



**NATIONAL CENTER FOR METROPOLITAN
TRANSPORTATION RESEARCH**

**ANNUAL REPORT
FISCAL YEAR ENDING JUNE 30, 2005**

Sections
Management Structure
&
Research Programs

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A. CENTER THEME

The theme of the National Center for Metropolitan Transportation Research (METRANS) is transportation within large metropolitan areas. METRANS works on developing and examining solutions to the transportation problems of major metropolitan areas using an integrated approach that blends engineering, policy, planning, business administration, and public administration expertise. Within the context of large metropolitan areas, METRANS addresses national transportation issues such as advanced transportation technologies, urban transportation research, transportation infrastructure technologies, intermodal efficiency, and transportation and the environment. METRANS also has become a national resource for information on solutions to metropolitan transportation problems.

The Center addresses problems related to all five of DOT's Strategic Science and Technology Goals, with focus on the types of problems that occur within the Southern California region:

Provide a Safer Transportation System

- Enhanced safety for the transportation infrastructure, public transit patrons, drivers and passengers, and pedestrians

Achieve a High Level of Transportation System Security

- Safety, security, productivity and survivability of the transportation infrastructure under natural disasters, such as earthquakes and floods

Improve Environmental Quality and Energy Efficiency

- Reduced air pollution impacts of transportation
- Upgrading United States Immigration and Naturalization Service (INS) and United States Customs Service (Customs) border operations to enhance and expedite passenger and cargo processing, thereby reducing air pollution
- More energy efficient transportation systems

Foster Economic Growth and Productivity

- Reduced congestion on highways, rail, shipping, and air transport systems
- Development of the infrastructure and processes to better support international trade and transportation industries

Ensure Improved Access and Increased Mobility

- Mobility and accessibility for immigrant, disadvantaged, aged, and minority populations
- Improved logistics through ports and the transportation corridors serving them

METRANS also directs its work at several of DOT's Strategic Partnership Initiatives, with research focused in the following areas:

- Enhanced Goods and Freight Movement at Domestic and International Gateways

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- Accessibility for Aging and Transportation-Disadvantaged Populations
 - Monitoring, Maintenance, and Rapid Renewal of the Physical Infrastructure
 - Environmental Sustainability of Transportation Systems
 - Smart Vehicles and Operators
 - Physical Infrastructure

Our research directed at these initiatives also crosses into several other DOT initiatives, such as National Intelligent Transportation Infrastructure, and Next Generation Motor Vehicles. Research is conducted in these areas as a means to solve problems in metropolitan areas.

METRANS also serves DOT's needs in International and Multidisciplinary Education, and in Mid-Career Training. USC and CSULB are uniquely positioned in these areas because of their highly diverse and international student bodies, diverse faculty, excellent facilities, location in the center of the nation's dominant region for international trade with Asia, and unique course offerings and degree programs. For example, USC has graduate degree programs with transportation field concentrations in civil engineering, industrial and systems engineering, urban planning, public policy, and public administration. CSULB has an established reputation for professional education in international trade and port operations, with the Global Logistics Specialist program. In March 2001, CSULB began instruction in the new MA in Global Logistics program to train professionals to deal with the complexities of supplier relations, supplier selection, purchasing negotiations, operations, transportation, inventory, warehousing, third-party vendors, electronic commerce, and customer relations.

METRANS complements the two other University Transportation Centers in California by placing special emphasis on transportation issues in Southern California, home to more than 5 percent of the nation's population and nearly 2/3 of California's population, and in GNP equivalent the 10th largest economy in the world. This includes study of Southern California's major investments in transportation (e.g., goods movement and public transport) as well as the prominent problems of congestion, air pollution, and limited mobility for disadvantaged populations. In addition, METRANS' emphasis on blending technology and policy research, and on technology transfer, is unique.

METRANS is committed to focusing on high-priority topics and issues in metropolitan regions. In its first two calls for proposals, METRANS requested research on methods for improving public transport and goods movement and logistics. In its third call for proposals, METRANS added the area of infrastructure renewal. A fourth area, safety and security, was added in the fifth year. Using Southern California as our laboratory, our goal is to improve the efficiency and effectiveness of the urban transportation system, while simultaneously building the human resource capacity to improve transportation in the United States.

Summary of Accomplishments

This Annual Report covers the seventh year of METRANS, We have expanded existing activities and launched new activities. Our 1999 Strategic Plan objectives have been largely achieved, and we are now planning for the next six years.

Highlights of the 2004-2005 year include:

- METRANS issued a seventh RFP. We received 20 proposals requesting a total of \$1,579,336. Proposals came from 32 faculty representing 10 different departments. After an extensive peer review process, 9 excellent proposals were selected for funding this year.
- The applied research program, *Monitoring the Ports*, entered its second year. The applied research program funds data collection and short-term research at CSULB that supports outreach and technology transfer in goods movement and international trade. Five projects were funded for the 2005-06 academic year.
- This year, the annual METRANS conference, *Mobility in the Metropolis: Making the Most of What We Have*, was held jointly with the METRANS annual Advisory Committee Meeting, allowing members to see first-hand one of METRANS' outreach activities. In a series of presentations and several poster demonstrations, results from recent METRANS research projects were showcased. The focus was on increasing the efficiency and productivity of existing transportation systems.
- The Seventh Annual Center for International Trade and Transportation (CITT) State of the Trade and Transportation Industry Town Hall Meeting was held in March 2004. Titled, *Lessons Learned from the 2004 Peak Season Crisis: Causes, Impacts, Solutions*, the Town Hall addressed how the local shipping industry will avoid the backlogs that marked last year's "peak season".
- Graduate students continue to win awards and recognition. **Ms. Jennifer Russell**, PhD student in Industrial and Systems Engineering, USC, won the national WTS Helen M. Overly Memorial Scholarship Graduate Award, after winning both Los Angeles chapter and California state competitions. **Kenneth Husting**, Master in Public Administration student, USC, was selected for the Eno Transportation Foundation 2004 Leadership Development Conference. **Luca Quadrifoglio** won the Council of University Transportation Centers best non-thesis paper award. **Sara Hayden**, USC Master of Planning student, won the UTC Outstanding Student Award.
- The quality of METRANS leadership was again demonstrated with a series of awards and promotions. **Marianne Venieris**, METRANS Deputy Director, was awarded the Stanley T. Olafson Bronze Plaque Award, sponsored by the Foreign

Trade Association of Southern California. **James Moore**, METRANS Executive Committee, won the WTS (formerly Women's Transportation Seminar) Diversity Leadership Award and the USC Academic Senate Distinguished Faculty Service Award. **Randolph Hall**, founding METRANS Director and Executive Committee member, has been appointed USC Vice Provost for Research Advancement.

- After nearly two years of development, the online version of the Global Logistics Certificate (GLS®) program, a professional training program in logistics and supply chain management, was launched in June 2004 and completed its first round of classes. The online version was developed to meet an ever increasing demand for logistics training outside the Southern California region.
- METRANS continues to attract matching funds. In addition to the full dollar-for-dollar match provided by Caltrans, USC faculty have received research funding from the Los Angeles County Metropolitan Transportation Authority (LACMTA, \$47,500) and from the USC Lusk Center for Real Estate (\$30,000). The Ports of Los Angeles/Long Beach, the ILWU and others continue to support the CITT Town Hall, together contributing over \$30,000 this year. The Port of Long Beach has awarded three scholarships for the Master of Arts Degree in Global Logistics and provided sponsorship for marketing activities for the GLS Online at CSULB.
- METRANS designed and conducted two three-day Goods Movement/Logistics seminars for Caltrans. The intent of the seminars was to introduce planners and engineers to what is involved in moving international freight effectively from source to destination, and to engage them in a broader discussion of goods movement and logistics planning.

As we look forward to the renewal of METRANS in the pending reauthorization bill, it is useful to look back at where we started in 1998 and where we are today. A few numbers highlight our accomplishments. Table 1 shows the remarkable growth of research and graduate education that has taken place since METRANS was established. Clearly METRANS has significantly increased the participation of faculty in transportation research, the overall level of research at the two universities, and the number of new transportation professionals trained in USC and CSULB graduate programs. Not captured by specific metrics is the growth and visibility of our outreach activities conducted through the CSULB Center for International Trade and Transportation. METRANS is now a recognized and respected university transportation center within California. We look forward to growing our national recognition in the coming years.

Table 1: Selected METRANS Metrics

	1998	2005
Total number METRANS faculty researchers	15	46
Number papers, books published (annual)	17	62
Masters graduates with transportation field specialization (annual)	69	117
PhD degrees granted with transportation field specialization (annual)	1	7

B. DESCRIPTION OF MANAGEMENT STRUCTURE

University of Southern California holds the prime grants that fund METRANS from the US DOT and CALTRANS. Center administration is the responsibility of the USC Principal Investigator, but all policy matters are jointly decided by USC and CSULB through the METRANS Executive Committee. A full-time staff member serves as METRANS Administrator. Staffing for CSULB activities is allocated on a task specific basis. In order to further promote transportation research on the CSULB campus, a 25% time research program coordinator position has been established. No changes in the Executive Committee took place this year.

Executive Committee

The Executive Committee is responsible for all METRANS project selections (research, education, and technology transfer) and for setting METRANS policies. Current membership is:

- Anastasios Chassiakos, Professor of Electrical Engineering and Associate Dean of Research and Administration, School of Engineering, CSULB
- Genevieve Giuliano, Professor of Policy, Planning, and Development, USC
- Randolph Hall, Professor of Industrial and Systems Engineering and Associate Dean of Research, School of Engineering, USC*
- Petros Ioannou, Professor of Electrical Engineering-Systems and Director, Center for Advanced Transportation Technologies, USC
- Joe Magaddino, Professor of Economics and Chair, Department of Economics, CSULB
- Michael Mahoney, Professor of Computer Science and Dean, School of Engineering, CSULB
- James E. Moore II, Professor of Industrial and Systems Engineering, and Public Policy and Management and Chair, Department of Industrial and Systems Engineering, USC
- Marianne Venieris, Executive Director, Center for International Trade and Transportation, CSULB
- Emeritus: Dan Barber, Professor Emeritus, Graduate Center for Public Policy and Administration, CSULB

*Vice Provost for Research Advancement as of July 2005.

Executive committee membership is a voluntary (unpaid) service activity. The level of leadership, expertise and dedication of the METRANS Executive committee is exemplary. Not only are these faculty leaders in their respective fields of research, all have significant administrative responsibilities. This year several have been recognized by receiving a variety of awards.

Director

Genevieve Giuliano, Professor in the School of Policy, Planning, and Development is Director of METRANS. The Director is responsible for the overall management of METRANS, including reporting, matching fund solicitation, outreach, publications, education, supervision of the METRANS Administrator, project management and development of the center research agenda, and requests for proposals/qualifications. The center director is responsible for chairing meetings of the Executive Committee (joint USC/CSULB) and the Advisory Committee.

Deputy Director

Marianne Venieris serves as METRANS Deputy Director. Ms. Venieris has been responsible for the CSULB technology transfer activities since METRANS' inception. She is an experienced manager and the leading force behind METRANS' goods movement outreach activities. Ms. Venieris is Executive Director of CITT and Director of Transportation Programs, CSULB Foundation.

The Deputy Director is responsible for collecting performance statistics related to CSULB activities, distributing information to CSULB faculty and students and overseeing the METRANS technology transfer program. The Deputy Director works under the direction of the METRANS Director.

Center Administrator

Jacquette Givens of USC serves as Center Administrator. She is responsible for the day-to-day administration of center activities, reporting to the Center Director. This includes coordination of outreach efforts; gathering information needed for annual reporting; coordination of the proposal review and report review processes; coordination of special conferences, seminars, and other events; and managing the METRANS accounts.

CSULB Administrator

Alix Traver serves as CSULB Administrator. The position is responsible for the collection of performance data at CSULB, and for communicating METRANS information to CSULB faculty, staff, and students. The position is also responsible for assisting with the METRANS Annual Conference, and for developing center promotions. The CSULB Administrator works under the guidance of the Deputy Director and the Center Administrator.

Applied Research Program Coordinator

Dr. Thomas O'Brien serves as Applied Research Program Coordinator. In addition to performing research, this 25% position is responsible for the day-to-day operation of the Monitoring the Ports applied research program. This includes outreach to faculty,

coordination with goods movement stakeholders, assisting with the proposal review process, and reporting requirements.

Promotion Manager

Marianne Venieris, METRANS Deputy Director and Executive Director of the CITT at CSULB, has served as the Promotion Manager. This position is responsible for developing outreach materials and managing the development of the website. Ms. Venieris managed the development of new promotional materials and the METRANS News.

Webmaster

Greg Raitz of CSULB Foundation serves as webmaster. He is responsible for developing and maintaining the METRANS web page. He works under the direction of the Center Administrator and Center Director.

Advisory Committee

The Director has formed an Advisory Committee (Table 2), composed of representatives from agencies and companies that participate in center activities. The Advisory Committee is used to solicit suggestions for research, to assist in student job placements, and to assist in outreach and technology transfer activities. The Advisory Committee met once during the 2004-05 fiscal year.

Faculty Members

METRANS has funded a total of 47 faculty at USC and CSULB, 43 of which are members of the METRANS Center (the remaining 4 either retired or no longer at USC or CSULB). This number includes faculty receiving funds either through the regular research program or the applied research program. Keeping to the METRANS interdisciplinary theme, faculty are drawn from four branches of engineering (civil, electrical, industrial, and mechanical), computer science, as well as business, economics, geography, health science, public policy, planning, and public administration. These faculty act as principal investigators on METRANS-funded projects, and have responsibility for overseeing individual research projects. METRANS faculty are listed in Table 3.

Table 2. METRANS Advisory Committee

<u>Name</u>	<u>Title</u>	<u>Organization</u>
Joel Anderson	Executive Vice President	California Trucking Association
Sandra Balmir	Transportation Planner	Federal Highway Administration
Dan Beal	Manager, Public Policy and Programs	Auto Club of Southern California
Rebecca Brewster	President and CEO	American Transportation Research Institute
Susan Collette	Supervising Transportation Planner	Los Angeles World Airport
James de la Loza	Executive Officer County Wide Planning and Development	Los Angeles County Metropolitan Transportation Authority
Doug Failing	Director, District 7	California. Department of Transportation
M.J. Fiocco	Transportation Specialist	U.S. Department of Transportation
Jim Gosnell	Deputy Executive Director	Southern California Association of Governments
Richard Hollingsworth	President and CEO	Gateway Cities Partnership, Inc.
Randell Iwasaki	Acting Senior Deputy Director	California Department of Transportation
Norm King	Executive Director	San Bernardino Association of Governments
Geraldine Knatz	Director of Planning	Port of Long Beach
Stephen Lantz	District, Communication and Development	Metrolink (Southern California Regional Rail Authority)
Jack Levis	Portfolio Project Manager	United Parcel Service
Domenick Miretti	ILWU Senior Liaison	Ports of Long Beach and Los Angeles
Michael Onder	Freight Management and Operations Team	U.S. Department of Transportation
Cindy Quon	Director, District 12	California Department of Transportation
Tom Teofilo	Managing Director of Maritime Services	Port of Long Beach
Lynn Terry	Deputy Executive Officer	California Air Resources Board
Barry Wallerstein	Executive Officer	South Coast Air Quality Management District

Table 3: METRANS Research Faculty

Tridib Banerjee	Policy, Planning, and Development	USC
Satish Bukkapatnam	Industrial & Systems Engineering	USC
Anastasios Chassiakos	Electrical Engineering	CSULB
Maged Dessouky	Industrial & Systems Engineering	USC
Michael Driver	Business Administration	USC
Mohammed Fourozesh	Health Science	CSULB
Robert Friis	Health Science	CSULB
Genevieve Giuliano	Policy, Planning, and Development	USC
Peter Gordon	Policy, Planning, and Development	USC
Lisa Grobar	Economics	CSULB
Karl – H. Grote	Mechanical and Aerospace Engineering	CSULB
Randolph Hall	Industrial and Systems Engineering	USC
Le Dam Hanh	Civil Engineering	USC
John Heidemann	Information Sciences Institute	USC
Petros Ioannou	Electrical Engineering Systems	USC
Clara Irazabel	Policy, Planning, and Development	USC
Kenneth James	Electrical Engineering	CSULB
Erik Johnson	Civil Engineering	USC
Tim Jordanides	Electrical Engineering	CSULB
Behrokh Khoshnevis	Industrial & Systems Engineering	USC
Ilias Kosmatopoulos	Electrical Engineering Systems	USC
John Kuprenas	Civil Engineering	USC
Shui Lam	Computer Engineering and Computer Science	CSULB
Christopher Lee	Geography	CSULB
Joe Maggadino	Economics	CSULB
Naj Meshkati	Civil Engineering	USC
Kristen Monaco	Economics	CSULB
James E. Moore II	Industrial and Systems Engineering and Policy, Planning, and Development	USC

Dowell Myers	Policy, Planning, and Development	USC
Fernando Ordonez	Industrial and Systems Engineering	USC
Emily Parentela	Civil Engineering	CSULB
Hamid Rahai	Mechanical Engineering	CSULB
Mansour Rahimi	Industrial and Systems Engineering	USC
Christian Redfearn	Policy, Planning, and Development	USC
Harry Richardson	Policy, Planning, and Development	USC
Paul Ronney	Mechanical Engineering	USC
Maria Todorovska	Civil Engineering	USC
Reza Toossi	Mechanical Engineering	CSULB
Jalal Torabzadeh	Mechanical and Aerospace Engineering	CSULB
Niraj Verma	Policy, Planning, and Development	USC
Suzanne Wechsler	Geography	CSULB
Chris Williamson	Geography	USC
Hung Leung Wong	Civil Engineering	USC
Maria Yang	Industrial and Systems Engineering	USC
Henry Yeh	Electrical Engineering	CSULB
Hsien-Yang Yeh	Mechanical and Aerospace Engineering	CSULB

C. DESCRIPTION OF RESEARCH PROGRAMS

The funding delays of past years have shifted the METRANS RFP and project award schedule. In addition, the continuing uncertainties regarding federal reauthorization have made it necessary to retain some funds from prior years to cover possible future interruptions in funding. This year the research program was affected by the various extensions of the federal transportation bill, as well as by a significant delay in match funding.

Table 4 gives the chronology of all completed research rounds. The bottom row gives the chronology for the 2004-05 round. The RFP was issued in August. Proposals were due October 15, 2004, and selections were made by the Executive Committee in late December. Selections were sent to Caltrans, and all were endorsed. The new schedule is intended to allow new projects to start at the beginning of the Spring semester. Instead, projects were authorized on a rolling schedule as federal and state funding became available.

Table 4: Timing of METRANS Requests for Proposals and Project Selection

Fiscal Year	RFP Issued	Due Date	Selections	Start Date
98/99	3/19/1999	4/28/1999	6/1/1999	7/1999 to 9/1999
99/00	7/7/1999	8/11/1999	9/27/1999	1/1/2000
00/01	2/11/2000	3/17/2000	5/8/2000	8/2000
01/02	12/12/2000	2/23/2001	4/24/2001	8/15/2001
02/03	8/16/2002	10/15/2002	1/12/2002	07/01/2003
03/04	9/5/2003	10/15/2003	12/27/2003	01/05/2004
04/05	8/24/2004	10/15/2004	12/17/2004	2/1/2005 to 6/1/05

METRANS' goal has been to make selections within three months after the RFP is issued. This allows about 5 weeks for proposal preparation, 4 weeks for peer review, and 3 weeks for compilation of results and communication with the METRANS Executive Committee. In order to assure that proposal evaluation is as neutral as possible, academic peer reviewers are drawn from outside USC and CSULB.

The first two METRANS RFPs restricted proposals to the two focus areas of goods movement and public transit. For the third and fourth RFP, infrastructure renewal was added as a third focus area. For the fifth RFP, four focus areas were identified: 1) commercial goods movement and international trade, 2) mobility of urban populations, 3) highway infrastructure and infrastructure renewal, 4) safety, security and vulnerability. These focus areas remain unchanged. A total of 20 proposals were submitted. A summary of the submitted proposals by focus area is provided in Table 5. As in previous years the largest number of proposals falls into the goods movement category. Compared to previous years, these proposals were more evenly distributed across the four focus areas. Our efforts to stimulate more activity at CSULB seem to be working. We

received 7 proposals from CSULB faculty (compared to 3 last year), as well as 3 joint USC/CSULB proposals.¹ The remaining proposals were from USC faculty.

Table 5: Summary of Proposals Submitted to METRANS

FY	Proposals	Requested	Number of Proposals by Focus Area				
			Goods	Mobility	Infra-structure	Safety	Multiple
98/99	15	\$808,497	6	8	0	0	1
99/00	12	451,335	6	5	0	0	1
00/01	17	906,370	10	6	1	0	0
01/02	16	882,261	7	2	5	0	2
02/03	29	2,696,136	10	8	6	5	0
03/04	18	1,440,565	7	4	1	6	0
04/05	20	1,579,336	7	5	5	3	0
Total	127	8,764,500	53	38	18	14	4

The selection process was competitive. The Executive Committee selected 9 projects for funding in the 2003-4 fiscal year, a selection rate of 45%. Although we had anticipated a research budget of about \$600,000 at the time the RFP was issued, the second increment of federal funding made it possible to increase our award total to about \$800,000.

Funded projects for the past seven years are summarized in Table 6. We have now funded a total of 61 projects totaling about \$4.2 million. As of June 30, 2005, we had 17 projects in progress, representing about \$1.4 million, with an additional three projects scheduled to begin in Summer 2005.

The awards retain the center's strength in goods movement and freight (6 awards), but in contrast to previous years, only 1 project was awarded in the mobility area. As in the previous year, two projects were awarded in safety; none were awarded in infrastructure. Our priority is to fund the best projects, rather than to achieve balance across our thematic areas. Again reflecting increased activity and interest at CSULB, 3 projects were awarded to CSULB, three were joint USC/CSULB, and the remainder was awarded to USC.

¹ There was one CSULB proposal that was not submitted as a joint proposal, but had a USC Co-PI.

Table 6: Summary of Proposals Awarded by METRANS

FY	Awards	Amount	Number of Awards by Area				
			Goods	Mobility	Infra-structure	Safety	Multiple
98/99	6	\$294,299	3	2	0	0	1
99/00	7	324,898	4	3	0	0	0
00/01	11	580,882	5	6	0	0	0
01/02	7	446,602	3	1	1	0	2
02/03	12	1,079,721	5	4	3	0	0
03/04	9	667,271	4	3	0	2	0
04/05	9	798,077	6	1	0	2	
Total	61	4,191,750	30	20	4	4	3

In reference to DOT subject areas (Table 4b), 7 of the new projects are in the Transportation System Performance area: one in Measurement, Characterization and Modeling (\$149,280), one in Transportation and Logistics System Operation (\$149,982); two in Behavioral Sciences and Human Performance (\$183,011), and three in Transportation Planning, Economics, and Institutional Issues (\$170,414). The remaining two projects are in Information Infrastructure (traffic management, \$75,000), and Vehicles (design and manufacture, \$70,390).

With respect to goals, our greatest emphasis is on economic growth and trade (4 projects and \$434,395), followed this year by safety (3 projects and \$253,391). The safety projects include vehicle safety, truck driver safety, and transit and pedestrian safety. These are consistent with METRANS’ emphasis on transportation problems of large metropolitan regions, such as Southern California. In terms of enabling research, Human Performance and Behavior has the largest number of projects (4, \$285,011), with the rest rather evenly spread across the various categories. For modal emphasis, highways are the most prominent in seven of the new projects (\$564,077), reflecting our research on highway infrastructure and trucking. Four of the seven include maritime. The remaining two projects have a transit orientation.

As intended, all projects selected by METRANS are directed toward DOT’s strategic initiatives. The following list is cumulative, covering all funding rounds to date:

Enhanced Goods and Freight Movement at Domestic and International Gateways

- Monaco: Ports and Highway Infrastructure Investment and Inter-state Spatial Spillovers (04/05)
- Hall: Improving Trucking Safety: Effects of Driver Hours of Service Regulations (04/05)
- Ioannou and Chassiakos: Simulation Test Bed and Evaluation of Truck Movement Concepts on Terminal Efficiency and Traffic Flow (04/05)

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- Giuliano and Magaddino: Evaluation of Extended Gate Operations at the Ports of Los Angeles and Long Beach (04/05)
 - Verma: Institutional Considerations in Freight Movement in port of Los Angeles/Long Beach (04/05)
 - Hanh and Moore: Landside Surface Transportation Impact of Short Sea Shipping in Southern California (03/04)
 - Ioannou and Chassiakos: Development of Methods for Handling Empty Containers with Applications in the Los Angeles/Long Beach Port Areas (03/04)
 - Giuliano and Magaddino: Evaluation of the Terminal Gate Appointment System at the Los Angeles/Long Beach Ports (03/04)
 - Dessouky and Ioannou: A Novel Approach to Routing and Dispatching Trucks based on Partial Information in a Dynamic Environment (02/03)
 - Hall: Freight Routing and Containerization (02/03)
 - Ioannou and Chassiakos: Cooperative Optimum Time Window Generation for Cargo Delivery/Pick-up with Application to Container Terminals (02/03)
 - Richardson, Gordon and Moore: Measuring California's Role in Supporting Interstate Goods Movement: Comprehensive Assessment of Interstate Freight Flows (02/03)
 - Hanh: Re-engineering the Logistics of Empty Cargo Containers in the SCAG Region (01/02)
 - Gordon and Williamson: Development and Test Methodology for the Evaluation of Highway Widening Plans to Facilitate Freight Flows Throughout a Major Metropolitan Area (01/02)
 - Ioannou and Chassiakos: Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Areas (01/02)
 - Grobar and Barber: An Integrated Approach to Managing Local Container Traffic Growth in the Long Beach/Los Angeles Port Complex Phase II (00/01)
 - Hall: Alternative Access and Locations for Air Cargo (00/01)
 - Ioannou and Chassiakos: Dynamic Optimization of Cargo Movements by Trucks in Metropolitan Areas with Adjacent Ports (00/01)
 - Kosmatopoulos: Design and Optimization of a Conceptual Automated Yard Using Overhead Rail Systems (00/01)
 - Parentela: Developing Risk Model for Commercial Goods Transport (00/01)
 - Bukkapatnam: Dynamic Coordination Framework for Resource Allocation in Trucking Operations (99/00)
 - Gordon: Assembling and Processing Freight Shipment Data: Developing a GIS-Based Origin-Destination Matrix for Southern California Freight Flows (99/00)
 - James: Non-Invasive Means of Investigating Container Contents for Customs Agents at Ports (99/00)
 - Jordanides: Use of Robotics and Expert Systems in Improving the Handling of Containers at the Port Terminals (99/00)
 - Grobar and Barber: Implementing a Statewide Goods Movement Strategy and Performance Measurement of Goods Movement in California (98/99)
 - Ioannou and Chassiakos: Modeling and Route Guidance of Trucks in Metropolitan Areas (98/99)

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- Khoshnevis: 3D Virtual and Physical Simulation of Automated Container Terminal Facilities and Analysis of Impact on In-land Transportation (98/99)

Accessibility for Aging and Transportation-Disadvantaged Populations

- Friis and Forouzesh: Cambodian Access to Transportation: Impact on Senior Nutrition and Congregate Meal Service Program (04/05)
- Meshkati, Rahimi and Torabzadeh: Study of the Exposition Light-Rail's Safety for Pedestrians and Drivers (04/05)
- Giuliano: Travel Patterns of the Elderly (00/01)
- Dessouky and Rahimi: A Task Decomposition Model for Dispatchers in Dynamic Scheduling of Demand Responsive Transit Systems (98/99)
- Giuliano: The Role of Public Transit in Mobility of Low Income Households (98/99)

Environmental Sustainability of Transportation Systems

- Kuprenas: Reduction of Construction Project Risk to Pedestrians, Drivers and Transit Passengers through Analysis of Historical Accident Records (03/04)
- Richardson and Gordon: What Can We Learn from CTPP 2000? (03/04)
- Ordonez and Palmer: Confidence Intervals for Estimated Traffic Demand (03/04)
- Redfearn: Transit Investment and the Capitalization of Access into Land Values (03/04)
- Moore: Improved Modeling of Transportation Network Flows Including Land Use Transportation Interactions: A Research Collaboration between METRANS and Caltrans District 7 (02/03)
- Toossi: Hydrogen Storage System for Transportation Applications (02/03)
- Gordon: Neighborhood Attributes and Commuting Behavior: A Comparative Study of California's Major Metropolitan Areas (02/03)
- Banerjee, Myers, and Irazabal: Increasing Bus Transit Ridership: Dynamics of Density, Land Use, and Population Growth (02/03)
- Rahai: Reducing Pollutants from Mobile Sources (01/02)
- Rahimi and Dessouky: A Methodology for Joint Optimization of Service and Life Cycle Environmental Assessment of Transportation Systems (01/02)
- Toossi: Assessment of Hybrid Vehicle Control Strategies in Planning Future Metropolitan/Urban Transit Systems (00/01)
- Williams: Solid State Sorption Air Conditioner System for Containerships and Vehicles (99/00) (Phase 2, 00/01)
- Ronney: Improving Fuel Economy and Emissions Performance of Commercial Goods Transportation and Mass Transit Vehicles Using Throttleless Engines (98/99)

Physical Infrastructure

- Todorovska and Trifunac: Methodology for Probabilistic Assessment of Permanent Ground Displacement Across Earthquake Faults for the Transportation System (02/03)

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- Johnson: Innovative Bridge Structural Health Monitoring Using Variable Stiffness and Damping Devices (02/03)
 - Ordonez: Robust Investment Decisions for Highway Capacity Expansion
 - Wong: Analysis of Vibrations as Infrastructure Caused by High-speed Rail Transit (01/02)
 - Johnson: Smart Damping Devices for Monitoring the Health of Bridge Structures (01/02)
 - Banerjee: Freeway Bus Station Area Development: Critical Evaluation and Design Guidelines (00/01)
 - Banerjee: Highway Oriented Transit System (HOTS): A Comprehensive Land Use-Transportation Strategy to Improve Transit Service Delivery (99/00)
 - Kuprenas: Identification and Analysis of Local Agency Transit Project Performance Criteria (99/00)

Smart Vehicles and Operators

- Grote and Yang: Validation of Sensory Systems for Intelligent Vehicles (04/05)
- Heidemann and Giuliano: SURE-FT: Sensor for Unexpected Roadway Events: Field Trials (04/05)
- Grote: Evolution of Collective Sensory Systems for Intelligent Vehicles (03/04)
- Giuliano and Heidemann: SURE-SE: Sensors for Unexpected Roadway Events: Simulation and Evaluation (03/04)
- Parentela: Development of an Artificial Intelligence Based Traffic Simulation Model Using the Discrete Element Method (02/03)
- Ioannou and Chassiakos: Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Areas (01/02)
- Bukkapatnam and Dessouky: Distributed Architecture for Real-time Coordination in Transit Networks (00/01)
- Meshkati, Rahimi and Driver: Investigating the Role of Driver Decision Styles in Highway-Rail Crossing Accidents (00/01)

METRANS has the goal of supporting cooperative research that involves transportation agencies and meets the transportation needs of metropolitan agencies. Nearly all projects have received financial support from Caltrans, and many others have cooperated with local and regional agencies. Cooperating agencies are shown below for the 03-04 and 04-05 projects:

Friis and Forouzesh

Cambodian Access to Transportation: Impact on Senior Nutrition and Congregate Meal Service Program

Cambodian Association of America

Giuliano and Heidemann

SURE-SE: Sensors for Unexpected Roadway Events: Simulation and Evaluation

Los Angeles Department of Transportation, University of Southern California

Giuliano and Magaddino

Evaluation of Extended Gate Operations at the Ports of Los Angeles and Long Beach
Port of Long Beach, Port of Los Angeles, Pacific Merchant Shipping Association

Giuliano and Magaddino

Evaluation of the Terminal Gate Appointment System at the Los Angeles/Long Beach Ports
Port of Long Beach, Port of Los Angeles, Pacific Merchant Shipping Association, MTC Terminals, ITS Terminals, Los Angeles Chapter of California Trucking Association, Southern California Air Quality Management District

Heidemann and Giuliano

SURE-FT: Sensor for Unexpected Roadway Events: Field Trials
Los Angeles Department of Transportation

Ioannou and Chassiakos

Simulation Test Bed and Evaluation of Truck Movement Concepts on Terminal Efficiency and Traffic Flow
Port of Long Beach

Ioannou and Chassiakos

Development of Methods for Handling Empty Containers with Applications in the Los Angeles/Long Beach Port Areas
Port of Long Beach

Meshkati, Rahimi and Torabzadeh

Study of the Exposition Light-Rail's Safety for Pedestrians and Drivers
Los Angeles County Metropolitan Transportation Authority

Moore

Improved Modeling of Transportation Network Flows Including Land Use Transportation Interactions: A Research Collaboration between METRANS and Caltrans District 7
District 7, California Department of Transportation

Richardson, Gordon and Moore

Measuring California's Rise in Supporting Interstate Goods Movement: Comprehensive Assessment of Interstate Freight Flows
California Department of Transportation

Verma

Institutional Considerations in Freight Movement in port of Los Angeles/Long Beach
Port of Long Beach, Port of Los Angeles

Selection Process

METRANS follows a peer-reviewed proposal selection process in which each proposal is submitted to a minimum of five people for review, drawn from the following groups:

- University expert (usually two people in category)
- Local transportation agency expert or private practitioner expert
- Caltrans expert
- US DOT expert

In the most recent RFP (04/05), the following DOT employees (or their designated representatives) reviewed proposals:

- Dennis Judycki, FHWA
- Anthony Furst, FHWA
- Cynthia Burbank, FHWA
- T. Paul Teng, FHWA
- A. George Ostensen, FHWA
- Charlotte Adams, FTA

These DOT representatives were selected because of their expertise and leadership in goods movement, transit, policy, advanced technology, safety or infrastructure.

We use an outside review process in order to assure neutral evaluation of all proposals; with few exceptions, academic reviewers were from outside USC or CSULB. We also used a mix of public and private sector local experts. The outside review process is more time consuming, but we feel it is worth the effort. This year a USC graduate research assistant helped to manage the proposal review process. A total of 50 reviewers participated in the process (not counting reviewers within Caltrans or USDOT). Summarized results of the evaluations are presented to the METRANS Executive Committee, which makes final selections.

As noted earlier, the schedule for METRANS research activities has shifted as a result of funding delays in prior years. The 04-05 round of projects was awarded on a rolling schedule, from February to June 2005. These will be completed sometime between February and June 2006. Three projects have not yet begun due to our requirement that any existing METRANS project must be completed (draft final report submitted) before the new project is authorized to begin.

Because of the ongoing uncertainties regarding federal reauthorization of the UTC program, METRANS has taken a conservative approach and not issued RFPs until sufficient funds are assured. As noted above, we increased our research funding allocation after the second increment of federal funding was announced.

Research Results

As of this writing, 32 research projects have been completed (8 this year), and 8 more are in the peer review/revision process.² Seventeen projects are in progress, including the new 2004-05 projects; three 04-05 projects had not yet begun as of June 30, 2005.

Last year we changed our report review process in order to expedite the completion of projects. The Director reviews all final reports and manages the revision process. In cases of research outside the Director's area of expertise, another member of the USC or CSULB faculty is asked to review the report. Per Caltrans request, we continue to send final reports to Caltrans for review, but we limit the time allowed for comments to two months. Final report abstracts are provided below for all projects completed this year.

00-7 Adsorption Air-Conditioning for Containerships and Vehicles, *Craig Christy and Reza Toossi*

An investigation is undertaken into the feasibility of meeting the cooling needs for commercial tractor-trailer refrigeration and transit bus air conditioning (A/C) by utilizing their own exhaust heat to drive an adsorption refrigeration system.

An experimental vapor compression A/C system utilizing adsorption compression was refurbished and operated at CSULB to verify previously reported coefficient of performance (COP) and specific cooling power (SCP) values and to gain knowledge, experience, and insight into product design issues.

Industry reported cooling requirements for tractor-trailers and buses, the heat available from these vehicles' exhaust gases, and the experimental systems COP and SCP were reported and used as benchmarks to establish system requirements and design concepts for a novel system proposal. Design options were considered in relation to these benchmark values and evaluated based upon their packaging volume, weight, and their relative energy input requirements. The use of refrigerants R717 (ammonia) and R134a were explored and potential sorbent bed designs were extrapolated for each. The expected reduction in emissions and fuel consumption from conventional refrigeration systems is discussed with respect to implementing the new adsorption compressor design.

The heat energy available from a large diesel engine's exhaust was found to be adequate to support an R717 adsorption system with reasonable size requirements and adequate cooling capacity to meet industry needs. In conclusion, design recommendations for an adsorption compressor cooling system applied to the transit industry are discussed. Utilizing R717 (ammonia) provides the best packaging design and satisfies the high end of typical cooling capacity requirements. An R134A systems performance is such that its overall size and heat rate required limit the systems practical cooling capacity to the realm of 30,000 to 60,000 BTU/hr. Potential for an R134A system to support the larger cooling requirements (60 to 120 kBTU/hr) are discussed utilizing a more complicated design layout.

² One project (99-20) was cancelled last year for lack of completion.

01-10 Parametric Frequency Domain Identification using Variable Stiffness and Damping Devices, (title change) *Erik A. Johnson and Mohamed I. S. Elmasry*

Accurate diagnosis of structural health is a vital step in protecting structures. Whether caused by acute events, such as earthquakes or other natural disasters, or long-term degradation from environment and human use (and abuse), structural damage can threaten both human life and economic loss. An autonomous monitoring system that has the capability of predicting the location of damage would have a positive economic impact, not to mention the potential for saving lives by giving quick assessments of structural health and whether immediate evacuation of, or re-routing, around a structure is necessary. The process of monitoring structural health and identifying damage severity and location is generally termed structural health monitoring (SHM). The core of this project is to investigate how variable stiffness and damping devices (VSDD) can be most effectively used to identify local damage in bridge and building structures. Using one or more VSDDs to modify the response, simulated damage is detected, localized, and quantified. One fundamental goal is to determine the best VSDD actions — whether adding damping or stiffness — to precisely and robustly locate and identify bridge damage. This study is based on simulation of bridge motion and other structures due to ambient excitation sources. Several VSDD behaviors, such as variable stiffness mode and variable damping mode, are studied in the context of a frequency domain analysis. These analyses are performed on simple models of bridge and building dynamics, e.g., two degree-of-freedom (2DOF) shear model systems and a six degree-of-freedom (6DOF) model. Structural behavior is assumed locally linear before damage and after damage. Generally, VSDDs were successful in improving the damage identification in structures using the variable stiffness mode but rather unsuccessful in the variable damping only mode. In addition to demonstrating the potential of using variable stiffness and damping devices to improve structural health monitoring, this study also provides some insights into further avenues of future research to build on the improvements studied herein.

01-14 The Economic Effects of Highway Widening: Tolled Lanes vs. General-Purpose Lanes – Using an Integrated Impact Model, (title change) *Peter Gordon, James E. Moore II, Harry W. Richardson, and Christopher Williamson*

Highway expansion projects in large metropolitan areas are usually contentious. What are the full effects of highway capacity gains and who wins and who loses? This research elaborates our earlier network impact modeling work in two important directions. First, we extend our modeling capability to include highway lanes that are tolled. Second, we apply the new model to an important prototype application, the (recently) private 10-mile segment of California SR91. The possible widening of this route via extra tolled or extra general-purpose lanes has been the subject of considerable controversy. We show that our approach can shed light on key elements of such controversies and, thereby, possibly reduce political conflict and misunderstanding. We also show that whereas congestion tolls are widely presumed to be efficient, the efficiency outcomes are complex when only a very small part of the network is tolled.

01-16 Automated Container Transport System between Inland Port and Terminals,
(title change) *Petros Ioannou and Anastasios Chassiakos*

Due to the fast growing rate of the global container trade, every major port is under pressure to meet the projected capacity demand. The scarcity of land at ports in many Metropolitan areas makes it difficult if at all possible to improve capacity by expanding the terminal area. As a result alternative solutions have been sought for improving capacity and meeting the growing demand for container storage area and terminal capacity.

In this study we propose a new concept called “Automated Cargo Transportation system between Inland Port and Terminals” (ACTIPOT) which involves the use of automated trucks to transfer containers from an inland port to terminals. The inland port could be a few or more miles away from the terminals where lower cost land is available and is used for storing and processing import/export containers before distribution to customers or transfer to the terminal for loading on ships.

In this report, we design, analyze, simulate and evaluate the various components of the ACTIPOT system with emphasis on the lateral and longitudinal control of the automated trucks and on the overall supervisory controller that synchronizes all operations and transfer of containers between the terminal and inland port using dedicated truck lanes. We employ the use of truck platoons in order to make the control of the overall system easier to handle and understand therefore minimizing the possibility of deadlocks, congestion and failures. Simulations are used to demonstrate that each subsystem operates in a satisfactory manner. Larger scale microscopic simulations are performed to demonstrate the overall performance of the ACTIPOT system. The choice of distances and other variables in the ACTIPOT system are selected by using the ICTF facility as the inland port and Pier G as the terminal both located in the Long Beach area.

03-01 A Novel Approach to Routing and Dispatching Trucks Based on Partial Information in a Dynamic Environment, *Maged Dessouky, Petros Ioannou, and Hossein Jula*

Congestion affects the trucking industry on three major service dimensions: travel time, reliability, and cost. Trucking is a commercial activity, and trucking operations are driven by the need to satisfy customer demands and the need to operate at the lowest possible cost. This industry is highly competitive, with easy entry into almost any market, relatively little differentiation between operators and slim profit margins.

However, most of the developed techniques and models for planning, routing and scheduling in the trucking industry assume ‘*known*’ static data as their input. For instance, in the Vehicle Routing Problem (VRP) the customer demands, travel costs, and travel times are known in advance. In this case, the fundamental problem is to determine the optimal *route* that minimizes a certain objective such as fleet size and travel distance. The built-in assumption of these approaches is that there will be small deviations on the

realization of the demand and travel times from the plan so that the pre-determined routes form a basis for either the pickup or delivery schedule. In the real world, however, operations in any traffic network contain a fairly high degree of uncertainties including variable waiting and travel times due to traffic congestion, arrival of new orders, and cancellation of existing orders. In a highly dynamic and stochastic environment, the pre-planned optimal routes are no longer of practical use. In this case, most of the research effort has focused on easy to control dispatching rules. The drawback with these techniques is that they do not make use of pre-planned and known information.

There is a gap in the routing literature for systems that operate between the two ends of the spectrum, which is the most realistic condition for trucking operations. Our research on partial route development addresses this gap by developing a new approach within an area that has received little attention. In a simulation study, we demonstrate the benefits of the partial routing approach over the pre-planned and dispatching methodologies.

03-06 Robust Investment Decisions for Highway Capacity Expansions, *Fernando Ordonez*

In this report we present a methodology to identify capacity expansions for a transportation network that finds a robust solution with respect to the uncertainty in demands and travel times. We show that solving for a robust solution is a computationally tractable problem under conditions that are reasonable for a transportation system. For example, the robust problem is tractable for a multicommodity flow problem with a single source and sink per commodity and uncertain demand and travel time represented by bounded convex sets. Preliminary computational results show that the robust solution can reduce the worst case cost by more than 20%, while incurring a 5% loss in optimality when compared to the optimal solution of a representative scenario.

03-07 Freight Routing and Containerization in a Package Network that Accounts for Sortation Constraints and Costs, (title change) *Randolph Hall*

In this research, we investigate package transportation routing that accounts for sorting activities at the terminals visited. Due to the large number of packages originated from different locations and destined to different locations, at each terminal visited, sorting operations are essential to regroup and dispatch incoming shipments from different origins to different destinations. This process is time, labor, and resource intensive. Proper containerization allows shipments to bypass terminals without entering sorting operations. The efficient utilization of sorting facilities, in turn, enables parcel carriers to handle more shipments with existing resources while maintaining the same service level. However, container capacity and limits on alternative routes resulting from bypass may cause the containers to be moved via longer routes. Thus, the efficiency of package transportation operations may deteriorate, leading to higher transportation costs.

The primary objective of this research is to study package routing that accounts for containerization to minimize transportation costs and sorting costs imposed. To obtain

container routings, a network is modified so that each arc represents a container group on a flight. The solution method is segmented into three phases: construct a new network, perform LP relaxation, and find the solution of the original problem. The solution provides a sequence of container groups along the whole route for each commodity. Three heuristic approaches are developed and evaluated: the grouping heuristic (GH), the forcing constraint heuristic (FCH) and the combined heuristic (CH). The approaches are benchmarked with lower bounds calculated by solving the LP relaxation with forcing constraints. Model extensions for congested periods of sorting operations are also proposed. To account for the sorting option at source terminals, heuristic approaches that build from the GH and the FCH are developed and examined under different parameters and problem instances.

Experimental results show that the GH is the fastest algorithm and provides solutions within 4% of lower bounds for test cases. The FCH outperforms the GH in terms of solution quality, in which solutions are within 2% of lower bounds for test cases, but it is slower than the GH. As for the CH, computation time is between the GH and the FCH but it yields inferior objective values relative to the FCH and the GH. Sensitivity analysis shows that container capacity has little effect on the solution quality. Sorting costs, however, significantly affect the heuristic performance.

Results for the model extensions correspond to the results from the core model in which the developed heuristic incorporated with the GH is faster than one with the FCH but yields poorer objective values. Sensitivity analysis shows that increase in sorting costs at source terminals has impacts on the heuristic performance.

03-20 Neighborhood Attributes and Commuting Behavior: Transit Choice, (title change) *Peter Gordon, Bumsoo Lee, James E. Moore II, Harry W. Richardson, and Christopher Williamson*

Neighborhood type matters when we try to explain variations in public transit commuting. We found this statistical link over a sample of all census tracts in the four largest California metro areas. In this research, we used statistical cluster analysis to identify twenty generic neighborhood types. The variables used in the analysis included broad indicators of location and population density, street design, transit access and highway access. Once identified, the denser neighborhoods had higher transit use, other things equal. Yet, what distinguishes the research is that we did not use a simple density measure to differentiate neighborhoods. Rather, density was an important ingredient of our neighborhood-type definition -- which surpassed simple density in explanatory power.

Applied Research Program

Last year we launched an applied research program under a new initiative, *Monitoring the Ports*. Its main purpose is to increase the participation of CSULB faculty and students in METRANS research. It also seeks to fund research in support of METRANS

technology transfer activities, and develop an information base of seaport operations and goods movement that will contribute to our research program.

Applied research projects are relatively small scale (\$40,000), must be completed within one year, and are oriented to data gathering, description, and documentation. The proposal submission requires a short preliminary proposal. The most promising and relevant pre-proposals are selected; Principle Investigators are then asked to submit a full proposal. Proposals are reviewed and approved by the METRANS Executive Committee. The applied research program is intended to generate more CSULB faculty participation in the regular METRANS research program. This has already happened; one of last year's applied research PIs won one of this year's regular research awards. The day-to-day operation of the Monitoring the Ports program is the responsibility of the METRANS Applied Research Program Coordinator.

Applied Research Selection Process

Table 7 shows the schedule for the applied research RFP process. The RFP was issued by inviting faculty to a lunch meeting to introduce faculty to the Applied Research program. Invitations were sent through the CSULB Office of University Research (OUR), the various Deans, and key faculty members who either previously submitted proposals to METRANS or expressed an interest in doing so. The first two Global Logistics Specialist Online modules were made available during the first two weeks in January for those faculty members interested in obtaining an overview of goods movement and the roles played by the various industry segments. It is a valuable introduction to the language of goods movement and to some of the issues faced by stakeholders.

Table 7: Timing of METRANS Requests for Proposals and Project Selection, Applied Research Program

Fiscal Year	Issue RFP	Pre-proposal Due	Selection	Full Proposal Due	Start Date
2003-04	5/15/03	7/1/03	7/30/03	9/19/03	10/15/03
2004-05	12/2/04	1/28/05	2/14/05	3/18/05	6/1/05-7/1/05

Table 8 shows proposals submitted and awarded for the applied research program. Nine pre-proposals were received on January 28; six were selected by the METRANS Executive Committee to submit complete proposals. Five of these six were ultimately deemed acceptable by the METRANS Executive Committee for funding. An additional project was solicited on measurement of port productivity. Total funding this year is \$239,836. The applied research projects are included in the list of projects in Section F as a separate section; they are not included in the performance indicators of this annual report, as they are not fully peer-reviewed.

Table 8: Applied Research Proposals and Awards

Fiscal Year	Pre-proposals Submitted	Number of Awards	Amount
2003-04	7	2	\$ 69,338
2004-05	9	6*	\$ 239,836

* Includes one project solicited outside of the RFP

Applied Research Results

Both of last year's applied research projects have been completed. Titles and abstracts are listed below.

AR 04-01 Examining the Effects of the Lowenthal Bill on Port Congestion

Principal Investigator: Lisa Grobar, Department of Economics, California State University Long Beach

Nearly one-half of all loaded containers entering the US come through the ports of Long Beach, Los Angeles, and Oakland. Congestion at the ports is a pressing issue for effective goods movement. The combined burden of inefficiencies due to traffic congestion and pollution from trucks idling at ports led to the passage of California Assembly Bill 2650 (the Lowenthal Bill, named after its sponsor) in August of 2002. The bill fines marine terminals for each truck waiting at the terminal in excess of 30 minutes. In response to the implementation of this Bill, a scheduling system has been implemented at the Port of Long Beach to minimize truck waiting times.

The research assesses the impact of the Lowenthal Bill on key aspects of port operations and goods movement, including harbor drayage, extended gate hours and gate appointments. Using survey results from 60 drayage firms and drivers at the port, the analysis includes use of the appointment system by truckers and trends in wages and working conditions.

The analysis indicates that the port drayage labor force largely consists of relatively low-educated Hispanic immigrants who receive no return from additional years of education, tenure with the firm, or other measures of human capital. Surveys also confirm that drivers spend a significant portion of their workday waiting at the ports. Though firms indicate that they utilize the appointment systems at available terminals, most do not use the system consistently. Though truck turn time data provides some evidence that time spent inside terminal facilities has decreased on average, the mean time inside the gates is still high.

The data sources all reveal potential sources of improvements in truck productivity. Consistent use of appointment times at the ports should decrease driver's waiting time, allowing them to increase individual productivity. There is also potential to improve firm

efficiency by using software for dispatching and routing, perhaps better coordinating drivers' trips to the ports. The turn time data provides initial evidence that trucking companies who establish long-term relationships with specific shippers and terminals can generate a significant reduction in turn times, increasing driver productivity.

AR 04-02 Labor at the Ports: Comparing Work Rules and Working Conditions of the ILA and ILWU

Principal Investigator: Kristen Monaco, Department of Economics, California State University Long Beach

Labor issues play a major role in efficient goods movement for ports. Longshoremen are organized by one of two primary unions: the International Longshoremen's Association (ILA), largely in operation on the east coast, and the International Longshore and Warehouse Union (ILWU) on the west coast. Ports have coordination problems due to holdup points created by these unions. The purpose of this study is to examine the role of unions in promoting or hindering efficient use of labor at the ports.

The research focuses on comparing current and historical work rules of both the ILA and ILWU to examine potential gains from better implementation of existing work rules and to identify sources of inefficiency stemming from the same. The findings point to several factors which drive the difference in pay and work rules of longshoremen on the East and West Coasts.

The unions, for example, have employed different strategies in collective bargaining. The ILWU strove to keep wages high by reducing labor supply. The ILA, however, had agreements with employers to keep a surplus of labor. The two unions also had different approaches to the adoption of technology. Given the inevitable decrease in labor demand due to modernization, the ILWU pursued the successful strategy of decreasing labor supply to keep wages high. In contrast, the ILA historically maintained a surplus of labor.

The ILWU has also been able to protect its workers through a master agreement with management that covers most aspects of wages and work rules. The master contract for ILA covers wages, hours, and benefits, while work rules are decided on a local level.

The ILA has been weakened due to trade balances and the type of freight handled, particularly at Gulf ports. The shift of trade to West Coast ports left East Coast ports with excess capacity. In addition, the break bulk segment of the market, largely served by Gulf ports, became more competitive with firms seeking to lower costs. This led to the entry of non-ILA stevedoring to Gulf ports, in turn leading to wage concessions by ILA workers in break bulk and the emergence of "ILA lite" operations.

The excess capacity on the East Coast and the ability of employers to pit labor at different ports against each other led to a bifurcation of the ILA wages and further segmentation of this labor market at a time when the ILWU was working to eliminate segmentation in

their labor market.

Other Research Activities

- **Research Conference:** This year METRANS held its annual conference in conjunction with the METRANS Advisory Committee meeting, giving members the opportunity to hear about some of the results of the METRANS research program. The conference was entitled, *Mobility in the Metropolis: Making the Most of What We Have*, and it focused on improving the productivity of our urban transportation system. Session One focused on planning and decision making for highway investments. Session Two was on increasing efficiency and how to use the system. A reception and poster demonstrations on selected ongoing projects followed the panel presentations. The Conference research presentations, project description and final reports for completed projects are posted on the METRANS website. Conference attendance was about 150, and included representatives of local and state agencies and industry, as well as faculty and students from throughout the university. For further details, see Section E
- **Publications and Presentations:** An important measure of the quality of the METRANS research program is the number of peer-reviewed publications generated. As more research projects are completed, academic publications follow. This year 11 of our METRANS faculty presented their research results at 29 conferences and have 44 articles published or forthcoming in refereed journals. CSULB Economics Professor **Kristen Monaco** co-authored Sailors of the Concrete Sea: A Portrait of Truck Drivers' Lives, released in January 2005.
- **Leveraging METRANS Funds:** Additional transportation funding generated by METRANS research is another important measure of quality. This year METRANS joined with the Los Angeles County Metropolitan Transportation Authority and Caltrans District 7 to conduct a study of the impacts of the 2002 west coast port shutdown.
- The METRANS Administrator continues to identify transportation funding sources, and has advertised these to faculty at CSULB and USC. In addition, the METRANS web page has been designed to link to 24 agencies that fund transportation research.

Faculty Awards and Promotions

This year METRANS faculty have been recognized with some prestigious awards. **James Moore** received the WTS (formerly Women's Transportation Seminar) Diversity Leadership Award for his efforts to promote professional advancement of women and people of color in transportation. He also received the USC Academic Senate Distinguished Faculty Service Award, recognizing his extensive service to the University through participation in the Academic Senate and a variety of university activities. **Genevieve Giuliano** received the School of Policy, Planning and Development Sterling Franklin Outstanding Faculty Award.

Randolph Hall, founding METRANS Director, has been appointed USC Vice Provost for Research, effective July 2005. He will work with Provost Max Nikias (former Dean of Viterbi School of Engineering) to further advance research activities throughout the university. Prof. Hall will resign from the METRANS Executive Committee effective July 2005 in view of his increased research oversight duties.

D. DESCRIPTION OF EDUCATION ACCOMPLISHMENTS

The METRANS education program emphasizes student involvement in research projects. METRANS continues to make graduate student involvement an explicit criterion in making research awards in our RFP. Involvement of undergraduate students in METRANS funded research is encouraged. As a result, all projects have had significant student participation (some undergraduate, some graduate, and some both). Investigators are strongly encouraged to budget for student presentations at conferences, such as the Transportation Research Board annual meeting.

National Student Competitions

In 2004, METRANS again participated in the USDOT UTC “Outstanding Student Award” program. The METRANS student of the 2004-05 academic year is **Ms. Sara Hayden**, Master of Planning student in the School of Policy, Planning, and Development at USC. Ms. Hayden has worked as a research assistant on the METRANS project evaluating the terminal gate appointment system and has co-authored a chapter on transit marketing. She received three awards upon graduation, including the AICP Outstanding Attainment in the Study of Planning Award.

Mr. **Luca Quadrifoglio**, a Ph.D. candidate in the Daniel J. Epstein Department of Industrial and Systems Engineering at USC, won the Council of University Transportation Centers (CUTC) National Student Paper Award for best non-thesis paper in Science and Technology in 2004. He devised a transit-scheduling algorithm to improve public bus transportation by allowing buses to follow fixed routes with a few mandatory stops and, in addition, passengers can be picked up or dropped off anywhere they want along the way, such as at their homes or offices.



Luca Quadrifoglio receives award from Mr. Jack Buffington, Mac-Blackwell Rural Transportation Study Center

Ms. **Jennifer Russell**, PhD Candidate in the Daniel J. Epstein Department of Industrial and Systems Engineering at USC won the national WTS Helene M. Overly Memorial Scholarship Graduate Award, the highest award given by the WTS. Last year she won the competition for the Los Angeles Chapter of WTS; she then won the statewide competition, and ultimately the national competition. Now stationed in Hawaii with her husband, who is on active duty with the US Military, she expects to complete a dissertation in the area of fleet management strategies for emergency response.

Mr. **Kenneth Husting**, Master of Public Administration student in the School of Policy, Planning and Development was the winner of a fellowship to attend the Eno Transportation Foundation Leadership Development Conference. The Eno Foundation provides fellowships to 20 students throughout the US to attend the Conference. Mr. Husting is employed as a transportation engineer at the Los Angeles City Department of Transportation, and seeks to become a policy leader in transportation.

Mr. **Dooil Hwang**, PhD candidate in the Daniel J. Epstein Department of Industrial and Systems Engineering received top honors from the Institute of Industrial Engineering Construction Division for the best student paper for 2005. The award included a cash prize of \$1,500 plus travel expenses. Hr. Hwang's submission is titled "Contour Crafting – The Emerging Construction Technology", which the Construction Division cited as "very interesting, highly imaginative", and "very well written". His advisor is Professor Berok Khoshnevis. Mr. Hwang was recognized on May 16 at the 2005 IIE Annual Conference in Atlanta, where he presented his paper in the Construction Track of the Solutions Conference.

Internal and External Graduation Awards

The following USC students received awards:

- **Sara Hayden**, Master of Planning graduate, received the AICP Outstanding Attainment in the study of Planning award, the Certificate of Merit for Outstanding Master's Candidates, and the MPL Comprehensive Examination Prize.
- **Meredith Fant**, Master of Planning graduate, received the Gordon Whitnall Outstanding Academic Achievement in Planning award, as well as the Certificate of Merit for Outstanding Master's Candidates and the MPL Comprehensive Examination Prize.
- **Michael Hogan**, Bachelor of Science in Industrial and Systems Engineering, received the Viterbi School of Engineering Alumni Advisory Award for Outstanding Achievement in Leadership. The award is given annually to the Viterbi School of Engineering senior who has distinguished him or herself as a leader supporting the objectives of the School, the University, and the profession. Students are nominated by their departments, and Hogan was nominated after winning the Epstein ISE Department's Outstanding Student Award for 2005. He

will continue his studies in the Epstein Department in the Master of Science program in Systems Architecture and Engineering.

The following CSULB students received awards:

- **Gil Valencia**, a Master of Science student in Computer Science won first place in the Engineering category at the annual CSULB research competition on March 4, 2005. Gil presented his work on the METRANS funded project "Cooperative Optimum Time Window Generation for Cargo Delivery/Pick up with Application to Container Terminals". He graduated from Western Washington University in 1998 with a B.S. Physics. In 2001, he enrolled in California State University in Long Beach where he recently completed a M.S. in Computer Science. His academic interests include computer simulations and object-oriented programming languages.
- Three MAGL students received scholarships: **Denise Jeong, Marco Espinoza,** and **Tana Norodom.**

The METRANS Administrator compiles opportunities for student competitions and advertises them both by email to identified students and by advertisement on the METRANS web site.

Student Conference Participation

California Transportation Foundation's Transportation Education Symposium

USC civil engineering and urban planning undergraduates consistently participate in the California Transportation Foundation's (CTF) annual Transportation Education Symposium. The symposium gives upper-division undergraduates a unique opportunity to collaborate with senior industry and agency professionals as they prepare competing team responses to a mock request for project proposals. The CFT makes this experience available to outstanding student participants at no cost to these students. Civil Engineering seniors **Eric Joseph Lim**, and **Brian Veitch** attended the November 2004 Symposium at the Asilomar Conference Center in Monterey, California. METRANS provides the travel funding for symposium attendance.

University of California Transportation Center Conference

The 11th annual University of California Transportation Center (UCTC) Conference was held February 4-5, 2005 at the Atrium Hotel in Irvine, California, and was hosted by the Institute of Transportation Studies at UC Irvine. "Signs Ahead: Emerging Themes in Transportation Research" was the theme of this year's event, which was organized almost exclusively by students. Co-sponsors of the conference included METRANS, the University of California Transportation Center, Caltrans Division of Research and Innovation, UC Irvine Graduate Program in Transportation Science, UC Irvine Center for

Urban Infrastructure, and UC Irvine Institute of Transportation Studies. There were approximately a dozen USC students representing METRANS at the conference.

USC Doctoral student **Luca Quadrifoglio** presented his dissertation research, “Mobility Allowance Shuttle Transit (MAST) Services: Description, Formulation Heuristic and Viability.” **Ajay Agarwal**, **Chen Li** and **Duan Zhuan**, doctoral students in planning at USC, presented, “Los Angeles Regional Spatial Structure Analysis.”

Other USC graduate students participated in poster demonstrations:

- **Paul Dell’Aquila** (MPL) and **Sara Hayden** (MPL), “Evaluation of Terminal Gate Appointment System”
- **Alison Linder** (PhD-Planning) and **Ajay Agarwal** (PhD-Planning) “Impacts of the 2002 West Coast Port Shutdown”
- **Mengzhao Hu** (MPL) and **Xi Wang** (PhD- Computer Science) “SURE-SE: Sensors for Unexpected Roadway Events: Simulation and Evaluation .

CALSTART 2020 Conference, December 2, 2004

On Thursday, December 2, 2004, USC graduate students in planning, public policy, and transportation engineering attended *CALSTART 2020: California’s Transportation Energy Future Conference* in Downtown Los Angeles. The event served as a forum to discuss California’s actions to become the first state to establish a petroleum reduction goal and plan.



To encourage students to register for the conference, METRANS subsidized the student attendance fee in full, enabling students who could not otherwise afford the event to attend. In addition, CALSTART organizers invited students to travel to the conference from the USC campus via a hybrid bus, free of charge. Several students took advantage of this opportunity.

At the one-day conference, students learned about the need, technologies, methods, and modes for reducing California petroleum consumption and increasing the use of non-petroleum fuels by the year 2020. In the context of rising oil prices, increasing global oil demand, geopolitical instability, and global warming concerns, the conference focused on a number of questions: Is California’s transportation energy system sustainable? Are the economy and environment at risk? Can conventional, hybrid, and advanced vehicle technologies reduce the state’s reliance on oil? How can transit and smart growth contribute to a more sustainable transportation energy future? Beyond petroleum, what other fuels can play a role in California over the next 15-20 years?

Students returning from the conference acknowledged the importance of the issues discussed, expressing that it was a productive learning experience overall.

Other Student Activities

Student Participation in Research

METRANS is committed to student involvement in research. It is the best way for students to acquire research skills, and it is an important source of student support. Students are often attracted to transportation as a result of working on a research project.

Student involvement in transportation research projects is difficult to compare across years. The number of students supported on METRANS research projects reflects year-to-year differences in the number of ongoing projects. METRANS student involvement also includes research projects funded from other sources and reflects the variability of university-wide extramural funding levels. The general trend is toward increased student support, as total research funding in transportation has significantly increased at USC.

The current METRANS projects (all projects in progress at any time during 2004-05) together are supporting 69 graduate students, and the budgeted student support represents 35 percent of the total project funding. METRANS projects account for only part of the funded research support of graduate students. At USC, the School of Policy, Planning and Development and the Viterbi School of Engineering provide match funding for tuition. In addition, funding from the National Science Foundation, federal, state and local government, and foundations and industry support a wide spectrum of transportation research beyond that funded by METRANS.

Internships

Students have many opportunities for paid internships to gain professional experience before graduation. The USC MPL program requires 400 hours of professional experience; the USC MSCE program encourages such experience. USC students have interned at the Los Angeles County Metropolitan Transportation Authority, Southern California Association of Government, cities of Los Angeles, Pasadena, and Long Beach, and several major consulting firms.

Student and Faculty Transportation Field Experience

Field experiences are a routine part of transportation engineering courses offered at USC and CSULB. There are many opportunities for unique site visits in Southern California, including technology facilities such as Caltrans District 7's Transportation Management Center (TMC) and the Caltrans District 12 TMC; the Los Angeles County Department of Transportation (LADoT) Automated Traffic Surveillance and Control (ATSAC) Center; the Orange County Transportation Authority's (OCTA) fully electronic State Route 91 Express lanes and the Transportation Corridor Agencies' (TCA) system of Orange County toll roads; and the Partnership for Advanced Transit and Highways' (PATH) technology test bed facilities at UC Irvine, the City of Irvine, the City of Anaheim, and

Santa Ana. Southern California also includes specialized transportation facilities such as commuter, heavy, and light rail systems; the El Monte busway and the Harbor transitway; the Ports of Los Angeles and Long Beach; and the Alameda corridor.

Opportunities to visit these facilities and to discuss problems and objectives with associated professionals and officials contribute considerable depth to transportation education and research. METRANS serves as clearinghouse for field experiences associated with USC and CSULB classes and research and local transportation organizations such as WTS, providing van transportation when demand justifies it. This past year, student-centered field trips were organized to Caltrans District 7's Transportation Management Center (TMC) and the Los Angeles County Department of Transportation's (LADoT) Automated Traffic Surveillance and Control (ATSAC) Center, the Ports of Long Beach and Los Angeles, and the Alameda Corridor.

Institute for Transportation Engineers Student Chapters

Professor Emelinda Parentela continues to serve as the advisor to the Southern California Chapter (District 6) of ITE (Institute of Transportation Engineers). Four groups presented transportation papers during the ITE student night held in May 2005 - one was awarded the short paper award - in total, the group received \$450 for presenting the papers. CalPoly received \$500. One student attended the CTF symposium held in November in Monterey California. Two tours were made: Long Beach Transit Facility Tour and the Port of Los Angeles boat tour.

MERIT Research Program/McNair Scholars Program

Every year, a select group of promising incoming freshmen are invited by the USC School of Engineering faculty to work on projects in their research laboratories or in the field. These student researchers actively participate in the development of new technology throughout their undergraduate years. In addition to giving students excellent first-hand research experience, this program can help offset the cost of education. Each participant earns an annual stipend for their work. The School of Engineering currently provides a stipend of \$2000; \$1500 as wages and \$500 for research expenditures. This renewable award is separate from other financial assistance offered by the University.

These undergraduate Merit Research Scholars are brought to the attention of USC faculty based on the student's interests and the faculty member's willingness to participate in the Merit research program. USC engineering faculty funded by METRANS are encouraged to participate in the Merit Research Program. Funded METRANS projects and lists of investigators are forwarded to the Office of Student Affairs in the School of Engineering to ensure that prospective students know these research projects are available to them. Prof. James Moore acts as a liaison to encourage placement of MERIT Scholars in transportation projects, and for students participating in the McNair Scholars program.

Degree Programs, Courses, and Seminars

Student involvement in transportation education and research continues to be strong at both USC and CSULB. Ongoing changes in transportation-related course offerings make year-to-year comparisons difficult. Civil engineering enrollments (a large source of transportation-related course enrollments) at USC have remained steady over the past year, but transportation engineering enrollments have increased substantially, approximately doubling. Enrollment in the MPL continues to increase, as does the number of MPL students concentrating in transportation. With the transportation field concentration now available in public policy and public administration, additional students are concentrating in transportation. Graduate student numbers are growing at CSULB as a result of the MAGL degree program.

New Courses

No new courses have been added at USC. However, the special topics graduate course, "Coastal Zone Policy and Planning," has now been approved as a regular course, PPD 694. This course addresses the problem of the coastal zone as scarce resource, discussing the various uses (ports, recreation, tourism, etc.) and examining strategies for planning and managing the urban coastline.

The classes listed below are transportation-related classes that should have been on the original lists over the years and are only just being added. The explanation following the course listing is text directly from the 2004-2005 CSULB catalog.

GEOG 446 Land Use Planning This course provides an examination of urban land use planning from the perspective of professional urban planners. The course will focus on planning issues and responses in some of the following major areas: land use, coastal zone planning; resource planning; urban growth, speculation and economics; design and aesthetic issues; planning parameters for residences, shopping center, and industrial parks, revitalization of built-up core areas; and transportation.

GEOG 466 Urban Geography Problems Examination of cities; their location, shape, structure and function.

GEOG 467/567 Urban Geography/Metropolitan Problems Geographic components of metropolitan problems and their solutions. Problems related to transportation systems, housing, evolution of ghetto, urban perception and behavioral patterns will be discussed in terms of theoretical and practically applied urban planning solutions.

Changes in USC Graduate Programs

As noted last year, the PhD in Transportation Engineering within Civil and Environmental Engineering is being phased out. Prospective doctoral students indicating an interest in transportation engineering are being directed to the PhD program in Industrial and Systems Engineering, which now has the greatest concentration of

transportation faculty. This is an appropriate match, and reflects a deliberate, strategic focus on applied mathematics and systems as opposed to materials and facilities.

The new PhD program in the School of Policy, Planning, and Development begins in Fall 2005. There is one PhD with field concentrations in public administration, public policy, urban planning and real estate development. This does not affect students seeking a concentration in transportation planning; the number of PhD students in transportation continues to increase. Last year a common set of electives for field concentrations was established at the Master's level, which allows students in urban planning, public policy, or public administration to specialize in transportation.

USC Transportation Students

In the USC School of Policy, Planning, and Development (SPPD), 6 students completed the comprehensive examination in the Master of Planning "Transportation and Land Use" field specialization in 2004-05. This is no longer a good measure of students seeking careers in transportation; some take the "Land use and sustainable regional growth" comprehensive exam. There are currently about 10 Master of Planning, 2 Master of Public Administration, and 3 Master of Public Policy students in the transportation field concentration in SPPD. Approximately 7 urban planning students and 1 public administration student are pursuing transportation-related PhD degrees. One student completed the PhD in urban planning; another completed the PhD in public administration.



Masters Graduates (from left) Lauren Siniawer, Paul Dell'Aquila, Kenneth Husting, Megan Cummings, Sara Hayden, Mengzhao Hu with Professor Genevieve Giuliano

In the USC School of Engineering, 5 students completed the MSCE – Transportation Engineering program. 7 students were enrolled in the Fall of 2004. Four students completed the PhD in Industrial and Systems Engineering.

Seven new USC doctoral dissertations in transportation were either defended or filed by the Spring of 2005.

- Scheduling Algorithms for Mobility Allowance Shuttle Transit (MAST) Services, *Luca Quadrifoglio*, Doctor of Philosophy, Industrial and Systems Engineering (M. Dessouky, chair).
- Green Logistics for Industrial Waste Materials and By-Products, *Hamid Pourmohammadi*, Doctor of Philosophy, Industrial and Systems Engineering (M. Rahimi, chair)
- A Slot Model for Automated Highway Flow Optimization through Entry, Exit and Flow Control, *Chinan Chin*, Doctor of Philosophy, Industrial and Systems Engineering (R. Hall, chair).
- Comparative Study of Organizational Commitment in the Public and Private Sectors: The Case of Transportation Agencies in Thailand, *Supamas Trivisvavet*, Doctor of Philosophy, Public Administration (P. Robertson, chair).

- Beyond Benefits and Costs: Understanding the Outcomes of Technology Deployment in Multi-Agency Transit Settings, *Thomas O'Brien*, Doctor of Philosophy, Urban Planning (G. Giuliano, chair).
- Investigation of soil – flexible foundation – structure interaction for incident plane SH waves, *Valdo Gicev*, Doctor of Philosophy, Civil and Environmental Engineering (M. Todorovska, chair)
- New Algorithmic Approaches to the Integrated Inventory Distribution Problem, *Tamer Abdelmaguid*, Doctor of Philosophy, Industrial and Systems Engineering (M. Rahimi, chair).

Shih-Che Lo, PhD, Industrial and Systems Engineering, 2004, has joined the faculty of National Taiwan University. Hamid Pourmohammadi is an Assistant Professor of Management at the College of Business Administration and Public Policy at California State University, Dominguez Hills. Thomas O'Brien is Director of Research, Center for International Trade and Transportation, CSULB, and Applied Research Coordinator, METRANS. Luca Quadrifoglio has accepted a Post-Doctoral research position in the DHS Center for Risk and Economic Analysis of Terrorism Events at the University of Southern California.



Engineering Graduates with Professor Jim Moore and Research Assistant Professor Le Dam Hanh

CSULB Students

One new PhD was granted at CSULB:

- “Numerical and Experimental Investigations of Two Side-by-Side Round Turbulent Jets in a Cross Flow,” *Carlos A. Orrala*, Doctor of Philosophy in Mechanical Engineering.

CSULB has a joint PhD program with Claremont Graduate University. Dr. Orrala is currently Senior Engineer and Research Associate, Center for Energy and Environmental Research and Services, CEERS, California State University, Long Beach

In 2004-05, 18 students completed the MSCE – Transportation Engineering program. CSULB's Master of Arts in Global Logistics (MAGL) debuted in spring 2002 with the first cohort. In spring 2003 and 2004 two additional cohorts were admitted. Eleven students completed the program in December 2004, and the third cohort will complete the program in December 2005. Beginning in 2005, the admission of new cohorts will occur in the fall, in line with CSULB admission practices.

The MAGL degree is interdisciplinary, combining the analytical skills of a traditional MBA with a strong emphasis on logistics in a global setting. It is a 30-unit accelerated graduate program that can be completed in less than two years (21 months). It is offered through CSULB's Department of Economics and administered through the Center for International Trade and Transportation (CITT) and the University College Extension Services. It developed in response to increasing demand for broad training in global logistics and supply chain management. The program prepares professionals to deal with the complexities of supplier relations/selection, purchasing negotiations, operations, e-commerce and many other dimensions of supply chain management. The Port of Long Beach has offered scholarships of \$5000 to each of three carefully selected students.

In 2004-05, 49 students completed the CITT certificate program leading to the Professional Designation as a Global Logistics Specialist. This is a professional training program. See details in Section E.

Transportation and Location Research Seminar

This seminar series serves to 1) provide speaking experience for advanced graduate students, 2) remind faculty of interdisciplinary transportation research opportunities, 3) provide a focus for transportation teaching and research, 4) provide a speaking forum for external visitors, and 5) increase the visibility of transportation research at USC and CSULB. The seminars are typically scheduled on Wednesdays throughout the academic year. In some cases external visitors are jointly sponsored with other groups in order to provide wider opportunities for seminar participation. The seminar resulted in excellent cooperation between faculty and students in several USC departments. During the Spring 2005 semester, the seminar series was held jointly with an ISE graduate seminar course. USC and CSULB faculty and graduate students, local alumni, and local agency representatives are invited to the seminar. As a practical matter, the distance between USC and CSULB has proven to be a significant barrier to participation from CSULB. The 2004-05 seminars are listed below.

Prior to the event, a METRANS research assistant publicizes the seminar through both an email list serv and via flyers. In the '04-'05 academic year, METRANS hosted five speakers. Below are the topics of each of the presentations, along with abstracts and bios for each speaker, respectively.

METRANS Speaker Series, 2004-2005

**USC Transportation and Location Research Seminar
Fall 2004**

Date	Speaker	Location	Topic
October 27	Kenneth Small Professor of Economics University of California, Irvine	RGL 105	Does Britain or the United States Have the Right Gasoline Tax?
November 10	Fernando Ordonez Assistant Professor, Industrial and Systems Engineering University of Southern California	KAP 203	Robust Capacity Expansion of Transit Networks and Estimating OD Pair Demand

**USC Transportation and Location Research Seminar
Spring 2005**

Date	Speaker	Location	Topic
January 18	Anthony Downs Author and Senior Fellow Brooking Institution	RGL 101	Still Stuck in Traffic
January 19	Marco Diana Post Doctoral Fellow INRETS (The French National Institute for Transport and Safety Research)	RGL 308	The Impact of Different Organizational Forms of Road Public Transport on Distance Covered and Atmospheric Pollution
January 20	Amelia C. Regan Associate Professor Computer Science and Civil Engineering University of California, Irvine	GER 309	Optimization Problems in the Logistics Industry
March 1	Donald Shoup Professor, School of Public Affairs University of California, Los Angeles	RGL 101	The High Cost of Free Parking
April 6	Patricia Mokhtarian Civil and Environmental	RGL 219	When is Getting There Half the Fun? Understanding the

Engineering
University of California, Davis

Positive Utility of Travel

April 20

Deike Peters
Post Doctoral Fellow
Center for Metropolitan Studies
Technical University (TU)
Berlin

RGL 219 Los Angeles and Berlin:
Opposite Realities But Similar
Policy Discourses – How Can
That Be?



Deike Peters presentation, April 20, 2005.

Continuing Education Programs

These are described in the technology transfer section under professional training.

E. DESCRIPTION OF TECHNOLOGY TRANSFER ACCOMPLISHMENTS

METRANS technology transfer activities are conducted primarily at CSULB through the University College and Extension Services and the Center for International Trade and Transportation, under the direction of Marianne Venieris. The CITT has a Policy Committee that plans and approves all outreach events. The METRANS Director is a member of the CITT Policy Committee. The METRANS Executive Committee reviews and approves all major technology transfer activities. Technology transfer at METRANS is more appropriately described as professional training and information dissemination. The topical focus of METRANS technology transfer is goods movement and international trade.

Professional Training

CSULB offers a series of industry driven training programs through the University College and Extension Services and the Center for International Trade and Transportation (CITT).

Global Logistics Specialist

The Global Logistics Specialist (GLS®) professional designation is the foundation of a spectrum of programs to cover the industry's training/education needs. It is designed to set a professional standard for the international trade logistics industry and, as such, is aimed at foreign traders and all stakeholders involved in the movement of cargo around the world. This includes both asset-based companies (ocean carriers, rail, trucking, and warehousing) and non-asset-based companies (freight forwarders, customs house broker, consolidators, etc.). In an industry/university partnership, the curriculum is designed to provide broad based, hands-on training for individuals involved in, or entering any part of the logistics chain. Carefully selected topics have been grouped into six core modules that are offered within a one-year time frame one night class per week. Each module contains up-to-date, practical information delivered through innovative hands-on instruction and site visits, making the program a unique training concept in this industry. After successfully completing all six modules and submission of a capstone project on integrated logistics planning, the participant will earn a professional designation and be a Global Logistics Specialist.

In 2004-2005, 49 students were awarded the Global Logistics Specialist (GLS®) professional designation. Since its inauguration in January 1997, over 800 people have attended classes in the program and to date over 500 have earned the GLS® professional designation.

GLS Online

The conversion of the rigorous, 118 hour GLS® certificate program has been completed. METRANS funding, together with a significant cost sharing commitment from CSULB, made development of the online course possible. The online version makes available

throughout the US the courses taught by top practitioners from every facet of the industry. The inaugural class started June 9th 2004 and as of July 1, 2005, 42 students have enrolled in various modules of the GLS Online.

The online version follows the same format as the regular program; it is organized in five modules plus a module that focuses on the capstone project. To earn the GLS® professional designation, students must work synchronously through each module and work in virtual teams to complete the capstone project. The latter is a problem solving case study involving a fictitious national retailer. The project is designed to test the conceptual, analytical, teamwork, and presentation skills the students have developed throughout the program. Deliverables for this project include a written Strategic Supply Chain Management Plan and an oral presentation, using virtual meeting software, given in real time over the Internet.

As of May 2005, 5 students have completed the entire online program. The course has done remarkably well; program evaluation surveys collected from students, the facilitator, and industry experts have been very positive. A number of testimonials have been posted on www.uces.csulb.edu/citt . A through assessment followed the first round of classes and various changes and improvements have already been implemented. These include a “New to Logistics” folder, refined benchmarks and rubrics for various lessons, and the creation of “Virtual Office Hours” set for each Friday afternoon. During the office hour, the industry expert on the material taught during the week is available to communicate with students in real time via email. Students post questions and comments in the “office hour chat room” and the industry expert responds with answers and additional up-to-date information pertinent to his/her industry segment.

Of the 42 students who took part in the online classes, 30 are from California. Most of these were outside the immediate CSULB service area. 11 were from other states including New York, Florida, Montana, Wisconsin, Maryland, North Carolina, Texas, Washington, Arizona and Utah.

A nationwide marketing campaign was implemented in Spring 2005. It targeted the military and the Coast Guard among others. The Port of Long Beach offered a \$5000 contribution in support of this marketing plan. We have already received many inquiries in response to the campaign and expect a full class of 16 students when the next round of classes begins on July 27, 2005 .

Workshop: Global Distribution Overview/Introduction to Logistics and the Supply Chain

Sponsored by Local 13 of the International Longshore and Warehouse Union (ILWU), the Center for International Trade and Transportation (CITT) offered a five hour seminar on Saturday, May 7, 2005. It was held at the offices of Local 63; sixteen longshore workers attended. The purpose of the seminar was to generate a better understanding of the role logistics plays in the operations of supply chain management and execution. The seminar focused on elements of the supply chain and how they are integrated in order to increase the flow of critical information from manufacturer to end user. These concepts

were illustrated with real-world examples and scenarios. The combination of the general overview and actual daily operations allowed the attendees to apply their new found logistics / supply chain management knowledge to actual events. The participant feedback clearly indicated that the seminar was a success. Many participants requested additional training sessions.

This training program for the ILWU rank and file is a milestone. It is a consequence of the Annual CITT town hall meetings which have been a learning resource for hundreds of ILWU members over the past six years.

Workshop: Caltrans Goods Movement/Logistics Seminars

METRANS, through CITT, designed and implemented two three-day Goods Movement/Logistics seminars for Caltrans. The intent of the seminars was to introduce planners and engineers to what is involved in moving international freight effectively from source to destination, and to engage them in a broader discussion of goods movement and logistics planning.

The workshops were held on April 13-15 in Long Beach and on April 27-29 in Oakland. In each case 30 participants took part. While the majority were from Caltrans, local Metropolitan Planning Organizations (MPOs) were also represented.

The curriculum maximized the participation of industry professionals to help establish relationships between planners and industry experts. In the process, the planner identified him/herself as a goods movement stakeholder and came to recognize potential partners for planning and implementation activities. Toward this end a Best Practices approach was used that allowed participants to see how various projects have developed, been funded, and involved unique partnerships.

The workshop included an overview of the supply chain and goods movement stakeholders, a discussion of the role of Caltrans and its partner agencies in planning for goods movement., a series of best practices presentations, and site visits to a marine terminal and intermodal facility.

Workshop: Virtual Weigh and Compliance Station Workshop (VWCS)

METRANS, through CITT, staged a one-day Goods Movement workshop for Caltrans in February 2005 at California State University, Long Beach. Caltrans, the California Highway Patrol, and others have begun an investigation into the virtual weigh and compliance station (VWS) concept. The workshop with key stakeholders was part of the early inquiry to report on current research activities, solicit input on the proposed development strategy, and create a working team to help guide future development and deployment. The objectives of the METRANS workshop were to: (a) introduce the VWCS concept, (b) discuss VWCS functions and capabilities, (c) provide an overview of project phasing, (d) assess function and implementation issues and (e) solicit input from workshop attendees on this concept.

The overall goal of the VWCS program is to promote commercial vehicle compliance through the application and fusion of sensor, communication, and information technologies. The first step in creating a virtual weigh station is accomplished by adding cameras and wireless communications to Caltrans' existing weigh-in-motion facilities and then integrating that system into CHP's operations for real-time commercial vehicle enforcement. The next step will be to add an information technology component that would enable automated weight enforcement capability. Adding additional functionality through sensors that would dynamically check brakes, vehicle height and length, or emissions would expand the system into a virtual weigh and compliance station.

Applied Research Program

To both address the continuing challenge of involving CSULB faculty in METRANS research and better support our outreach efforts, we have launched a program in applied research, *Monitoring the Ports*. The applied research program is directly linked with our goods movement and international trade outreach activities. See Section C for details.

Outreach Events

The port complex, like other major transportation complexes, generates significant public benefits but also significant localized costs. Increasingly communities bearing these costs are seeking to limit the growth of these transportation complexes. These efforts may limit overall economic growth of the region and the nation.

The region and the industry are deeply divided on how growth can be absorbed over the next several years. The I-710 expansion project, together with some high visibility lawsuits by environmental groups over port expansion projects, have placed increasing pressure on port and international trade interests to broaden their perspective. The Annual State of the Trade and Transportation Industry Town Hall Meetings, sponsored by METRANS over the past six years, have consequently evolved to focus more on the larger impacts and less on the operational issues of the ports. The challenge for METRANS and CITT is to maintain their role as neutral forum while fostering education, research and information exchange that positively contributes to resolution of these conflicts.

Town Hall Meeting

With sponsorship from METRANS, CITT staged the seventh Annual State of the Trade and Transportation Industry Town Hall Meeting, titled *Lessons Learned from the 2004 Peak Season Crisis: Causes, Impacts, Solutions* in March 2005 at the Carpenter Performing Arts Center, California State University, Long Beach, California. The event attracted over 1000 industry stakeholders, including organized labor, port authorities, industry representatives, and public officials.

This year's Town Hall was titled, *Lessons Learned from the 2004 Peak Season Crisis: Causes, Impacts, and Solutions*. The purpose was to discuss the response of goods

movement stakeholders to the unprecedented volumes of cargo moved through the ports of Los Angeles and Long Beach during the summer and fall of 2004, and the adjustments being made for the future. As always, a major thrust of the meeting was to encourage involvement of the ILWU membership in a proactive way on issues affecting members as both workers and residents of the community.

The panel discussion included representatives of the longshore union, the Pacific Maritime Association, terminal operators, ocean carriers, the National Industrial Transportation League, and the rail and trucking communities. The focus of the panel discussion was on solutions to the problem of limited capacity on the docks, on the highway and rail networks, and at distribution centers. There was general agreement that increasing capacity through increased infrastructure was only a long term solution. Shorter term improvements depend upon changes in operations, including the hours during which the supply chain operates, and increased use of technology to make existing land uses more efficient. There was also consensus surrounding the need for a national freight transportation policy.

As in previous years, the evening included a video presentation. This year's video highlighted both the causes and impacts of the 2004 goods movement crisis. The 7th Town Hall video was featured in workshops sponsored by the USC Southern California Environmental Health Sciences Center, the World Trade Center in Oakland, and a conference hosted by the San Diego World Trade Center. Requests for copies were received from Toyota (10 copies), the National Industrial Transportation League (NITL), San Francisco State University, Mississippi World Trade Center, and Exel Global Logistics Inc.

The event received support and financial sponsorships from the Ports of Los Angeles and Long Beach, the Pacific Maritime Association, International Longshore and Warehouse Union (Locals 13, 63, and 94), Alameda Corridor Transportation Authority, and Long Beach City College Office of Economic Resource Development. The event also received formal endorsement by the board of directors of 21 trade associations. The Town Hall was open to anyone and free of charge.



The event was webcasted; the webcast is available at www.uces.csulb.edu/citt.

The Annual Town Hall meetings have received wide recognition in the goods movement industry. They have been praised by union members, management, Long Beach and Los Angeles Port officials, and the public sector. The extent of local stakeholder support is demonstrated by the formal endorsements received, as well as by the over \$30,000 in matching funds contributed to CITT in support of this event.

Town Hall White Paper

A main objective of the annual Town Hall meetings is to explore opportunities and policy options to further common goals, and to establish a means for on-going communication among port stakeholders. One of the ways of doing this is through a Town Hall White Paper. The White Paper provides a context for the discussion and sets the stage for future steps to be taken by the participants. It includes a timeline of key events leading up to the peak season crisis and responses made by stakeholders in the aftermath. It also looks ahead to likely supply chain pressure points in 2005, including trucking and rail capacity.

A summary of the 7th Town Hall discussion suggests an awareness of the need to develop solutions to common problems but considers why this goal remains elusive: what benefits the self-interest of individual stakeholders does not always benefit the supply chain as a whole. The White Paper also proposes a redefinition of both “peak season” and “crisis.” Peak volumes seem to be moving from October to November and without the drop-off that has traditionally occurred as Christmas approaches. This is a trend to observe. Furthermore, despite larger ships and diversions to other ports, the San Pedro port complex moved record numbers of containers in 2004. The ability of other ports to act as

relief valves for Southern California may be more of a sign of the supply chain at work than in crisis.

The final White Paper will be made available on both the METRANS and CITT websites.

METRANS Annual Conference: *Mobility in the Metropolis: Making the Most of What We have*

Improving the productivity of our transportation system has become increasingly important as growing demand for transport of people and goods has far exceeded growth in transport capacity. How can we make the best use of our existing resources? The Annual conference, held at the USC Davidson Center, presented results from recent METRANS research on improving productivity of both goods and passenger transport.

Results from recent METRANS research projects were showcased in a series of presentations and several poster demonstrations. Keynote speaker was Brian Smith, Caltrans Deputy Director of Planning and Modal Operations. Session 1, “Making the Most of Our Resources,” included presentations by Peter Gordon, James Moore, and Anastasios Chassiakos. Session 2, “More Effective Utilization,” included presentations by Le Dam Hanh, Kristen Monaco, and Randolph Hall. At the reception, poster demonstrations featured other METRANS studies, including “Increasing Bus Transit Ridership” “SURE-SE: Sensors for Unexpected Roadway Events,” “Robust Investment Decisions for Highway Capacity Expansions,” “Reducing Pollutants from Mobile Sources,” “Bridge Structural Health Monitoring,” and Investigating the Role of Driver Decisions and Styles in Highway-Rail Crossing Accidents.” The Conference research presentations, project description and final reports for completed projects are posted on the METRANS website.

Other Outreach Activities

Members of the METRANS management team are active in a variety of outreach and professional service activities.

METRANS Director Genevieve Giuliano served as Chair of the Transportation Research Board Executive Committee for calendar year 2003 and continues as Executive Committee member through 2006. She currently serves as chair of the Sub-Committee on Planning, Programming and Research. She was elected to the Executive Committee of the Council of University Transportation Centers in June 2005. She is a member of the Southern California Automobile Association Mobility Council, a group of state and local leaders who seek to increase public awareness of California’s transportation needs, and has recently joined the Southern California Association of Government’s Goods Movement Task Force.

METRANS Deputy Director Marianne Venieris is a member of several local business associations. She serves on the Transportation Research Board (TRB) Education &

Training Committee, ABG20, the Board of the California Marine and Intermodal Transportation System Advisory Council (CALMITSAC), and on the Board of Directors of the Gateway Cities Partnership, Inc. a regional, nonprofit economic collaborative comprising twenty-seven cities in Los Angeles County. She has given speeches and moderated panels and meetings of the Transportation Clubs International Conference, Harbor Transportation Club, and the Carson Chamber of Commerce. She also moderated a Port Security Town Hall Meeting for California Assemblywoman Betty Karnette.

Ms Venieris is the 2005 recipient of the prestigious Stanley T. Olafson Bronze Plaque in recognition of her outstanding contributions to the advancement of World Trade and international relations in the greater Los Angeles area. The Journal of Commerce profiled her in 2004 as one of 22 Women in Trade and Transportation in the US with important and influential positions.

METRANS Executive Committee member James Moore is an active member of the Los Angeles Chapter of WTS (formerly Women's Transportation Seminar). This year he was awarded the WTS Diversity Leadership Award for his efforts to promote the professional development of women and people of color in transportation.

Publications

Building Bridges

A bi-monthly newsletter, *Building Bridges*, began publication in January 2001. The newsletter is a briefing document to inform and promote dialogue within the maritime/logistics industry community. Three thousand hard copies and about 100 electronic versions of each issue are distributed to ILWU local members, industry leaders, government agencies, and METRANS Advisory Committee Members. In addition, the newsletters are made available at the Town Hall meetings, trade association meetings, and via the METRANS and CITT websites. As of June 2005, 13 issues have been published. Three issues have been published since July, 2004.

The objectives of *Building Bridges* are:

- To provide a neutral communications channel on industry issues
- To lead to fruitful and open dialogue
- To encourage closer cooperation among all industry stakeholders

The newsletter is formulated, edited, and distributed by an Editor-in-chief selected by the CITT Engagement Subcommittee. An Editorial Board that includes members of the subcommittee and the METRANS Director provides oversight.

METRANS News

The first issue of the *METRANS News* was published in February 2003. This newsletter summarizes METRANS research, education and information dissemination activities. It

compliments the METRANS website and broadens our exposure to the research community, government, and industry. The newsletter features METRANS researchers, conferences and other events, recent publications, interviews with key individuals involved in METRANS, and other newsworthy activities and events. With a three issues per year publication schedule, it is distributed electronically to the national research community, federal, state and local leaders, industry leaders, and federal, state and local transportation agencies. Printed copies are distributed to the METRANS Advisory Committee, public agency managers, and elected officials. The newsletter is also available on the METRANS website. As of June 2005, seven issues have been published. Three issues have been published since July, 2004.

Outreach - Website

The METRANS website is the primary source for dissemination of information on METRANS activities. The METRANS Strategic Plan, Annual Reports, and Semi-Annual Reports are available in downloadable form. All research project final reports, conference summaries, and technology transfer reports are also available. The *Building Bridges* newsletter and *Metrans NEWS* are available, as well as information on CSULB's Master of Arts in Global Logistics and the new GLS® Online. An in depth program description including a list of core courses and options of specialization courses is provided. The website also identifies educational programs in transportation and links to 120 sources of transportation information. In particular, we have sought out organizations that find funding for transportation research, student internships, student awards and professional organizations, and provided links to their webpages. The UTC search engine locates documents on all other UTC websites by keyword.

The website is continually updated to include the latest research project descriptions and reports. The website maintenance also includes updates to information on key personnel, past events, and changes to the METRANS Advisory Committee. Updated information was added for METRANS' conferences and presentations including the Annual Town Hall and White Paper, the 2005 METRANS Research Conference and the upcoming National Urban Freight Conference. The website also includes updated versions of the Annual and Semi-annual Reports and information on the online version of the GLS program. As of June 2005, www.metrans.org had received a total of about 72,400 hits on the home page. This represents a large increase compared to the previous year.

Although the METRANS website has served us well, it is showing its age, and does not take advantage of new technology to allow easier navigation and user interaction. We initiated a complete re-design of the website; the new website is scheduled to go live in September 2005.

Project Reports

Project reports are distributed through the METRANS website. The Research page of the site provides a convenient mechanism for downloading and viewing reports. All

completed reports are available online. All Final Reports completed after May 2003 are available in print form by request.

F. LIST OF PROJECTS

The following lists ongoing and completed research projects in METRANS. Complete project descriptions can be found on the METRANS web site at www.metrans.org.

ONGOING PROJECTS:

Draft Report Submitted

Project Number:	00-12
Research Project:	Freeway Bus Station Area Development: Critical Evaluation and Design Guidelines
Project Number	03-13
Research Project	Hydrogen Storage System for Transportation Applications
Project Number	03-18
Research Project	Cooperative Optimum Time Window Generation for Cargo Delivery/Pick Up with Application to Container Terminals
Project Number	03-24
Research Project	Increasing Bus Transit Ridership: Dynamics of Density, Land Use and Population Growth
Project Number	03-27
Research Project	Methodology for Probabilistic Assessment of Permanent Ground Displacement Across Earthquake Faults for the Transportation System
Project Number	04-03
Research Project	Evolution of Collective Sensory Systems for Intelligent Vehicles
Project Number	04-08
Research Project	SURE-SE: Sensors for Unexpected Roadway Events: Simulation and Evaluation
Project Number	04-13
Research Project	What Can We Learn From CTPP 2000? Neighborhood Attributes, Commuting Behavior and Jobs-Housing Balance: A Comparative 1990-2000 Study Across California's Major Metropolitan Areas

Research in Progress

Project Number	01-3
Research Project	Analysis of Vibrations as Infrastructure Deterioration Caused by High-speed Rail Transit
Project Number	03-17
Research Project	Innovative Bridge Structural Health Monitoring Using Variable Stiffness and Damping Devices

Project Number	03-19
Research Project	Measuring California’s Role in Supporting Interstate Goods Movement: Comprehensive Assessment of Interstate Freight Flows
Project Number:	03-23
Research Project:	Improved Modeling of Network Transportation Flows, Including Land Use-Transportation Interactions: A Research Collaboration Between USC (METRANS) and Caltrans District 7 (Office of Advance Planning)
Project Number:	03-25
Research Project:	Development of an Artificial Intelligence Based Traffic Simulation Model Using the Discrete Element Method
Project Number	04-04
Research Project	Landside Surface Transportation Impact of Short Sea Shipping in Southern California
Project Number	04-05
Research Project	Development of Methods for Handling Empty Containers with Applications in the Los Angeles/Long Beach Port Areas
Project Number	04-06
Research Project	Evaluation of the Terminal Gate Appointment System at the Los Angeles/Long Beach Ports
Project Number	04-09
Research Project	Reduction of Construction Project Risks to Pedestrians, Drivers, and Transit Passengers Through Analysis of Historical Accident Records
Project Number	04-15
Research Project	Confidence Intervals for Estimated Traffic Demand
Project Number	04-18
Research Project	Transit Investment and the Capitalization of Access into Land Values
Project Number	05-01
Research Project	Validation of Sensory Systems for Intelligent Vehicles
Project Number	05-04
Research Project	Ports and Highways Infrastructure Investment and Inter-State Spatial Spillovers
Project Number	05-06
Research Project	Cambodian Access to Transportation: Impact on Senior Nutrition and Congregate Meal Service Programs
Project Number	05-10
Research Project	Improving Trucking Safety: Effects of Driver Hours of Service Regulations
Project Number	05-14
Research Project	SURE-FT: Sensors for Unexpected Roadway Events: Field Trials
Project Number	05-17
Research Project	Institutional Considerations in Freight Movement in Port of Los Angeles/Long Beach

Research Projects Approved, not started as of 6/30/05

Project Number	05-11
Research Project	Simulation Test Bed and Evaluation of Truck Movement Concepts on Terminal Efficiency and Traffic Flow
Project Number	05-12
Research Project	Evaluation of Extended Gate Operations at the Ports of Los Angeles and Long Beach
Project Number	05-13
Research Project	Study of the Exposition Light-Rail's Safety for Pedestrians and Drivers

COMPLETED PROJECTS:

Project Number:	99-3
Research Project:	A Task Decomposition Model for Dispatchers in Dynamic Scheduling of Demand Responsive Transit Systems
Project Number:	99-5
Research Project:	Improving Fuel Economy and Emissions Performance of Commercial Goods Transportation and Mass Transit Vehicles Using Throttleless Engines
Project Number:	99-7
Research Project:	Modeling and Route Guidance of Trucks in Metropolitan Area
Project Number:	99-10
Research Project:	Implementing a Statewide Goods Movement Strategy and Performance Measurement of Goods Movement in California
Project Number:	99-11
Research Project:	The Role of Public Transit in Mobility of Low Income Households
Project Number:	99-14
Research Project:	2D Virtual and Physical Simulation of Automated Container Terminal Facilities and Analysis of Impact on In-Land Transportation
Project Number:	99-18
Research Project:	Identification and Analysis of Local Agency Transit Project Performance Criteria
Project Number:	99-19
Research Project:	Solid State Sorption Air Condition System for Containerships and Vehicles – Phase I
Project Number:	99-22
Research Project:	Highway Oriented Transit System (HOTS): A Comprehensive Land Use-Transportation Strategy to Improve Transit Service Delivery
Project Number:	99-23
Research Project:	Non-Invasive Means of Investigating Container Contents for Customs Agents at Port

Project Number:	99-25
Research Project:	Assembling and Processing Freight Shipment Data: Developing a GIS-Based Origin-Destination Matrix for Southern California Freight Flows
Project Number:	99-27
Research Project:	Dynamic Coordination Framework for Resource Allocation in Trucking Operations
Project Number:	00-3
Research Project:	Alternative Access and Locations for Air Cargo
Project Number:	00-5
Research Project:	Developing Risk Model for Commercial Goods Transport
Project Number:	00-6
Research Project:	Assessment of Hybrid Vehicle Control Strategies in Planning Future Metropolitan/Urban Transit Systems
Project Number:	00-7
Research Project:	Solid State Sorption Air Conditioner System for Containerships and Vehicles - II
Project Number:	00-8
Research Project:	Travel Patterns of the Elderly
Project Number:	00-11
Research Project:	Investigating the Role of Driver Decision Styles in Highway-Rail Crossing Accidents
Project Number:	00-13
Research Project:	Distributed Architecture for Real-Time Coordination in Transit Networks
Project Number:	00-15
Research Project:	Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Area with Adjacent Ports
Project Number:	00-16
Research Project:	Design and Optimization of a Conceptual Automated Yard Using Overhead Grid Rail System
Project Number:	00-17
Research Project:	An Integrated Approach to Managing Local Container Traffic Growth in the Long Beach/Los Angeles Port Complex Phase II
Project Number:	01-2
Research Project:	Reducing Pollutants from Mobile Sources
Project Number:	01-5
Research Project:	Re-engineering the Logistics of Empty Cargo Containers in the SCAG Region
Project Number:	01-6
Research Project:	A Methodology for Joint Optimization of Service and Life Cycle Environment Impact Assessment of Transport Systems
Project Number:	01-10
Research Project:	Smart Damping for Monitoring the Health of Bridge Structures

Project Number:	01-14
Research Project:	Developing and Testing Methodologies for the Evaluation of Highway Widening Plans to Facilitate Freight Flows
Project Number:	01-16
Research Project:	Automated Trucks on Dedicated Lanes for Cargo Movement
Project Number	03-01
Research Project	A Novel Approach to Routing and Dispatching Trucks Based on Partial Information in a Dynamic Environment
Project Number	03-06
Research Project	Robust Investment Decisions for Highway Capacity Expansions
Project Number	03-07
Research Project	Freight Routing and Containerization
Project Number	03-20
Research Project	Neighborhood Attributes and Commuting Behavior: A Comparative Study of California's Major Metropolitan Areas

APPLIED RESEARCH PROJECTS

ONGOING

Project Number	AR 05-01
Research Project	An Accurate Monitoring of Truck Waiting and Flow Times
Project Number	AR 05-02
Research Project	Feature Extraction from High Resolution Satellite Imagery as an Input to the Development and Rapid Update of a METTRANS Geographic Information System (GIS)
Project Number	AR 05-03
Research Project	Development of an Exposure Model for Diesel Locomotive Emissions near the Alameda Corridor
Project Number	AR 05-04
Research Project	Development of a LIDAR Derived Digital Elevation Model (DEM) as Input to a METTRANS Geographic Information System (GIS)
Project Number	AR 05-05
Research Project	Survey and Identify the Needs of Port Communication Equipment for Safety, Security, and Interoperability
Project Number	AR 05-06
Research Project	Assessing Container Terminal/Port Productivity: Experiences of the Ports of Los Angeles and Long Beach

COMPLETED

Project Number
Research Project

AR 04-01
Examining the Effects of the Lowenthal Bill on Port Congestion

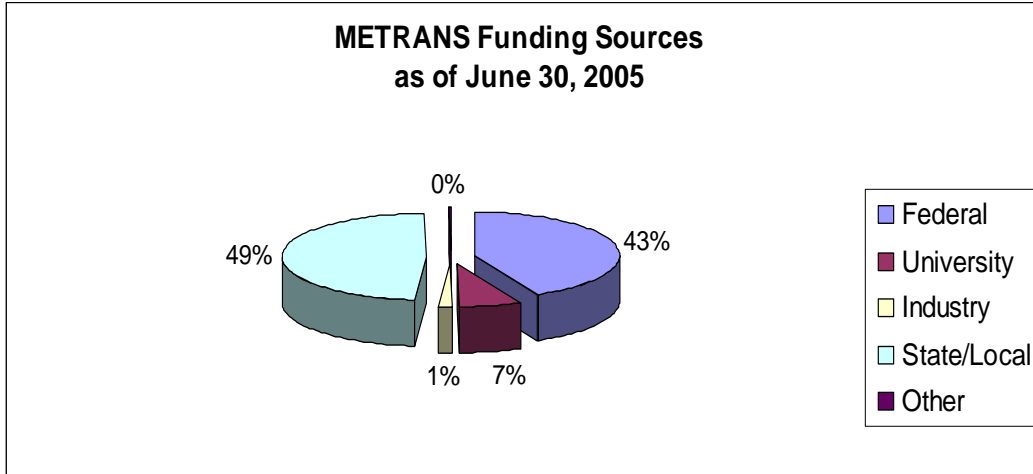
Project Number
Research Project

AR 04-02
Labor at the Ports: Comparing Work Rules and Working Conditions of the ILA
and ILWU

G. FUNDING SOURCES AND USES

Funding Sources

This section reports on cumulative budgeted expenses and income for six years of METRANS' existence (1998-2005). METRANS received \$9,777,862 in total funding during this period, an increase of nearly 30% over the previous year's total of \$7,596,344. These numbers include matching funds from all sources. USDOT funds now account for 43% of the total. The largest portion (49%) comes from state and local sources: the full dollar-for-dollar match from the California Dept. of Transportation, plus additional contributions from state and local agencies. University matching funds account for 7%, with the remainder coming from private industry and other sources. Through 2005 \$1.34 has been obtained for each dollar of federal funding, compared to \$1.36 through 2004 and \$1.34 for 2003.



Funding Uses

The primary use of METRANS funds is research, and its share has increased to 61% of total expenditures. Administrative expenses account for 22% of the total, and it includes administrative support for outreach events, information dissemination, and educational activities, as well as the general operation and management of the research center. Technology transfer accounts for 16%; it includes conferences and other events, publications, and training. The education share has increased slightly as a result of a new scholarship fund. However, the largest source of support for students is the research program. Research projects in progress during 2004-05 include 69 student assistant positions.

Please refer to Section I of the financial section of the report for additional details on expenditures and income.

