EXECUTIVE SUMMARY

Evaluation Plan
National Advanced Rural Transportation Systems
Field Operational Tests of
Traveler Information Services in Tourism Areas

Branson TRIP **I-40 TTIS**

July 1998

Prepared for:

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E X E C U T I V E S U M M A R Y

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PREFACE

This document is part of a series of planning documents for the evaluation of Field Operational Tests of Traveler Information Services in Rural Tourism Areas (Branson TRIP and I-40 TTIS) prepared by Battelle, along with subcontractors BRW Incorporated and CJI Research, for the U.S. Department of Transportation's ITS Joint Program Office (DOT/JPO). Electronic versions of these documents are available through the ITS Electronic Document Library (EDL):

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Title	Date	DOT Report No.
Evaluation Plan: The I-40 Traveler and Tourist Information System Field Operational Test	February 25, 1998	FHWA-JPO-99-028
Test Plan: I-40 TTIS Tourist Intercept Survey	May 18, 1998	FHWA-JPO-99-029
Test Plan: I-40 TTIS Focus Groups and Personal Interviews	May 18, 1998	
Test Plan: I-40 TTIS System/Historical Data Analysis	May 20, 1998	
Test Plan: I-40 TTIS Route Diversion Study	May 20, 1998	
Evaluation Plan: The Branson Travel and Recreational Information Program Field Operational Test	February 25, 1998	FHWA-JPO-99-027
Test Plan: Branson TRIP Tourist Intercept Survey	May 29, 1998	
Test Plan: Branson TRIP Focus Groups and Personal Interviews	May 29, 1998	
Test Plan: Branson TRIP System/Historical Data Analysis	June 1, 1998	
Test Plan: Branson TRIP Travel Time/Data Accuracy Test	June 1, 1998	
Executive Summary: Evaluation Plan (for the) National Advanced Rural Transportation Systems Field Operational Tests of Traveler Information Services in Tourism Areas	July 1998	

Executive Summary

Evaluation Plan for the National Advanced Rural Transportation Systems Field Operational Tests of Traveler Information Services in Tourism Areas

Branson Travel and Recreational Information Program
and
I-40 Traveler and Tourist Information System

The Branson Travel and Recreational Information Program (Branson TRIP) in Branson, Missouri, and the I-40 Traveler and Tourist Information System (I-40 TTIS) in northern Arizona are field operational tests (FOTs) being conducted through partnerships involving state and federal agencies and private organizations. The FOTs are funded in part by the National Advanced Rural Transportation Systems program. The focus of these FOTs is to provide the traveling public, especially tourists, with information about traffic and travel conditions, national and state parks, local events and attractions, and accommodations. These tests will demonstrate the degree to which Advanced Traveler Information Systems (ATIS) can improve traveler mobility and access, relieve congestion, and stimulate economic development in rural tourism areas.

Branson TRIP is a regional traveler information system that will provide comprehensive information on tourist attractions, weather, traffic, and road construction in the Branson/Tri-Lakes area. Each year, over six million visitors are attracted to the Branson area because of the availability of over 38 live music and entertainment theaters, numerous outlet malls and shopping centers, and various outdoor recreation opportunities. The TRIP system is envisioned as the first phase of the Great Plains TRIP, which will encompass Nebraska, Iowa, Kansas, Missouri, Oklahoma, and Arkansas.

The I-40 TTIS will collect, process, and disseminate, weather, road condition, and traveler information to I-40 corridor travelers. I-40 is an east-west interstate highway that crosses northern Arizona. Average daily traffic is more than 25,000 vehicles per day, including about 10,000 commercial vehicles. The I-40 corridor is the primary access to the Grand Canyon and over 20 other major national parks, monuments, and recreation areas. Significant changes in elevation and adverse weather conditions occur along the corridor. Like Branson TRIP, the I-40 TTIS links existing and new data sources to provide tourists and travelers with information before departure, while en route, and at designated local sites. Information is available through systems managed by public and private organizations.

Battelle is evaluating the Branson TRIP and I-40 TTIS under a contract with the ITS Joint Program Office. An overview of the common evaluation strategy is presented below. It is followed by brief summaries of the specific data collection and analysis efforts that will be undertaken to accomplish the evaluation goals.

OVERVIEW OF EVALUATION STRATEGY

Battelle's evaluation will address technical challenges of developing advanced traveler information systems (ATIS) in rural environments, institutional benefits and issues, usefulness of the information to the traveling public, effectiveness of various media in disseminating information to the public, and the

overall impact of the information on traveler behavior. The evaluation will address five goal areas: mobility, access, congestion, economic development, and safety. The key measures associated with these goals are listed in the table below.

Evaluation Goal Areas and Measures

Evaluation Goal Areas (Focus)	Evaluation Measures
Mobility (Traveler)	**- Travel Time** **- Perceived Ease of Travel** **- Customer Satisfaction**
Access (Destinations)	**- Knowledge of Travel Options** **- Use of Alternative Modes and Routes** **- Perceived Availability of Options**
Congestion (Transportation System)	**- Number of Delays** **- Level of Service** **- Perception of Delay Frequency and Severity**
Economic Development (Region)	**- Duration of Visit** **- Intent to Return**
Safety (Traveler)	**- Number of Emergency Calls** **- Amount of Safety Information Available**

The evaluation also will provide valuable information on the mechanisms for improvement in these areas. For example, the evaluation will answer such questions as, "Are tourists aware of and using components of ITS? Which components of the deployed ITS are being used? Is the information obtained by tourists accurate and understandable? Does the information change tourists' travel behavior or plans? Does this technology improve the overall experience of the tourist?"

The evaluation strategy and approach were developed in cooperation with local partners. Separate evaluation workshops were conducted with the I-40 and Branson teams to prioritize the evaluation goals. Both workshops included representatives from the state and federal Departments of Transportation. The Branson workshop also included private partners and representatives from several participating communities. Despite the differences in participant make-up of the workshops, the conclusions were very similar. Both teams considered assessing improvements in visitor satisfaction the most important evaluation goal. Evaluating improvements in efficiency of the transportation system was the second highest priority for both teams.

The teams also agreed on the overall approach to conducting the evaluations. Four evaluation tests are planned for each FOT site. These tests combine primary and secondary data collection and analyses for evaluating benefits and outcomes. At both sites, tourist intercept surveys, focus groups and personal interviews, and system and historical data analysis will be performed. The tourist intercept surveys will collect primary data on user awareness and satisfaction. The focus groups and personal interviews will provide more in-depth perspectives on issues affecting deployment, awareness, and use of the technology, as well as additional information on behavioral responses. The analysis of systems data will document the type, content, and sources of information made available through the various input systems

and characterize the use of various user interfaces. Results from the current tourist intercept surveys will be compared with similar data from historical surveys.

The fourth test at each site will focus on specific traffic management issues. In Branson, a travel time/data accuracy study will assess the accuracy of travel information and estimate the travel time saved as a result of traffic routing recommendations. An I-40 route diversion study will evaluate behavioral responses to variable message signs (VMS) in a rural environment.

PLANNED EVALUATION TESTS

Tourist Intercept Surveys

Tourists will be surveyed during two periods; a two-day pilot effort in June (I-40) or July (Branson), and a four-day main study in August (I-40) or September (Branson). At both locations, tourists will be surveyed using an "intercept" approach. That is, tourists will be approached by an interviewer as they enter or leave an attraction or other location (e.g., hotel or tourist information center). An initial "screening" interview will determine the level of awareness of the participants, their use of ATIS technologies, and their eligibility to complete an in-depth self-administered questionnaire (SAQ). Finally, an attempt will be made to obtain additional qualitative information from a subset of respondents who complete the questionnaire.

Approximately 600 screenings and 150 SAQs are expected to be completed at each FOT site during the two-day pilot study. During the main study, an additional 1,200 screenings and 600 SAQs should be collected at each site.

The survey will provide valuable information on ATIS awareness, use, and resulting behavior in rural environments. It will also provide information on the tourists' travel experiences, satisfaction with various aspects of the transportation system, travel characteristics, and general demographic information. This information will be used to assess tourists' awareness and use of ITS and to test specific hypotheses related to the primary evaluation goals. The hypotheses to be tested and the survey-related measures that will be used to address these hypotheses are presented in the accompanying table.

Focus Groups and Personal Interviews

During the main data collection period, formal focus groups and key informant interviews will be conducted. Typically, the focus groups will consist of two to four people and a moderator and will last about an hour. Individual interviews will vary in length, depending on the knowledge and experience of the respondent. Interviews with tourists are expected to last about ten minutes, while interviews with key informants might last up to 30 minutes.

Qualitative information will be collected from tourists and key informants (e.g., police, operators of hotels and attractions, park rangers, tour bus operators) who can provide additional insight on the impact, or lack of impact, of ATIS in rural environments. During the pilot data collection period, qualitative interviews will be conducted with tourists who have completed a questionnaire. The focus of these qualitative interviews is to solicit information that will permit revisions to the questionnaire.

Hypotheses and Evaluation Measures Related to the Tourist Intercept Surveys

Evaluation Area	Hypotheses	Evaluation Measures
ITS Awareness and Use	At least 25% of tourists are aware of at least one ITS component	Percentage of respondents reporting awareness
	At least 10% of tourists use at least one ITS component	Percentage of respondents reporting usage
	Over 80% of tourists using a specific component receive accurate, understandable, and easy to obtain information	Percentage of respondents indicating that the system is accurate, understandable, and easy to use.
Mobility	Tourists using ITS components will have a more satisfying travel experience than those who do not	Proportion of respondents indicating satisfaction with travel conditions
	Using ITS components will save time for tourists	Proportion of respondents indicating that the information saved time
	Using ITS components will make travel easier for tourists	Proportion of respondents agreeing that ITS made it easier to travel and avoid congestion Reported number of stops for directions
Access	Tourists will use alternative routes as a result of obtaining information from a deployed ITS component	Percentage of respondents who indicate use of alternative route
	Tourists will visit alternative attractions as a result of obtaining information from a deployed ITS component	Percentage of respondents indicating a change in attractions due to ITS
	Tourists using a deployed component of ITS will be more aware and able to visit more attractions than will non-users	Reported number of attractions visited
Congestion	The ITS components will help tourists avoid congestion	Percentage of respondents indicating that congestion was avoided
	Tourists using ITS will experience fewer and shorter delays	Reported number and length of delays
Economic Development	Tourists using an ITS component are more likely to return than tourists who do not use ITS	Percentage of respondents indicating an intent to return
	Tourists using components of the ITS will stay longer and spend more than will tourists who do not use an ITS component	Reported number of overnight stays and expenditures
	Tourists using ITS components will use them again and would be willing to pay a fee for such information	Percentage of respondents agreeing that they would use the source again and would pay a fee for use
Safety	ITS will improve travelers' perceptions of safety	Percentage of respondents agreeing that the highways are safer

Tourists will be identified for participation in a focus group following the completion of their self-administered questionnaires. In the focus groups, tourists will be asked to explain, in their own words, their experiences using intelligent transportation systems (ITS) in the FOT site. In separate focus groups or personal interviews, key informants will be asked to describe their perception of how ATIS affects traffic flow, travel behavior of tourists, the tourism business, and other factors potentially affected by ATIS. Institutional issues and perceived benefits will be documented. A total of 12 focus groups for tourists and key informants will be held at each FOT site.

If only a small percentage of tourists are aware of or use ATIS components, several of the tourist focus groups will be replaced with a series of test-site case studies. Here, a small sample of tourists will be exposed to an ITS component, then asked to comment on what they learned. For example, at kiosk sites, tourists could be intercepted and asked to use the kiosk, then respond to questions related to their understanding of the technology, satisfaction with the device or the information, or planned use of the information obtained.

System/Historical Data

System data are data obtained by (input) or generated by (output) components of an ATIS system. The number of data elements of each type that are stored in the TRIP or TTIS central databases will be documented. Input data might include congestion or incident information, emergency calls, traffic flow, hotel accommodations, and attraction schedules. Similarly, information on system outputs (e.g., number and nature of messages on variable message signs, number of calls to or hits on the voice response system, number of hits on web pages, etc.) will be documented. In general, the systems data will be used to document the functioning of the data collection and dissemination functions of the FOT.

For the I-40 FOT, the number of calls requesting travel condition information received by the Department of Public Safety (DPS) in Flagstaff during the evaluation period will be compared with similar data from previous years. Data from the Voice Remote Access System will be used in a similar manner. These data will be used to test the hypothesis that ITS is improving safety by reducing the number of calls to the DPS regarding roadway conditions and thereby increasing the ability of the DPS to respond to emergencies because resources can be reallocated.

Historical data, such as previous surveys of tourists, will be used to place in context the results of the current survey and will add to the body of knowledge on traveler attitudes and characteristics at each FOT site. For example, previous surveys will be used to help determine whether the tourists sampled for the FOT are representative. For the I-40 FOT, three previous surveys of Arizona travelers have been identified. For the Branson FOT, monthly visitor surveys conducted by the Branson-Lakes Area Chamber of Commerce will be used.

Travel Time/Data Accuracy (Branson Only)

A travel time and data accuracy test will validate TRIP traffic condition information by comparing travel times and traffic conditions on primary and recommended alternative routes. In addition to verifying the accuracy of the information provided, this test will identify the impact of the information on traffic patterns and estimate the savings realized as a result of route diversions.

To examine the effectiveness of the TRIP in directing tourists around recurring congestion, traffic routing information and recommendations will be recorded at selected times from one or more TRIP components (kiosk, VMS, telephone, highway advisory radio, etc.). Then, the primary and recommended alternative routes will be driven to determine travel times and traffic conditions. Approximately 10 congestion-related verification runs will be performed. To examine the effectiveness of the TRIP in directing tourists away from incident-related congestion, two local Missouri Department of Transportation (MoDOT) personnel will identify alternative routes from the TRIP as if they were tourists and perform verification runs in which one MoDOT staff member will drive the recommended alternative route and the other will drive the main route. They will record the information source, route identification information, run statistics, and other qualitative information.

The results will be used to test the hypothesis that TRIP information, specifically information on traffic congestion (either recurring or incident-related) in the Branson area, is accurate. This hypothesis will be tested by comparing the posted information to the observed levels of congestion on the routes.

A second hypothesis that will be investigated is whether tourists following the recommended alternative routes during times of congestion arrive at their destination faster than tourists that ignore the ITS information and travel the main route. This hypothesis will be tested by comparing the recorded travel times of the MoDOT staff member traveling the recommended alternative routes with those of the staff member traveling the main route.

Route Diversion (I-40 Only)

This route diversion test will assess driver response to the I-40 TTIS messages at selected locations by measuring the changes in traffic on main and alternative routes during periods when specific types of travel advisory messages are disseminated. The information might be disseminated through kiosks, web sites, automated phone information, and roadside VMSs. The junction of eastbound I-40 and SR 89, located approximately 55 miles west of Flagstaff and near the town of Ash Fork, Arizona, was selected as the site for this study because of the availability of traffic counts, the presence of a TTIS VMS, and the presence of a pair of alternative routes. Arizona Department of Transportation (ADOT) logs of the Ash Fork VMSs will be acquired and reviewed weekly throughout the test period (June 1, 1998, through January 31, 1999). Message postings will be screened, and six analysis scenarios will be identified. Hourly automatic traffic recorder count data for the 24-hour period that includes the time that the message was posted will be requested from ADOT on a monthly basis.

The specific hypothesis to be evaluated in this test is that drivers will alter their travel routes based on specific TTIS advisories (e.g., poor traffic or bad weather conditions on the main route). This hypothesis will be tested by examining the proportion of traffic on the main and alternative roadways during periods when certain types of messages are posted. For example, if the hypothesis is supported, then the percentage of traffic on the main route will decrease and the percentage of traffic on the alternative route will increase.

EVALUATION SCHEDULE

The schedule for the Branson TRIP and I-40 TTIS evaluations is illustrated in the figure below. Data collection began on June 19-20, 1998, with a two-day pilot tourist survey in northern Arizona. The pilot survey for Branson TRIP will take place on July 17-18. The four-day main surveys will take place in August and September 1998 for the I-40 and Branson FOTs respectively. ATIS data and special field

studies will be collected between June 1998 and January 1999. A data summary report will be available in November 1998. Final reports and an integrating summary report are due in April 1999.

Evaluation Schedule

Milestone/Deliverable	1998												1999			
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A
Preliminary Evaluation Strategy	◆															
Evaluation Kickoff Meetings		◆														
Evaluation Plans (2)*		◆														
Detailed Test Plans (8)*					◆											
I-40 TTIS Fully Operational						◆										
Branson TRIP Fully Operational							◆									
Data Collection						◆	◆	◆	◆	◆	◆	◆	◆			
Summary of Preliminary Results (2)*											◆					
Final Evaluation Report (2)*																◆
Integrating Summary Report																◆

* Separate plans and reports for Branson and I-40.
◆ Milestone or deliverable.

RELATED DOCUMENTS

Electronic versions of the Branson and I-40 evaluation plans, as well as the eight detailed test plans referenced above, are available on the ITS Electronic Document Library: http://www.its.fhwa.dot.gov/cyberdocs/welcome.htm. Also see publications FHWA-JPO-99-027, FHWA-JPO-99-028, and FHWA-JPO-99-029.