

Technical Assessment of Roaring Fork Transit Authority ITS / Related Alternative Transportation Concepts on the White River National Forest

U.S. DOT Volpe National Transportation Systems Center



(Maroon Bells Shuttle Photo: Roaring Fork Transit Authority)

**Aspen, Colorado
December 12, 2007**

At the request of the U.S. Department of Agriculture Forest Service (USFS), the U.S. DOT Volpe Center conducted a review of the status of Intelligent Transportation Systems (ITS) planning by the Roaring Fork Transit Authority (RFTA). The assessment was performed in cooperation with staff from Federal Transit Administration (FTA) Region VIII, the Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), and the Western Transportation Institute (WTI) of Montana State University. Representatives from RFTA, the Forest Service Region 2, and the White River Forest participated in the half day review. The agenda and list of participants is included at the end of this report. The Western Transportation Institute participation was made possible under the U.S. DOT ITS Peer-to-Peer (P2P) Program, which provides short-term technical assistance to agencies facing ITS planning, procurement, deployment, and operational challenges.

Background

Maroon Bells on the White River National Forest is among the most photographed scenic mountain areas in the world. Each year about 200,000 people visit the site during a short summer season. Since the late 1970's private motor vehicle access to Maroon Bells has been restricted. Visitor access to the site is via shuttle buses that operate from the Aspen Highlands Ski Area with free connecting shuttle bus service from the Aspen Rubey Park Transportation Center. The Maroon Bells shuttle bus service runs daily from 9:05a to 5:00p from mid-June through Labor Day, and on Friday, Saturday and Sunday through the balance of September. RFTA operates the Maroon Bells shuttle service in partnership with the Forest Service. RFTA operates regional transit service throughout a 70-mile corridor, primarily along Highway 82 between Aspen and Glenwood Springs, Colorado (see map below) and extending to Rifle, Colorado, along I-70 to the west. Parking in Aspen also is

oversubscribed during peak weekends, requiring travelers having to backtrack to one of the Park & Ride areas along the corridor. RFTA also provides service to four major ski resort areas in the vicinity of Aspen, which operate shuttle buses within the resorts.

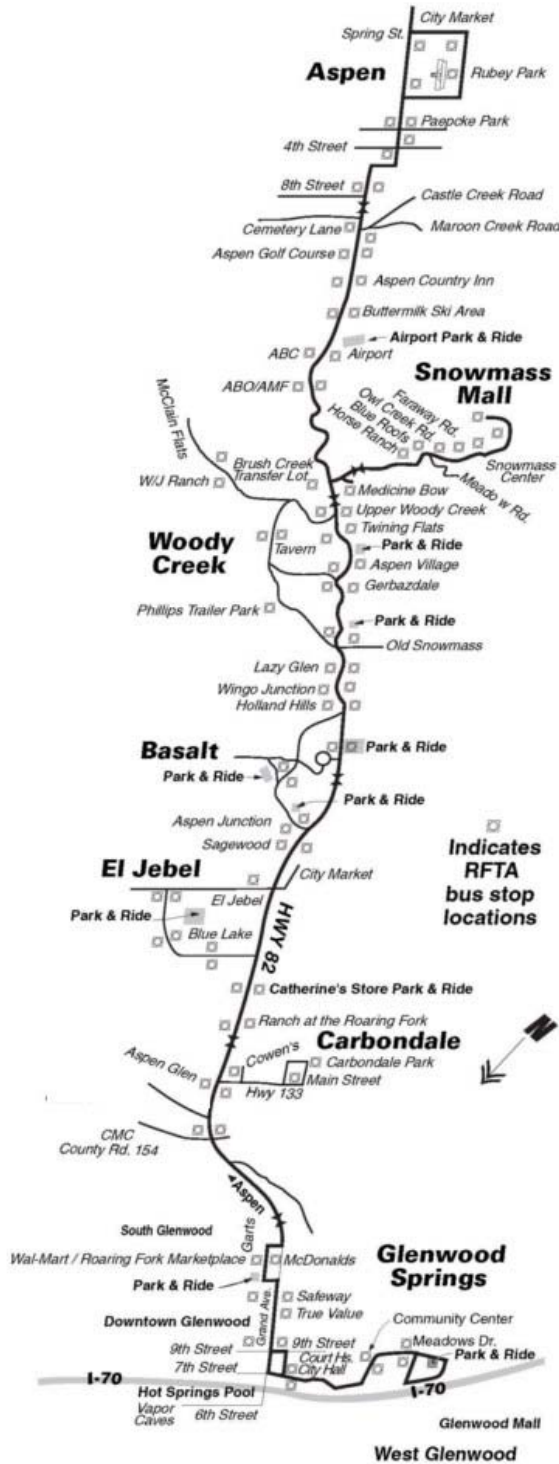


Figure 1: Map of RFTA Service Area along Highway 82

In FY-07, RFTA, with cooperation from the White River National Forest, was awarded a grant to purchase hybrid buses and related ITS technology under the FTA Alternative Transportation in Parks and Public Lands (ATPPL) program. The Forest Service requested assistance in assessing the status of planning relative to ITS needs, which were presented in limited detail as part of the grant application.

Transportation planning

RFTA has and is experiencing growth in ridership, both in terms of daily commuters, and on specialized service such as the Maroon Bells shuttle. It is remarkable in terms of its size and capability in comparison to transit agencies in rural areas, and is positioned as a strong partner for the Forest Service.

Transportation planning in Colorado and in the Roaring Fork Valley is supportive of ITS. Relevant studies and plans include:

- Intermountain TPR Transit Element Final Report, LSC Transportation Consultants, Inc., June 10, 2003.
- Colorado 2030 Statewide Transportation Plan, *Moving Colorado – Vision for the Future*, Colorado Transportation Commission, February 17, 2005,.
- ITS Deployment Plan Project, Task 6 Deployment Plan, TranSystems Corporation, May 2006.

ITS needs are documented in an initial needs study as outlined below, and are being more completely defined as part of a Bus Rapid Transit (BRT) planning study that is getting underway. Statewide ITS incident management and traveler information needs are included in the Colorado DOT 2030 Statewide Transportation Plan; transit needs however, are outlined in corridor visions as part of regional strategies. The 2030 Intermountain Transportation Regional Plan (TRP) identifies \$405,000 of Advanced Public Transit Systems for the Roaring Fork Valley over a 27-year period, with \$100,000 programmed for 2008. This plan is being updated to 2035 and is likely to reflect additional needs based on recently completed and initiated planning efforts. The 2006 ITS Deployment Plan and preliminary ITS related BRT needs are estimated at \$11.8 million.

The 2006 RFTA ITS Deployment Plan outlines a series of short, medium, and long term ITS deployment opportunities as listed below. These needs formed the basis for including ITS technology in the 2007 ATPPL grant application.

Short Term

- Computer Aided Dispatch (CAD) / Automated Vehicle Location (AVL) with Mobile Data Terminals (MDT) and Transfer Connection Protection (TCP)
- Scheduling Software
- In-Vehicle Surveillance
- Real-Time Information on Internet (and at stops)

- Interface to fueling and mileage
- Electronic Payment System

Medium Term

- Automatic Passenger Counters
- Strobe Lights at Shelters
- Schedule Adherence
- Automatic Annunciation System
- Facility Surveillance

Long Term

- In-Vehicle Internet Connectivity
- Transit Signal Priority
- Ticket Vending Machines
- Access to traffic Closed Circuit TV

Findings

The review disclosed that opportunities for the beneficial application of ITS technology exist within the region. There are clear, near term opportunities to apply ITS to enhance the usability of transit for residents and visitors alike, particularly with respect to popular destinations such as Maroon Bells and the ski areas. Existing studies and plans provide a basis for moving forward with ITS deployment selectively as ITS deployment plans and strategies are more fully formed. Further planning is needed to establish a framework for ITS deployment and associated concept of operations. The BRT study, for instance, will contribute in this regard.

RFTA reported that the ATPPL funding for ITS was intended to be used for ITS as part of the hybrid bus procurement. The agency was not able to determine specific needs for ITS on the buses so deferred the purchase until more was known about its needs, particularly with respect to the CAD/AVL technologies to be implemented. This is a reasonable and conservative approach. Whereas there may be some cost savings if the necessary cabling is installed at the time a bus is manufactured, there also are risks if problems with cabling arise during installation of AVL, on-board traveler information, and other ITS devices, in that the bus manufacturer typically is not responsible for problems that are detected after the vehicle has been accepted. RFTA did acquire a bus that offers reasonable access for installing antenna cabling and includes space for rack mounted ITS devices. SAE J1708 - Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications, was noted as the key ITS standard governing on-board ITS devices.

RFTA discussed its near term interest in electronic fare payment to expedite boarding and to provide for innovative fare structures. David Kack noted that The Lone Star Card fare card system being used by the Capital Area Regional Transit System (CARTS) in Austin, Texas, might be a model for consideration, as it is a comparably sized rural transit system.

The need for traveler information appeared to be a high priority, particularly for visitors to the area who are unfamiliar with RFTA routes and services, as well as how to access the shuttle bus to Maroon Bells.

Next Steps

There are a number of follow-on actions that were identified, along with recommendations for additional planning and analysis.

Follow-on actions:

- David Kack committed to providing materials on the CARTS Lone Star fare card.
- Susan Law committed to providing a review of the 2006 ITS Deployment Plan by the CFLHD ITS specialist.
- Jennifer Stewart indicated that she would coordinate with the regional FTA ITS specialist and Susan Law to provide an indication of the sufficiency of the 2006 ITS Deployment Plan with respect to the National ITS Architecture conformity policy requirement with respect to any subsequent ITS implementation funding.

RFTA is positioned to move forward with its ITS activities. Recommendations are as follows:

- As was noted in the 2006 ITS Deployment plan, it may be worthwhile to consider advancing ticket vending machines identified as a long term need for deployment with any electronic fare payment concept to ensure uniformity and compatibility. The incorporation of Maroon Bells shuttle fees should be considered as part of any electronic fare payment planning study.
- The deployment of electronic message signs to direct traffic to the Maroon Bells shuttle could be implemented while ITS implementation planning on a broader scale continues. Similarly, “next bus” electronic signage at major terminals in the Aspen area could be advanced based on schedule information until such time AVL is incorporated on buses. Using ITS to help manage shared boarding areas at ski resorts with local and RFTA regional transit service is an opportunity as well.
- Pending specification and acquisition of a comprehensive CAD/AVL system, the possibility of implementing simple AVL in conjunction with web-based traveler information could be considered. RFTA staff indicated possible interest in trying to implement a Google Maps mashup as has been done elsewhere. The Cape Cod Regional Transit Authority, which uses cell phones with GPS capability to provide bus location, was cited as an example (<http://www.capecodtransit.org/>).
- Further ITS deployment planning is viewed as a worthwhile endeavor. Needs exist to more fully define the extent, location, and timing of ITS deployment, as well as to specify system capability / concept of operation and functional requirements in advance of initiating design and specification as part of implementation activities. Two publications on systems engineering in the planning process are available from U.S. DOT (http://www.ops.fhwa.dot.gov/int_its_deployment/sys_eng.htm):

- **Systems Engineering for Intelligent Transportation Systems** ([HTML](#), [PDF 2.7MB](#)) - A handbook that provides an introduction for transportation professionals to systems engineering and a basic understanding of how it can be applied to planning, designing, and implementing intelligent transportation systems (ITS) projects.
- **Developing Functional Requirements for ITS Projects** ([HTML](#), [DOC - 398KB](#)) presents guidelines for developing good functional requirements as part of a systems engineering process.

Concluding Remarks

RFTA is embarking on an ambitious agenda to improve transit services through ITS, at a cost of \$11.8 million based on preliminary estimates. To date ITS planning in the Roaring Fork Valley has focused primarily on general RFTA transit services. To the extent that ATPPL funding will be sought to help finance such services, it would be useful to explore if and how traveler information needs differ between the resident population and visitors to the area. Trip planning tools, particularly with multi-modal / weather capabilities, may be of interest to visitors who are unfamiliar with the area, for example. Likewise, traveler information regarding how to use RFTA to access popular recreational destinations on the forest or in the surrounding area may reveal distinct possibilities that serve the needs of the residents and visitors both. An ATPPL planning grant is one possibility for seeking funds to conduct such analyses.



Agenda

ITS Planning Meeting and Tour

December 12, 2007, 11:00 am MST (1:00 pm EST)

RFTA Aspen Maintenance Facility Conference Room

11:00	Introductions and Meeting Goals	All
11:15	Overview of RFTA Plans (BRT and ITS)	Kristin Kenyon
11:30	Progress on Implementing ITS Elements and Remaining Needs	Phil Schultz
11:55	Update on Hybrid vehicles	Kenny Osier
12:10	Discussion on RFTA/Forest Service Coordination	All
12:25	Wrap-up and Next Steps	All
12:30	Site Tour of Aspen Facility – Dispatch, etc	
12:50	Hybrid Bus Tour of Key Off-site Locations (Rubey Station, Snowmass, Highlands)	

Participants:

U.S. DOT

Scott Faulk, FTA, Region 8

Jennifer Stewart, FTA, Region 8

Gary Ritter, RITA Volpe National Transportation Center

U.S. Forest Service

Jeffrey Moll, Region 2, Lakewood

Christopher Spurl, Region 2, Lakewood

Martha Moran, White River National Forest District

RFTA

Information Technologies Dept: Phil Schultz, Andy Hermes

Operations Dept: John Hocker, Kent Blackmer

Planning Dept: Kristin Kenyon, Jason White, Sylvia Cranmer

Vehicle Maintenance Dept: Kenny Osier

Western Transportation Institute

David Kack, Montana State University