demand	Commuting	*Reliability in transport: researchers & practitioners are finding the uncertainty in travel times is impacting behavior in significant ways, and unreliability is exerting a very serious toll on system costs. Finding ways to moderate unreliability, and appreciate its effects, are important; these include variable tolling & ITS.
Demand	Demographics	**Strategic Issue: I anticipate that my working career will extend into my 70s or 80s due to the unstable US and world economic conditions. I will need to alter my work / travel patterns to maintain work productivity and viability within the next 5 - 10 years or potentially longer. Background: US government actions with regard to the US and Global banking crisis including the use of hundreds of billions of dollars in Government funds for bailouts, the collapse or instability of 401Ks, banking, insurance and investment firms (AIG, etc) major US corporations (ENRON, Saturn, Chrysler, SAAB) and other factors suggest that even Government retirement income(s), savings and/or investments may be undependable. I may need to continue working in a full-time or part-time position for at least the next 10 years and possible the next 20 years to provide a stable, reliable income for my family. This could be coupled with changes regarding work location, how I get to work (if office is not also home), work hours, and associated transportation options/activities. What options will be available in 10 years to ensure that I can travel to / from work; to / from meetings at different locations around Austin / UT / CTR / TXDOT which can be addressed through the use of a personal vehicle or possible future Public Transportation Options. Strategic Issue: As I age, what transportation options will be available that I can depend on when planning life / career choices in the next 5-10 years?

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Demand	Demographics	*Baby Boomers: An increasing share of Texas drivers will be retired in the next 5 years, including me! Our traveling will be change demand in many areas of the state. As we age even further, alternate transportation will be required for my safety and for that of younger Texans.
Demand	Demographics	*Rural transportation initiatives. There is a growing research trend in the United States toward identifying areas which could benefit from rural transportation initiatives. These areas are most often dominated by the farming, logging, mining, or oil industries. The general rationale is that, in some areas, increased transportation avenues pay for themselves through increased economic activity.
Demand	Freight	**Strategic Issue: Develop and enhance TxDOT / Trucking Industry Communications & Partnerships to identify and enhance State freight movement Strategies. Background: The nation's roadway system and short- & long-haul trucking industry carry over 70% of the nation's freight: and possibly a higher percentage of the freight value. TxDOT leads the nation in terms of annual Truck VMT and is a portal through which the majority of NAFTA truck traffic flows to manufacturing regions to the north and north east. However, to date, DOT / Trucking industry relations have been adversarial or non-existent at best. Strategic Research: UT/CTR should lead a Strategic research effort to identify short and long-term actions that TxDOT should consider to address State, regional and national Highway Infrastructure and trucking industry freight movement. One key priority of this effort will be to identify existing or new venues through which TxDOT and other DOTs can interact with major trucking industry leaders to: a. create unified DOT—trucking industry partnerships. b. learn about, trucking industry short- and long-term goals and the technologies that major US truck and truck component manufactures plan (or want) to incorporate in 2015, 2020 and 2025 heavy trucks. c. learn about Highway Infrastructure issues that can act to enhance or restrict the US economic engine, trucking industry profits and Infrastructure Condition / maintenance needs.
Demand	Freight	**The following idea was discussed at the 2nd Annual Transportation Forum July 19-20, 2007 by Nathan Asplund (economist) - General Director - PPP Burlington Northern Santa Fe RR Background Since the Staggers Act of 1980 BNSF productivity has increased 100% while revenues have decreased by 10 - 15%. Rail currently spends 18% of revenue on capital expenditures (greater than many other industries). BNSF spent $1.5 B in 2002 and about $2.7 B in 2006 on infrastructure upgrades. Capital improvement costs still continue to increase even if the rail industry loses market share. Current trends suggest that rail will lose market share. Other modes of freight movement such as trucking and barges pay less than their share for use of infrastructure. The trucking industry is BNSF largest customer - best value is long haul of truck trailers - trucking industry picks up and drops off. Currently rail bears investment risk -- Senator Kent Conrad has proposed a 25% tax credit for rail capital improvements. Passenger rail or direct government subsidy isn't attractive based on studies we've conducted regarding rail in Eastern Europe and Russia. Strategic Research: To meet future US freight demands Rail needs to increase capacity - this means more track, facilities and support capacity. How can TxDOT work with Rail and Trucking industry to support increased freight capacity?
Demand	Freight	*Freight Movements: Texas' importance for international and cross-USA transportation will increase substantially in the next few years. At the same time, the increased Texas population will create dramatic further needs for access to efficient, timely goods movements. How will Charles Butt deliver my daily bread?
Demand	Freight	*The separation of commercial trucks and public transportation from small cars/trucks.
Infrastructure	Maintenance	**Maximizing the use of existing infrastructure for reconstruction and added capacity projects. Currently, most reconstruction projects that result in added capacity involve removing the existing infrastructure and then replacing with new infrastructure. There is a need to encourage the incorporation of existing infrastructure in such projects. For example, pavements that are still structurally adequate can be used as base material in the reconstruction, or simply overlaid with concrete or asphalt materials. The potential cost

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		savings can be significant (possibly up to 50% savings over the current strategy of removing and replacing)
Infrastructure	Maintenance	*Maintain: Use pavement preservation planning tools to determine what % of overall funding should be applied to preservation vs. re-hab. Maximize the available funding by applying the dollars to areas that will provide the highest return on investment.
Network	Efficiency	*Building intermodal support of increased Panama Canal traffic.
Network	Integration	**Explore the potential for building better connection yards between rail and trucking so that it would be easier to move trailers by rail where economical, and then distribute by truck tractor nearer to destinations
Network	Integration	*Freight rail, high speed rail, light rail, passenger heavy commuter rail Examine the new role of rail, particularly freight and high speed passenger rail, and the potential impact to improve the efficiency of our existing surface transportation system.
Network	Integration	*increased nodal or centers concept development Need for increased multi-model system Price of oil air quality issues
Network	Integration	*working on multi-modal approach projects that are looking at sustainability, national, state, regional and community visions and values and considering environmental issues in a meaningful way.
Network	Safety	*This Strategic issue is of immediate, Urgent importance. Strategic Issue - Develop a Strategic plan for continuing key TxDOT / State Transportation operations that support military, medical, emergency, and civilian transportation needs in the event of a major terrorist attack against Austin. Background: Post 9-11, US intelligence agencies have studied various Scenarios in which terrorists could utilize US transportation infrastructure to attack and destroy key civilian or military targets. News reporters have shown that gaining entrance to rail yards with tanker cars containing: a. Liquefied Natural Gas (LNG), b. Liquefied Petroleum Gas (LPG), c. Chlorine Gas, d. Anhydrous Ammonia, e. other toxic / explosive gases. is relatively easy, as evidenced by a reporter who entered an unguarded rail yard and left his business cards on tanker cars carrying these potentially deadly chemicals. This demonstration was intended to show that, instead of business cards, he could have just as easily have been attaching plastique explosive charges to the rail cars which would have caused detonation of the tank car contents (using a timing device...). Few security measures are in place to safe-guard rail cars located in a yard or a train of rail cars carrying toxic/explosive gases traveling through densely populated urban areas. NOTE: next time you travel north on MOPAC - and pass a train, note how many rail cars are covered in graffiti: this shows 1) how easy it is for unauthorized personnel to access these rail cars; and, 2) illustrates a potential, unanticipated method for transmitting information and orders, from city to city to "interested parties" --- including on the train to be used for a terrorist attack. It has also been noted that: * detonation of a single LPG tank car can cause fires, catastrophic structural damage, death, and serious injuries over a wide area. To illustrate, if an LPG rail car was detonated, 2nd degree burns would occur at the outer fringes of the blast zone within a one-mile radius of the epicenter. * it has been hypothesized that detonation of a rail car or 18-wheeler tanker truck carrying 40,000 - 70,000 lbs of Chlorine chemicals could result in 18,000 fatalities and over 100,000 injuries depending on the placement of the tanker in a densely populated urban area or near a heavily attended sporting event. * the military has developed a family of weapons based on the Fuel-Air-Explosive (FEA) device concept in which a high pressure gas cloud is emitted from the delivery vehicle (bomb or missile) in a fraction of a second and then detonated to create a high pressure concussion front of 4,000 psi or greater. This blast front can result in a massive, destructive (infrastructure) and fatal (people) concussive blast accompanied by fire and toxic fumes. FEA weapons have been used with devastating effect on enemy fortifications, bunker and subterranean communications / supply / and logistics cave complexes during the Iraq / Afghanistan war. It is important to note that the following commentary is only meant as a detailed description of events that could happen. This graphic illustration is intended to provide the ground work for later discussion of

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		pro-active Strategic / Tactical / Technical - Research Planning and Implementation steps that must take place now. ++ Background Texas law does not limit train lengths and Union Pacific trains up to 3.5 miles in length have travelled from Texas to destinations outside the state including California - which required crossing several other states. Trains of this size have caused concerns among State Law makers as evidenced by information available on the web with regard to 1) impacts on traffic flow at at-grade rail/roadway crossings; 2) safety concerns associated with operating a train of this size at speeds up to 70 mph; and, 3) security concerns. It is noted that different 'What-If' Scenarios could be considered regarding rail lines adjacent to the Austin CBD which also cross major north-south and east-west highway corridors. Examples would be the rail line that crosses the Colorado River between the Lamar Ave and S. Congress Avenue Bridges and parallels the Amtrak station west of Lamar. Another possible route which could be used to deliver a lethal rail-launched attack against Austin would be the rail lines that pass under IH 35 near the Fiesta Mart and travel south and east toward the Austin Bergstrom Airport. This line travels north serving several major businesses and passes under US 183 and other major highway corridors in the Austin metro-plex. However, for purposes of this 'What if' Scenario, the Colorado River - Amtrak - MOPAC rail line will be considered as the rail attack route for reasons that will not be detailed in this document. 'What - If' Colorado River Crossing rail line attack Scenario: In Austin - a train composed of hundreds of pressurized tank cars including LPG, LNG and other explosive / toxic gases travels through the city core, along the rail bridge that crosses the Colorado River and around the train track curve that will take the train over Lamar. The train stretches from the last car, located nearly one-half mile south of the Colorado River, around the rail line curve and then west, over Lamar Avenue, to a point where the locomotives, at the head of the train, are positioned just past the MOPAC FM 2222/Koenig Lane Interchange. The positioning of the train, at the planned time of detonation, is determined based on the objectives to destroy the Austin City Central Core, to destroy major and minor transportation corridors within the city and to destroy the National Guard armory adjacent to 35th and MOPAC. As an obvious consequence, NAFTA trade flow would be immobilized for an extended period. The radial distance from the State Capitol Building to the rail tank cars rounding the rail track curve adjacent to West 3rd Street is approximately 3,500 ft. Just past this curve, the rail cars would be parallel to the Amtrak station west of Lamar. Near simultaneous detonation of the rail cars along the entire length of the train is effected not by explosives attached to the cars, but rather by hollow charge weapons that were previously installed in the railroad ties along this route; extending well past the Anderson Lane / MOPAC interchange. The installation of these ties was completed in spring, 2010. The hollow charges were installed in the ties during their manufacture and therefore did not require any 'suspicious' activities during the installation of the ties. The hollow charge weapons are linked, wirelessly using a sophisticated command/control communications system which is designed to detonate the charges simultaneously. Detonation of the hollow charge weapons would direct jets of high velocity gases vertically into the underside of every tank car at multiple entry points. The high pressure gas streams would penetrate the undersides of the steel pressure vessels and cause molten metal to penetrate and spray into the tank car contents resulting in detonation. The result would be a massive explosion, along a 3 + mile corridor in the Austin CBD core which would also destroy key bridges at points where the rail line and other modes of transport intersect (Cross Roads); the concussive blast and resulting fires would destroy down town Austin, the Capitol building complex, and other State and Federal government buildings and private businesses in the vicinity. Neighborhoods, schools, hospitals, emergency services such as EMS, police and fire stations would be destroyed within 1/4 - 1/2 mile on either side of the rail line - with additional damage, fatalities and injuries occurring inside a 1/2 mile to 1 mile corridor parallel to the tracks. Fatalities and injuries would occur both from blast,

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		concussion, fire, toxic gases and resulting, secondary fires and traffic accidents in the mayhem that would follow. The concussive blasts and resulting fires would destroy the rail bridge across the Colorado River, the adjacent
Organization	Funding	**Can Texans actually own and prosper from transportation investments? Is there a way for Texans to invest directly in infrastructure much like they own stock in corporations?
Organization	Funding	**Funding Examine the short term consequences of our inability to fund our mobility needs, particularly for our most congested metro areas.
Organization	Funding	*have in place a long term funding solution for national, state and regional long-term funding realities and corresponding visioning as related to trends and solutions and to accomplish the following based on this funding reality and where we need to be in terms of trends for needed transportation improvements: --clear roles and responsibilities as related to funding -clear roles and responsibilities as related to infrastructure maintenance --finalize framework for roles and responsibilities as related to project development; construction; operations. --better understand the unintended consequences of not dedicating funds towards long-term transportation solutions. --require that transportation projects be prioritized and worked on considering needs and resource limitations --start implementing aspects of the strategic sustainable transportation plan that focuses on more than just highway infrastructure to address short-term; mid-term and long-term solutions to transportation issues and based on the funding realities and future trends. --refine performance measures --report on expenditures and various 5 or so performance measures per term --have in place a deinvestment framework --eliminate earmarking
Organization	Funding	*Long term strategies for funding and implementing transportation projects. How to pay for highway improvements? How to distribute travel efficiently between the different modes of travel?
Organization	Funding	*Reestablishment of a predictable and stable funding stream: With improved technology traditional gas tax becoming less reliable.
Organization	Funding	*The impact of electric vehicles and other alternative fuel vehicles on funding for transportation.
Organization	Funding	*Topic: TxDOT is considering the possibility of implementing a Multi-Tier Goal system for pavement conditions that will reduce funding for rural districts. There are concerns that rural low volume FM roads would not receive sufficient funding and might end up as 'dirt roads'. The State Legislature is unwilling to consider a 5 or 10 cent a gallon gas tax to increase revenues to maintain the current system. Strategic Issue: TxDOT might consider bundling certain rural FM roads that are important to a county and allowing the county to adopt these roadways based on the County residents agreeing to a local County gas tax increase or other funding source sufficient to cover future maintenance needs. This strategy would likely not work if the roads remained on the state system. The county would likely need to take ownership - a different form of 'adopt a highway.' The Department could continue to collect data on these roads and provide annual reports on conditions so that the County Engineer and residents would know how the roads are performing and could also use this information to help determine when maintenance might be needed. TxDOT District Staff could possibly provide analysis support for Counties which do not have an engineering staff. The amount of gas tax necessary to maintain the roads 'adopted' by the County and its residents would vary depending on the number of lane miles adopted; number of residents; traffic levels on each route and other factors.
Organization	Funding	*Transition away from the motor fuel tax. Current transportation funding is misaligned with other priorities of the nation - reduced emissions and reduced reliance on foreign oil which have lead to higher MPG standards.
Organization	Partnerships	**Develop a partnership with the freight moving industry. Learn about their short- and long-term goals and the technologies that they plan (or want) to incorporate in 2015, 2020 and 2025. Understand how the transportation system can function as an economic engine.

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Organization	Partnerships	*education of internal and external audiences on project prioritization based on resource constraints; realistic project schedules; performance measures; environmental requirements; the value of the environmental and public involvement process; and, sustainable transportation solutions and techniques. If everything is number one--nothing is number one. All must realize that in order to deliver needed transportation projects that we must establish priorities and direct our resources towards those priorities. Many times, the environmental process is blamed for project delivery delays when in actuality, the problem is poor project planning coupled with predetermined decisions that circumvent the environmental and public involvement process. There is value in considering the environmental and social implications that result from transportation solutions. Transportation improvements are public investments. Decision-makers should evaluate and consider the related environmental and social consequences that result from those transportation investment decisions. This includes approaching transportation solutions using a multi-modal and sustainable approach which might include a combination of rail, sidewalks, roadways and other public transportation and the use of more visioning with the community and the use of more environmentally sensitive materials and techniques in constructing those solutions. *work towards reorienting environmental requirements and public involvement based on outcomes rather than just on process. As a public entity, it is process that helps bring transparency to the work that is performed and decisions that are made by public employees. However, it is important that how we perform our work is not just process driven. It is important that we establish related process goals to ensure that we are following a process that can be evaluated to determine if it is resulting in something good and with unintended bad consequences. For example, meeting minimum requirements for public involvement may result in meeting the public involvement process but may result in ineffective public involvement and as a result, may result in public opposition or unaddressed concerns in the project. Another example, the permitting process requirements may require impacts be mitigated in a certain way. However, in the long-term towards sustainability--the mitigation may really need to be accomplished differently.
Organization	Performance	**Develop a new framework for organizational performance measures based on what users want of the transportation system, i.e., how is TxDOT doing in satisfying user needs
Organization	Performance	*continue to bring to light and addressing the national, state, and regional short-term, mid-term, and long-term funding realities, including funding roles and responsibilities. *an understanding of the importance of alternative fuels; energy independence; alternative modes and fully investigate funding strategies for all modes based on national; state; regional; and local importance. *shed light on the pros and cons in earmarking projects *start identifying national, state, regional and local transportation long-term transportation trend needs and long-term where we want to or expect to be and establish related goals. Examples include: Trend towards telecommuting; moving long-haul freight through rail; commuter rail; high speed rail for travel; intelligent vehicles that might result in less accidents; other vehicle technology; population and related migration trends; etc *start identifying goals (short-term, mid-term and long-term) and develop no more than 5 or so outcome based performance measures maybe for each term. *within the next five years, accomplish the following based on this funding reality: --reporting on the condition of the existing infrastructure --reporting operational issues of the existing infrastructure -- maintenance of the existing transportation infrastructure --address existing safety issues -- develop a financially constrained transportation improvement program --start the effort of prioritizing and working on transportation projects considering needs and resource limitations --addressing how funding will occur for national, state, regional and local needs. --start formalizing roles and responsibilities as related to project development; construction; maintenance and operations. --start saving money to dedicate towards long-term transportation solutions --initiate the development of a strategic sustainable transportation plan that focuses on more than just highway infrastructure to address short-term and long-term sustainable solutions to transportation issues and based on the funding

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		realities. --report on project expenditures and the various 5 or so performance measures for each term. Transportation improvements cost money to develop and implement. Many times, money and personnel resources are expended on projects regardless of the purpose and need of the project and whether or not the project can realistically be funded. As a result, many times, projects are constructed that are of limited value and there are inadequate resources to develop and implement important projects. It is important to manage expectations by bringing to light the funding realities and then basing transportation improvements based on those funding realities. It appears that it is coming to light that TxDOT did not concoct the funding crisis and it is important that the momentum not be lost on developing real solutions for the funding crisis. In addition, it appears that there is confusion regarding what the intent of the federal and state gas tax were intended to serve. Many times, local governments expect federal and state assistance although they have been remiss in their duties as related to the infrastructure or that the project is not really of national, state, or regional importance. And finally, it is important that we start visioning towards future transportation needs rather than trying to solve transportation problems using outdated models based on the past rather than trends and national, state, and regional visioning.
Organization	Performance	*Strategic Issue: The concept of 'DOT' as a government Transportation agency will change - the UK/Canadian/Euro 'Quango' concept will become more accepted in the US and possibly adopted by Texas and TxDOT. A Quango is a Quasi- non-governmental agency that has the authority to raise revenue through taxes, fees and tolls but also incorporates the advantages of a private company to market, advertise, and solicit increased revenue directly from the population under the direction of a Board. Strategic Research: Evaluate how facets of the Quango concept can be adopted by TxDOT now to enhance performance. Consider how TxDOT might function as a Quango by 2020. What are the advantages / disadvantages?