DRAFT 8/26/93

The Public Partnership Program

An Invitation to a Collaborative Technology Transfer and Training Program

Center for Transportation Studies

Massachusetts Institute of Technology

Foreword

The Center for Transportation Studies is inviting the participation of leading public agencies in the transportation sector for the formation of a new Public Partnership Program at MIT.

This international, multimodal program will create a critical mass of energy focused on the challenges and opportunities facing public agencies in transportation. It will provide a structure for discussion, research and cooperative problem-solving among the leading public actors in the transportation sector, at all levels of government. It will address such common concerns as the competing priorities of mobility, the economy and the environment. It will also provide for interaction with primary players in the private sector through the Center's existing Corporate Affiliates Program, exploring new and untapped opportunities for public/private partnerships.

Based upon the Center's success with its Corporate Affiliates Program, the Public Partnership Program will offer opportunities for public agencies to participate in the latest research, to share experiences with colleagues in other countries and at different levels of government, to network on implementation issues, and to cultivate opportunities for benchmarking programs and processes. In addition to providing the chance to interact with public agencies and private enterprises representing all modes of transportation, the program will offer introductions to some of the world's best students in transportation policy and technology.

Ultimately, the program will seek to develop new research topics and new styles of cooperative research undertakings among the participants, as well as

between participants and the private sector corporate affiliates. The program will also contribute to MIT's educational programs by offering students direct access to participating agencies through internships, case studies and joint thesis supervision.

The Center for Transportation Studies

The Center for Transportation Studies was established in 1973 to develop and coordinate a range of transportation-related activity at MIT. It provides a focal point for transportation education, facilitates transportation research, conducts an outreach program to the transportation industry, and encourages a sense of common purpose among the many departments, centers and laboratories involved in transportation at MIT.

Since the Center's founding, the annual volume of research has grown to $5 million (in 1992) — 56% of which is passenger-related, including both urban and intercity transportation, and 44% of which is freight-related. The Center's Master of Science in Transportation program has enrolled over 200 students since its inception in 1978, and the annual enrollment has grown to a current level of over 40 students. Enrollment in the interdepartmental PhD program in transportation is now over 15.

The activities of the Center involve all modes of transportation. Along with vehicle technology, investigation of public transit systems and urban planning are among the longest-standing transportation interests at MIT. All of MIT's transportation interests involve not only studies of transportation technology but also of the many institutional issues in the field.

Today, the Center maintains ongoing relationships with public agencies such as the Volpe National Transportation Systems Center of the US Department of Transportation, the Federal Highway Administration, the Federal Transit Administration, the American Association of State Highway and Transportation Officials, the Massachusetts Bay Transportation Authority, the Federal Aviation

Administration, NASA and the six New England state departments of transportation. The Association of American Railroads has also established MIT as one of two affiliated research laboratories in the US to strengthen ties between the rail industry and academia.

MIT has also developed the New England Transportation Infrastructure Consortium, a cooperative program with five New England state departments of transportation and their state universities to pool the resources of the region to address common high-priority transportation projects. As lead university for the federal government's University Transportation Centers Program (Region One), MIT is conducting and coordinating research and education projects in multimodal transportation at eight universities. It has also organized the New England Electronic Toll and Traffic Management Initiative, a cooperative effort among the six New England states to coordinate efforts in introducing new ETTM technologies.

Other current efforts in the public arena include a major three-year contract with Boston's Central Artery Project and Bechtel/Parsons Brinckerhoff to design a state-of-the-art Integrated Project Control System; a collaboration with MIT's Lincoln Laboratory on Intelligent Vehicle/Highway Systems; and a leading role in organizing the transportation sessions of the international Industry Summit of the World Economic Forum held at MIT in the fall of 1993.

It is probably fair to say that no other transportation center in the country — or, for that matter, in the world — combines so effectively work in all modes of transportation, including intermodal transportation, with the proven ability to manage programs such as the one proposed. Furthermore, because of its role

as an academic institution, MIT is well-positioned to act as the 'honest broker' in bringing together organizational entities which may have competing interests.

The Corporate Affiliates Program

The Corporate Affiliates Program, which in several ways serves as a model for the Public Partnership Program, was established in 1981 to develop relationships between MIT and the private sector transportation industry. With a current enrollment of over 35 shippers and carriers, the program helps support research which is of particular interest to private sector organizations, guides educational programs for freight transportation and logistics management, and provides for an open interchange of ideas and information on current developments and practice.

Membership in the program supplies carriers, shippers and other transportation industry companies with access to all the Center's activities, including the opportunity to join in research of mutual interest. It also provides the opportunity to convene with others with similar concerns at various forums sponsored by the Center to review the latest research findings on issues of current interest, and to consider alternatives and future courses of action.

Because the program attracts the involvement of executives, operators, analysts and managers in each of the member firms, different people participate in the various seminars and workshops. Thus, an event may involve information technology professionals, marketing executives, government policy directors, operations research analysts or chief executive officers, depending on its content. (Topics for the events, by the way, are often suggested by the participating affiliates.)

From time to time in the past, the Center has hosted meetings in which private sector executives have met with high-level public officials to help define

emerging issues in the transportation field and to build a consensus for coping with them. The establishment of the Public Partnership Program will create a framework not only for further meetings of this sort, tailored specifically to the needs of public agencies, but also for ongoing interaction among the participants of both programs. Because of their mutual interests in such specifics as airports, seaports, traffic congestion, commuter rail, environmental concerns and vehicle technologies, it is anticipated that synergies created among the members of the two programs will be extraordinary.

The Public Partnership Program

The Public Partnership Program is designed to create alliances between MIT and public agencies at the cutting edge of practice in the United States and abroad, with the aim of facilitating ways in which researchers and practitioners can work together to deal with issues of common concern.

Participants in the program will include leading public agencies and other organizations involved in transportation at the local, regional, national and international levels — such as metropolitan transportation agencies, regional planning organizations, port and airport authorities, turnpike authorities, state departments of transportation, national government agencies, international federations, ministries and finance organizations. By creating closer ties with these groups, MIT hopes not only to conduct more fully-informed research — more informed because of collaboration on the formulation of questions, execution of work and access to data — but also to ensure the Institute's involvement in the implementation of its research results.

Participation in the program will offer agencies the chance to help create the research and education agenda for the transportation field, which, in turn, will help shape the future of the industry and its leaders. By playing a stronger, more conscious role in defining that future, participants will be taking part in the forging of a new way of approaching transportation — rather than continuing to depend on defense initiatives to drive advances which then can be applied to the public domain, the traditional model in the United States since World War II. In some ways, this may be the most important 'defense conversion' in which industry members can take part.

How the Program Will Work

When an agency joins the program, it will designate a senior officer to act as liaison. That liaison will become the contact for all the program's formal events, for arranging informal activities such as site visits, and for disseminating the MIT information throughout his or her agency. This regular interaction will help keep MIT abreast of the agency's changing interests, needs and goals so the program can continue to be of maximum benefit.

The program will be overseen by an advisory board consisting of representatives from participating agencies and from MIT. The board will supervise the program's general operation and provide guidance on the selection of topics for research, seminars and workshops.

While some participating agencies will remit their share of the program's funding in full and directly, the Center is also exploring various mechanisms for cost-sharing. For state highway and transportation agencies, there is the possibility of collaborative funding mechanisms with the Federal Highway Administration; for transit agencies, with the Federal Transit Administration. A standard agreement is also being explored to avoid the necessity of separate contracts with each participant.

Benefits for Participants

The program offers participants priority access to MIT and to all of the Center's activities. Included in that access is the opportunity for ongoing dialogue with leading MIT faculty and researchers on topics of mutual concern, dialogue which has — in the Corporate Affiliates Program — frequently grown into highly successful collaborative research undertakings.

Participants' access also includes interaction with representatives of some of the leading public agencies in the world, a networking opportunity that has in the Corporate Affiliates Program led to mutual benchmarking, collaborative work and other intercompany ties.

Other benefits include:

Seminars at which members convene for presentations on industry issues, and to review MIT research important to the public sector, providing intellectual cross-fertilization through presentations by leading theorists and practitioners.

Direction of research sponsored by the program, and the opportunity to influence the shape of the full research program of the Center.

Workshops at which participants exchange experiences on specific issues and work together to develop new, proactive strategies.

Annual Meetings at participating organizations where participants and guests convene for day-long introductions to the transportation operations

of the hosting agency, and for on-site discussion of recent research and developments in the field.

Industry Forums for top-level decisionmakers focused on emerging policy and industrial issues; the most recent of these forums was hosted as part of the international Industry Summit sponsored jointly by MIT and the World Economic Forum.

One guaranteed free seat in the MIT summer course *Public Transportation Operations and Service Planning.*

Member Clinics during which representatives from a participant spend a half-day or so at MIT in private conference with faculty members to discuss specific concerns.

Use of MIT as an "honest broker" between competing interests in the public sector — labor/management, transportation/environment, federal/state — as they air their differences off-record and work together toward solutions.

The chance to benefit directly from ongoing research at MIT by providing agency data to be used in problem-solving.

Referrals to others in the public sector, industry and academia with expertise of particular relevance.

Access to some of the world's best students as interns and as potential employees.

Access to information on the latest MIT research projects and theses in transportation.

Benefits for MIT

Contacts developed by the program and funds generated by program funding will be used to provide essential contributions to the Center's efforts. Specific benefits include:

Access to current thinking, trends and issues in transportation practice, as seen by world leaders in the field.

Fertile ground for implementing ideas generated at MIT, through collaborative work with public innovators in the field.

Support for seed research which might not otherwise be funded, projects which can develop into major undertakings.

Input of real-world experience to MIT's educational program.

Support for graduate students; about one-third of the corporate affiliates fee supports graduate educational activities.

Opportunity for placement of students in forward-thinking agencies which will continue to challenge them.

Participation in these activities, of course, will make teaching and research results immediately and particularly relevant to participants' problems. It will also enhance MIT's ability to include the problems of implementation in its research and development scheme.

Some Commonly Asked Questions

Why should we allocate money to MIT when we have our own state university?

Membership by a state agency will automatically include full membership by the state university of that agency's choice, including the opportunity to attend all seminars and workshops, so that the benefits of the program can be disseminated through the state's educational structure as well as its governmental structure.

How many seminars, workshops and so forth will there be in a year?

The degree of activity in the program will depend on the participants. As the program grows the number of opportunities for interaction will grow, requiring a greater frequency and variety of events. At this point, the Center sees no upper limit for the program.

How will the activities of the Public Partnership Program differ from those now offered by such organizations as TRB and AASHTO?

Participants in the program's activities will regularly include representatives from a wide variety of agencies, ranging from port authorities to state transportation departments and including transportation ministries from other countries. They will also provide an unparalleled opportunity for interaction with leading private sector executives.

Why MIT?

MIT is recognized as a world leader in transportation — organizing the transportation sessions of the recent international Industry Summit sponsored by MIT and the World Economic Forum, and named by *US News & World Report* #1 in transportation and logistics. Few universities have developed a transportation research and education program as large as MIT's, and fewer still can boast such a well-developed Center for Transportation Studies. MIT also has a proven record in creating and maintaining programs such as the one proposed, including the Corporate Affiliates Program, the Leaders for Manufacturing Program, the International Study on the Future of the Automobile, and many others.

For more information about the Public Partnership Program, contact Peter Metz at MIT 1-123, Cambridge MA 02139. (617) 253-5322.

Appendices

Current Research

Participants will be encouraged to get involved in MIT research, research which can typically range from broad conceptual planning to the specifics of equipment design and operations analysis, and vary from smaller projects involving a single faculty member to large-scale international programs involving scores of people and a full-time research staff.

Typically, our efforts involve the confluence of critical issues with rapid advancement in technology and methodology. The issue of congestion, for instance, is addressed from a number of perspectives including new advances in information technology. Solutions to infrastructure deterioration are being sought with new advances in materials and structures. And the dramatic changes in the transportation industry itself are being analyzed in light of the latest theories in management and economics.

Examples of research areas include logistics, computer systems, intelligent vehicle/highway systems, geographic information systems, crashworthiness, health and safety, labor issues and infrastructure. Modal programs are also pursued in rail, air, trucking, motor, water, transit and urban transportation.

Typically, our annual research program includes more than 100 projects, involving roughly 50 researchers. For information on specific projects, see the Center's booklet, *Current Research Projects in Transportation at MIT*.

Current examples of relevant research at MIT include:

A comprehensive, coordinated effort for research and development in intelligent vehicle/highway systems and technologies — a multi-year, multi-million dollar undertaking that will involve a number of MIT's centers, labs and academic departments, as well as a range of public agencies and private companies.

Development of cost-effective applications of computer and communications technology to improve public transport service quality and overall performance.

Development of an analytic model and simulation studies of the provision of local infrastructure services under alternative management regimes; the model is applied to growing, static, and declining urban areas.

Preparation of a comprehensive text on the design of airports, including the airside (runways, taxiways and air traffic control), the landside (terminal buildings, ground access) and the systems integration (commercial, financing, environmental impacts).

A formal review of State/MPO planning processes, procedures and products, documenting planning issues and problems, and recommendations for improvements by local participants.

Faculty and Staff

RAY AUSROTAS
Air transportation

ANANTARAM BALAKRISHNAN
Network design

ARNOLD BARNETT
Aviation safety

CYNTHIA BARNHART
Distribution, logistics, large-scale network optimization

PETER BELOBABA
Air transportation economics; airline marketing and management; applied operations research; aerospace industry analysis.

MOSHE BEN-AKIVA
Transportation systems analysis; transportation demand forecasting; transportation and urban models; behavioral models and econometric methods

DAVID BERNSTEIN
Network modeling

JONATHAN BYRNES
Logistics management

RICHARD DE NEUFVILLE
Airport systems planning; transportation technology and policy; geographic databases

JOSEPH FERREIRA
Geographic information systems

ERNST FRANKEL
Port development and planning; systems analysis; ocean systems design

RALPH GAKENHEIMER
Urban transportation planning; transfer of methodology to developing countries; transportation infrastructure

STEPHEN GRAVES
Operations management; optimization models; inventory analysis

AMAR GUPTA
Information management systems

JOHN HEYWOOD
Automotive engines and fuels; use of ceramic materials in internal combustion engines; development and application of new analysis and experimental techniques

ANTHONY HOTZ
Modeling and simulation; systems architecture and engineering for IVHS; advanced sensors and traffic control systems

THOMAS HUMPHREY
Infrastructure, government, intelligent vehicle/highway systems

HARILAOS KOUTSOPOULOS
Operations research; logistics; public transportation

RICHARD LARSON
Operations research and analysis of public systems; evaluation of technology applied to urban systems; postal services; urban transportation

STEVEN LERMAN
Urban locational analysis; travel demand modeling; retail analysis; transportation planning; computer systems

ROBERT LOGCHER
Project management, management information and control systems; construction productivity; risk analysis

STUART MADNICK
Information systems engineering

THOMAS MAGNANTI
Transportation planning including vehicle fleet planning, personnel scheduling, distribution system design and urban traffic management; network analysis; mathematical programming; combinatorial theory

HENRY MARCUS
Transportation management, ocean transportation; ocean systems management; public policy

CARL MARTLAND
Railroad operations and management

GERARD MC CULLOUGH
Transportation economics, government policy

PETER METZ
Logistics systems design and strategy; public/private interface

FRED MOAVENZADEH
Construction; transportation in developing countries; transfer and adaptation of technology to developing countries

AMEDEO ODONI
Operations research; airport and air traffic control problems; analysis of urban service systems; project evaluation

JAMES ORLIN
Mathematical programming; combinatorial and network optimization; design and analysis of heuristics

KAREN POLENSKE
Regional economic analysis, with emphasis on transportation, employment, energy and environmental policies

DANIEL ROOS
Information systems; transportation systems; policy issues in transportation; automotive industry

NANCY ROSE
Trucking economics; effects of transport deregulation on safety in various modes

JEROME ROTHENBERG
Urban transportation systems; relationship between transportation and urban forms and industrial and residual location; urban transportation and environment

FRED SALVUCCI
Transportation planning, government policy

YOSEF SHEFFI
Transportation network analysis and design; traffic engineering; travel demand modeling and equilibrium analysis; transportation and logistics analysis; freight transportation; rail and truck systems

THOMAS SHERIDAN
Intelligent vehicle/highway systems, driver safety, information modeling

ROBERT SIMPSON
Flight transportation; airline economics and operations; air traffic control; airport operations and design; aviation noise

DUVVURU SRIRAM
Knowledge-based engineering

JOSEPH SUSSMAN
Transportation systems management and operations; systems analysis; simulation methods; rail systems; intelligent vehicle highway systems

RICHARD THORNTON
Magnetic levitation

TOMASZ WIERZBICKI
Collision protection and crashworthiness of land, air and sea vehicles

NIGEL WILSON
Urban transport; public transport operations, planning and management; transport systems analysis