

TCRP

REPORT 84

*e-Transit: Electronic Business
Strategies for Public Transportation*
Volume 4

Advanced Features of Transit Websites

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES



TRANSIT
COOPERATIVE
RESEARCH
PROGRAM



Sponsored by
the Federal
Transit Administration

**TCRP OVERSIGHT AND PROJECT
SELECTION COMMITTEE**
(as of October 2002)

CHAIR

J. BARRY BARKER
Transit Authority of River City

MEMBERS

DANNY ALVAREZ
Miami-Dade Transit Agency
KAREN ANTION
Karen Antion Consulting
GORDON AOYAGI
Montgomery County Government
JEAN PAUL BAILLY
Union Internationale des Transports Publics
RONALD L. BARNES
Central Ohio Transit Authority
LINDA J. BOHLINGER
HNTB Corp.
ANDREW BONDS, JR.
Parsons Transportation Group, Inc.
JENNIFER L. DORN
FTA
NATHANIEL P. FORD, SR.
Metropolitan Atlanta RTA
CONSTANCE GARBER
York County Community Action Corp.
FRED M. GILLIAM
Capital Metropolitan Transportation Authority
KIM R. GREEN
GFI GENFARE
SHARON GREENE
Sharon Greene & Associates
KATHERINE M. HUNTER-ZAWORSKI
Oregon State University
ROBERT H. IRWIN
British Columbia Transit
CELIA G. KUPERSMITH
*Golden Gate Bridge, Highway and
Transportation District*
PAUL J. LARROUSSE
National Transit Institute
DAVID A. LEE
Connecticut Transit
CLARENCE W. MARSELLA
Denver Regional Transportation District
FAYE L. M. MOORE
*Southeastern Pennsylvania Transportation
Authority*
STEPHANIE L. PINSON
Gilbert Tweed Associates, Inc.
ROBERT H. PRINCE, JR.
DMJM+HARRIS
JEFFERY M. ROSENBERG
Amalgamated Transit Union
RICHARD J. SIMONETTA
pbConsult
PAUL P. SKOUTELAS
Port Authority of Allegheny County
LINDA S. WATSON
Corpus Christi RTA

EX OFFICIO MEMBERS

WILLIAM W. MILLAR
APTA
MARY E. PETERS
FHWA
JOHN C. HORSLEY
AASHTO
ROBERT E. SKINNER, JR.
TRB

TDC EXECUTIVE DIRECTOR

LOUIS F. SANDERS
APTA

SECRETARY

ROBERT J. REILLY
TRB

TRANSPORTATION RESEARCH BOARD EXECUTIVE COMMITTEE 2003 (Membership as of March 2003)

OFFICERS

Chair: Genevieve Giuliano, *Director and Prof., School of Policy, Planning, and Development, USC, Los Angeles*
Vice Chair: Michael S. Townes, *Exec. Dir., Transportation District Commission of Hampton Roads, Hampton, VA*
Executive Director: Robert E. Skinner, Jr., *Transportation Research Board*

MEMBERS

MICHAEL W. BEHRENS, *Executive Director, Texas DOT*
JOSEPH H. BOARDMAN, *Commissioner, New York State DOT*
SARAH C. CAMPBELL, *President, TransManagement, Inc., Washington, DC*
E. DEAN CARLSON, *Secretary of Transportation, Kansas DOT*
JOANNE F. CASEY, *President, Intermodal Association of North America*
JAMES C. CODELL III, *Secretary, Kentucky Transportation Cabinet*
JOHN L. CRAIG, *Director, Nebraska Department of Roads*
BERNARD S. GROSECLOSE, JR., *President and CEO, South Carolina State Ports Authority*
SUSAN HANSON, *Landry University Prof. of Geography, Graduate School of Geography, Clark University*
LESTER A. HOEL, *L. A. Lacy Distinguished Professor, Depart. of Civil Engineering, University of Virginia*
HENRY L. HUNGERBEELER, *Director, Missouri DOT*
ADIB K. KANAFANI, *Cahill Prof. and Chair, Dept. of Civil and Environmental Engineering, University of
California at Berkeley*
RONALD F. KIRBY, *Director of Transportation Planning, Metropolitan Washington Council of Governments*
HERBERT S. LEVINSON, *Principal, Herbert S. Levinson Transportation Consultant, New Haven, CT*
MICHAEL D. MEYER, *Professor, School of Civil and Environmental Engineering, Georgia Institute of
Technology*
JEFF P. MORALES, *Director of Transportation, California DOT*
KAM MOVASSAGHI, *Secretary of Transportation, Louisiana Department of Transportation and Development*
CAROL A. MURRAY, *Commissioner, New Hampshire DOT*
DAVID PLAVIN, *President, Airports Council International, Washington, DC*
JOHN REBENDSOLF, *Vice Pres., Network and Service Planning, Union Pacific Railroad Co., Omaha, NE*
CATHERINE L. ROSS, *Executive Director, Georgia Regional Transportation Agency*
JOHN M. SAMUELS, *Sr. Vice Pres.-Operations Planning & Support, Norfolk Southern Corporation, Norfolk, VA*
PAUL P. SKOUTELAS, *CEO, Port Authority of Allegheny County, Pittsburgh, PA*
MARTIN WACHS, *Director, Institute of Transportation Studies, University of California at Berkeley*
MICHAEL W. WICKHAM, *Chairman and CEO, Roadway Express, Inc., Akron, OH*

EX OFFICIO MEMBERS

MIKE ACOTT, *President, National Asphalt Pavement Association*
MARION C. BLAKEY, *Federal Aviation Administrator, U.S.DOT*
REBECCA M. BREWSTER, *President and CEO, American Transportation Research Institute, Atlanta, GA*
THOMAS H. COLLINS (Adm., U.S. Coast Guard), *Commandant, U.S. Coast Guard*
JENNIFER L. DORN, *Federal Transit Administrator, U.S.DOT*
ELLEN G. ENGLEMAN, *Research and Special Programs Administrator, U.S.DOT*
ROBERT B. FLOWERS (Lt. Gen., U.S. Army), *Chief of Engineers and Commander, U.S. Army Corps of
Engineers*
HAROLD K. FORSEN, *Foreign Secretary, National Academy of Engineering*
EDWARD R. HAMBERGER, *President and CEO, Association of American Railroads*
JOHN C. HORSLEY, *Exec. Dir., American Association of State Highway and Transportation Officials*
MICHAEL P. JACKSON, *Deputy Secretary of Transportation, U.S.DOT*
ROGER L. KING, *Chief Applications Technologist, National Aeronautics and Space Administration*
ROBERT S. KIRK, *Director, Office of Advanced Automotive Technologies, U.S. DOE*
RICK KOWALEWSKI, *Acting Director, Bureau of Transportation Statistics, U.S.DOT*
WILLIAM W. MILLAR, *President, American Public Transportation Association*
MARY E. PETERS, *Federal Highway Administrator, U.S.DOT*
SUZANNE RUDZINSKI, *Director, Office of Transportation and Air Quality, U.S. EPA*
JEFFREY W. RUNGE, *National Highway Traffic Safety Administrator, U.S.DOT*
ALLAN RUTTER, *Federal Railroad Administrator, U.S.DOT*
ANNETTE M. SANDBERG, *Deputy Administrator, Federal Motor Carrier Safety Administration, U.S.DOT*
WILLIAM G. SCHUBERT, *Maritime Administrator, U.S.DOT*

TRANSIT COOPERATIVE RESEARCH PROGRAM

Transportation Research Board Executive Committee Subcommittee for TCRP
GENEVIEVE GIULIANO, *University of Southern California, Los Angeles (Chair)*
E. DEAN CARLSON, *Kansas DOT*
JENNIFER L. DORN, *Federal Transit Administration, U.S.DOT*
LESTER A. HOEL, *University of Virginia*
WILLIAM W. MILLAR, *American Public Transportation Association*
ROBERT E. SKINNER, JR., *Transportation Research Board*
PAUL P. SKOUTELAS, *Port Authority of Allegheny County, Pittsburgh, PA*
MICHAEL S. TOWNES, *Transportation District Commission of Hampton Roads, Hampton, VA*

TCRP REPORT 84

***e-Transit: Electronic Business
Strategies for Public Transportation
Volume 4***

**Advanced Features of
Transit Websites**

MULTISYSTEMS, INC.
Cambridge, MA
and
MATTHEW A. COOGAN
White River Junction, VT

SUBJECT AREAS
Public Transit

Research Sponsored by the Federal Transit Administration in Cooperation with the Transit Development Corporation

TRANSPORTATION RESEARCH BOARD

WASHINGTON, D.C.
2003
www.TRB.org

COOPERATIVE RESEARCH PROGRAMS STAFF FOR TCRP REPORT 84

ROBERT J. REILLY, *Director, Cooperative Research Programs*
CHRISTOPHER W. JENKS, *TCRP Manager*
GWEN CHISHOLM, *Senior Program Officer*
EILEEN P. DELANEY, *Managing Editor*
ANDREA BRIERE, *Associate Editor*

TCRP PROJECT J-09 PANEL Field of Special Projects

PAUL A. TOLIVER, *King County Metro, WA (Chair)*
GORDON AOYAGI, *Montgomery County Government, MD*
RONALD L. BARNES, *Central Ohio Transit Authority*
ROBIN CODY, *San Francisco Bay Area Rapid Transit*
RAYMOND H. ELLIS, *AECOM Consulting Transportation Group, Inc., Fairfax, VA*
RICARDO ERNST, *Georgetown University*
LAWRENCE J. HARMAN, *Harman Consulting, Boston, MA*
EVA LERNER-LAM, *Palisades Consulting Group, Inc., Tenafly, NJ*
SHAWN M. MARCELL, *Gladwyne, PA*
PATRICIA S. NETTLESHIP, *TNG, Inc., Santa Monica, CA*
DANIEL ROTH, *Freightdesk.com, Bethesda, MD*
ROBIN STEVENS, *New York, NY*
LINDA S. WATSON, *Corpus Christi Regional Transit Authority, TX*
NIGEL H. M. WILSON, *Massachusetts Institute of Technology*
ANTHONY M. KOUNESKI, *APTA Liaison Representative*
THOMAS PALMERLEE, *TRB Liaison Representative*

AUTHOR ACKNOWLEDGMENTS

Task Order 4, “Advanced Features of Transit Web Sites,” of TCRP Project J-09 was performed by Multisystems, Inc., and Matthew Coogan. Multisystems served as the primary contractor for the study.

Buck Marks of Multisystems served as Principal Investigator of the study and was thus responsible for the overall supervision of the research. Joana Conklin had primary responsibility for conducting the case study interviews and aided in preparation of the final report. Mike Bolton and Dan Fleishman served as Senior Advisors for this

study. Rich Juster helped in editing the final report. Matthew Coogan provided input throughout the study process and aided in preparation of the final report.

The project team would like to express special thanks to the 16 organizations that participated in the research and made the project possible. The guidance of Stephan Parker and Gwen Chisholm, the TCRP Program Officers for the project, and the J-09 Project Panel is also acknowledged and appreciated.

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions*, published in 1987 and based on a study sponsored by the Urban Mass Transportation Administration—now the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA; the National Academies, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

Project J-09 FY'00
ISSN 1073-4872
ISBN 0-309-06766-9
Library of Congress Control Number 2002112858

© 2003 Transportation Research Board

Price \$15.00

NOTICE

The project that is the subject of this report was a part of the Transit Cooperative Research Program conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council. Such approval reflects the Governing Board's judgment that the project concerned is appropriate with respect to both the purposes and resources of the National Research Council.

The members of the technical advisory panel selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the National Research Council, the Transit Development Corporation, or the Federal Transit Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

To save time and money in disseminating the research findings, the report is essentially the original text as submitted by the research agency. This report has not been edited by TRB.

Special Notice

The Transportation Research Board, the National Research Council, the Transit Development Corporation, and the Federal Transit Administration (sponsor of the Transit Cooperative Research Program) do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the clarity and completeness of the project reporting.

Published reports of the

TRANSIT COOPERATIVE RESEARCH PROGRAM

are available from:

Transportation Research Board
Business Office
500 Fifth Street, NW
Washington, DC 20001

and can be ordered through the Internet at
<http://www.national-academies.org/trb/bookstore>

Printed in the United States of America

THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. On the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Bruce M. Alberts is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. William A. Wulf is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, on its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both the Academies and the Institute of Medicine. Dr. Bruce M. Alberts and Dr. William A. Wulf are chair and vice chair, respectively, of the National Research Council.

The **Transportation Research Board** is a division of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering. The Board's mission is to promote innovation and progress in transportation by stimulating and conducting research, facilitating the dissemination of information, and encouraging the implementation of research results. The Board's varied activities annually engage more than 4,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation. **www.TRB.org**

www.national-academies.org

FOREWORD

By Gwen Chisholm
Staff Officer
Transportation Research
Board

TCRP Report 84: e-Transit: Electronic Business Strategies for Public Transportation documents principles and techniques that are used in electronic business strategies for public transportation. *TCRP Report 84* is being published as multiple volumes. *Volume 4: Advanced Features of Transit Websites* explores the potential of the following advanced website features for the transit industry: automated itinerary planners, real-time customer information, e-mail notification systems, and customer relationship management. This report may be used by senior managers, website design managers, operations managers, and technical and other professional employees.

The Internet and other new information and communication technologies are revolutionizing the way services are delivered and organizations are structured. Electronic business processes change the ways organizations operate and conduct business. Opportunities to lower transaction costs and improve efficiency have changed relationships between transit agencies and their suppliers and customers, and electronic business processes are likely to change industry structures in the longer term. Portals for transactions in government-to-government and business-to-government marketplaces are offered through diverse organizations. Numerous transit agencies are preparing to offer customized itinerary planning and fare media purchasing over the Internet.

The declining costs of communications, data storage, and data retrieval are accelerating the opportunities spawned by the Internet and other information and communications technologies. Choosing and sequencing investments in technologies, processes, and people to reduce costs and increase productivity present challenges to the transit manager, who must weigh the costs, benefits, and risks of changing the ways services are delivered. To assist in meeting such challenges, TCRP Project J-09 is producing a multiple-volume series under *TCRP Report 84*. The research program will identify, develop, and provide flexible, ongoing, quick-response research designed to bring electronic business strategies to public transportation and mobility management.

Volume 4: Advanced Features of Transit Websites is the fourth volume in the *TCRP Report 84* series; the report is in portable document format (pdf) on *CRP-CD-34*. Multisystems, Inc., prepared the report with assistance from Matthew Coogan. The objective of this task was to identify and document lessons learned regarding the potential of incorporating advanced web features into the transit industry. The focus is on automated itinerary planning systems, real-time transit information, e-mail notification, and the application of customer relationship management concepts to these services. The web features were reviewed in the context of customer relationship management. The report provides an overview of the implementation, technology, value creation, lessons learned, and best practices associated with web-based advanced features. The study findings reveal that an investment in advanced website features offers the potential to provide significant benefits to the customer and the transit industry.

Volumes issued under *TCRP Report 84* may be found on the TRB website at nationalacademies.org/trb.

Contents

1. Preface: How to Use this Electronic Document	1-1
2. Executive Summary	2-1
3. Research Opportunity and Objectives	3-1
4. Methodology and Results	4-1
4.1 Introduction/Background	4-1
4.2 Review Prior Institutional Efforts / Perform Information Search	4-3
4.3 Select Transit Agencies	4-4
4.4 Develop Telephone Surveys	4-5
4.5 Conduct Detailed Telephone Surveys.....	4-6
4.6 Synthesize Telephone Survey Information	4-6
5. Itinerary Planning Systems	5-1
5.1 Metropolitan Transportation Commission	5-1
5.2 Ventura County Transportation Commission	5-11
5.3 Washington Area Metropolitan Transit Authority.....	5-19
5.4 San Diego Metropolitan Transit System.....	5-26
5.5 Twin Cities Metro Transit	5-32
5.6 Southeastern Pennsylvania Transportation Authority (SEPTA)	5-42
5.7 Anchorage Public Transportation	5-52
5.8 Greater Manchester Public Transport Executive.....	5-56
6. Real-Time Display, Notifications Systems, and CRM	6-1
6.1 Washington State Ferries.....	6-2
6.2 Cape Cod Regional Transit Authority.....	6-7
6.3 The Virginia Railway Express	6-14
6.4 Tri-County Commuter Rail Authority	6-19
6.5 King County Metro	6-23
6.6 NextBus	6-30
6.7 New Jersey Transit Corporation.....	6-32
6.8 Utah Transit Authority	6-40
7. Transit Web Site Technology Considerations	7-1
7.1 Application Design, Development, and Performance Issues.....	7-2
7.2 Functionality.....	7-5
7.3 Privacy Concerns.....	7-7
7.4 Security Concerns.....	7-7
7.5 Application Deployment	7-8
7.6 Customer Relationship Management.....	7-9

8. Cross-Cutting Issues of Advanced Transit Web Site Features.....	8-1
8.1 Project Objectives	8-1
8.2 Future Promise	8-2
8.3 Value Creation	8-4
8.4 Implementation Issues and Best Practices	8-6
9. Notable Project Innovations and Opportunities for Further Research.....	9-1
9.1 Notable Project Innovations from the J-09 Survey	9-1
9.2 Highlights of the European Experience	9-3
9.3 Further Research	9-6

Appendix A: Summary Bibliography for Web-based Customer Information

Appendix B: Contact Information for Customer Information Survey

Appendix C: Telephone Interview Invitation Letter

Appendix D: Survey Outline for Itinerary Planning

Table of Figures

Figure 4.1: JPO <i>Transitweb</i> Home Page	4-5
Figure 5.1: MTC <i>TakeTransit</i> Input Page.....	5-3
Figure 5.2: <i>TakeTransit</i> Coverage Area Link	5-3
Figure 5.3: <i>TakeTransit</i> Landmark Correction Page.....	5-4
Figure 5.4: <i>TakeTransit</i> Itinerary Output	5-5
Figure 5.5: MTC Walking Map	5-5
Figure 5.6: Detail of the Relevant Bay Area System Map (MUNI)	5-6
Figure 5.7: VCTC Itinerary Planning Input Page.....	5-12
Figure 5.8: VCTC Spanish Language Itinerary Planning Input Page.....	5-12
Figure 5.9: VCTC Itinerary Planning Output Page, Part 1, Directions	5-14
Figure 5.10 VCTC Itinerary Planning Output Page, Part 2, Options	5-14
Figure 5.11: VCTC Itinerary Walking Map	5-15
Figure 5.12: WMATA <i>RideGuide</i> 1-2-3 Start Page	5-20
Figure 5.13: <i>RideGuide</i> Input Screen 1 – Origin/Destination.....	5-20
Figure 5.14: <i>RideGuide</i> Origins/Destinations Examples Pop-up Screen	5-21
Figure 5.15: <i>RideGuide</i> Input Screen 2 – Trip Criteria.....	5-21
Figure 5.16: <i>RideGuide</i> Output Screen (3)	5-22
Figure 5.17: New WMATA Home Page with Itinerary Planning Frame.....	5-23
Figure 5.18: San Diego Transit's Itinerary Planning Input Page	5-27
Figure 5.19: SDMTS Origin or Destination Error-Trapping Screen.....	5-28
Figure 5.20: Maximum Walking Distance Error-Trapping Screen.....	5-28
Figure 5.21: San Diego Transit's Itinerary Planning Output Page	5-29
Figure 5.22: Detours Page on the SDMTS Web Site.....	5-30
Figure 5.23: San Diego Regional Transit Map.....	5-33
Figure 5.24: San Diego Route Map	5-33
Figure 5.25: Twin Cities Metro Transit's Itinerary Planning Input Form	5-35
Figure 5.26: Alternate Version of Itinerary Planning Input Form.....	5-35
Figure 5.27: Twin Cities Metro Transit's Itinerary Planning Output Page	5-36
Figure 5.28: Detailed Walking Directions from Twin Cities Metro AIP	5-37
Figure 5.29: "Schedule Adjust" and "Plan Return Trip" Features	5-37
Figure 5.30: Metro Transit's Personalized Bus Schedule Maker, Step 1	5-39
Figure 5.31: Metro Transit's Personalized Bus Schedule Maker, Step 2.....	5-39

Figure 5.32: Results of Constructing a Personalized Bus Schedule.....	5-40
Figure 5.33: <i>TransitQuest</i> Input Form.....	5-43
Figure 5.34: SEPTA's Error-Trapping Mechanism for Origins and Destinations	5-43
Figure 5.35: Result of Clicking on <i>TransitQuest's</i> "Means of Transport" Button.....	5-45
Figure 5.36: <i>TransitQuest</i> Help Screen	5-45
Figure 5.37: SEPTA's Station Schedule Request Form.....	5-46
Figure 5.38: Result of Station Schedule Request	5-46
Figure 5.39: Initial Output from <i>TransitQuest</i>	5-47
Figure 5.40: <i>TransitQuest</i> Itinerary Details	5-47
Figure 5.41: <i>TransitQuest</i> Trip Guide	5-49
Figure 5.42: <i>TransitQuest</i> Connection Graphics.....	5-49
Figure 5.43: APT's Dynamic Route Generator Input Form	5-53
Figure 5.44: APT's Dynamic Route Generator Results	5-54
Figure 5.45: GMPTE's Itinerary Planning Input Form	5-57
Figure 5.46: Error Trapping for Origin or Destination.....	5-57
Figure 5.47: GMPTE's Journey Planner Output Screen	5-58
Figure 5.48: Link to Mapping Page from GMPTE's Journey Planner	5-58
Figure 5.49: Aerial Photos Showing Location of Transit Stop.....	5-59
Figure 6.1: WSF <i>Vessel Watch</i> Start Page.....	6-3
Figure 6.2: WSF Seattle Area <i>Vessel Watch</i>	6-3
Figure 6.3: WSF E-mail Subscriber Page	6-5
Figure 6.4: Example of WSF <i>FerryCam</i> Project Objectives.....	6-6
Figure 6.5: WSF Growth in Web Hits 1998 - 2000.....	6-8
Figure 6.6: WSF Reduction in Call Center Activity 1998 - 2000	6-8
Figure 6.7: Original CCRTA Real-Time Web Page Display	6-10
Figure 6.8: New CCRTA Real-Time Web Page Display	6-10
Figure 6.9: CCRTA Main Mapping Page Options	6-11
Figure 6.10: CCRTA Map Setting Interface	6-11
Figure 6.11: VRE <i>Train Brain</i> Web Display.....	6-16
Figure 6.12: VRE Local Directions for Station Access.....	6-16
Figure 6.13: VRE Train Talk Subscription Page	6-17
Figure 6.14: Tri-Rail Train Tracking Display	6-21
Figure 6.15: KC Metro <i>MyBus</i> Display.....	6-24
Figure 6.16: KC Metro <i>MyBus</i> Zone Map	6-24
Figure 6.17: Example of <i>MyBus</i> Information on a WAP-enabled Cell Phone	6-26

Figure 6.18: Example of <i>MyBus</i> Information Displayed on a Palm OS Device.....	6-26
Figure 6.19: <i>BusView</i> Start-up Screen.....	6-27
Figure 6.20: <i>BusView</i> Route Tracking and Alarm Window	6-27
Figure 6.21: <i>Transit Alert!</i> Subscription Page	6-28
Figure 6.22: NextBus Stop Information Display	6-31
Figure 6.23: NextBus Route Specific Map Display	6-31
Figure 6.24: NJT's <i>My Transit</i> Welcome Page	6-33
Figure 6.25: NJT's <i>My Transit</i> Registration Page	6-34
Figure 6.26: NJT's <i>My Transit</i> Account Management Page	6-35
Figure 6.27: My Transit Trip Feature (Screen 1).....	6-35
Figure 6.28: My Transit Trip Feature (Screen 2).....	6-36
Figure 6.29: My Transit Trip Feature (Screen 3).....	6-36
Figure 6.30: <i>My Transit</i> Customized Web Page	6-37
Figure 6.31: <i>My Transit</i> Custom Link Option	6-37
Figure 6.32: UTA Trip Planner, Step 1.....	6-41
Figure 6.33: Result of Category Selection in UTA Trip Planner.....	6-42
Figure 6.34: Step 2 of UTA Trip Planner Including Address History	6-42
Figure 6.35 Step 3 of UTA Trip Planner.....	6-43
Figure 6.36 Itineraries Produced Using UTA Trip Planner.....	6-43
Figure 6.37 Trip Planner E-Mail Feature.....	6-44
Figure 6.38: <i>UTA My Way</i> Registration Page	6-45
Figure 6.39: <i>UTA My Way</i> Logon Page	6-45
Figure 6.40: <i>UTA My Way</i> , Part 1	6-46
Figure 6.41: <i>UTA My Way</i> , Part 2	6-46
Figure 6.42: <i>UTA My Way</i> Personalization Screen.....	6-47
Figure 6.43: <i>UTA My Way</i> Link Editor.....	6-48
Figure 6.44 Personalized Schedule from UTA My Way (part 1)	6-49
Figure 6.45 Personalized Schedule from UTA My Way (part 2)	6-50
Figure 7.1: King County Metro Rider Alerts	7-10
Figure 8.1: PVTA Landmark Look-up Interface	8-8
Figure 9.1 New GMPTE Trip Planner Format.....	9-2
Figure 9.2: "Genvagen" Trip Planner Distributed via CD-ROM in Sweden.....	9-5
Figure 9.3: Zurich Passenger Information System.....	9-5
Figure 9.4: Map-based Data Entry Offered on the Dutch Railways Planner Plus Program	9-7
Figure 9.5: The Dutch Planner Plus Program Showing Access to the Rail Station by Foot, Bike or Auto.....	9-7