Creating Intelligent, Coordinated Transit:
Moving New Mexico the Smart Way

By Judith M. Espinosa, Eric F. Holm, and Mary E. White

Making Change

With the Alliance for Transportation Research Institute (ATRI) acting as a change agent, in 1997, the State of New Mexico began initial efforts to bring about interagency coordination of transportation. Under contract to the New Mexico Department of Transportation (NMDOT) Public Transportation Programs Bureau (PTPB), the ATRI conducted ground-breaking research with their studies on the lack of transportation alternatives for the State's poorest and most disadvantaged citizens. The ATRI studies include: *Public Transportation: A Priority Link in Moving People to Work (1998)*, *Moving Forward: A Transportation Toolkit for Welfare Reform* (2000), and *At the Crossroads: Disability and Transportation in New Mexico* (2002).

**Public Transportation:
A Priority Link in
Moving People to Work**

prepared by the
ATR Institute
University of New Mexico

for the

Public Transportation Programs Bureau
Transportation Programs Division
New Mexico State Highway and Transportation Department

Pete Rahn, Secretary
H. Allen Fenner, Director
Josette Lucero, Bureau Chief

October 23, 1998

ATR Institute

Altered State

These ATRI publications, along with initiatives at the federal level to coordinate across agencies, provided the impetus transform the state's model of providing transportation services by broadening the circle of understanding about the benefits of interagency transportation coordination. As a result, partnerships were forged. In 1997-98, ATRI, the NMDOT PTPB, the New Mexico Human Services Department (NMHSD), and the New Mexico Department of Labor began to work as a team. Bringing in national experts and federal officials in 2000, the ATRI hosted A National Quality Initiative on Public Transit in New Mexico that resulted in a Memorandum of Understanding between NMDOT, NMDOL and NMHSD. The New Mexico Developmental Disabilities Planning Council joined the coordination effort in 2001. Small, rural transit providers manually tracked agency funded rides and generating the reports needed by various funding programs.

Technology to Overcome Coordination Roadblocks

To move coordination to the next level, the ATRI looked to technology for solutions and developed the Client Referral, Ridership, and Financial Tracking software system (CRRAFT), a Web-based program that tracks the scheduling, ridership, and financial data which transit providers input in the course of daily

operations.   CRRAFT enables the efficient management of interagency coordination and promotes multimodal policies through its ability to track clients and clients' use of multiple funding streams for agency transportation services. The NMDOT and NMHSD continue a strong utilization of CRRAFT for its Temporary Assistance for Needy Families (TANF) program with transit providers in New Mexico.

ATRI is working with funding from the Federal Transit Administration/Federal Highways Administration Joint Programs Office. CRRAFT currently generates reports for FTA Sections 5311, 5310, and 3037 and HSD TANF, and also is capable of producing reports for all FTA funding streams as well as a variety of Health/Human Services funding (Welfare to Work, Vocational Rehabilitation, etc.).

CRRAFT Design

Because the CRRAFT software system is Web-based, the data in CRRAFT is, therefore, available to be accessed at any time by each agency's authorized users. Funding sponsors can generate reports and view data in real-time to track agency transportation funds as they are being utilized.   The costs of maintaining and updating the CRRAFT software for transit providers across the state is reduced due its Web-based design which enables the software to be administered from a central location. CRRAFT modules include transit system management, client management, schedule management, fiscal management, swipe card interface, systems administration, and reports. CRRAFT integrates human service transportation referral with daily rural public transit operations.

Benefits of CRRAFT for the funding agencies include: standardization of client transportation referral across multiple funding streams for human service agencies and collects data for management decision making. CRRAFT makes data more audit friendly and also may reduce misuse of transportation assistance by giving sponsoring agencies the real-time capability to monitor their clients' transportation usage with better accuracy.   For transit providers, CRRAFT improves invoicing and ridership reporting and simplifies scheduling. CRRAFT also allows transit providers the ability to focus their efforts on providing efficient, seamless transportation services to their riders.

Smart Card System High Level Design for Intelligent, Coordinated Transit

New Mexico is to be among one of the first states in the nation to implement Smart technology in a rural setting with the utilization of an Intelligent, Coordinated Transit (ICTransit) Card in non-urban areas.

ATRI has developed an electronic farecard that uses Smart Technology to track up to 16 different agency funders to interface with CRRAFT that will be deployed at small, rural public transit providers in 2004. The farecard—the Intelligent, Coordinated Transit (ICTransit) Card—uses low-cost, open technology and off-the-shelf hardware. The applications of technology have been developed by ATRI as practical, cost effective ways to help the State more easily realize the benefits of interagency coordination and provide seamless transportation services to people.

ATRI is beta testing the ICTransit Smart technology/Pocket PC interface with CRRAFT software. With ATRI's interface to integrate the contactless ICTransit technology with the CRRAFT software, ridership reporting will be further streamlined, and stigmatizing passes that indicate a client is receiving public assistance benefits can be eliminated. The contactless ICTransit system will provide a convenient, secure, and discrete method of providing transportation benefits to clients. The system will also reduce the data entry requirements of the transit system operators and drivers and improve the accuracy of the data collected. Freed from manual tracking, drivers will be better able to concentrate on driving and providing friendly customer service. ICTransit Smart technology can enable future applications, such as the NMDOT PTPB as the State's transportation broker for Medicaid clients' nonemergency transportation services (NEMT).

For human services passengers, the ICTransit Smart chip will be designed to piggyback on the State of New Mexico's Electronic Benefits Transfer (EBT) Card. The EBT Card is a high-coercivity magnetic stripe card containing a unique 16-digit number correlated to the client's social security number. ICTransit Cards with contactless Smart chips will be available for purchase by tourists, the public, or by sponsored clients who have used all their agency-funded transportation benefits. The ICTransit Smart Cards could come in either a disposable paper format or on a plastic, rechargeable card.

To implement the Smart technology systems in ICTransit, the following hardware will be provided to the transit systems. Selected for its usability, availability, and expandability, the hardware includes:

- Handheld PCs running Pocket PC 2003
- Bluetooth Enabled Global Positioning Satellite (GPS) Receivers
- Contactless Smart Card Readers/Writers (MIFARE compatible)
- Contactless Smart Chips (MIFARE compatible ISO 14443A)
- Pocket PC Cradles for the Depot and Vehicles

Vehicle Ticketing Process for Intelligent, Coordinated Transit System

The Pocket PC sets securely in a cradle beside the driver during the shift. Transit providers will be able to embed the ICTransit chip onto State EBT cards and make and issue cards for multiple trip purchasers. The driver will pick up the passengers listed in a log that is stored within the Pocket PC. As passengers enter and exit the vehicle, they will not have to remove the card from their wallets or purses, because the ICTransit Smart chip on the card is contactless. The rider needs only to wave the card within four-to-six inches of the contactless chip reader for the reader to collect the information. The card reader transmits the card serial number (CSN) to the Pocket PC. The Pocket PC will match the CSN that it read with the CSN associated with the scheduled trip. The card reader signifies the transaction has occurred by displaying a green light.

The Pocket PC records the time at which the passenger boards and exits the vehicle. The card

reader will reduce or decrement the ride count/amount on the ICTransit card as the passenger leaves the vehicle. In addition to storing the driver's schedule and log for each day, the Pocket PC will be equipped with a Bluetooth enabled GPS receiver. During the shift, the GPS receiver will be queried for position information every second. The position information obtained will be used to calculate the trip distances for passengers and the total vehicle miles during the shift.   The GPS feature will improve enable the system to record route information, travel patterns, and vehicle location.

Synchronization Process for the Intelligent, Coordinated Transit

The driver can synchronize the Pocket PC to the transit system's network or computer—either wirelessly or by direct connection—in only a matter of seconds. The trip data collected during the driver's shift is synchronized with the CRRAFT system daily or periodically as required by the transit system. During the synchronization, the most up-to-date version of driver's scheduled trips is downloaded from the CRRAFT Scheduling Module while the data from the trips that have already occurred are uploaded from the Pocket PC. The Pocket PC will upload the data collected by the driver during the shift and also download any new information from CRRAFT (i.e., funding providers, clients, scheduling). The trip data sent via the Internet to CRRAFT will update each client's total number of remaining authorized trips onto the CRRAFT server, where that data are stored. The client's ICTransit Card stores the remaining number of rides and expiration date of transportation benefits.

Technology Success Takes Coordination to the Next Level

The success of CRRAFT has led to a proposal from NMHSD, the agency that oversees the State's Medicaid program, for the NMDOT PTPB to become the State's one-stop transportation broker for Medicaid clients' NEMT. Discussions between the two agencies regarding the proposal are currently underway. The numbers of those eligible for Medicaid, as well as Medicaid cases, have grown dramatically in New Mexico during the last four years.

The NMDOT PTPB as the State's One-Stop Transit Broker will provide a statewide policy framework for the coordination of transportation services to:

- Use ITS technology to coordinate services
- Develop statewide guidance on coordination
- Leverage the 511 national number
- Organize the call center
- Coordinate with public and private transportation providers
- Link interagency client referral to urban transportation centers

A National Best Practice in Rural ITS
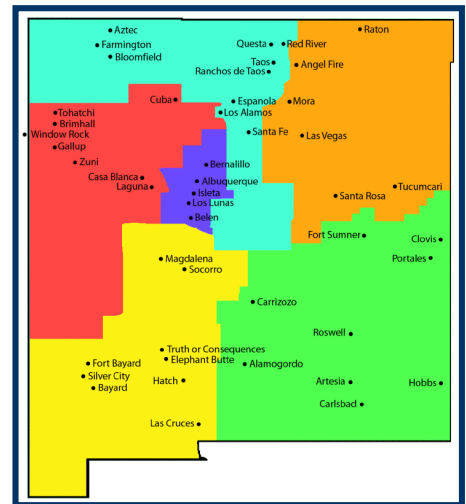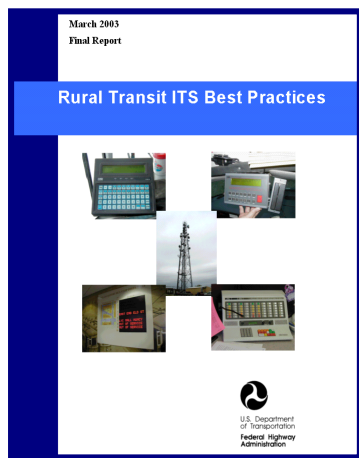
The CRRAFT software system was recognized in 2003 as an FHWA Best Practice in Rural ITS and can be used as a model to assist interagency coordination of transportation for the entire nation. Awareness, momentum, and know-how are increasing to create better transportation systems that can respond to the needs of growing communities in a modern world by providing access, independence, and mobility to all our people. The smart move to fully coordinated interagency transportation is now more easily doable than ever through this low-cost application of technology.

For more information, please contact: Judith M. Espinosa, Director
◈ Eric F. Holm, Manager Information Systems ◈ Mary E. White, Research Scientist II
Alliance for Transportation Research Institute (ATRI)
801 University Boulevard SE, Suite 302 ◈ Albuquerque, NM 87106
Telephone: 505 246-6410 ◈ Fax: 505 246-6001
◈ Email: jmespino@unm.edu ◈ eholm@unm.edu ◈ Internet: www.unm.edu/~atr
"At ATRI, we think the world of transportation."

INTELLIGENT, COORDINATED TRANSIT CARD INTEGRATION WITH CRRAFT
Updated on Tuesday, February 10, 2004

At the Transit System Depot

In the Transit Vehicle

CRRAFT

Internet

Dial Up<56Kb/s

High Speed Connection

Modem

Router

Workstation

Ethernet

Workstation

Hand Held Computer

Hand Held Computer

Satellite

GPS Information

Smart Card Reader/Writer

Smart Card

Hand Held Computer

Transit Vehicle