

# **Last Mile Commercial Package Delivery as a Revenue Generation Tool for Rural Public Transportation Systems in Wyoming**

## **Project Champion**

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A proposal prepared for the

Wyoming Department of Transportation

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## PROBLEM STATEMENT

In August 2015, the United States Patent & Trademark Office approved a patent called, “Mobile Pickup Locations” filed by the Amazon Technologies, Inc. Mobile Pickup Locations is a lockbox installed at fix locations such as bus stops, railway stations, airports and at mobile locations such as buses and trains. Instead of delivering products to customers’ resident and office addresses, customers can opt for a mobile pickup location delivery. Amazon is exploring this and other solutions such as Amazon Flex program with Uber to curb rising shipping costs, to improve last mile delivery services in rural areas, and to develop its own full-blown delivery network (Bhatt, 2015).

In general, urban and rural transit agencies work with very tight budgets. In fact, rural transit agencies have to become more creative with their operational budgets and local match. Raising the necessary local match with limited resources is key to sustain rural transit services. Last mile package delivery initiatives create opportunities for rural transit services to diversify their funding sources. It is likely that Amazon and other delivery companies may turn to the urban and rural transit industry to partner in last mile package delivery. Moreover, intercity bus systems provide package delivery on many routes. Rural transit systems can join with the intercity bus systems to further extend the reach of the transit network. A key question faced by state departments of transportation and rural transit systems is, “How can transit managers/administrators accommodate package delivery opportunities that can help generate additional revenues into their existing operations, given current regulations?” Other factors affecting this opportunity include: state DOTs policies regarding package delivery; modification of transit operations; potential modifications to transit vehicles; driver training issues; demand/capacity for package delivery on rural systems; and revenue forecasts. Given the growth in the delivery market, it appears to be the right time to investigate how rural transit may have a role in the last mile package delivery system and can generate revenues that can be utilized as a local match for federal grants.

The proposed project is aligned with the six overall goals from the 2012-2015 WYDOT Strategic Plan:

- a. *Improve Safety on the State Transportation System;*
- b. *Serve Our Customers;*
- c. *Improve Agency Efficiency and Effectiveness;*
- d. *Take Care of All Physical Aspects of the State Transportation System;*
- e. *Develop and Care for our People; and*
- f. *Exercise Good Stewardship of Our Resources (WYDOT, 2014).*

The goal of this project is to assess the feasibility of last mile package delivery as a revenue generation tool for rural public transportation systems in Wyoming. The objectives are:

1. Understand the impact of technologies and innovative last mile package delivery systems and how rural public transportation systems may have a role in the process.
2. Synthesize current the last mile package delivery practices in public transportation systems in rural states.
3. Analyze policies of states regarding the use of public transportation for package delivery.
4. Estimate demand, capacity need, and revenue generation for rural transit systems in regard to last mile package delivery.

## BACKGROUND STATEMENT

Rural and small urban areas encompass 80% of the nation's landmass, but only 25 percent of U. S. citizens claim these areas as their home. Rural areas have more than 3 million miles of roads and carry 40 percent of all vehicle miles traveled. Many poor, senior citizens (almost 70% of all senior citizens), veterans, and disabled citizens choose rural and small urban areas due to low-priced housing, less traffic, low crime, low living cost, and natural beauty. According to the Federal Highway Administration (FHWA), nearly 40 percent of the country's transit-dependent population live in rural and small urban areas. Larger geographical distances influence the life of rural and small urban citizens for their income, mobility, culture, health care access, employment status and, access to many other livelihood services. Due to a lack of alternate transportation services, rural and small urban populations are more dependent on automobiles than their urban counterparts. Low population densities and larger geographical areas, an aging population, and limited resources put rural people and rural transit agencies in the difficult situations of accessing their routine livelihood services. States with dominant rural populations must address three important factors in order to have a reliable and safe transportation.

*1. Low Population Density and Larger Geographical areas:* These factors often result in fewer riders and longer routes and can negatively impact a rural transit's bottom line due to sheer cost in providing this kind of service. In rural areas, people tend to be widely spread out. Large geographical areas directly affect response time and impact operational costs. Rural transit agencies face difficulties in addressing vehicle maintenance, fuel and staffing issues. Geographical areas of states such as Wyoming, Montana, New Mexico, and Colorado are predominantly rural or frontier. As show in Table 1, there are 13 states where the majority of the counties have a population density of less than 20 people per square mile. In addition, a large number of federally recognized Indian Tribes are also located in these states.

**Table 1: State and Frontier/Rural Areas**

State	Total Number of Counties	Number of counties with Population Density <20.0sq.mi*	Number of Indian Reservations**	Projected Percent of Population Age 65 and Older (2030)
Wyoming	23	22	2	26.5
New Mexico	33	25	21	26.4
Montana	56	48	7	25.8
N. Dakota	53	49	5	25.1
S. Dakota	66	54	6	23.1
Arizona	15	9	22	22.1
Nebraska	93	69	4	20.6
Kansas	105	69	4	20.2
Nevada	17	13	21	18.6
Idaho	44	30	5	18.3
Colorado	63	41	2	16.5
Alaska	27	25	16	14.7
Utah	29	23	3	13.2

Note: \* Designated either frontier/rural area; \*\* Federally recognized Indian Nations

Source: \*\* [http://500nations.com/tribes/Tribes\\_State-by-State.asp](http://500nations.com/tribes/Tribes_State-by-State.asp)

Ref: U.S. Census Bureau, Population Division, Interim State Population Projections, 2005

*2. Aging Populations:* Senior citizens (65 and older) are the fastest grown population segment in the United States. By 2030, the senior population is projected to be 72 million, up from the current 35 million, which would be equal to 25% of the U.S. population (APTA, 2010). More than 70% of senior citizens live either in suburban or rural areas due to low-priced housing, less traffic, low crime, low cost of living, and natural beauty (CTAA, 2003). While more and more senior citizens continue to drive well into their 70's and even 80's, at some point they must find an alternative to driving their own vehicle. This decision of when to stop driving can be confounded by a lack of alternative transportation. As the number (percentage) of Americans continues to grow with their rural living preferences, this age group will present new challenges for the 21<sup>st</sup> century's rural transportation system to provide convenient, safe, and sustainable transit service. With a rise in aging populations, rural areas will see increases in on-call and appointment-based transportation needs.

*3. Limited Resources:* In general urban and rural transit agencies work with very tight budgets. In fact, rural transit agencies must become more creative with their operational budgets and local match. Raising the necessary local match with limited resources is key to sustaining rural transit services. Rural transit organizations will have to equip themselves to better deal with scheduling issues and depleted resources resulting from the impacts of aging populations. High demand for customized routes and erratic scheduling, as well as expectations of efficiency and effectiveness, tend to strain rural transit resources.

In Wyoming, a rural and frontier state, every county has its own transit systems mainly operated by local transit and social service organizations. However, only 17 of 90 cities and towns listed by the U.S. Census are connected to intercity bus services. In 2016, the Western Transportation Institute at Montana State University conducted a survey of the Wyoming transit managers to identify challenges to operate transit services between towns. The survey results indicate that the transit agencies need additional funding and vehicles to improve transit services. Moreover, the majority (17 of 21) of transit agencies noted that intercity bus needs were being met "Not Very Well" or "Not at All." This survey was conducted as a part of the Wyoming Department of Transportation's Wyoming Intercity Bus Service Study. Similar concerns are prevalent among other states such as, California, Colorado, Montana, Nevada, Oregon, South Dakota, Utah, and Washington.

As indicated by the Wyoming Public Transit Association:

- 1. Rider demand is increasing an average of 12 percent per year for transit agencies. Transit agency costs are increasing 16.7 percent per year per ride.*
- 2. The agencies have an average shortfall of \$28,400 in meeting the demand for transit services, and need to find 20 percent of their budget, an average of \$28,400 per year, to provide enough service to meet demand.*
- 3. Local match sources are projected to decline in 15 percent of the agencies, with 66 percent projecting a stable local match source. Seventeen percent project an increase in local match.*
- 4. The typical van costs \$30,000, while the typical 12-15 passenger bus costs about \$45,000. The estimated replacement cost for the state-wide fleet is \$10,000,000. The typical economic life of a van or bus is five years. The average age of the vehicles in the Wyoming Public Transit fleet is 5.74 years.*

5. *The average fare or suggested donation requested by the transit agencies is \$1.56. This averages out to be less than 30 percent of the total cost of each ride, which is one person one way. A return trip home from the doctor's office, is a separate trip.*
6. *At the same time, the transit agencies estimate that only 20 percent of their riders could pay more for a ride.*

(Source: WYDOT, WYTRANS, <http://www.wytrans.org>)

In addition, the Wyoming Intercity Bus Service Study recommended that the Wyoming Department of Transportation (WYDOT) focus on providing intercity bus services to the central and the northwest parts of the state and strive for 85% (24 of 28 cities with population over 2,000) of these most populated cities in Wyoming to be connected to an intercity bus (ICB) service provider or, at a minimum, a more populated city. The following routes ( Table 2) are proposed to achieve 85% threshold for the intercity bus service coverage.

**Table 2: Proposed Routes and Major ICB Destination**

Route	Cities	Population	Major ICB Destination
1	Lander	7,642	Casper
	Riverton	10,953	
2	Cody	9,740	Billings (MT)
	Lovell	2,404	
	Powell	6,407	
3	Thermopolis	3,020	Casper
	Worland	5,366	
4	Lusk	1,578	Cheyenne
	Torrington	6,738	
5	Greybull	1,868	Billings
	Worland	5,366	
6	Newcastle	3,513	Gillette

Ref: WYDOT Intercity Bus Study, 2016a

The total annual cost of the proposed routes equals \$144,300. Given the match ratios (match funding) provided by WYDOT, it is assumed that the local share would be approximately 42%, or an annual total of \$60,606. The FTA/WYDOT share would be \$83,694 (WYDOT Intercity Bus Service Study).

In order to provide adequate local and ICB services in Wyoming, new financial resources are needed as local match to obtain federal grants. Usually, transit agencies in rural areas largely depend on the local governments, county governments, and few nonprofit organizations for support. There is an urgent need in Wyoming for transit agencies to look beyond the traditional sources of funding to operate efficient services. Many studies have been conducted to explore various financial resources, however none are focused on the emerging market of the package delivery through transit systems.

In August 2015, Amazon (largest online retailer) announced to was creating its own package delivery system through its invented moving lockbox facility—"Mobile Pickup Locations." Instead of delivering products to customers' resident and office addresses, customers can opt for a

mobile pickup location delivery. Amazon is exploring this and other solutions such as Amazon Flex, a program with Uber to curb rising shipping costs, to improve last mile delivery services in rural areas, and to develop its own full-blown delivery network. These initiatives create opportunities for rural transit services to diversify their funding sources. It is likely that Amazon and other delivery companies may turn to the urban and rural transit industry to partner in last mile package delivery. Moreover, intercity bus systems provide package delivery on many routes. Rural transit systems can join with the intercity bus systems to further extend the reach of the transit network. A key question faced by state departments of transportation and rural transit systems is, “How can I accommodate package delivery opportunities into my existing operations, given current regulations?” Other questions pertaining to this opportunity include: state DOTs’ policies regarding package delivery; modification of transit operations; potential modifications to transit vehicles; driver training issues; demand/capacity for package delivery on rural systems; and revenue forecasts. Given the growth in the delivery market, it appears to be the right time to investigate how rural transit may have a role in the last mile package delivery system. The purpose of this project is to address the concerns raised here and to identify new financial resources for rural transit systems of Wyoming.



## OBJECTIVES

The goal of this project is to assess the feasibility of last mile package delivery as a revenue generation tool for rural public transportation systems in Wyoming. The objectives are:

- a. Understand the impact of technologies and innovative last mile package delivery systems.
- b. Synthesize current last mile package delivery practices in public transportation systems in rural states.
- c. Analyze policies of states regarding the use of public transportation for package delivery.
- d. Estimate demand, capacity need, and revenue generation for rural transit systems in regard to last mile package delivery.

The proposed project is aligned with overall goals from the 2012-2015 WYDOT Strategic Plan. Table 3 shows how the project objectives are linked with WYDOT's strategic goals, potential project outcome measures, and suggested performance measures if WYDOT chooses to implement recommendations suggested at the completion of the project.

**Table 3: WYDOT Goals and Project Links**

<b>WYDOT Goals</b>	<b>Output measures</b> (Applicable Project Objectives)	<b>Outcome Measures</b>	<b>Suggested Performance Measures</b>
<i>Improve Safety on the State Transportation System</i>	<i>Synthesize current last mile package delivery practices in public transportation systems in rural states.</i>	<i>To teach rural transit managers/drivers how to handle last mile package delivery and passenger safety.</i>  <i>To maximize WYDOT enforcement, educational and support efforts.</i>	<i>Education programs</i>
<i>Serve Our Customers</i>	<i>Synthesize current last mile package delivery practices in public transportation systems in rural states.</i>	<i>To serve rural citizens by providing multiple services including passenger services and goods.</i>	<i>Extended transit services (by days, routes, and time)</i>  <i>Transit Managers/Workforce Satisfaction Rating</i>
<i>Improve Agency Efficiency and Effectiveness</i>	<i>Analyze state policies regarding the use of public transportation for package delivery.</i>	<i>To identify opportunities to generate more revenue.</i>  <i>To improve administrative processes for enabling transit agencies to opt for more financial resources</i>	<i>Financial Resources Improvement</i>  <i>Changes in Policies</i>
<i>Take Care of All Physical Aspects of the State Transportation System</i>	<i>Estimate demand, capacity need, and revenue generation for rural transit systems in</i>	<i>To maintain and improve the existing public transportation systems through:</i>	<i>Better utilization of transit buses other than resources</i>

	<i>regard to last mile package delivery.</i>	<ul style="list-style-type: none"> <li>* <i>Training</i></li> <li>* <i>Resource management and prioritization</i></li> <li>* <i>Best practices</i></li> <li>* <i>Innovative solutions</i></li> </ul>	
<i>Develop and Care for our People</i>	<i>Analyze state policies regarding the use of public transportation for package delivery.</i>	<p><i>To train rural transit workforce for handling last mile package delivery and riders efficiently and effectively.</i></p> <p><i>To demonstrate a professional service oriented approach for last mile package delivery.</i></p>	<p><i>Training Programs for rural transit workforce</i></p> <p><i>Employee Satisfaction Rating</i></p>
<i>Exercise Good Stewardship of Our Resources</i>	<p><i>Understand the impact of technologies and innovative last mile package delivery systems.</i></p> <p><i>Estimate demand, capacity need, and revenue generation for rural transit systems in regard to last mile package delivery.</i></p>	<p><i>To assess the impact of current and future technology.</i></p> <p><i>To maintain fiscal responsibility.</i></p>	<p><i>Space utilization of rural transit vehicles</i></p> <p><i>% of additional available funds for public transportation systems</i></p>

Note: 1. Output measures: The direct or indirect link between the proposal and the WYDOT goals and/or strategic plans.

2. Outcome measures: The end result of the project. Outcome measures should explain how an action will improve efficiency, safety, or other measure while at the same time lower costs and accident rates.

3. Performance measure: How to manage and/or improve a service or process, by what unit of measure, and by when. The performance measure should provide effectiveness, efficiency, quality, and/or timeliness of the project.

Ref: WYDOT, 2016b.

## **BENEFITS AND BUSINESS CASE**

According to the United States Postal Service's 2014 White Paper— Package Services: Get Ready, Set, Grow!, consumers and businesses in the United States spent more than \$68 billion to ship packages domestically in 2013. Amazon alone paid more than \$6.6 billion to deliver goods of online retailer in 2013 including books, clothing, electronics, jewelry, and shoes (USPS 2014). The package delivery market of online products is experiencing continuous change in order to make it more efficient and cost effective. Commercial companies are investigating various practices that can replace traditional last mile delivery systems. Since public transportation systems have emerged as a viable solution for the last mile package delivery market, these public transportation systems and state departments of transportation should research this opportunity to obtain new revenue. This revenue could help rural transit systems obtain critically needed local match. Finally, package delivery through a transit system could help improve the efficiency, effectiveness, visibility of rural transit systems, and provide another venue to connect transit systems with the general public.

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## APPLICABLE QUESTIONS

- Are there any potential barriers to implementation (e.g. material, technology, vendors, legal/regulatory, public perception). For each potential barrier, identify strategies to mitigating these potential barriers.

*Answer: The research team does not anticipate any barriers.*

- What is the expected time frame for implementation.

*Answer: It will depend on the individual transit agencies of rural areas in Wyoming.*

- Does the project involve action on Federal lands or other conditions that will require National Environmental Policy Act (NEPA) documentation (e.g. Categorical Exclusion or Environmental Assessment), and/or forest service or other permits.

*Answer: No*

- What are the major uncontrollable factors and/or unknowns in the project such as weather, wildlife, material properties, traffic, etc. For each uncontrollable factor, address whether there could be additional costs or delays.

*Answer: Not Applicable*

- Should the project be segmented into phases with go-no/go decision points based on known unknowns (e.g. technology, partnerships, regulatory).

*Answer: All tasks of the project are independent and the project is not structured in a phased manner.*

- If the project involves evolution of one or more technologies, is a technology road map provided showing how these technologies fit together.

*Answer: While certain technologies may be discussed, this project does not focus on the technology aspects, thus no road map will be provided.*

- Will a Buy American Waiver be necessary.

*Answer: No*

- Will any data produced by this project be considered confidential or sensitive.

*Answer: No. It is not anticipated that this will be an issue.*

- Will the data and/or report from the final project be copyrighted, patented, or trademarked.

*Answer: No.*

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## STATEMENT OF WORK

This section of the proposal includes the work plan/scope and work schedule. This project will be completed by a team of researchers and graduate students from the Western Transportation Institute (WTI) at Montana State University (MSU). The detail time schedule of each task is shown in Work Schedule section of this document.

### Work Plan/Scope

The project will rely on qualitative and quantitative research methods and is applied in nature. The project will include a literature review, data collection, surveys, informal interviews, policy and plan analysis, and statistical analysis. To complete this research, the tasks have been identified and described as follows:

#### Tasks 0: Project Management

Project Management is essential to ensure effective communications and accountability between WYDOT and the Western Transportation Institute (WTI) throughout the project. Specific project management activities follow.

- Meetings will be held with the Technical Panel, as necessary, to ensure the project meets the needs of WYDOT. Proposed meetings include:
  - A kickoff meeting to take place as soon as practical after a contract is in place to review the proposal with and receive additional input on the project activities;
  - One or more interim meetings to discuss initial results and discuss the direction of the remaining tasks; and
  - A wrap-up meeting to discuss the findings and determine what refinement of results is necessary.
- Monthly progress and status reports will be delivered, assessing work done on specific tasks and the percent of each task completed to date.

Deliverables: Progress and Status Reports as required by WYDOT.

#### Task 1: Literature Review and Data Collection

This task involves two components; (1) Literature Review and (2) Data Collection. Each of these components is also required throughout Tasks 2 - 6. The purpose of the Literature Review is to review internet shopping information, various commercial package delivery systems in rural areas, historic and current trends of package delivery through public transportation systems, and state DOTs' policies and directions about package delivery. Package delivery operation management documents of public transportation systems will also be reviewed. In addition, information from sources such as the Federal Motor Carrier Safety Administration, Federal Highway Administration, Federal Transit Administration, Transportation Research Board, WYDOT and other state DOTs, FedEx, Amazon, USPS, and UPS will be reviewed for lessons learned from their commercial package delivery initiative and data can be incorporated into the project.

Tasks 3 through 6 require various datasets including surveys, freight data, package delivery economics, monthly and annual retail trade data, geographical information system maps, census information, and air travel information from sources such as the Bureau of Transportation

Statistics, National Transportation Statistics Data, US Census Bureau, and commercial entities such as FedEx, Amazon, USPS, and UPS. Once the literature review is completed for each task, a data collection process will be started for each of them based on the reviewed information. For this project three surveys will be conducted (Tasks 2, 3, & 4). The sample size of each survey would be 50 or less and the online survey tool, Survey Monkey, will be used extensively. While analyzing the various datasets, additional public transit information may be obtained through informal interviews of key stakeholders involved with rural transit services and commercial package delivery. An emphasis will be placed on collecting information that will help to draw a conclusion of each task. Prior to conducting the surveys, the research team of the WTI will obtain an approval of the Institutional Research Board of Montana State University—Bozeman. The final Task 7, Draft and Final Report, will be the compilation of all technical memorandums.

Deliverables: Technical Memorandum

**Task 2: Survey of commercial entities that use the public transportation systems in rural areas for last package delivery**

The intent of this task is to conduct a survey of the commercial entities that use public transportation systems for delivering certain oversized, regular and irregular, and multi-box shipments. For Wyoming, the commercial entities will be identified through intercity bus systems such as Greyhound Express, Black Hills, Stage Line, Mountain States Express, and Jefferson Lines. The focus of the survey will remain on delivery preferences, types of shipment, tools needed to store shipments, operation efficiency, and return services. The purpose of this talk is to evaluate whether commercial package delivery is a viable concept from a client’s perspective. The online survey tool—Survey Monkey will be used to conduct the survey.

Deliverables: Technical Memorandum

**Task 3: Survey of public transportation agencies engaged in last mile package delivery systems**

This survey is intended to document the peer public transportation systems experiences delivering commercial packages. Both rural transit agencies and the intercity bus systems will be approached for the survey. The survey methodology will remain the same as in Task 2. The survey will cover topics such as package delivery operation efficiency, future development, opportunities, threats, benefits and the current and potential issues.

Deliverables: Technical Memorandum

**Task 4: Survey of state department of transportation officials on their commercial package delivery policies and the opportunities for the revenue generation for public transportation**

The purpose of this survey to enlist the opinion of the state departments of transportation officials about the emerging commercial package delivery trends and opportunities to generate revenue for rural transit systems. This survey will be focused on package delivery trends; regulatory, legal, and policy issues; education programs for transit managers, future developments, existing package delivery policies, commercial package delivery revenues eligibility for the revenue as local match

for federal grants. States for this survey will be selected based on the project oversight committee's suggestions and the states with the similar commercial package delivery policies.

Deliverables: Technical Memorandum

### **Task 5: Regulatory and package delivery allowance policies analysis**

In this task, the project team will conduct comprehensive research on the legal, policy requirements for rural transit systems to determine what terms can reasonably be put into a package delivery allowance while complying with laws, agency rules, and policies. The project team will accomplish this by contacting the DOT staff responsible for the legal and regulatory requirements for transit services. Legal and policy documents pertaining to commercial package delivery through public transportation systems will be compared and contrasted among the state DOTs. The types of information that will be gathered include: the ability to change entrance fees, transportation fees, amenity fees, contractor incentives provided, and internal restrictions for various agencies.

The project team will also review various commercial package delivery mechanisms used by FTA and state DOT grant recipients that provide public transportation services. Relevant research undertaken by the Transportation Research Board or other research centric organizations and guidance provided by other professional organizations will also be reviewed and analyzed.

Deliverables: Technical Memorandum

### **Task 6: Quantification of commercial package delivery demands and revenue generation for public transportation systems**

The purpose of this task is to quantify the benefits of commercial package delivery through rural transit systems. This task will attempt to answer the following key questions:

- What is the current volume of package delivery in rural areas?
- What kinds of packages are delivered through public transportation systems?
- What could be the demand of package delivery in rural areas of Wyoming?
- How much revenues could be generated?
- What is the demand/capacity ratio for more package delivery on rural transit systems in Wyoming?

Quarterly online trade information published by the U.S. Census Bureau will be widely used. Statistical information focused on online value of shipments in the manufacturing sector, sales in the merchant wholesale trade and retail trade, revenue in service industries, and sales by merchandise line through e-shopping and mail-order will be subtracted and used for this task. Moreover, the shipment information from the shipment companies—Airborne, Federal Express (FedEx), United Parcel Service (UPS), and the U.S. Postal Service, and online retailers such as Amazon, Netflix, eBay, and Walmart will be utilized.

In order to estimate of revenue of package delivery, a set of factors such as number of packages, types of delivery, and delivery distances will be utilized to convert online revenue and sales into revenue. The potential variables that would enter into developing these factors are number of

household internet users in a typical rural area, online shopping revenue generated per household, and percentage of e-tailing when compared to total retail sales.

Deliverables: Technical Memorandum

**Task 7: Draft and Final Report**

This task will consist of the compilation of the Project Report and Project Summary Report. These documents will present the results of the overall research effort. The Project Report will summarize literature and other state practices in regards to commercial package delivery through public transportation system and revenue generation, quantification of revenue and package delivery, policy recommendations, education and training program suggestions, and the best practices to handle last mile package deliveries.

A draft of the documents will be provided to the Technical Panel a month before the end of the project for review and comment prior to finalization.

If requested, members of the research team will make a formal presentation to WYDOT staff and the Wyoming Transit Association upon completion of the project, in addition to presentations made to the Technical Panel.

*Deliverables: Final Report*



## Work Schedule

The time schedule is realistic and presented based on the experiences of researchers of similar projects. The research team does not anticipate any extensions, barring unforeseen situations. It is anticipated that this project will take twelve months to complete with presentations to WYDOT staff and Wyoming Transit Association meetings, if requested, in the thirteenth or fourteenth month. A draft project report will be submitted by July 1, 2017. After a meeting with the Technical Panel, adjustments will be made to the research report and a final report will be submitted by August 15, 2017. The schedule is presented in Table 4. As the start date of the project is unknown, for reference purposes, it is assumed that the work will commence September 1, 2016, which would result in its expected conclusion at the end of August 31, 2017.

**Table 4: Project Time Schedule**

<i>Tasks</i>	2016				2017							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Tasks 0: Project Management												
Task 1: Literature Review and Data Collection												
Task 2: Survey of commercial entities												
Task 3: Survey of public transportation agencies												
Task 4: Survey of state department of transportation officials												
Task 5: Regulatory and package delivery allowance policies Analysis												
Task 6: Quantification of commercial package delivery demands, and revenue												
Task 7: Draft and Final Report												

## BUDGET

The total budget for this project is \$120,773. It is anticipated that WYDOT will provide a \$40,143 grant for this project. WTI's Small Urban and Rural Livability Center (a University Transportation Center) grant will provide \$80,660 for the project. Projected expenditures by task are shown in Table 5 (WYDOT Budget) & Table 6 (WTI/UTC Grant). The WYDOT Budget will be utilized from September 1, 2016 to December 31, 2016.

**Table 5: WYDOT Budget**

	Budgeted Amount	Explanatory Note
<b>Direct Cost</b>		
<b>Total Personnel Costs (including Fringe Benefits)</b>	<b>\$27,027</b>	
Principle Investigator	\$14,868	
Graduate Student	\$7,800	
Other Personnel	\$4,359	Including Co-PI, Editors, Business Manager
Research Travel	\$750	To visit to WYDOT Headquarters or other places suggested by the project champion
Report Generation	\$100	
<b>Total Direct Cost</b>	<b>\$27,877</b>	
<b>Indirect Costs @44%</b>	<b>\$12,266</b>	
<b>TOTAL</b>	<b>\$40,143</b>	

**Table 6: WTI/UTC Grant**

	Budgeted Amount	Explanatory Note
<b>Direct Cost</b>		
<b>Total Personnel Costs (including Fringe Benefits)</b>	<b>\$52,414</b>	
Principle Investigator	\$35,563	
Graduate Student	\$4,200	
Other Personnel	\$12,651	Including Co-PI, Editors, Business Manager
Research Travel	\$3,000	For a trip to WYDOT Headquarters or other places suggested by the project champion to make report presentation, academic presentations, and to attend conferences.
Report Generation	\$600	For printing reports, research findings briefs, etc.
<b>Total Direct Cost</b>	<b>\$56,014</b>	
<b>Indirect Costs @44%</b>	<b>\$24,646</b>	
<b>TOTAL</b>	<b>\$80,660</b>	

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## IMPLEMENTATION

This research project will not implement any WYDOT current practices, changes to policy, or auditing practices related to last mile commercial package delivery systems.

The results of this research, provided in the final report and project summary report, could lead to implementation of several items:

- The report will provide insight into potential commercial package delivery market in Wyoming and how it could help the rural transit systems to raise local match revenue.
- Should the results of this research show there is adequate benefit to be gained from last mile package delivery systems, consideration should be given to the implementation of such a system in rural areas. The report will include suggestions for the structure and design of such best practices.
- Where adequate evidence can be compiled, changes to the WYDOT commercial package delivery through rural transit policy will be suggested. WYDOT would subsequently determine which, if any, of these suggestions should be pursued through administrative or legislative efforts.

## TECHNOLOGY TRANSFER

The technology transfer program for this project will be designed to support the USDOT in their objective “to make research results available to potential users in a form that can be implemented, utilized, commercialized or otherwise applied.” The research team will do this by sharing research results quickly and to the widest possible audience. Table presents the planned technology transfer activities.

**Table 7: Table Planned Technology Transfer Activities**

Activity	Tasks
Increase partnership opportunities to share expertise and move research into practice	<ul style="list-style-type: none"> <li>• Catalogue local, state, and tribal government contacts that operate transit system.</li> </ul>
Provide Technical Assistance	<ul style="list-style-type: none"> <li>• Provide on-site or web-based technical assistance to those who could implement research results to increase mobility for people and goods in small urban, rural, and tribal areas. (Modalities of this task will be discussed with WYDOT)</li> </ul>
Use Peer Reviewed Journals and Other Avenues to Disseminate Research Results	<ul style="list-style-type: none"> <li>• Prepare final reports, and develop peer reviewed journals or academic publications to showcase research results of UTC sponsored research.</li> <li>• Present research findings at regional, national, and international transportation forums.</li> <li>• Submit research reports and tech briefs to online libraries including TRB’s TRID, the National Transportation Library, USDOT Research Hub, Transportation Library, Volpe National Transportation System Center, FHWA Library, and the US Dept. of Commerce National Technical Information Service.</li> <li>• Share project research results on WTI and WYDOT websites and newsletters that are featuring research, education and technology transfer activities.</li> </ul>
Increase Information Exchanges	<ul style="list-style-type: none"> <li>• Utilize platforms such as Facebook, Twitter or other social media tools to increase dissemination of research results.</li> <li>• Participate in webinars on topics relevant to project goals.</li> <li>• Participate in a national or regional conference or workshop, or leverage existing conferences and workshops relevant to rural transit system topics.</li> </ul>

## DATA MANAGEMENT PLAN

The goal of the data management plan is to ensure that data is well-managed in the present, and prepared for preservation in the future. The final data product will be thoroughly documented in the research report itself. At the kickoff meeting of the project, the research team will present a proposed Data Management Plan (DMP) and will explain how the data will be managed throughout the project and after the completion of the project. The research team will incorporate all DMP suggestions made by the WYDOT Project Champion and Research Manager. During the research project, the PI will ensure that the data is maintained and backed up in a secure manner at WTI. WTI is well equipped to store such data. The research team will also meet all reasonable requests for WYDOT's data management.

The research team will utilize the ScholarWorks system of Montana State University-Bozeman. It is an open access institutional repository for the capture of the intellectual work of Montana State University. ScholarWorks is a central point of discovery for accessing, collecting, sharing, preserving, and distributing knowledge to the MSU community and the world.

The proposed DMP of the project is as follows:

### 1. Types of Data Produced

The research team anticipates that this research project will generate data in terms of text files and spreadsheets. Text files and spreadsheets are categorized as "small" databases. The research team will ensure that small-scale databases remain simple to understand, simple to use, and simple to update, edit, change, or append.

### 2. Data Access and Sharing

Data supporting the conclusions from published articles will be openly published in MSU ScholarWorks, Montana State University's open access institutional repository. Scholarworks is managed and maintained by the MSU Library. Content in ScholarWorks is documented with Dublin Core metadata, with additional Highwire Press tags to optimize discoverability via search engines. A detailed readme file will accompany the files. Data in ScholarWorks is retained indefinitely, and is freely available to the public, with an optional embargo period.

### 3. Policies for Re--use, Distribution

Access to databases will be available for educational, research, and non-profit purposes. Such access will be provided using web-based applications, as appropriate.

### 4. Archiving and Preservation

MSU ScholarWorks' secure storage servers are backed up locally and off-site. ScholarWorks runs checksums on data every night, and reports are sent to repository administrators for verification. Original files will be preserved for the long-term, and the MSU Library may migrate files to updated formats as needed to maintain the content in a useable and understandable format into the future.

In addition to the above MSU ScholarWork', WTI will retain all files and datasets for the five years after the completion of the project.

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## STAFFING

The research team for this project consists of: Mr. Jaydeep Chaudhari, Research Scientist, Mr. David Kack, Director of the Small Urban and Rural Livability Center, and a graduate student. The project will be led by Mr. Chaudhari—Principle Investigator. He will be responsible for the management and integrity of the design, conduct, and reporting of this research project. Additionally, Mr. Chaudhari will be responsible for the direction and oversight of compliance, financial, personnel, and other related aspects of the research project. He will ensure research is conducted in accordance with Federal regulations, Montana State University—Bozeman, and WYDOT policies and procedures. Mr. Chaudhari will be supported by Mr. Kack—Co-Principle Investigator. The graduate student will be hired upon approval of this project. WTI’s in house editors will provide support for report preparation, editing, and review. A business manager will oversee all administrative work including finances and project contracting. Following are the key qualifications of the key research personal:

**Jaydeep Chaudhari, AICP**, is a Research Scientist with the Western Transportation Institute. He is skilled in the fields of transportation planning, safety and operations, policy, intelligent transportation systems (ITS), administration, geographical information systems, and architecture. Recently, he completed the Wyoming Intercity Bus Study for the Wyoming Department of Transportation. He also helped to launch the USDOT Planning Leadership Award winning transit system—the North Central Montana Transit system. Jaydeep served as a member of the National Cooperative Highway Research Program (NCHRP) road safety project —*Design Guidance for High-Speed to Low-Speed Transition Zones for Rural Highways*—panel, Education Group of US-French Cooperation on Mass Transportation: MoU Action Plan (FTA-USDOT), and the Education, Audiovisual and Culture Executive Agency, European Commission.

**David Kack**, is currently the Director for the Small Urban and Rural Livability Center (a WTI managed University Transportation Center). David holds a Master’s Degree in Business Administration and specializes in transportation coordination, management, and planning. He has helped three communities in Montana start public transportation systems, and has an on-going role with two of these systems. David is a member of the Transportation Research Board’s Rural Public and Intercity Bus Transportation Committee, and has extensive experience working with the public and cultivating multi-agency institutional relationships for the purpose of transportation development. David was selected to be the sole “rural” expert on the U.S. Housing and Urban Development’s Location Affordability Index project panel.

Table 6 provides the number of person-hours devoted to each task by research team members.

**Table 6: Project Staffing**

Name of Principal, Professional, Employee, or Support Classification	Role in Study	Task									Percent of Time vs Total Project Hours (total hours/person/total project hours)	Percent of Time Annual Basis (total hours/person/2080 hours)
		0	1	2	3	4	5	6	7	Total		
Jaydeep Chaudhari	Principal Investigator	56	120	88	88	88	114	160	288	1002	46	48
David Kack	Co-Principal Investigator	40	24	24	20	20	20	28	48	224	10	11
Graduate Student 1	Research Assistant		80	120	120	120	120	120	120	800	37	38
Editor	Report Preparation, editing, & review		10	10	10	10	10	10	44	104	5	5
Business Manager	Administrative Work	28								28	1	1
<b>TOTAL</b>		124	234	242	238	238	264	318	500	2158	N/A	N/A

Resumes of Mr. Jaydeep Chaudhari and Mr. David Kack are located in the resume section.

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## FACILITIES

The Western Transportation Institute (WTI) at Montana State University is the nation's largest transportation institute focusing on rural transportation issues and has twice been designated as a National University Transportation Center (UTC) by the U.S. Department of Transportation. Further, WTI is the lead institution for the Small Urban and Rural Livability Center (SURLC), a Tier I University Transportation Center. WTI was established in 1994 by the State Departments of Transportation of Montana and California, in cooperation with Montana State University – Bozeman (MSU). WTI has an annual budget exceeding \$8 million and a multidisciplinary staff of 75 professionals, students and associated faculty from engineering (mechanical/industrial/civil), computer science, fish and wildlife, ecology, business, and economics. WTI has conducted research in more than 35 states, at local, state, and federal levels, as well as international work in countries including Canada, Bulgaria, Norway, Germany, and China.

WTI is housed in the Transportation and Systems Engineering Building on the south side of the Montana State University campus, which provides ready access to MSU's library, computing, and other facilities. The 27,000 square feet of office space provides dedicated onsite space for project staff as well as facilities for archiving and transmitting data. WTI additionally has almost 7,000 square feet of space in an adjacent building where WTI's materials, sustainable infrastructure, and driving simulator laboratories are located. Other WTI resources include TRANSCEND, a 230 acre field test facility in central Montana, and a rolling wheel load accelerated pavement/bridge deck tester.

Further, as a department within the College of Engineering at MSU, WTI is also supported by the College and by the umbrella of MSU administrative, academic, and research resources. Facilities and resources include the structural engineering, geotechnical, materials, transportation and Sub-Zero laboratories in the Civil Engineering Department. WTI enjoys a close relationship with the entire university and its faculty.

The research activities at WTI are assisted by a core of support staff. Administrative staff helps with budgeting, procurement, contracts, and accounting. Communications staff provides technical editing, layout, graphic design, and web page support. Information Technology staff maintains network servers and individual computers, software and hardware. WTI is well resourced to accomplish all tasks of this project.



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## REFERENCES

1. Bhatt, K. 2015. Mobile Pick Up Locations. Amazon Technologies Inc's Patent Application available at <http://appft1.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PG01&p=1&u=/netahtml/PTO/srchnum.html&r=1&f=G&l=50&s1=20150227882.PG NR>.
2. Office of Inspector General, USPS. 2014. Package Services: Get Ready, Set, Grow! Available at [https://www.uspoig.gov/sites/default/files/document-library-files/2015/rarc-wp-14-012\\_0.pdf](https://www.uspoig.gov/sites/default/files/document-library-files/2015/rarc-wp-14-012_0.pdf)
3. Wyoming Department of Transportation (WYDOT). 2014. Strategic Plan 2012-15. Available at [http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Management\\_Services/SPI/Strategic%20Plan%202012-2015.pdf](http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Management_Services/SPI/Strategic%20Plan%202012-2015.pdf)
4. U.S. Census Bureau, Population Division, Interim State Population Projections, 2005
5. American Public Transportation Association (APTA). 2010. Funding the Public Transportation Needs of an Aging Population. Available at [http://www.apta.com/resources/reportsandpublications/Documents/TCRP\\_J11\\_Funding\\_Transit\\_Needs\\_of\\_Aging\\_Population.pdf](http://www.apta.com/resources/reportsandpublications/Documents/TCRP_J11_Funding_Transit_Needs_of_Aging_Population.pdf)
6. Community Transportation Association of America (CTAA). 2003. Senior Transportation Took Kit and Best Practices. Available at [http://www.ctaa.org/webmodules/webarticles/articlefiles/senior\\_toolkit\\_color1.pdf](http://www.ctaa.org/webmodules/webarticles/articlefiles/senior_toolkit_color1.pdf)
7. *WYTRANS. 2016, WY Transit Fact. Available at <http://www.wytrans.org>*
8. Wyoming Department of Transportation (WYDOT). 2016a. WYDOT Intercity Bus Study (Yet to be published).
9. Wyoming Department of Transportation (WYDOT). 2016b. 2012-2015 Overall BSC with 2015 Actuals. Available at [http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Management\\_Services/SPI/wydot\\_overall\\_bsc.pdf](http://www.dot.state.wy.us/files/live/sites/wydot/files/shared/Management_Services/SPI/wydot_overall_bsc.pdf)

## **RESUMES**

**Jaydeep Chaudhari, AICP**

Research Scientist, Montana State University-Bozeman

**Education**

- 2010 Comprehensive Planning Exam, American Institute of Certified Planners (AICP), USA
- 2007 Master of Community Planning, Auburn University, Alabama, USA
- 2007 Master of Public Administration, Auburn University, Alabama, USA
- 2002 Diploma in Architecture, School of Architecture, APIED, Vallabh Vidyanagar, India  
(Bachelor of Architecture)

**Employment History**

- 2010-present *Research Scientist*, Western Transportation Institute, Bozeman, MT
- 2007-2010 *Research Associate*, Western Transportation Institute, Bozeman, MT
- 2007 *Research Associate II (Interim Project Manager)*, Center for Urban Rural
- 2005-2007 *Research Assistant*, Auburn University, Auburn, AL
- 2005 *GIS Intern*, City of Auburn, AL
- 2002-2003 *Architect, M/S VVT Architects, Urban Designer & Valuers*, Ahmedabd, India
- 2002-2004 *Principal Architect and Owner*, Samvad Foundation, Mehsana India
- 2000 *Architecture Intern*, Manayan Architects, Inc. Ahmedabad, India.

**Recent Research Grants/Projects**

**The Park County Public Transportation Feasibility Study (PI):** The purpose of this study is to determine the overall necessity, feasibility, and desirability of a public transportation (transit) system options in the Park County, WY and to provide general parameters for a system, including proposed routes and costs. Sponsor: Park County, WY & University Transportation Center Grant. Duration: 2015-2016. Budget: \$ 53,000.

**The Wyoming Intercity Bus Study (Co-PI):** This project provides the Wyoming Department of Transportation (WyDOT) with an assessment of the current need for intercity bus services in the state, a review of the current services being provided in this regard, and an attendant assessment of how well these services are meeting the identified needs. Sponsored by: Wyoming Department of Transportation (WyDOT). Duration: 2015-2016. Budget: \$139,087.

**North Central Montana Transit Development Plan (Co-PI):** This project is to complete a 5-year Transportation Development Plan for North Central Montana Transit taking into consideration the region's needs and services of regional and local public transportation providers in North Central Montana. Sponsor: Opportunity Link, Inc. & Montana Department of Transportation (MDT). Duration: 2014-2015. Budget: \$25,000.

**The Operations and Travel Information Integration Sharing (OTIIS) Project for I-94 and I-90 Corridors (Task Leader):** The goal of this project was to research, develop, and test a technology solutions with a sustainable business model that provided commercial and private vehicle drivers with a single integrated source of traveler information for the entire corridor and

provided transportation agencies with information and tools to plan and coordinate operations and incident response activities. Sponsored by: Federal Highway Administration, USDOT (Pooled Fund Study). Duration: 2013-2014. Budget: \$768,261.00.

**BLM Lower Madison River Alternate Transportation System Management Project (Co PI):**

The goals of the project were to increase traveler information, and explore alternative transportation systems on the MT 84 corridor. The project developed and implemented an advanced technology transportation system on MT 84. This enhanced access and safety to the Lower Madison River recreational area while improving the visitor experience. Sponsored by: Paul S. Sarbanes Transit in Parks Technical Assistance Center. Duration: 2012-2013. Budget: \$ 25,000.00.

**YNP Intelligent Transportation System Project (PI):** The purpose of this Intelligent Transportation System (ITS) project was to use advanced technologies to increase information to motorists on the on US 89 and US 212 corridors at key decision points around Livingston, MT and Cody, WY. The project focused reducing the impacts of traffic through traffic management and way-finding enhancements. Sponsored by: Yellowstone National Park, NPS. Duration: 2012-2013. Budget: \$ 7,726.75.

**Selected Publications (total 44 publications & presentations)**

\*Chaudhari, J., Ye, Z. and Patel, D. Rural Evacuation and Public Transportation, in *Securing Transportation Systems* (eds S. Hakim, G. Albert and Y. Shiftan), John Wiley & Sons, Inc., Hoboken, NJ. doi: 10.1002/9781119078203.ch18. June 2015.

\*Ye, Z., Kack, D., J. Chaudhari, and Ewan, L. “ Intercity Bus Service Funding and Assessment Methodology.” *Journal of Public Transportation Safety & Security*, Volume 15 Issue 3, 2012: Pages 113 - 128

\*Kack, D.,Z. Ye, J. Chaudhari, and L. Ewan.. *Montana Intercity Bus Service*. Montana Department of Transportation. July 2011.

\*McGowen P., J. Chaudhari, J., B. Church., and J. Booth. *Montana Fuel Tax Refunds*. Montana Department of Transportation. July 2011.

\*Chaudhari, J. and D. Kack. *Greater Yellowstone Regional Traveler & Weather Information System—US 89*. Wyoming: Yellowstone National Park. January 2011.

\*Ye, Z., J. Chaudhari, J. Booth, and B. Posadas. “ Evaluation of the Use of Rural Transportation Infrastructure in Evacuation Operations.” *Journal of Transportation Safety & Security*, Volume 2 Issue 2, June 2010: Pages 88 - 101

\* Chaudhari, J. and Z. Ye. “GIS as a Sketch Plan Tool to Replace Traditional Transit Route Planning Practice for College and University Communities.” *Planning for Higher Education—The Journal of The Society for College and University Planning*. Volume 39, No. 1. (October-December 2010): Pages 39-50.

\*Chaudhari, Jaydeep & Albert, Steve. *Rural Transportation District’s Research Need Survey*. Sacramento: Division of Research and Innovation, California Department of Transportation, 2009.

**David Kack, Director**  
**Small Urban, Rural and Tribal Center on Mobility**

### Education

MBA, Business Administration, University of North Dakota, May 1995

BBA, Business Mgmt. & Aviation Administration, Univ. of North Dakota, May 1988

Transit Operations and Planning Course – Federal Transit Administration, Sep. 2000

Innovative Strategies to Increase Transit Ridership–University of Milwaukee, Mar. 2001

Fundamentals of ITS & Traffic Management – University of Maryland, May 2002

### Professional Experience

2013 – present     *Director, Small Urban & Rural Livability Center, Western Transportation Institute, Bozeman, MT*

2005-2013     *Research Associate II and Program Manager-Mobility & Public Transportation, Western Transportation Institute, Bozeman, MT*

2001-2005     *Research Associate I, Western Transportation Institute, Bozeman, MT.*

2000-2001     *Planner, City of Fargo Transit Department (Metro Area Transit), Fargo, ND*

2000-2001     *Administrator, Fargo Transportation Management Association (TMA) Fargo, ND*

### Relevant Project Experience

**Big Sky Transportation District Coordinator (PI).** Purpose: to act as the Coordinator for the Big Sky Transportation District. This project provides support to the public transportation system operating in Big Sky, MT, and providing intercity bus service between Big Sky and Bozeman. Relevant tasks include: reviewing operations, including ridership and routes/schedules; providing both operational and strategic planning support; and developing and maintaining partnerships that support the District.

**Wyoming Intercity Bus Service Study (PI).** Purpose: to lead a team that will research intercity bus service issues within the State of Wyoming, and present the Wyoming Department of Transportation with an analysis of critical issues related to intercity bus services. Tasks include: surveys of bus riders, transit managers, and DOT officials from rural states; analysis of current intercity services; analysis of potential intercity services; and creating a methodology to analyze intercity bus services every two to three years.

**Northcentral Montana Regional Plan for Sustainable Development (Team).** In this project I was a member of the Sustainability Advisory Council; and was a member of, and provided technical assistance to, the Transportation Subcommittee that was part of this three-year planning project. This three-year planning project encompassed eleven counties in Montana, an area of 31,250 square miles, with a population of 149,000.

**Paul S. Sarbanes Transit in Parks Technical Assistance Center (Team).** I provided technical assistance to Federal Land Management Agencies (FLMAs) and their partners who were planning

and implementing alternative transportation projects. Relevant tasks included: conducting site/location reviews; conducting and writing feasibility studies; and providing technical assistance for operational and strategic planning efforts.

**National Park Service Congestion Management Toolkit (PI).** I led a team that created a Toolkit that is used by Park (Unit) Superintendents and their staff, and regional staff to address traffic congestion issues in National Parks. The Toolkit includes information on individual tools/solutions that can be used to reduce traffic congestion.

**Montana Intercity Bus Service Study (PI).** The purpose of this project was to provide the Montana Department of Transportation (MDT) with an assessment of the current need for intercity bus services in the state, and how well these services are meeting the identified needs. A methodology was developed so that MDT can assess intercity bus services and needs in the future to comply with Federal regulations.

**Mendenhall Glacier Visitor Center Traffic Management Plan (PI).** I created a plan that led to implementation of technologies in the Tongass National Forest, which help manage traffic and provide information to visitors at the Mendenhall Glacier Visitor Center in Juneau, Alaska. Tasks included: review of visitor and traffic data; coordinating with stakeholders; developing a Concept of Operations; and partnering in the implementation and evaluation of the ITS systems

**US 89 Alternative Transportation Program (PI).** The purpose of this project was to plan, implement and evaluate alternative transportation programs and traveler information systems along US 89 from Livingston, MT to the Yellowstone National Park entrance at Gardiner, Montana. Relevant tasks included: developing a Concept of Operations; creating an implementation plan; and evaluating the results.

### **Leadership: Professional Affiliations and Activities**

Member, Rural Public and Intercity Bus Committee, Transportation Research Board

Member, Community Transportation Association of America

Vice President, Montana Transit Association

Housing and Transportation Index Technical Review Panel: One of only twelve people on the national panel, and the only rural representative (2011-2013).

Named to the Mobility Services for All Americans (MSAA) Outreach Working Group. Only one of seven people across the nation to be part of this group (2008).