National Cooperative Freight Research Program

FY 2006 & 2007

Announcement of FY 2006 and 2007 Freight Research Projects
February 2007

America's freight transportation system makes critical contributions to the nation's economy, security, and quality of life. More than $660 billion (about 6.4 percent of the US Gross Domestic Product) is spent annually to move freight, and the cost and volume of goods movement are crucial to the productivity of the entire US economy. The National Cooperative Freight Research Program (NCFRP) was authorized in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

The NCFRP is sponsored by the Research and Innovative Technology Administration (RITA) and managed by the National Academies, acting through the Transportation Research Board (TRB). The NCFRP Oversight Committee, the governing board for the program, met on December 14-15, 2006 and selected 10 projects for the Fiscal Year 2006 and 2007 programs. The purpose of this announcement is to inform the research community of these projects. The NCFRP Strategic Plan is available at the program website, http://www.trb.org/ncfrp.

This announcement contains problem statements that are preliminary descriptions of the selected projects. Panels are being formed to develop detailed project statements and oversee these projects. Recommendations for panel members may be made by sending an email indicating the project of interest and a resume or CV to Ms. Brenda Douple (bdouple@nas.edu) by March 9, 2007. Detailed project statements, formally soliciting proposals for these projects, are expected to be released starting in April 2007.

NCFRP project statements will be available only at the program website, http://www.trb.org/ncfrp. Each project statement will be announced by e-mail, and information on registering for this service and other details on the NCFRP are available at that site.

The NCFRP will conduct research and disseminate timely findings that will inform investment and operations decisions affecting the performance of the freight transportation system. Proposals should evidence strong capabilities gained through extensive, successful experiences. Any research agency interested in submitting a proposal should first make a frank and thorough self-appraisal to determine whether or not it possesses the capability and experience necessary to ensure successful completion of the project. The specifications for preparing proposals will be set forth in a brochure entitled, *Information and Instructions for Preparing Proposals*, that will be available on the Internet at the website referenced above at the time that the NCFRP project statements are posted. Proposals will be rejected if they are not prepared in strict conformance with the section entitled, "Instructions for Preparing and Submitting Proposals."

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National Cooperative Freight Research Program
Projects in the Fiscal Year 2006 and 2007 Programs

Summary of Research Projects

■ Project 1

Review and Analysis of Freight Transportation Markets and Relationships

Allocation: $250,000

Decisions about the future of the U.S. freight system should be based on a good understanding of freight markets, trends, and relationships. Fundamental to this assessment is an understanding of the demand for freight by customers and how it is affected by public-sector decisions.

The objective of this project is to develop a freight primer for public-sector decision makers that provides them a deeper understanding of the factors that drive freight demand and the major trends (e.g., demographic, technological, economic, logistical) that will shape the future demand for freight. Public policies that can affect each of the factors and trends should be identified. It is expected that the U.S. DOT's Motor Carrier 2025 Report and AASHTO's Freight Demand and Logistics Bottom Line Report will be valuable resources for this effort. This study will produce a schematic-level description of the U.S. multimodal freight transportation system, highlighting the interactions among the modes and intermodal connections. The schematic-level description will indicate how driving factors link to both the public/private sector policy and investment decisions as well as to the interaction among modes (if they in fact do link). The research will focus on current and future demand for freight transportation, in the context of global and national economic trends and advanced business logistics practices and should serve as a foundation for future research. The project report should be prepared in a format that will facilitate use by public-sector decision makers.

■ Project 2

Impacts of Public Policy on the Freight Transportation System

Allocation: $450,000

The freight system is largely a private-sector enterprise, but public policy decisions have major impacts on its development and operations. While intended to benefit the nation's economy, these decisions often have unintended consequences for one or more sectors of the freight industry; for example, support for one mode may lead to the decline of another. A study of such impacts is needed to help guide future public policy decisions.

The objective of this research is to identify the various public subsidies, incentives, taxes, and regulations that impact the freight transportation system and to describe their effects, both in the public and private sectors. Public policies should be sufficiently recent to be relevant and include areas other than transportation (e.g., trade, energy, and environment). International examples may be included if they are relevant to U.S. policy decisions. Some examples of effects that should be described are changes to supply chains and markets, impacts on public and private investment decisions, environmental impacts, and passive impacts such as highway deterioration. The project report will include case studies that illustrate lessons learned from public policy decisions that represent both successful interventions that achieve the intended outcomes and others that result in costly market distortions and failures. The report should recommend principles that agencies can use in developing effective public policies.

■ **Project 3**
Performance Metrics for Freight Transportation Productivity

Allocation: $300,000

Public and private decisions related to the freight industry should be based on a thorough analysis of the impacts of those decisions. These analyses are routinely made in the private sector but less commonly in the public sector. As the demand for freight movements outstrips the capacity of the nation's highway, rail, waterway, air, and port systems, the effects are felt as congestion, upward pressure on freight prices, and longer and less reliable transit times. These indicators of distress in the freight transportation system result in increased supply costs for manufacturers, higher import prices, and higher inventory levels. Ultimately, these costs add up to a higher cost of doing business for firms, a higher cost of living for consumers, and a less productive and competitive economy. Such indicators need to be quantified to be useful to decision makers as well as for public education on freight issues. Establishing consistent performance metrics for the freight system will be very helpful in conducting and comparing analyses of the freight system, particularly by identifying the critical data that are needed to assess system performance.

The objective of this project is to determine performance measures that should be used to gauge the effectiveness and efficiency of the freight transportation system and to promote public understanding of the importance of efficient freight transportation to the nation's economy. It is expected that these performance measures would be useful both in the public and private sector, particularly in making investment decisions at the national, state and local levels. It should be noted that decision-makers are looking for no more that 4-6 key performance metrics to be used to measure progress toward stated organizational or societal objectives/goals. Examples of issues that should be considered in establishing performance measures include: infrastructure condition, capital needed and available, congestion, injuries, fatalities, cost of security, energy usage and availability, environmental costs, human capital, ton-mile production, and intermodal transfers. For each recommended performance measure, identify the data sources and gaps and describe any needs for data standards. Describe any concerns identified with current confidentiality/privacy laws and regulations. For any data drawn from the private sector, provide a rationale for firms to participate in the effort. The project should produce initial thoughts on a freight data architecture and methods to capture raw trend data on a routine basis.

■ **Project 4**
Operational and Low-Cost Improvements to Freight Transportation System Performance

Allocation: $500,000

The infrastructure for moving freight in the United States is well established but overburdened. Dramatically increasing congestion inflicts costs on shippers, consumers, and the environment. Because expansions to the system are often complicated and expensive, both the public and private sector benefit from making the best use of the existing system, either through improved operations or by enhancing the system using low-cost techniques. Targeted investment and improved operations by both private businesses and government will be required to avert even more severe capacity constraints.

The objective of this project is to describe successful practices in maximizing the utility of the existing freight transportation infrastructure, either through operational practices or relatively inexpensive system enhancements. The research should examine each element of each mode for weakness or failure and then describe the operational practice or system enhancement used to strengthen it and do the same for the linkages between the modes so that a full picture of the system emerges. These practices may be mode-specific or logistical. The practices should be related to the different types of constraints in freight flow and the description should indicate whether implementation depends on the private sector, public sector, or both. Operations and ITS alternatives such as routing and time of day adjustments made by carriers as well as targeted infrastructure improvements such as those done

by the State of Ohio's interchange upgrade programrm should be included. It is expected that some successful practices are proprietary, but that a sufficient number of nonproprietary practices will be found to justify this effort.

NOTE: The NCFRP expects to form one technical project panel that will oversee this project and NCFRP Project 7, Private Sector Responses to Freight Transportation Capacity Constraints. That panel will decide how these two projects should be coordinated and details will be included in the request for proposal(s).

■ **Project 5**
Review of Freight Investment Decision-Making Processes in the Public Sector

Allocation: $400,000

While private-sector firms must rigorously justify investment decisions to show that they contribute to corporate and community goals, public-sector transportation agency decisions must consider a much wider set of concerns. The economic impacts of public-sector investment decisions on the freight system can often be influenced by other issues, and it is important to develop a better understanding of the cause and effect relationships.

The objective of this project is to recommend methods that public sector transportation agencies, at all levels of government, can use to consider system performance, freight movement, and economic impact issues in making rational investment decisions. Determining a project's return on investment is of particular interest. Case studies of individual projects should be conducted that show 1) how freight impacts were considered in the project selection process, 2) the freight and economic objectives of the project, 3) the eventual outcome of the project with regard to the impact on freight movement efficiency and productivity, and 4) how the project outcomes relate to the original project goals. The case studies should cover significant public programs that affect all surface freight modes. The report should 1) compile successful practices and lessons learned; 2) discuss procedures for identifying projects that are likely to generate the greatest economic return, nationally, or regionally; and 3) identify the need for and benefits from potential statutory, regulatory, and institutional changes. It will be especially important that this project make explicit how measures of system performance and factors and techniques to quantify benefits and costs were employed.

NOTE: The NCFRP expects to form one technical project panel that will oversee this project and NCFRP Project 8, Analytical Tools for Freight Infrastructure Investments. That panel will decide how these two projects should be coordinated and details will be included in the request for proposal(s).

■ **Project 6**
Freight Demand Modeling to Support Public Sector Decision Making

Allocation: $600,000

The private sector is largely responsible for development and management of the nation's freight flow system, but public agencies at all levels face important investment and policy decisions that may affect those flows. Decision makers need to understand the large and shifting increases in traffic generated, for example, by ports, inland terminals, and mega-destination centers. Public sector agencies need capabilities to model freight demand, in order to project the future consequences of investment and policy alternatives in their planning and decision making.

The U.S. Department of Transportation in 2004 launched the Freight Model Improvement Program (FMIP) as a joint effort with the U.S. Department of Agriculture, the U.S. Department of Energy, and the U.S. Army Corps of Engineers, and with support from the Oak Ridge National Laboratory. Each of these agencies has developed models for national-level analysis in support of their own unique missions.

Some state and regional agencies have undertaken their own modeling efforts. The Florida Intermodal Statewide Highway Freight Model, for example, is intended to serve as a

planning tool to support the state's efforts to provide adequate highway connections to other freight modes and regional freight hubs. Agencies in Ohio and Oregon are pursuing similar efforts. The Los Angeles County Metropolitan Transportation Authority is one of several metropolitan agencies developing and using models for truck traffic in their regions. Other regional and local agencies such as port authorities and toll-road authorities also work to model the markets they seek to serve.

A TRB conference on *Freight Demand Modeling: Tools for Public-Sector Decision Making*, was held September 25-27, 2006 to establish a prioritized list of research objectives and projects. The output of that conference is due out in the Spring of 2007.

The objective of this project is to carry out one or more high-priority, high-payoff research tasks that can be completed in the near term to improve freight-demand models that may be used in decision making by state, regional, and local agencies. These tasks will be drawn from the results of the TRB conference.

This research is intended to provide public sector policy and program officials with tools and techniques that are available, affordable, practical, and comparable among multiple jurisdictions. It should be intellectually rigorous but the primary audience of users is not the community of academic analysts. This project is focused on demand modeling, but should be directly connected to the question "For what purpose?" The answer to that question, in general terms, is for the purpose of measuring the performance of the freight transportation system and assessing the impacts, cost and benefits, of interventions in the system.

■ **Project 7**
Private Sector Responses to Freight Transportation Capacity Constraints

Allocation: $300,000

The nation's freight infrastructure is mature, and the capacity constraints in the system are well known by logistics providers and freight carriers. It is clear that capacity is expanding too slowly to keep up with demand. The congestion and inefficiencies resulting from this gap hurt the nation's economy and its competitive status in the global marketplace. Although private-sector firms often cannot improve the bottlenecks, they are innovative in adapting their operations to move freight through congested areas. The users of the infrastructure, operating in a free market, compete to squeeze maximum benefit from the transportation system and may behave in ways that will affect the need for certain public sector investments. It is also the case that public sector agencies make decisions about expanding infrastructure or changing operations without necessarily having a solid understanding of how the private sector will respond.

The objective of this project is to catalogue ways in which those responsible for moving freight respond to constraints on freight system capacity. This will be useful in assessing the impacts of projects designed to remedy system constraints. It should also include case analyses of private sector responses to public sector decisions that illustrate both intended and unintended outcomes and the underlying causes. This study will focus on congested segments and chokepoints in the freight transportation system that cause significant drags on its efficiency and costs to the economy. Responses to be considered should include consolidation of origins and destinations for freight movements, as well as various strategies used in transportation management optimization software applications.

NOTE: The NCFRP expects to form one technical project panel that will oversee this project and NCFRP Project 4, Operational and Low-Cost Improvements to Freight Transportation System Performance. That panel

will decide how these two projects should be coordinated and details will be included in the request for proposal(s).

■ Project 8
Analytical Tools for Freight Infrastructure Investments

Allocation: $600,000

A thorough study of alternative freight infrastructure investments relies on analytical tools to develop the information needed by decision makers. Decisions affecting the freight system are made at many levels of government and must consider externalities such as land use and the environment. There is a need to improve the foundation of data and analysis on which to build a strategy for dealing with growing freight demand and severe capacity constraints.

The objective of this project is to recommend analytical tools that transportation agencies can use to assess freight infrastructure investments. These tools should help agencies estimate the public benefit or return on the infrastructure investment and facilitate comparison among alternative improvements, including those in different modes. They should be appropriate and feasible for public agency use. This study will identify gaps and weaknesses in public and private data sources and their adequacy for analysis of the freight transportation system. Improvements needed to further advance the development of tools should be identified. The report should include strategies for communicating the applicability and value of different analytical tools and will include recommendations for improvements in collection, analysis, and use of data. The tools recommended should be congruent with a general description of the operations of the freight transportation system and measures of system performance. They should also be consistent with the results of NCFRP Project 5, Review of Freight Investment Decision-Making Processes in the Public Sector.

NOTE: The NCFRP expects to form one technical project panel that will oversee this project and NCFRP Project 5, Review of Freight Investment Decision-Making Processes in the Public Sector. That panel will decide how these two projects should be coordinated and details will be included in the request for proposals.

■ Project 9
Institutional Strategies in the Freight Transportation System

Allocation: $300,000

The freight industry is a unique blend of private and public-sector organizations, each with its own objectives and constraints. Political and jurisdictional boundaries do not define market relationships, but they do have a significant influence on infrastructure funding. Effective freight policy will require coordination and collaboration among public and private interests. New forms of public-private and public-public partnerships are needed to address challenges that do not conform to government jurisdictions, geographic boundaries, or traditional dividing lines between government and business. Some State Departments of Transportation and Metropolitan Planning Organizations, for example, have established freight offices and they and others have formed freight advisory councils in order to engage carriers and shippers on issues of mutual interest. A number of states are involved in multi-state, multi-modal collaborations to deal with freight transportation problems and objectives that cross state boundaries.

The objective of this project is to describe successful and promising institutional strategies for the current and future freight industry. Determining which strategies are successful and promising will require the following:

- Determination of federal, state, and local interests and roles regarding freight movement.
- Identification of existing institutional strategies and their context and original purpose.
- Definition of the levers of influence in shaping the freight industry (e.g., money, regulation, leadership).

- Consideration of regulatory and other constraints on the effectiveness of institutional strategies.

A review of domestic and international experience should be used to identify successful and promising institutional strategies. Of particular interest are joint entities that have the authority to make improvements to the freight system. The research will identify potential institutional changes to address local, state, regional, and national needs and opportunities for efficient freight transportation. It will incorporate the results of work completed and underway supported by organizations such as the NCHRP, FHWA, and AASHTO.

■ Project 10
Success Factors for Truck-Only Lane Projects

Allocation: $50,000

NCHRP Project 3-73, "Separation of Vehicles - CMV Only Lanes," starting early in 2007 and ending late in 2008, has the following objectives, (1) examine the various performance characteristics of a CMV-only lane application within a highway (e.g., reduced congestion, accident reduction); (2) examine relative items such as cost variables, aspects of reduced and/or increased pavement wear; (3) examine/explore modeling scenarios which have been completed by others; (4) examine/explore the benefits to Intelligent Transportation Systems (ITS) technologies that are being used by various states [e.g., Automated Vehicle Identification (AVI) readers, Electronic Traffic Control and Monitoring (ETCM) system]; (5) examine/review the feasibility of increased size and weight standards on CMV only lanes; and (6) prepare a report of pertinent data and findings that includes economic implications, transportation performance, safety benefits, and other impacts associated with the application of CMV-only lanes.

The objective of this project is to augment NCHRP Project 3-73 by examining additional factors related to the success of truck-only lane projects. The specific factors to be examined will be negotiated with the panel overseeing NCHRP Project 3-73 but could include the planning process, institutional considerations, return-on-investment analysis, public benefits, equity and environmental impacts, and technology applications to increase capacity. The research should examine the suitability of tolling and privatization.

NOTE: The existing project technical panel for NCHRP Project 3-73 will be augmented to handle this effort. No nominations for panel members are requested.