

**CORRIDOR PLANNING
AND FEASIBILITY ANALYSIS**

**BUSINESS PLAN AND
MARKETING STRATEGY**

**Colorado Department
of Transportation**

DE LEUW, CATHER & COMPANY

Engineers and Planners Denver
and

COLEY/FORREST

660205-01440/01550

February 1996





TABLE OF CONTENTS

EXECUTIVE OVERVIEW

SECTION I INTRODUCTION

Business Plan and Marketing Strategy Components	I-1
CDOT ITS Program Objectives	I-1
Components of Successful Business Plans	I-1
Business Plan/Marketing Strategy Objectives	I-5
CDOT Accomplishments in ITS: 1990 to 1995	I-5

SECTION II MARKETING STRATEGY

The ITS Message	II-1
ITS Program Clients, Partners, and Supporters	II-1
Marketing Methods	II-3
Post-Implementation Techniques	II-4

SECTION III FINANCIAL DECISION-MAKING PROCESSES

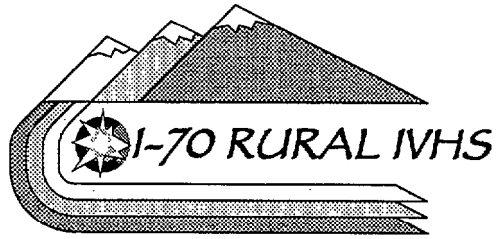
Overview	III-1
Federal Funding/Decision Making Process	III-1
State Funding/Decision Making Process	III-2
Working With the Private Sector	III-3

SECTION IV FINANCE PLAN

Financial Packaging for Results	IV-1
ITS Projects - Functional Areas	IV-14
Summary of Financing Recommendations	IV-15
Project-Specific Financing Recommendations	IV-22

APPENDICES

Appendix A--Public/Private Partnership Case Study



**BUSINESS PLAN AND
MARKETING STRATEGY**

EXECUTIVE OVERVIEW



EXECUTIVE OVERVIEW

OBJECTIVES

- Provide Direction for implementation
- identify Funding Sources
- Create a Marketing Strategy
- Outline Internal Program Execution
- Describe the Benefits to Stakeholders

PROCESS

- Draw From Nationwide Examples
- Field Test Strategies
- Modify Process to Local Requirements
- Design Business and Marketing Elements Based on What Learned
- Apply to Early Action Projects

SOURCES

- Travelers
- Local Residents and Businesses
- Prospective Funding Partners
- Legislators
- CDOT Staff
- Local Governments

Scope: Identify private sector participation opportunities for implementing IVHS technology as well as seek commitments for joint participation in implementation phases.

Prepare a marketing strategy that will provide CDOT with a framework for completing the overall goals outlined in the plan.

Develop a Business Plan which prioritizes the short-term and long-term vision of the IVHS plan for this corridor and takes advantage of private sector finding opportunities. First priority will be given to those items which benefit traveler safety.

Deliverables:

*Business Plan
Marketing Strategy*

The Business Plan is a guidance document for implementing the I-70 **West Corridor** ITS program. A business plan is necessary to establish and prioritize the ITS vision for the I-70 West Corridor. Since ITS technology is relatively new in the eyes of most stakeholders, it is appropriate to provide direction to those stakeholders on how the vision can be carried out. It is has proven difficult to foster change within the organizations that have responsibility for implementing new planning paradigms. The integration of advanced technology concepts into traditional transportation planning and improvement programs has, and will continue, to require a distinct and consistent effort from within.

While the objectives of the Business Plan are process-oriented; the milestones of success are measurable by:

- providing specific direction for CDOT to implement an integrated ITS Program for the I-70 West Corridor;
- identifying prospective sources of funding for priority ITS programs and projects;
- creating a marketing strategy that broadens awareness of ITS benefits;
- outlining how CDOT can execute the objectives of the I-70 West Corridor ITS Program internally; and



- describing how the benefits of the ITS Program can be communicated effectively to the traveling public, local governments, prospective funding partners, and local residents and businesses.

The Business Plan is specific and practical. It has a strong financial component. The Business Plan draws from other illustrative examples throughout the country. Portions of the Plan were subjected to a “field test” by taking the next implementation steps and using the process and results to refine the Plan.

The Business Plan builds on the accomplishments of the CDOT ITS Program Office with respect to the initiative that stepped beyond traditional mores and brought the ITS vision to Colorado. This dramatic, and sometimes courageous effort, has put Colorado in the spotlight as one of the front-running states in implementing a strong statewide ITS program.

CDOT embarked on this aggressive ITS initiative in the early 1990s by identifying how advanced technology applications could effectively respond to and solve the State’s deteriorating transportation system. Since that time, several steps have been taken:

- initiation of several organizational changes to allow deployment of ITS technology efficiently and creatively;
- completion of an ITS vision for the state--C-Star;
- organization of a statewide ITS Implementation Team who developed the Smart Path Business Plan which carries the C-Star vision into an active implementation plan;
- funding of five operational tests of ITS technology;
- amendment of Colorado legislation to facilitate incident response and partnerships with private sector parties. The public/private partnering initiatives led to legislation allowing the telecommunications industry to install fiber in highway rights-of-way;
- initiated six additional ITS projects, which are in the planning stages; and
- identified SO+ feasible ITS projects for implementation in the I-70 West Corridor.

The Business Plan concentrates on the following components:

Colorado ITS Program Overview. The CDOT ITS program in given perspective by explaining activities to date, describing planned early action programs, and providing the uninitiated with a perspective of how ITS fits into the transportation industry. It includes:

- activities accomplished;
- planned programs; and
- ITS-- in context within the transportation industry.

Target Markets. The Business Plan is market-driven based on target markets, pertinent market trends, and strategic opportunities to achieve them. Target markets include:



- travelers;
- residents & businesses;
- prospective funding partners;
- state legislators;
- CDOT staff; and
- local governments.

Decision-Making Processes. Various funding approval processes can impact the deployment of ITS programs, including:

- federal funding;
- state funding;
- working with the private sector; and
- critical paths for approvals.

Marketing Strategy. The Marketing Strategy is designed to increase “customer” awareness and deliver a message. It targets internally (within CDOT) and externally. Private sector marketing strategies typically include activities such as advertising, public relations, and direct-mail. To these activities, this Marketing Strategy adds workshops, working with the news media, telecommunications, and other activities. The Marketing Strategy recommends:

- plan overviews;
- strategic marketing programs;
- public relations programs;
- print and electronic media outlets;
- workshops;
- written materials; and
- advertising.

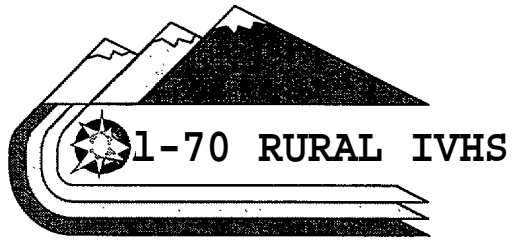
Finance Plan. Likely financing partners and their respective attributes influence:

- how to package programs for acceptance by financing partners;
- sources of revenue from federal, state, local and private sources; and
- techniques pertinent to financing ITS projects.

Projects that are considered as the backbone of the I-70 West Corridor ITS will underlie the success of all projects. Several Early Action Projects are considered ready-to-go since the technology is in place and they are not contingent on any action other than direct implementation. Other sets of projects represent required combinations to achieve success.

The Finance Plan includes:

- financial packaging for results;



**BUSINESS PLAN AND
MARKETING STRATEGY**

**SECTION I
INTRODUCTION**



SECTION I INTRODUCTION

BUSINESS PLAN AND MARKETING STRATEGY COMPONENTS

The I-70 West Corridor ITS Business Plan and Marketing Strategy focuses on approaches, strategies, and implementation techniques based on the 80 Early Action Projects that were initially developed as a part of the I-70 Rural IVHS study program. It is consistent with the Smart draft Path Business Plan, which provides a statewide perspective on implementing ITS projects.

The Smart Path Business Plan and the I-70 West Corridor ITS Business Plan & Marketing Strategy have been prepared because ITS is relatively new to most Colorado constituents. The Colorado Department of Transportation (CDOT) believes that the existing, emerging, and future technologies can only be integrated into traditional transportation planning and improvements when a distinct and consistent effort originates from within the Department.

Preparing a business plan for a public sector agency is a new and innovative idea. This Business Plan & Marketing Strategy has been developed using applicable attributes of private-sector plans. Some business plan components of the Smart Path Business Plan are re-stated in this Plan in an abbreviated way.

The I-70 West Corridor Business Plan & Marketing Strategy is presented in 4 sections as outlined in Table I-1.

CDOT ITS PROGRAM OBJECTIVES

CDOT objectives regarding ITS, as stated in the 1995 Smart Path Business Plan, are highlighted in Table I-2.

I-70 West Corridor ITS Program Goals. Encompassing goals set by national and Colorado ITS programs (and with special consideration of the service providers and users that rely on the I-70 West Corridor), 5 program goals for the I-70 Rural IVHS study program have been established, as described in Table I-2

COMPONENTS OF SUCCESSFUL BUSINESSES PLANS

Adapting Private Sector Attributes. The most successful private sector businesses have adopted a series of key strategic factors in planning their business-related endeavors. By adapting private sector attributes to CDOT ITS program management and organization, the I-70 Rural IVHS study initiatives have an enormous opportunity to be realized.



**TABLE I-1
BUSINESS PLAN AND MARKETING STRATEGY STRUCTURE**

Section	Summary of Contents
I Introduction	Overview of CDOT's statewide ITS and I-70 Rural IVHS study program objectives. Introduction to components of successful business plans and outline of business plan objectives for the I-70 West Corridor. To place the business plan in perspective, it summarizes CDOT's ITS accomplishments to date.
II Marketing Strategy	The purpose of a marketing plan is to increase "customer" awareness and deliver a message--it targets internally (within CDOT) and externally. Private sector marketing plans typically include activities such as advertising, public relations, and direct-mail. In addition to these activities, this strategy suggests other effective methods and tools, such as one-on-one meetings, working with the news media, telecommunications, and other activities that are pertinent to perceptions and acceptance of public sector activities by their constituencies.
III Financial Decision-Making Processes	Description of various funding and approval processes that will set the stage for deployment of ITS initiatives within the I-70 West Corridor.
IV Finance Plan	Preliminary identification of likely financial partners and their attributes. Discussion on how to package programs for acceptance by financing partners. Review of revenue sources from federal, state, local, and private entities. Discussion on techniques pertinent to financing each of the 80 Early Action and future projects that comprise the I-70 Rural IVHS study recommendations.

The factors (adapted from The Success & *Business Plan: Secrets & Strategies*, Ronda M. Abrams, The Oasis Press, Grants Pass, Oregon, 7/93) are:

- The Business Concept
- Understanding the Market
- Industry Health
- Capable Management
- Financial Control
- Consistent Business Focus
- Anticipating Change



**TABLE I-2
ITS OBJECTIVES AND PROGRAM GOALS**

Colorado's Smart Path ITS Objectives

1. Satisfy transportation system needs that are regional or statewide priorities.
2. Focus on ITS implementation activities that respond to these critical needs, such as improving mobility, safety and air quality.
3. Implement ITS solutions that enhance intermodal coordination and recognize the interactions between the various components of the State's transportation system.
4. Integrate the implementation of ITS applications with other aspects of the transportation system, where possible, such as construction, maintenance, and system management.
5. Encourage the near-term implementation of ITS solutions that will be highly-visible, yet will have low risk and a high probability of success.
6. Implement ITS solutions which encourage the development of effective partnerships, resource-sharing between various public sector agencies, including agencies with traditional transportation system responsibilities, and those with compatible missions and objectives.
7. Encourage the participation of the private sector in the development and implementation of ITS solutions.

Source: Smart Path, 2195

I-70 Rural IVHS Study Program Goals

1. Improve safety.
2. Reduce congestion by decreasing disruptions due to weather/road conditions and encouraging alternative modes usage.
3. Disseminate traveler information oriented towards traveler peace of mind and good driver decisions.
4. Overcome institutional barriers.
5. Build a constituency.



The Business Concept. Meeting needs is the basis of all business. A need may correspond to (a) something new, (b) something better, (c) an under-served or new market or (d) increased integration of services. The basic business concept should incorporate at least one of these factors. The ITS Program provides for better transportation services to an existing market; some programs integrate services.

Understanding the Market. It is not enough to have a valid business concept; it is also necessary to have a market that is sufficiently large, accessible and responsive. If the market cannot be reached or is not ready, the business venture will fail.

This concept presents the most challenge in the ITS Program because ITS is new to travelers, businesses, and governments. They have not planned for ITS technology, they have not budgeted for ITS services, and they have managed without for decades. A number of business plan projects focus on understanding and communicating with the market.

Industry Health No business operates in a vacuum; rather, it is subject to the same conditions that affect the overall industry. If consumer spending declines as unemployment increases, then many retailers will experience lower sales and some will fail. It is also harder to raise money to start or expand businesses in troubled industries.

The transportation industry is so basic that it is relatively immune to “industry” fluctuations. However, the mode of transportation services is vulnerable to the price gasoline, parking, and freight services, the health of business activity in destinations, the costs of telecommuting, environmental constraints and costs, and other factors. Most ITS technologies are costly to deploy but are designed to improve efficiency and cost-effectiveness over time by saving time, conserving fuel, and eliminating incidents. Due to high initial costs, the pace of ITS technology deployment will likely fluctuate with general economic conditions.

Capable Management. Often, venture capital firms place the single greatest emphasis on management when deciding on their investment. Characteristics of competent management are experience, realism, adaptability to change and ability to work with people.

Recognizing that the public sector has less flexibility in management decisions than the private sector, the business plan focuses on organizational characteristics that are useful and pertinent to execute ITS programs.

Financial Control. A key to any business venture is managing money. Inadequate working capital relative to the business objectives can bring down a seemingly thriving business.

This business plan focuses on two components of financial control: [1] identification of sufficient budget for various activities so that if a project is pursued, that sufficient resources are available to achieve success, and; [2] flexibility so that if key grants are not secured, key financial partners disapprove a project, or legislation changes that other components of the business plan can proceed.



Consistent Business Focus. In the private sector, developing and maintaining a clear, consistent focus helps maximize use of resources, provide motivation within and maintain a competitive edge. For this reason, the mission statement or statement of objectives is critical.

The business plan introduces a statement of objectives, proposes strategies to accomplish these objectives and outlines how CDOT can work within its organization and with prospective financing and operations partners.

Anticipating Change. Change is inevitable and the rate of change gets faster. In the business community, there are external changes that are technological, sociological and competitive. Internally changes occur such as the arrival or departure of key staff, and new product or services development. ITS is new; change is constant.

BUSINESS PLAN/MARKETING STRATEGY OBJECTIVES

The objectives of the Rural I-70 Corridor ITS Business Plan are summarized below. They relate specifically to the set of 80 projects detailed in Section IV. The I-70 West Corridor ITS Business Plan is consistent with the CDOT Smart Path Business Plan in that it focuses specifically on a set of rural projects that are relevant to the corridor needs. The Smart Path Business Plan provides a statewide overview of the types of implementation projects that CDOT seeks to implement.

I-70 West Corridor ITS Business Plan Objectives

1. Provide specific direction for CDOT to implement I-70 West Corridor ITS programs.
 2. Identify prospective sources of funding for priority I-70 West Corridor ITS programs.
 3. Provide a marketing strategy to broaden awareness of I-70 West Corridor ITS program benefits.
 4. Outline how CDOT can execute the I-70 West Corridor ITS program objectives internally.
 5. Describe how the benefits of the I-70 West Corridor ITS Program can be communicated effectively to the traveling public, local governments, prospective funding partners, residents, and businesses.
-

CDOT ACCOMPLISHMENTS IN ITS: 1990 TO 1995

CDOT has embarked on an aggressive ITS program since the early 1990s by identifying how advanced technology applications could effectively respond to and solve the state's deteriorating transportation system. Since that time, several steps have been taken and are in Table I-3.

CDOT's Administration of ITS. To administer ITS activities in Colorado, the CDOT ITS Program Office is divided into three sections: Research and Implementation, Statewide ITS, and the Colorado Traffic Operations Center (C-TOC).

- **The Research and Implementation Section** of the ITS Program Office develops and manages ITS research projects, conducts ITS strategic planning, and administers the ENTERPRISE group activities.



- The **Statewide ITS Section** oversees implementation of ITS projects, including ITS marketing and the formation of public/private partnerships.
- **The Colorado Traffic Operations Center** is responsible for the development and implementation of a TOC, which will provide a nucleus for the I-70 West Corridor ITS communications and coordination.

**TABLE I-3
CDOT ACCOMPLISHMENTS IN ITS:1990-1995**

1. Initiated organizational changes to deploy ITS technology efficiently and creatively--currently the ITS Program Office.
2. Completed a statewide ITS plan--C-STAR.
3. Established a statewide ITS coalition--ITS Implementation Team.
4. Created a statewide vision and developed a dynamic statewide business plan--Smart Path.
5. Obtained funding for ITS early deployment planning studies--Denver Metro IVHS/I-70 Rural IVHS.
6. Won funding for and initiated operational tests of ITS technology--Hogback Multi-Modal ATIS/Mayday/Emissions Testing/AM Subcarrier Broadcasting/Mile High Courtesy Patrol/One-Stop Shopping (CVO)/Dynamic Truck Speed Warning.
7. Implemented the Mile High Country Patrol, a pilot project funded by Region 6 using state funds.
8. Amended legislation to allow removal of vehicular obstructions on state roads and to facilitate partnerships with private sector parties.
9. Initiated additional ITS projects--C-TOC/VMS/Call Boxes.
10. Identified 80 ITS projects for implementation within the I-70 West Corridor.

CDOT has also established a Business Development Office under the research arm of the Division of Transportation Development. This concept, well-known to private industry for marketing goods and services, represents a new philosophy in Colorado--marketing services to the private sector to expand and improve benefits to the public.



CDOT is represented on the Telecommunications Advisory Committee, a Colorado Legislature sponsored task force responsible for improving and enhancing statewide telecommunications systems. CDOT also works with the Colorado Advanced Technology Institute (CATI) to assist in developing non-profit organization initiatives related to advanced technology applications.

C-Star. This integrated program was prepared in 1993; it combines CDOT's ongoing efforts with new initiatives in a strategic plan for the research, development, demonstration and deployment of ITS in Colorado. C-Star was a precursor to the Smart Path program; while C-Star considers the range of ITS options available to the State of Colorado Smart Path, described below, provides the program of implementation.

Smart Path. This business plan was prepared in March, 1995. It is a program of projects and implementation activities which lead to the statewide deployment of ITS in Colorado. It provides the context within which the Rural I-70 Corridor Business Plan has been prepared in that it defines transportation needs of statewide and regional significance, outlines opportunities where ITS applications can provide solutions to transportation needs, identifies statewide or regional projects which satisfy high priority needs and reviews funding opportunities for types of projects. Eleven of the thirty-nine projects proposed for early implementation within Smart Path are also recommended in the Rural I-70 Corridor ITS Program.

Enterprise Program. Colorado is the administrator for the ENTERPRISE Group, a multi-state and international consortium dedicated to collaborative research and testing of ITS. The ENTERPRISE Program is a mechanism with which the I-70 Coalition can coordinate with and learn from the technological and institutional experiences of other states with similar needs and interests.

ITS Operational Tests. With the support of federal grant money, CDOT has initiated four operational tests. Each are summarized below:

- A **Dynamic Truck Speed Warning System** became operational in 1995 on the I-70 downgrade west of the Eisenhower Tunnel in Summit County. Using weigh-in-motion (WIM), automatic vehicle identification (AVI), and variable message sign (VMS) technologies, the system will identify safe speeds for commercial vehicles based on size and weight and advise operators of the appropriate speed to negotiate the descent and curves.
- **Colorado's MAYDAY System** will equip 2000 test vehicles with global positioning system (GPS), automatic vehicle location (AVL), and cellular telephone technologies to provide emergency two-way communications for stranded motorists in remote areas. CDOT received federal funding through a competitive process to perform this operational test.
- **The Electronic One-Stop Shopping** operational test is a multi-state cooperative effort to enable commercial vehicles to traverse Colorado and surrounding states across seamless borders with minimal regulatory delays.



- A **Roadside Carbon Monoxide (CO) Emissions Testing** station will measure pollutant levels emitted by passing vehicles.
- **The Hogback Multi-Modal Transfer Center Advanced Traveler Information System (ATIS)**, although currently in stasis, beckons immediate opportunity to capture recreational travelers at a center where real-time road, weather, traffic, and air travel information can be disseminated via electronic equipment.
- CDOT **Region 6's Mile High Courtesy Patrol**, originally a pilot project, has become an exceptional success and is now an established service to the traveling public in the Denver metropolitan area.
- Through the ENTERPRISE Group, CDOT is developing an operational test to implement **AA4 Subcarrier Broadcasting** of real-time traffic, weather, and roadway data via radio stations to vehicles (HERALD).

Colorado Legislative Initiatives. Prior to 1993, the Colorado State Patrol was responsible for determining when a vehicle could be removed from an incident scene during accident investigation. CDOT successfully worked with the legislature to pass the MOVE-IT and REMOVE-IT laws. This allows motorists to move vehicles out of travel ways if no injuries are sustained as a result of an accident and officials to remove obstructing vehicles and cargo from travel lanes.

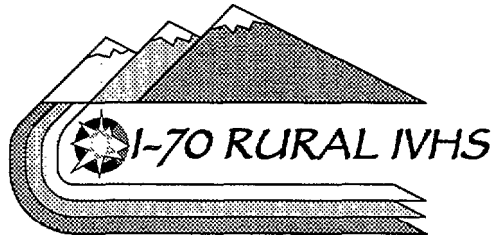
Prior to April, 1995, Colorado legislation prohibited any commercial enterprise or activity (other than emergency services for disabled vehicles)to be located on property acquired for or in connection with a freeway or highway. In 1995, The General Assembly approved legislation (HB 95-1287) which enables CDOT to enter into public-private agreements to allow privately operated services within public rights-of-way.

Colorado ITS Projects in the Planning Process. There are additional ITS initiatives in the planning and development stages.

- A statewide fiber optics program has been designed to allow private sector communications companies to install cable along state highway rights-of-way. Once installed, the network will provide point-to-point connectivity to enhance data and voice communications to more than 60 sites.
- In partnership with CDOT, the National Oceanic and Atmospheric Administration (NOAA) will develop a research laboratory to provide state-of-the-art advanced weather sensing information to the Colorado Traffic Management Center (C-TMC) to support traffic operations, construction, and maintenance activities.
- Surface Systems, Inc. (SSI) is calibrating and maintaining weather detection and sensing devices in exchange for the exclusive right to resell value-added weather-related information to other customers.



- A statewide bid has been issued by CDOT to pay telephone vendors to install, operate, and maintain their equipment within public roadway rights-of-way. Initiatives are being examined to extend this type of program to emergency call box installations.
- The ITS Program Office is identifying and negotiating with other potential private sector partners to implement traveler information systems statewide.



**BUSINESS PLAN AND
MARKETING STRATEGY**

**SECTION II
MARKETING STRATEGY**



SECTION II MARKETING STRATEGY

Marketing and sales are closely aligned. A marketing plan is designed to increase customer awareness and delivery a message. Sales strategies are direct actions proposed to solicit and procure customer orders. Marketing includes activities such as advertising (broadcast and printed materials) and public relations. Sales encompass telemarketing, contact calls, and direct-mail solicitations.

Business marketing and sales concepts can be readily adapted to the public sector and ITS. Any marketing plan and sales strategy contain four main components:

- the message to be conveyed;
- the target customers or clients;
- the methods and tools to deliver and reinforce the message; and
- the techniques to escalate use of the product or service.

THE ITS MESSAGE

Every successful business operation sends a message that motivates the customer or client to buy or use the product or service. Many marketing strategists concur that customers buy or use benefits, not features. That is, they will use a product or service that affects their lives--they are not concerned with how the product or service is made or provided. This concept fits well into the ITS program, since the primary ITS message relates directly to convenience and safety for the traveling public.

ITS PROGRAM CLIENTS, PARTNERS, AND SUPPORTERS

To be successful, the I-70 West Corridor ITS Program needs to generate interest among its potential clients, partners, and supporters. In some cases, the same entity may be a client, a partner, and a sponsor.

- **Clients (customers)** are those who directly benefit from ITS technologies. Examples include travelers on business and personal trips, trucking companies, express package delivery services, local fire districts, and destination resorts.
- **Partners** are those who may become a co-sponsor of a particular project. Examples include potential vendors, private for-profit businesses, non-profit foundations, and local governments.

Supporters are those who can influence whether and how ITS projects are implemented. Examples include the Colorado legislature, environmental organizations, trucking and environmental lobby groups, trade associations, the CDOT Transportation Commission, and CDOT staff.



Each type of client, partner and supporter include a variety of interests, as follows:

Individual Travelers. This customer includes individuals traveling in private automobiles on personal and business trips. This customer classification includes nearly all of the “public”.

Commercial Vehicle/Private Transit Operators. These customers use I-70 as a normal part of their business operation, such as product deliveries via truck (Coors; Northwest Transport) and mass people transport via buses and vans (Resort Express; Greyhound Bus Company; Summit Stage). Each can have a specific interest in one or several ITS projects, readily becoming an ally or an obstructionist.

Express Package Delivery Services. These commercial customers use I-70 frequently in their business operations. They will have a specific interest in any ITS projects which can make their delivery trips quicker and/or more predictable.

The Colorado Legislature. The legislature is a critical potential sponsor because it approves a significant portion of CDOT funding on an annual basis. The Legislature has already expressed its support in facilitating partnerships with the private sector through its adoption of HB 95-1287.

Vendors. While some components of ITS technology are market-tested and available for use at established prices; many components of technology are still in an experimental or demonstration stage. Marketing to vendors to showcase the I-70 West Corridor ITS program may facilitate their willingness to partner with public or other private sector parties by offering their product or service on a gratis (demonstration) basis or at cost with free technical support.

Federal Agencies. The Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Federal Railroad Administration (FRA), the Federal Aviation Administration (FAA), the U.S. Forest Service (USFS), and the Bureau of Land Management (BLM) each have an interest in the success and lessons learned from this process. Some agencies, such as the USFS, may become ITS technology users; other agencies, such as the FHWA and the FTA, may be providers of demonstration or operational grants.

Local Governments, Utilities, & Districts. These include cities, counties, electric and gas utilities, and special purpose districts for education, fire, police and emergency medical services. They may become co-sponsors of projects that will benefit their delivery of services, bolster local sales activity, or improve safety. They may also become users.

For-Profit and Non-Profit Sponsors. There are private sponsorship opportunities for more than three-fourths of the 80 I-70 West Corridor ITS projects identified to date. Examples of for-profit sponsors include ski resorts, major lodging owners, large service stations, broadcast or cable television stations, radio stations, private transit carriers, major businesses who deliver products by truck, and others. Examples of non-profit sponsors include chambers of commerce, trucking industry lobby groups or trade associations, and the American Automobile Association.



CDOT Commission & Staff. ITS is a new way of providing transportation services. In CDOT, as well as in many established organizations, most staff are comfortable with their existing ways and are resistant to change.

Environmental, Economic Development, Transportation, Medical & Safety Trade and Lobby Organizations. Key attributes of ITS technology improve air quality, make existing infrastructure more efficient, offer a more pleasing travel trip through mountainous terrain, and reduce medical costs by improving safety. These attributes are attractive to various interest organizations, which can become powerful allies when promoting a project and can become obstructionists when they perceive their core concerns are threatened. A consistent marketing campaign to keep these groups aware of attributes of and progress on ITS projects can be very useful as projects are proposed and implemented.

MARKETING METHODS

Personal Contact & Follow-Through. For a period of several years, it will be important for CDOT to assemble an internal “project development team” within the ITS Program Office that can initiate contact with a variety of potential customers and clients to explain ITS, increase interest and awareness, and initiate projects. CDOT has already tested and benefited from this type of effort. The CDOT Business Development Office, Region 1 Environmental Unit, and the ITS Program Office have initiated several of these types of efforts, resulting in facilitation of several I-70 West Corridor ITS projects.

Collateral Materials. A project development team needs a flexible package of collateral materials that inform ITS customers, clients, partners and supporters. The materials should be void of engineering lingo and acronyms. Separate write-ups on topics can serve a variety of purposes. Some topics might include: What is ITS? Why are fiber optics important? How can ITS improve air quality? The materials should be continuously revamped and expanded.

Building on this concept, collateral materials can also be developed as education modules for incorporation into elementary, middle and high-school curricula to advance knowledge about ITS among younger and/or future users.

Newsletters. A newsletter can keep the variety of clients and constituents informed. To be effective, the newsletter should be published at least quarterly. It should describe CDOT activities, outline future plans, educate about each facet of ITS, and provide contact names, telephone, fax and e-mail numbers.

Print Media. In addition to providing the media with news releases and newsletters, there are several ways to use local and state newspapers as a marketing tool: write guest author articles, submit public service announcements, communicate with the editorial staff, and advertise.



Broadcast Media: There are a number of cost-effective marketing techniques involving radio and television. Broadcast and cable television stations and radio stations are logical co-sponsors of ITS projects. These potential partnerships create the opportunity for news stories when a project happens, as well as public service announcements.

Specialized Presentations. If activated, the ITS Project Development Team(s) for the I-70 West Corridor will have ample opportunity to make specialized presentations to CDOT staff, the Colorado Transportation Commission, the State Legislature, local chambers of commerce, local governments, destination resorts, interest groups, and many others. Presentations can use a variety of media (video, slides, handouts, computer-generated and displayed). Each need to be tailored to the specific audience and focus on a distinctive area or project.

Focus Groups. Focus Groups have had tremendous success in other states with respect to general transportation issues and perspectives as well as ITS. A Focus Group brings a select audience into a workshop environment, often conducted by a professional facilitator from a public relations/advertising agency. The audience is selected using various survey and marketing tools so that a broad spectrum of interests and perspectives among the participants are maintained. Focus Groups establish program and specific project champions, partners, needs, perceptions, and participation.

Table II-1 establishes a matrix that suggests which marketing methods are most appropriate for prospective clients, partners and supporters.

POST-IMPLEMENTATION TECHNIQUES

Tools and techniques to escalate the use of products and services use similar methods as those described for marketing ITS and specific projects. Foremost to the success of any program and/or project is the evaluation of the benefits to the operation and use.

Each ITS program and project that is developed and implemented within the I-70 West Corridor must have an evaluation plan that identifies how well it is serving the users. Those users include CDOT developers, designers, operators, and maintainers of the systems and subsystems; the commercial and personal travelers; the financiers; the supports and sponsors; and all other individuals and groups that are in any way impacted by the initiative.

An evaluation plan should include, at a minimum, the following:

- Measures of effectiveness (performance criteria);
- Quantitative and qualitative methods to assess how well each component measures up to the established performance criteria;
- Identified organizations and personnel to collect data and perform evaluations as to the operations and benefits of the program or project;



- Methods for responding to operations, maintenance, and user defects within the system;
- An established time frame for evaluating the initiative;
- A formal decision-making process as to whether the program or project continues (is it a demonstration, operational test, continuous deployment); and
- A strategy for continued marketing and collecting user input.



**TABLE III-1
 COLORADO DEPARTMENT OF TRANSPORTATION
 CALENDAR OF FUNDING DECISIONS FOR FISCAL YEAR 1995-96:**

DATE	EVENT
August 1994	CDOT Transportation Commission adopts Construction Budget. To be eligible for a funding approval, projects must also be in the Statewide Transportation Improvement Program (STIP) or: for urban areas, within a Transportation Improvement Program (TIP).
December 15, 1994	CDOT submits relevant portions of its budget to Senate and House Transportation Committees for review and appropriation by the General Assembly
April 30, 1995	Colorado Transportation Commission adopts its Maintenance and Operations Budget
May 1995	Prior to the end of the session General Assembly adopts the portions of the budget which it controls: Administration Division of Aeronautics, Office of Transportation Safety,
June 1995	CTC allocates \$2.5 million for ITS projects, to be taken off-the top before distribution of budget to existing programs. CDOT ITS staff and Engineering Regions must develop a list of ITS programs and projects to be funded.
July 1, 1995	Fiscal Year 1995-96 begins.
August 1995	The ITS Program Office and Region 1 submit separate plans for funding ITS initiatives. A hybrid plan is prepared and the \$2.5 million is disbursed to fund specific projects.

WORKING WITH THE PRIVATE SECTOR

Many transit projects in the 1960s, 1970s, and early 1980s were funded with a substantial financial subsidy from the federal government. Over the last ten years, a variety of public/private partnerships have emerged, as the private sector discovers opportunities to earn a profit, secure visibility, or demonstrate its ability. As the public sector's capacity to fund projects is constrained by federal government revenue limitations, transportation agencies are seeking ways to partner, financially, with business enterprises.



CDOT Initiative HB 95-1267. In April 1995 the Governor signed an Act “Concerning Public-Private Initiatives for Transportation System Projects.” This Act enables CDOT to pursue public/private partnerships more readily. Subject to certain limitations, HB 95-1 267 allows CDOT to enter into agreements for public-private initiatives; solicit competitive sealed proposals; accept unsolicited proposals; grant public benefits in exchange for a private contribution; and accept private contributions to a transportation system projects.

Types of Private-Sector Partners. There is a wide variety of prospective private-sector partners. A representative sampling of types of partners that have been involved in ITS projects elsewhere include the following:

- Product Vendors of equipment, software, hardware, telecommunications;
- Multi-Disciplined Consulting Firms which offer design/build/operate services;
- Private, Non-Profit Organizations & Institutions;
- Research Institutes within Universities;
- Foundations and Endowments;
- Community Colleges seeking technical training opportunities for students;
- National Trade & Lobby Associations;
- Property Owners & Real Estate Developers;
- Major Existing or Prospective Businesses and Their Affiliated Non-Profit Foundations; and
- Chambers of Commerce.

Due to the complex nature of ITS projects, it is typical for a combination of private partners to participate jointly in a project with a public sector party, such as a local government or transit authority.

Identifying Likely Types of Private-Sector Partners. The single most important and most creative step in establishing a partnership with a private-sector party is identifying likely types of partners. Every partnership is specific and unique. A partnership which may work in one community may not work in another; a partnership suitable for one ITS technology will likely be inappropriate for another technology.

The most direct approach in identifying likely types of partners is to:

1. Anticipate likely types of benefits that might accrue to the private sector; and
2. Match the benefit with the prospective partner.

Viable partners are going to participate in the venture only because they perceive there will be benefits (ie, revenues) that further their profit-making objectives. Benefits may include not only profits or net revenues but also:

- opportunities to penetrate a new market segment, geographic area or type of community;
- visibility;
- employment for a targeted division of their company;



- demonstration of the merits or durability of a new product;
- demonstration of ability to work with the public sector; and
- long-range benefits by positioning or keeping competitors out of a new market.

Some examples illustrate these points include:

- A large land owner potentially willing to dedicate land for an intermodal transfer center if that owner is in a position to develop the abutting land;
- A land owner potentially willing to dedicate land if that owner can receive a tax advantage;
- A local Chamber of Commerce or individual business potentially willing to finance a variable message sign if there is an opportunity to advertise a product or service or receive acknowledgment of sponsorship in some visible way;
- An ITS product vendor potentially willing to provide long-term financing at favorable rates, thereby enabling the public sector to avoid the issuance of debt;
- A provider of advanced communications equipment potentially willing to provide a product at a reduced cost or provide free operations and maintenance in return for the opportunity to “advertise” the product or service as operational in the community;
- A public radio or television station potentially willing to produce and/or broadcast information as part of public service requirements or in return for anticipated increases in listeners or viewers; and/or
- A local resort service provider potentially willing to finance the upkeep of real-time weather information displays in return for an advertising message or public recognition of their services.

Identifying Prospective Partners. Once the types of potential partners are identified, it is necessary to develop a list of prospects and begin marketing these prospects. If the potential partner is a product vendor, then the list would likely be derived from firms providing the product to other communities in North America. There are resources which can help identify those vendors that provide products. If the partner is local, such as a local business, developer, or property owner, then knowledgeable representatives of the local community should be able to help develop the list.

Packaging the Partnering Materials. At a minimum, the public-sector party should describe in writing:

1. the project and the project objectives;
2. the possible types of commitments or requirements with respect to ownership, financing, operations, and timing;



3. the types of partners it seeks and why; and
4. the process to select partners.

While it is not necessary to know answers to all potential technical and policy issues when packaging the materials to solicit other partners, the public sector should state clearly what is known or certain and also state clearly what questions or issues remain to be answered during the selection and negotiation processes.

Considerations in Structuring the Partnership. Considerations for public-sector agencies, such as CDOT, to package materials for response by private-sector interests depend on the organization and structure of the desired partnership. There is no single correct partnership model. Some key factors that should be considered in selecting a partnership arrangement are described in Table III-2.

Issues Specific to ITS Partnerships. Due to the expensive and proprietary technical and research characteristics of ITS, the public-sector, at this time, is generally less knowledgeable about ITS technology than the relatively few large companies that produce ITS products. This condition has been labeled “information asymmetry.” Because of this condition, there is a relatively strong bias towards the provision of ITS services by the private sector. The Urban Institute has identified a number of issues pertinent to the role of the private sector in delivering ITS services, are described in Table 111-3.

These considerations are used in the project-specific financing recommendations, presented in Section IV, Finance Plan.

“Working” the Partnership Through to Completion. An unusual aspect of structuring a public/private partnership from the public-sector’s perspective is marketing or “working” the partnership by approaching prospective partners and presenting the partnership opportunity. For this reason, many public/private partnerships are initiated by the private sector approaching the public sector.



**TABLE III-2
CONSIDERATIONS IN STRUCTURING THE PARTNERSHIP ARRANGEMENT**

FEATURE	EXPLANATION
Selection Process	It is essential to consider how the private partner(s) are to be selected and how structured and open or informal and incremental the selection process will be. One primary potential stumbling block in creating a partnership is the process of finding partners. Mistakes can be made by the public sector in drawing out the selection process, keeping the process too closed and needing to retrace steps and open the process later, changing its position regarding the process during the process, or insisting on full disclosure of all proposal components to all potential competitors. While an open process is necessary at the beginning of the partnership creation, the documentation required prior to selection, and the willingness to negotiate privately with the selected party will influence the level of interest among prospective private parties.
Ownership	Who should legally own the facility and who should have equitable ownership? For a variety of reasons, it may be necessary for legal ownership to be with the public agency; in such cases, equitable ownership may actually involve a lease or franchise.
Funding	Who provides the funds and who pays the debt service or makes the loan payments? In some partnerships, the private partner raises capital through a combination of taxable debt and equity capital. In other situations, it may be possible to use tax-exempt debt, raised by the public partner.
Assuming Risks	Who should assume various risks and receive the benefits (or incur losses) associated with the (positive or negative) return on investment? The risk/benefit mix can vary, depending on the arrangements between the partners. Typically, risk is highest in the pre-construction feasibility stages and is the least during the operations stage.
Sources of Revenue	What sources of revenue will be used to pay the debt and return on investment? Depending on the type of asset, it may be lease payments, fixed charges, service fees, loans or grants.
Operations	Who should operate the facility? Often, the private partner will be selected to operate the facility, due to efficiencies, based on unique or specialized experience and/or its ability to adapt quickly as circumstances require.

Source: Adopted and expanded from Private Sector Briefs, Federal Transit Administration, May, 1992.



**TABLE III-3
ISSUES IN THE PRIVATE SECTOR PROVISION OF ITS SERVICES**

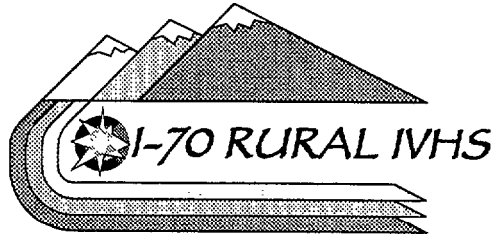
- | |
|---|
| 1. For which services and at what stage can consumers be excluded from the benefits provided by the ITS system? That is, for which stage(s) can a price be charged? If a price cannot be imposed, then the ITS service probably should be provided by the public sector. |
| 2. For which ITS services and at which stage(s) is the exclusion efficient or should be avoided? What are the transactions costs of exclusion at various stages? It may be possible to impose a fee for the ITS service, but the administrative costs of doing so may be too high to be cost effective and it makes more business sense to avoid user fees. |
| 3. What is the optimal market structure to provide the various benefits of ITS? That is, where are there significant economies of scale in production? |
| 4. What are the options for reducing risk exposure? |

Source: Overcoming Barriers to ITS Lessons from Other Technologies” Draft Task C Report - Models of Public and Private Participation in ATMS/ATIS, prepared for the Federal Highway Administration by The Urban Institute, 2/24/95.

Governments are accustomed to being approached and “sold” by others and are not accustomed to initiating marketing efforts. Many times, governments do not have staff who want to take the task on; who have time to commit to a sustained level of effort to “work” the project through to its outcome; and/or who know how to successfully develop, sustain, and negotiate the partner’s terms and conditions

Often the risk of failure outweighs possible benefits of success from the public-sector staff person’s perspective. Also, the dynamics of the partnership, when executed, may be considerably different from the government’s initial concept, as different prospective partners present approaches that were not initially considered. The probability of success within a short time period is often unpredictable- this circumstance sometimes does not fit with the local political process.

These traditional “barriers” are changing as governments become more entrepreneurial in accomplishing their mission. If there is consistent political will to attempt a partnership arrangement, then the initiative may well be worth the effort. It also may be the only way to accomplish new and innovative transportation improvements.



**BUSINESS PLAN AND
MARKETING STRATEGY**

**SECTION IV
FINANCE PLAN**



SECTION IV FINANCE PLAN

Potential financing partners suitable for I-70 West Corridor ITS projects have been identified to offer project-specific financing recommendations for each project identified for short- and medium-term implementation. An emphasis has been formulated to identify who can benefit as a result of each initiative and to determine if there are private sector interests that might be willing to participate in the construction, installation, and/or on-going operation.

Full public-sector participation is always an option. Private sector interests are willing to participate only when they perceive there are benefits that will further their business objectives. Since the fundamental purposes of ITS applications are to save time, fuel or money; reduce congestion; increase the predictability of the travel trip; or increase safety, there are many opportunities for private sector participation.

FINANCIAL PACKAGING FOR RESULTS

The opportunities for private sector involvement in funding ITS projects are extensive and unusual, if not unique. ITS America, the national trade association for ITS, forecasts that intelligent vehicle projects and programs will be a \$200 billion program over the next 20 years. The organization also predicts that the private business sector plus consumer investment will support 80 percent of the investment, while governments will support 20 percent.

Many of the earliest ITS projects were funded in a traditional manner--with substantial public investment. Over the last five years, a variety of public/private partnerships have emerged, as the private sector observed that the probability of main-streaming ITS projects is increasing and as government's capacity to fund projects is decreasing due to revenue limitations. There is no single correct partnership model. Some key factors that should be considered in selecting each partnership arrangement are described in Table III-2.

A substantial amount of investment in ITS technology is, at this time, in operational tests. While many are partnerships between state and local governments, educational institutions and private sector firms have participated, to some extent, in cost-sharing. The US DOT generally provides between 50 and 80 percent of the funding for operational tests and 100 percent of the funding for research and development projects.

Partnerships have typically included some combination of product vendors, research organizations, and state Departments of Transportation. In a few situations, national trade or lobby organizations and local governments and transit authorities have participated. The roles and responsibilities that each type of potential partner is discussed below. The types of partners have generally included representatives from the following groups:



- Product Vendors
- Federal Government
- Private Non-Profit Institutions
- State Governments
- National Trade & Lobby Associations
- Local Governments
- Local Business Community

Product Vendors. Recent ITS operational test projects are typically a partnership between a consortium of state agencies and one or more product vendors. Table IV-1 illustrates, by example, some of the product vendors that are active in ITS project deployments.

Private Non-Profit Institutions. Outside of universities, there have been relatively few private, non-profit organizations involved in ITS projects. However, the illustrative examples depicted in Table IV-2 provide additional perspective on potential partnering scenarios.

National Trade & Lobby Associations. The involvement of trade and lobby associations is important because these organizations are potential sponsors or financial partners in deploying I-70 West Corridor projects. These organizations also can provide technical and political liaison and feedback for concepts under consideration.

As ITS technology is applied, the national trade and lobby associations have begun to involve themselves. Most have begun by joining the ITS trade association, ITS America, and participating in its committee structure. A few associations have officially joined as a partner in ITS operational tests. Several illustrative examples are provided below.

- The American Automobile Association was among the first associations to become involved in ITS. The AAA officially joined the ADVANCE Dynamic Route Guidance System operational test in Chicago project and its steering committee.
- American Trucking Association Foundation is a partner with Rockwell International and Iowa DOT to test the feasibility of using automated electronic equipment to gather mileage information from commercial trucks.
- The National Private Truck Council president is actively involved in the Commercial Vehicle Operations Committee of the ITS.
- The Association of American Railroads is involved through the Intermodal Committee of ITS America.



**TABLE IV-1
ILLUSTRATIVE VENDOR PARTICIPATION IN ITS PROJECTS
WITH APPLICABILITY TO THE I-70 WEST CORRIDOR**

TYPE OF PROJECT	ILLUSTRATIVE PRODUCT VENDOR PARTICIPATION
Commercial Vehicle Operations	<ul style="list-style-type: none"> - Lockheed IMS is a partner in an operational test involving the multiple issuance of port-of-entry permits and collection of fees. The intent is to increase productivity of registration, permits and tax collections. Caltrans, Arizona DOT and New Mexico DOT are also venture partners. - In 1992 and 1993, the Greyhound Bus Company installed collision warning radar on 1,600 buses. The system looks ahead and to the side of the bus and provides a warning if the driver is too close to another vehicle or obstacle or if is approaching too fast. The radar can “see” through rain, fog and darkness. Based on the first 100 million miles, Greyhound experienced a 20% reduction in accidents. - IBM is coordinating with J.B. Hunt, a large commercial trucking firm, based in Arkansas in developing an “on-board computer” product for use by trucking management and drivers for all aspects of company activities. - Rockwell International developed a global positioning system (GPS) for defense industry and is now partnering with Iowa DOT, the American Trucking Association Foundation and others to test the feasibility of using automated electronic equipment to gather location and mileage information from commercial trucks. Information would be used to administer fuel tax and registration regulation.
Communications Systems	<ul style="list-style-type: none"> - MCI and the Maryland DOT have entered into an agreement within which MCI will lay fiber optic line within the I-95 right-of-way in return for free use of fiber optics for 40 years.
Data Collection & Aggregation	<ul style="list-style-type: none"> - Metro Traffic Control is a private company that collects, processes and translates traffic information and barter their service in the form of live reports and video graphic packages to radio and television stations in return for advertising time which they sell to commercial advertisers.
Emergency Response	<ul style="list-style-type: none"> - NA VSYS Corporation, ESRI and Cellular, Inc. are partner’s in Colorado’s MAYDAY operational test. This project will evaluate the use of GPS for vehicle location and cellular phones to provide assistance to travelers in a portion of north-central Colorado. - US West, Minnesota DOT, the Minnesota State Patrol and local transit agencies are partner in ARCTIC (Advanced Rural Transportation Information and Coordination) which will coordinate the communications systems of highway, state patrol and transit to reduce response times to accident and road condition emergencies.
Public/Private Partnerships	<ul style="list-style-type: none"> - Among the most comprehensive Advanced Traveler Information Systems (ATIS) is the Dulles Area Traveler Information System (DATIS) which is a partnership between GTE Corporation, Urban Mobility Corporation, Metro Traffic Control, a university and several public sector members.



**TABLE IV-1
ILLUSTRATIVE VENDOR PARTICIPATION IN ITS PROJECTS
WITH APPLICABILITY TO THE I-70 WEST CORRIDOR**

TYPE OF PROJECT	ILLUSTRATIVE PRODUCT VENDOR PARTICIPATION
Public Transportation/ Alternate Modes	<ul style="list-style-type: none"> - <i>The Regional Transportation District (RTD)</i> is among 25 transit agencies that currently use a automated vehicle location system. In 1994, the RTD equipped 1,200 vehicles with AVL equipment using GPS technology.
Safety/Warning	<ul style="list-style-type: none"> - <i>Delco Electronics</i>, a division of General Motors' Hughes aerospace unit has developed a 360 degree radar detection system which is being installed in school buses. The system detects the presence of children in driver's blind spots. - <i>SEIKO Communications Systems</i> is co-venturing a project with Washington (State) DOT to design a watch with paging, weather, traffic and road conditions services. This is targeted at the commercial vehicle operator needing current accessible information.
Traveler Information Systems	<ul style="list-style-type: none"> - <i>Maxwell Laboratories and the California State Department of Transportation</i> provide real-time freeway traffic information to commuters via the Internet on its World Wide Web page for San Diego, Los Angeles and Orange Counties. (http://www.scubed.com/caltrans/transnet.html) - <i>Ford Motor Company, IBM, Delcon Electronics, Seiko Telecommunications</i> joined the Seattle Consortium for IVHS Technologies. The Consortium received \$5.5 million in state and federal funding to test a high-speed FM sub-carrier data broadcast system to disseminate en route information to drivers and commuters through existing radios. - <i>General Motors, Ford Chrysler, Delco, Ericsson/GE, Metro Traffic Control, Michigan DOT, FHWA</i> and others are conducting an operational field test that will deploy and evaluate several low cost methods of communicating advisory information to motorists, including use of the radio data system RDSO, television sub-carrier, automatic highway advisory radio (AHAR), low power highway advisory radio (HAR), and cellular phones. The project has 50% federal funding.
Education & Training	<ul style="list-style-type: none"> - <i>PATHFINDER</i> was a cooperative effort by Caltrans, FHWA & General Motors to use In-vehicle navigation system to provide real-time traffic information to drivers. - The Minnesota DOT, the Texas DOT, and Caltrans have sponsored presentations throughout their states to broaden interest in ITS technology. In most cases, product vendors have participated at their expense to showcase their products and their applicability to local circumstances. <i>GM, IBM and Seiko Communications</i> are frequent vendor attendees.



**TABLE IV-2
ILLUSTRATIVE PRIVATE NON-PROFIT & EDUCATIONAL/INSTITUTIONAL PARTICIPATION
IN ITS PROJECTS WITH APPLICABILITY TO THE I-70 WEST CORRIDOR**

TYPE OF PROJECT	ILLUSTRATIVE PRODUCT/VENDOR PARTICIPATION
Commercial Vehicle Operation	<ul style="list-style-type: none"> ✓ <i>Carnegie Mellon Research Institute</i>, under contract with the National Highway Traffic Safety Administration has begun to develop two driver alertness monitors for over the road heavy vehicles. The monitors will contain performance sensors, psychophysiological sensors, processing software and a driver warning system integrated into the existing on-board computer system.
Communications Systems	<ul style="list-style-type: none"> ✓ <i>Minnesota Public Radio</i> broadcasts travel advisories produced by the Minnesota Department of Transportation. ✓ The <i>National Weather Service</i> provides service in four ways: some information is free to the public via telephone; some information is sold inexpensively via weather frequency adapters; "weather wire" is sold to radio and TV stations via a satellite uplink/downlink service; the most sophisticated weather information, NEXRAD, is sold to one of four vendors who, in turn, sell to television and radio stations.
Data Collection & Aggregation	<ul style="list-style-type: none"> ✓ <i>Trilogy</i> will provide traveler information through three different communications techniques to end users with area and route-specific en-route advisories on highway operating conditions in the Twin Cities Metropolitan area. The intent is to test and compare the user devices. Minneapolis Public Schools Radio and the University of Minnesota are partners in this venture.
Education & Training	<ul style="list-style-type: none"> ✓ The <i>ITS Consortium</i> is a partnership of historically Black colleges and universities, minority educational institutions and minority-owned businesses and the FHWA to provide minority organizations with mainstream business opportunities to manufacture, integrate and distribute ITS technology products. ✓ In June 1995, the <i>University of Washington</i> initiated TRIHline (pronounced Try Line), which is a new Transportation Research Information Hotline service, available to private industry, government organizations, transportation researchers and students through the University's Transportation Northwest Research Center. (trihline@u.washington.edu)
Traveler Information Systems	<ul style="list-style-type: none"> ✓ The <i>American Automobile Association</i> will be testing the marketability of kiosks located in hotel lobbies and public places; these monitors will provide real travel information and routing recommendations. ✓ The <i>Atlanta Committee for Olympic Games</i>, Federal Express, TRW, Georgia Tech, Georgia DOT and others are testing the benefits of en-route traveler advisory and traveler services information using FM sub-carrier communications. The project is called ADAS (Atlanta Driver Advisory System).



Local Business Community. The scale and expense of ITS operational test projects is substantial. In this experimental stage, it is not surprising that the local business community has generally not been involved. As ITS technologies are deployed and proven to be successful, it is reasonable to expect more significant participation. The ensuing discussion of rural ITS projects suggests a number of ways for local businesses to participate.

Federal Government. The majority of federal funding for ITS projects is through appropriations authorized within the Intelligent Vehicle-Highway Systems Act of 1991, which is also Part B of the ISTEA legislation. These funds are appropriated at the beginning of each fiscal year to the FHWA. The FHWA is authorized to make portions of these moneys available to State and local governments at an 80/20 match arrangement. Appropriations have been made since fiscal year 1992; in fiscal year 1994 (10/93-9/94), \$214,000,000 was appropriated; in fiscal year 1995 (10/94-9/95) \$227,000,000 was appropriated; in fiscal year 1996 (10/95-9/96) \$223,000,000 is appropriated.

Approximately 35 percent of the recent annual appropriations have been for projects earmarked by Congress and the remaining 65 percent has been allocated to FHWA operations. At the end of each federal fiscal year, the FHWA determines how much of the earmarked appropriations remain uncommitted; these residual funds are used to finance additional operational tests.

Table IV-3 summarizes the federal ITS funding allocations as a result of the ISTEA legislation.

The FTA also identifies a portion of its ISTEA-appropriated funds for ITS projects. The FTA does not directly receive a portion of the ITS allocation from ISTEA. For example, in fiscal year 1995, the FTA allocated \$3,000,000 towards ITS projects.

In 1994, US DOT formed the Joint ITS Program Office, which is responsible for planning, coordination and oversight of all US DOT ITS activities and management of activities that affect all ITS functional areas, such as system architecture, standards, and institutional and legal issues. This office is assuming increasing coordination and management responsibilities.

Federally-Funded ITS Operational Tests. US DOT - ITS Operational Test Program, administered by FHWA in conjunction with the FTA and the National Highway Traffic Safety Association (NHTSA), evaluates system concepts, technologies and institutional and financial arrangements. In the Fall of each year since 1992, US DOT has solicited proposals for operational tests. Colorado has been involved in several contract awards.

- **Southwest States Electronic One-Stop Shopping** (Colorado, Arkansas, New Mexico). This project develops credential systems to facilitate truck monitoring and payment of fees. The US DOT awarded \$694,000 for this test.



**TABLE IV-3
FEDERAL FUNDING OF ITS PROJECTS THROUGH ISTE A AUTHORIZATION**

TYPE OF FUNDING	FISCAL YEAR 1994 (10/93-9/94)	FISCAL YEAR 1995 (10/94-9/95)	FISCAL YEAR 1996 (10/95-9/96)
FHWA ITS Operations:			
Research & Development	\$28,000,000	\$35,000,000	\$24,479,000
Operational Tests	\$15,000,000	\$22,500,000	\$32,500,000
Commercial Vehicle	\$10,000,000	\$10,700,000	\$14,500,000
Operations			
Automated Highway System	\$10,000,000	\$10,000,000	\$14,000,000
Adv. Technology Applications	\$15,000,000	\$15,000,000	\$0
Crash Avoidance Research	\$0	\$0	\$13,000,000
Program & Systems Support	\$12,300,000	\$11,300,000	\$11,300,000
Total	\$90,300,000	\$114,500,000	\$109,719,000
ITS Project Earmarks	\$79,500,000	\$76,000,000	\$40,950,000
ITS - Other, such as program support, outreach, priority corridors, and model deployment	\$44,200,000	\$37,000,000	\$72,331,000
ITS Total	\$214,000,000	\$227,500,000	\$223,000,000

Source: FHWA & ITS/AMERICA

- **Herald En-Route Driver Advisory System via AM Subcarrier** (Colorado and six other states). This project will result in dissemination of traveler information in difficult to reach, remote, rural areas using a sub-carrier on an AM broadcast station. The US DOT awarded \$200,000 for this operational test.
- **Colorado MAYDAY System** (Colorado and Iowa) evaluates use of a GPS, for vehicle location and cellular telephone for traveler assistance in a 12,000 square mile area in north-central Colorado. The public-private sponsors for this test received a \$2,400,000 grant from the US DOT.
- **IVHS for Voluntary Emissions Reduction** (Colorado only) uses an active infrared roadside emissions sensor and a variable message sign to give real-time vehicle emissions readings to passing motorists. The award for this operational test is \$304,000.
- **Dynamic Trust Speed Warning for Long Downgrades** is a public-private partnership between CDOT, the Colorado Motor Carriers Association, and International Road Dynamics (IRD), Inc. This system is designed to reduce runaway truck accidents on the long downgrade on the



western side of the Eisenhower Tunnel. The system design began in 1993 and was inaugurated in June, 1995. \$243,000 was awarded by the US DOT to deploy the system.

- **The Hogback Multi-Modal Transfer Center ATIS** includes a public-public-private partnership between CDOT, the RTD, and Westinghouse to establish real-time transit information in a remotely-located kiosk. The US DOT awarded a \$200,000 grant for this project.

Federal government interest in “operational tests” is being replaced by a heightened need to fund ITS applications that will be deployed for the duration. For fiscal year 1996 (10/95 - 9/96) the US DOT sought to fund its Trailblazer initiative which would deploy ITS infrastructure in selected urban areas. Funding authorization is unlikely. Undeterred, the US DOT announced its intention, pending funding approval, to select three metropolitan areas for model deployment of an ITS “core infrastructure.” This new direction reflects a realization that most state and local officials remain skeptical about the benefits of ITS and need visible proof of its applicability.

Financial Innovations in Using Federal Funds. Executive Order 12893, issued January 26, 1994, mandated federal agencies with infrastructure responsibilities to “seek private sector participation in investment . . . management . . . ownership, financing, construction and operation of infrastructure programs.” In response, the US DOT initiated its Innovative Financing Project (TE-045).

The FHWA is furthest along in activating the Innovative Financing Project. Its first round of innovative financing projects began implementation in October 1994. I-70 West Corridor ITS projects, which have potential application to this program, are presented later in this section and are referenced where appropriate.

In January 1995, the US DOT Secretary announced a new initiative that re-orientes the way the agency disburses funds to states. Under the Partnership for Transportation Investment, four new financing techniques were outlined that are intended to replace the old grant reimbursement method. They include the following four concepts:

- **Private Match:** Private sector dollars may be added to or substituted for state matching funds.
- **Revolving Loan Funds:** Federal dollars are loaned and granted to states. When repaid, the funds are deposited in state revolving loan funds to be used to finance other projects.
- **Flexible Reimbursement:** States need not wait to accumulate the full federal grant before beginning a project.
- **Credit Enhancement:** Federal dollars may be used as collateral for lines of credit to support bond issues.



Table IV-4 summarizes these and other financing strategies that FHWA is considering to enable state governments to leverage federal financial aid.

TABLE IV-4 NEW FINANCING STRATEGIES UNDER CONSIDERATION BY FHWA WITH APPLICABILITY TO COLORADO ITS PROJECTS	
TYPE OF PROJECT	DESCRIPTION
Phased Funding	Traditionally, a state must set aside the entire amount of obligational authority required for a project to shelter FHWA from risk. Phased funding allows states to begin projects before they have accumulated the full (state) budget capacity to cover the federal reimbursement of total project costs. Under phased funding, where a state does not yet have full budget capacity, FHWA and the state share the funding risks involved in preconstruction and construction.
Tapering	Tapering is an alternative means of making the federal reimbursement to states. Under this concept, the federal share of the project may vary from year to year as long as the overall federal contribution does not exceed the federal-aid limit. The federal contribution could start at 100% and taper to 0%. Tapering allows states to maximize use of private capital to finance the remainder of construction costs after the riskier preconstruction stage is complete.
Advance Construction	Through advance construction, a state can independently raise the up-front capital required for a project and preserve eligibility for future federal-aid funding for that project. This technique allows a state to build a project eligible for federal aid when the need arises, rather than having to set aside obligational authority for the federal share. FHWA must designate the project and approve it as a construction project in advance. If a state uses debt to finance an advance construction project, the interest cost is eligible for federal reimbursement.
Bonds/ Federal-Aid Anticipation Notes	States could receive investment-grade bond ratings if they can structure a predictable stream of federal funding. FHWA is evaluating its capacity to commit to authorizations beyond 1997, the year ISTEA expires.
Expanded Definition of Local Match	Historically, any in-kind contribution, except for rights-of-way donations, have been deducted from the total project cost before the level of federal assistance is calculated. FHWA is evaluating relaxing this standard and allowing private donations and local-kind contributions and the contribution of existing assets towards the 20 percent non-federal match.
Section 1044 Investment Credits	Traditionally, most highways providing similar functions have been categorized as either highways receiving federal aid for which there is no charge or toll roads which receive no federal aid. ISTEA Section 1044(b) establishes "investment credits." Investment credits can be used to build new partnerships between turnpike/toll road operators and state DOTs, by the state's commitment to a future maintenance of effort. For states using all federal-aid funding available to them, the investment credit permits them to free up traditional state dollars for additional projects.



**TABLE IV-4
NEW FINANCING STRATEGIES UNDER CONSIDERATION BY FHWA
WITH APPLICABILITY TO COLORADO ITS PROJECTS**

TYPE OF PROJECT	DESCRIPTION
ISTEA Section 1012 Loans	Under Section 1012 of the ISTEA legislation, states may loan money to any project sponsor for an ISTEA-eligible project. Federal funds can reimburse the state up to the federal share of the project costs. The loan may be repaid to the state with revenue generated by the project. The state must use loan repayment proceeds to fund other surface transportation or ISTEA projects.
Revolving Loan Fund	FHWA is capitalizing revolving loan funds. States are establishing criteria for and lending moneys from the revolving loan fund and reinvesting loan proceeds in related projects. The intent is to wean governments off of grants and into self-sustaining transportation projects.

Sources: *Rebuilding America: Partnership for Investment*, December, 1994, Federal Highway Administration; personal interviews with innovative finance project sponsors.

State Government--Colorado Department of Transportation. The primary source of State-generated revenues for CDOT are from the Highway Users Trust Fund (HUTF). The HUTF receives revenues from:

- the state's motor fuel tax, which comprises 76% of HUTF;
- gross ton mile tax;
- motor vehicle and truck registrations, which comprise 19% of HUTF; and
- miscellaneous revenues, including drivers license and port of entry fees.

HUTF revenues are appropriated to CDOT, the Colorado State Patrol, counties, and municipalities on an annual basis. Most appropriations are by formula.

The portion of HUTF that is distributed to CDOT is deposited into the State Highway Fund. Typically, this portion is approximately one-half of HUTF revenues. The State Highway Fund is used primarily for administration, maintenance, and operations with matching available from federal construction funds.

Table IV-5 provides a summary of the approved CDOT 1995-6 fiscal year budget. Since financing certain ITS projects referenced later in this section might involve increasing or changing state taxes and fees, Table IV-6 defines the most significant sources of revenue generated for the HUTF.

Federal Funding for CDOT. In Fiscal Year 1995-96, approximately \$197.3 million (32%) of CDOT's budget will come from the federal government. Funds are received through a series of different and partially-related federal programs. Table IV-7 provides a summary of the federal programs that are relevant to ITS and the applicability to ITS funding in Colorado.



**TABLE IV-5
SUMMARY OF FY 95-96 CDOT BUDGET**

SOURCES OF REVENUE		ESTIMATED EXPENDITURES:	
State Highway Fund:		CDOT Programs:	
HUTF	\$308,482,015	Construction	\$269,474,922
HB 95-1174	\$75,000,000	Maintenance	\$110,593,770
Miscellaneous Revenues,	<u>\$7,469,000.</u>	Engineering Program	\$57,845,782
Subtotal	\$390,951,015	Surface Treatment	\$107,189,000
		Project Support	\$4,804,636
Federal FHWA Funds:		Planning, Policy & Research	\$9,405,769
Surface Transportation Funds	\$219,240,991	Transit & Rail	\$3,042,003
Less Obligation Limitation	<u>(\$21,901,599)</u>	Administration	\$17,403,002
Subtotal	\$197,339,392	Aeronautics	\$11,148,038
		Safety Education	\$10,579,733
Other State Funds:		Equipment	\$2,162,719
Transit & Rail	\$3,042,003	Property	\$2,590,100
Aeronautics Fund	\$11,148,038	Statewide Allocation: Und. Storage	\$2,820,000
Gaming Fund	\$2,811,000	Statewide Allocation: TOC	\$2,543,272
Highway Safety Funds (MOST & LEAF)	\$10,579,733	Statewide Allocation: Park Roads	\$450,000
Local Reimbursement	\$8,579,458	Statewide Allocation: Work. Comp.	\$4,068,191
Subtotal	\$36,160,232	Statewide Allocation: Contingency	\$2,000,000
		Statewide Allocation: Other	<u>\$6,329,702</u>
Grand Total	\$624,450,639	Subtotal	\$624,450,639

Source: CDOT Budget - Fiscal Year 1995-96, July 1, 1995.



**TABLE IV-6
SOURCES OF COLORADO HIGHWAY USERS TRUST FUND REVENUES**

SOURCE OF REVENUE	DESCRIPTION	BASIS, RATES, REVENUE AMOUNT
Motor Fuel Excise Tax	Tax on gasoline, gasohol, and diesel fuels. It is imposed at the wholesale level and is in lieu of a state (retail) sales tax on motor fuels.	Basis: gross gallons received Rate: gasoline: \$0.22 / gallon gasohol: \$0.22 / gallon special fuel: \$0.205 / gallon
Passenger Mile Tax	Tax imposed on owners/operators of vehicles used to transport passengers for compensation.	Basis: passenger miles Rate: \$0.001 / passenger mile
Motor Vehicle Registration	The state fee is imposed on a per vehicle basis. Vehicles include passenger vehicles, passenger buses, motor cycles, farm trucks, commercial trucks, trailers, recreational trucks, motor homes, and heavy vehicles.	Basis: class, weight and age of vehicle FY93-4 - 3,471,119 vehicles registered
Motor Vehicle Ownership Tax	This tax is imposed on the vehicle's taxable value by vehicle class. These revenues are for local governments only.	Basis: Vehicles registered Rates: 0.5% to 2.1% of 75% to 85% of the vehicle value
Drivers Licenses	Imposed on drivers of motor vehicles who reside in Colorado.	Basis: vehicular drivers Rates: \$15 for basic renewal FY 93-4 Licenses issued 555,256
Emissions Fees	Imposed on a per vehicle basis.	Rates: gasoline engine \$9 per diesel engine - \$45 per FY 93-94 Inspection Reports: 2,102,925
Port of Entry: Laden Weight Registration	Registration is for out-of-state commercial vehicles; permit is valid for 72 hours and based on the gross vehicle weight.	Trucks Cleared, FY 93-4: 4,710,521 FY93-4 Total port of entry revenues: \$5,400,000
Port of Entry: Fines	Fines are imposed on commercial vehicles that are too heavy, too large or too long.	Fines are based on the quantify of the infraction relative to the statute. Trucks Weighed: 4,168,401
Port of Entry: Special Fuel Permits	Imposed on interstate commercial carriers that are not registered in IFTA states. The intent is to collect the equivalent of the motor fuel tax.	Payment is based on miles traveled in Colorado. Permits Issued: 22,615 (one per company)
Port of Entry: Hazardous Material Permits	Permits required for all commercial carriers transporting hazardous materials other than those hauling trash.	FY93-94 Permits Issued: 2,255
Gaming	Imposed on adjusted gross proceeds (AGP), which is equivalent to the house take or money lost by gaming patrons.	Rate: 2% to 18% depending in AGP generated in a year plus a per-device fee of \$100 per year.

Sources: Colorado Department of Revenue 1993 and 1994 Annual Reports



**TABLE IV-7
SOURCES OF FEDERAL FUNDING THROUGH ISTE A
WITH APPLICABILITY TO ITS IN COLORADO**

FUNDING SOURCE	FUNDING ARRANGEMENTS	APPLICABILITY TO ITS IN COLORADO
FHWA ITS Operations	These revenues from Part B of the ISTE A legislation. Unlike most ISTE A revenues, there is competition for these funds.	Colorado has been successful in competing for these funds.
Interstate Completion	Share: 90% federal/10% State or Local. Colorado's share is a mathematical calculation based on the need to complete the interstate system.	Total revenues to Colorado are fixed by formula.
Interstate Maintenance	Share: 90% federal/10% State or local. Colorado's share is a mathematical calculation based on interstate lanes /vehicle miles traveled. Funds may be transferred to other accounts.	In addition to maintenance, these funds may be used for HOV lane additions, which can be enhanced with ITS. Total revenues fixed by formula.
National Highway System	Share: 80% federal/20% State or Local. Colorado has about 2.4% of the national roads on the national highway system. Colorado may transfer up to 55% of these funds to the Surface Transportation Program. FY94-5 Fed: \$49,540,000; CO: \$6,404,000	Total revenues to Colorado are fixed by formula.
Surface Transportation Program	Share: 80% federal/20% State or Local. Mandatory Application: Block grant program; formula based on prior share of federal funding. 10% set aside for safety: <i>FY94-5 Fed: \$6,798,000; CO: \$823,000</i> 10% set aside for enhancements: <i>FY94-5 Fed-\$6,798,000; CO-\$156,000; local-\$1,798,000</i> 50% by population (>200,000): <i>FY94-5 - Fed-\$19,303,000; Local-\$4,712,000</i> 30% discretionary: <i>rural: Fed: \$11,914,000; CO \$2,908,000</i> <i>any: Fed: \$22,125,000; CO \$4,921,000; local \$480,000</i>	This program provides the broadest flexibility in the types of projects that can be funded. Total revenues to Colorado are fixed by federal formula.
Congestion Management & Air Quality	Share: 80% federal / 20% State or Local. State allocation based on State's share of population in non-attainment areas and degree of pollution; with a minimum floor of 0.5% per State. For 3 metro non-attainment areas in State (Denver, Colorado Springs, Fort Collins) Colorado will receive \$30 million over 6 years of ISTE A. <i>FY 94-5 Fed: \$4,738,000; Local: \$1,157,000</i>	Most of the Rural I-70 Corridor is outside of a non-attainment area.
Bridge Replacement & Rehabilitation	Share: 80% federal / 20% State or Local. <i>FY 94-5 Fed: \$23,414,000; CO-\$5,721,000; local \$1,010,000</i>	The applicability to ITS is less than for other sources of federal revenue.
Discretionary Funds	Share: 50% Federal/50% State or Local <i>FY 94-5 N/A</i>	Colorado has been an aggressive competitor for funds that are distributed at the discretion of the Secretary.
Planning	Share: 80% federal / 20% local 25% of statewide funds must be for research <i>FY94-5 Fed: \$5,989,000; CO \$1,006,000; Local \$409,000</i>	Variable based on Federal Planning
Safety Programs	There are four major safety programs funded with federal aid: (1) The Transportation Safety Program, funded with 402 revenues; (2) the Highway Safety Plan funded from NHSTA 402 funds and the FHWA 402 program; (3) The Alcohol Incentive Grant Program, and (4) the Fatal Accident Reporting System (FARS), which is funded 100% with Section 403 funds.	1) Potential funding through Advance Safety and Warning when applications are made. 2) Based on project specifics when applications are made. 3) Limited funding opportunities. 4) Applicability to ITS using the automatic reporting system.



Local Government. Larger local governments and metropolitan area transit authorities have become partners in ITS technology projects. Colorado RTD received one of the earliest federal grants to pursue a GPS for buses. The Seattle METRO is another leader in ITS technology. To date, few examples exist to portray smaller local or county government involvement in ITS.

To date, a few local governments across the US have become directly involved in ITS. One example, the City of Anaheim, California, operates a Traffic Internet Information Server which provides traffic speeds and road information for Anaheim, Los Angeles, and Orange County. The information is updated every 30 seconds. Detailed maps are provided for Disneyland, Orange County Airport, and other congested areas. The system imports sensor data from Caltrans and the city's street network, then converts it to graphics on a World Wide Web page.

In Colorado, due to TABOR Amendment expenditure limitations, local governments will probably be reluctant to initiate a major new service without a vote. However, local governments are in a position to provide in-kind staff support. They may be able to provide a land lease for a variable message sign; they may be willing to lend their name as a co-sponsor or endorser of a project; and they can facilitate the local approval processes.

ITS PROJECTS - FUNCTIONAL AREAS

A corridor wide outreach program was conducted to identify problems and needs associated with travel along the I-70 West Corridor from Denver to Glenwood Springs. Based on the input received, 80 potential projects were identified. These projects are grouped into 12 functional areas:

FUNCTIONAL AREAS OF RURAL I-70 CORRIDOR ITS PROJECTS

✓ Commercial Vehicle Operations	✓ Emergency Response	✓ Public Transportation
✓ Communication Systems	✓ Environmental / Econ. Impacts	✓ Safety / Warning
✓ Data Collection / Aggregation	✓ Institutional Issues	✓ Traffic Management/Operations
✓ Education / Training	✓ Public/Private Partnerships	✓ Traveler Information Systems

Using the established goals and objectives, the I-70 West Corridor ITS projects were prioritized, identifying 15 early action projects for immediate implementation. These, and the remaining 65 projects, make up the short-, medium-, and long-term actions recommended as worthwhile and realistic ITS applications to address the transportation problems and needs along the I-70 rural corridor. Each of the projects need to be funded to guarantee implementation. Potential financing mechanisms are recommended for all projects.

Backbone Projects. Five projects are considered as the backbone because they underlie the success of many individual projects.



BACKBONE RURAL I-70 WEST CORRIDOR ITS PROJECTS

CS-1	Regional Traffic Operations Centers (TOCs)
CS-2	High-Capacity Data Transmission Links
II-1	Proactive Legislative Change Campaign
II-2	FCC Rule-Making Permit Process
PPP3	Communication Links

Ready-To-Go Projects. Among the projects, 6 are ready-to-go. These projects do not rely on the development and testing of a particular technology or the particular technology is tested and proven. The projects are not contingent on any action, other than direct implementation.

READY-TO-GO PROJECTS

ET-1 Trained Caller Program	ET-4 Traveler Comm Service	EI-1 Alternate Fueled Vehicles
ET-2 I-70 Corridor Road Show	ET-5 Public Acceptance Program	EI-4 Econ. Dev. Partnership

Project Sets. Five project sets have been identified where a **combination** of ITS projects create a complementary package of actions to address and respond to a problem and/or need within the I-70 West Corridor. By combining the actions associated with each individual project, a greater level of success is possible.

PROJECT SETS	INDIVIDUAL PROJECT
WeatherPackage	CS-5 Weather Station Centralized Communication Links CS-8 Mobile Two-Way Information Communications
Traffic & Weather	DCA-1 Vehicular Probe Data Collection / TOC Aggregation DCA-2 Weather/ Ice Sensor Data Collection / TOC Aggregation DCA-4 Avalanche Detection Research DCA-5 Eisenhower Tunnel Approach Vehicle Detectors
Traffic, Weather & Video	DCA-6 Basic Data Infusion
VideoSurveillance	DCA-3 Video Surveillance Data Collection / TOC Aggregation PPP-1 Metro Traffic Control / TOC Real Time Information Relay PPP-2 Television Station Video Surveillance
Emergency Patrol	ER- 1 Hot Spot Courtesy Patrols II-3 MOVE-IT / REMOVE-IT Campaign II-4 Public Information Officer Training Program PPP-3 Communication Links II-5 Corridor Incident Management Plan

SUMMARY OF FINANCING RECOMMENDATIONS

Table IV-S highlights the primary sources of financing recommended for each project. Eleven of these projects are also recommended for funding by the Smart Path Business Plan. Financing tools, that are appropriate for each project, within each functional area, are presented.



**TABLE IV-8
FINANCING PROGRAM:
FUNDING ARRANGEMENTS, TYPE OF PROJECT, LIKELY FUNDING PARTNERSHIPS**

PROJECT	PRIMARY FUNDING ARRANGEMENTS	TYPE PACKAGE	PRIVATE SECTOR FOR PROFIT		PRIVATE SECTOR NON-PROFIT		GOVERNMENT		
			PRODUCT VENDOR	BUSINESS	TRADE ASSN	CHAMBER	LOCAL	STATE	FEDERAL
COMMERCIAL VEHICLE OPERATIONS									
CVO-1 Electronic Tag Hazardous Materials Monitoring	private	stand alone		user fees					
CVO-2 Dumont / Downieville Automated Port of Entry . (ea)	private	stand alone		user fees					
CVO-3 Dynamic Truck Warning Operations ■	public/not-profit partnership	stand alone				*	*		
CVO-4 Eisenhower Tunnel Over-Height Vehicle Detectors	public/not-profit partnership					*	*		
COMMUNICATIONS SYSTEMS									
CS- 1 Regional Traffic Operations Centers (TOCs) (ea)	public/private partnership; public lead	backbone		purchase services				*	
CS-2 High-Capacity Data Transmission Links (ea)	private	backbone	*	*					
CS-3 Real-Time Road/Weather Info. Electronic Relay = (ea)	public/ private partnership; private lead	requires CS- 1		*		*	*	*	
CS-4 Voice/Data Communications Upgrades (ea)	public	stand alone; need CS-1 & cs-2						*	
CS-5 Weather Station Centralized Communications Links	public/public partnership	weather package		purchase services					
CS-6 Corridor-Wide Cellular Telephone Coverage	private	ready to go	*						
CS-7 HAR Broadcast Messaging System	public/private partnership; private lead	requires cs-1		*	*			*	
CS-8 Mobile Two-Way Information Communications	public/private partnership- public lead	weather package; requires CS-1		*				*	



**TABLE IV-8
FINANCING PROGRAM:
FUNDING ARRANGEMENTS, TYPE OF PROJECT, LIKELY FUNDING PARTNERSHIPS**

PROJECT	PRIMARY FUNDING ARRANGEMENTS	TYPE PACKAGE	PRIVATE SECTOR FOR PROFIT		PRIVATE SECTOR NON-PROFIT		GOVERNMENT		
			PRODUCT VENDOR	BUSINESS	TRADE ASSN.	CHAMBER	LOCAL	STATE	FEDERAL
CS-9 Haning Lake TOC Upgrades	public		*					*	
DATA COLLECTION/AGGREGATION									
DCA-1 Vehicular Probe Data Collection/ TOC Aggregation	public/private partnership-private lead	traffic & weather		sub- scription	★			★	
DCA-2 Weather/ICE, Inc Sensor Data Collection/ TOC Aggregation (ea)	public/private partnership-private lead	traffic & weather		sub- scription				*	
DCA-3 Video Surveillance Data Collection/ TOC Aggregation	public/private partnership-private lead	video package		sub- scription	*			*	
DCA-4 Avalanche Detection Research (mt)	public/private partnership-private lead	traffic & weather		sub- scription				* I	
DCA-5 Eisenhower Tunnel Approach Vehicle Detectors	public/private partnership-private lead	traffic & weather		*	*			*	
DCA-6 Basic Data Fusion	public/private partnership-private lead	traffic & weather; video		sub- scription				★	
DCA-7 Advanced Ice Detection Warning System	public	traffic & weather	★					★	
EDUCATION/TRAINING									
ET-1 Trained Caller Program	public	ready to go	co- sponsor		co- sponsor			★	
ET-2 I-70 West Corridor Road Show	public	ready to go	co- sponsor		co- sponsor			★	
ET-3 Smart Driver / Vehicle Program	public/private partnership-public lead	stand alone	vendor finance					★	
ET-4 Traveler Information Community Service Program	public	ready to go	co- sponsor		co- sponsor			★	



**TABLE IV-S
FINANCING PROGRAM:
FUNDING ARRANGEMENTS, TYPE OF PROJECT, LIKELY FUNDING PARTNERSHIPS**

PROJECT	PRIMARY FUNDING ARRANGEMENTS	TYPE PACKAGE	PRIVATE SECTOR FOR PROFIT		PRIVATE SECTOR NON-PROFIT		GOVERNMENT			
			PRODUCT VENDOR	BUSINESS	TRADE ASSN	CHAMBER	LOCAL	STATE	FEDERAL	
ET-5 Public Acceptance Program ■	public	ready to go	co-sponsor		co-sponsor				★	
EMERGENCY RESPONSE										
ER-1 Hot Spot Courtesy Patrols (ea)	public/private partnership private lead	emergency patrol	*		co-sponsor	co-sponsor	in kind			
ER-2 Good Samaritan Reporting System	public/private partnership-private lead	emergency response	*	telephone co-sponsors	co-sponsor					
ER-3 Corridor-Wide Call Box System ■ (ea)	private	requires II-1 & cs-2	self-sustain							
ER-4 MAYDAY Operations .										
ER-5 Emergency Services District Program	public/public partnership						*	*		
ENVIRONMENTAL/ ECONOMIC IMPACTS										
EEl-1 Alternate Fueled Vehicles Program	public/private partnership-private lead	ready to go		*					*	
EEl-2 Sensor/Chemical De-Icing Program	public								*	
EEl-3 Sanding/Storm Water Runoff Program	public								*	
EEl-4 Economic Development Partnership Program	public/public partnership	ready to go					kind (staff)		*	
EEl-5 Mobile Emissions Testing Stations (mt)	public			user fees					*	
INSTITUTIONAL ISSUES										
II-1 Proactive Legislative Change Campaign	public	backbone							*	
II-2 FCC Rule-Making Permit Process	public	backbone; video package							*	



**TABLE IV-8
FINANCING PROGRAM:
FUNDING ARRANGEMENTS, TYPE OF PROJECT, LIKELY FUNDING PARTNERSHIPS**

PROJECT	PRIMARY FUNDING ARRANGEMENTS	TYPE PACKAGE	PRIVATE SECTOR FOR PROFIT		PRIVATE SECTOR NON-PROFIT		GOVERNMENT		
			PRODUCT VENDOR	BUSINESS	TRADE ASSN.	CHAMBER	LOCAL	STATE	FEDERAL
II-3 MOVE-IT/REMOVE-IT Campaign	public	emergency patrol						★	
II-4 Public Information Officer Training Program	public	emergency patrol					in-kind staff	in-kind staff	
II-5 Corridor Incident Management Plan	public/public partnership	emergency patrol					in-kind staff	in-kind staff	
II-6 I-70 West Corridor ITS Coalition	public/private partnership-public lead	stand alone		in-kind (staff)	in-kind (staff)		in-kind staff		
II-7 ITS Implementation Team Regional Task Force	partnership-public / public	stand alone					in-kind staff		
PUBLIC/PRIVATE PARTNERSHIPS									
PPP-1 Metro Traffic Control/TOC Real-Time Information Relay	public/private partnership-private lead	video surveillance-requires CS-1		sub- scription					
PPP-2 Television Station Video Surveillance	public/private partnership-private lead	video surveillance		sell service					
PPP-3 Communications Links	public/private partnership-private lead	backbone; emr. patrol	★						
PPP-4 Traveler Information Systems	public/private partnership-private lead	requires CS-1		local bus. support		co- sponsor	co- spons or		
PPP-5 Adopt-a-VMS Program	public/private partnership-private lead	requires CS-1		local bus. support		co- sponsor	co- spons or		
PPP-6 Colorado Ski Country USA/Tourism Region ITS Task Forces	public/private partnership-private lead				★				



**TABLE IV-8
FINANCING PROGRAM:
FUNDING ARRANGEMENTS, TYPE OF PROJECT, LIKELY FUNDING PARTNERSHIPS**

PROJECT	PRIMARY FUNDING ARRANGEMENTS	TYPE PACKAGE	PRIVATE SECTOR FOR PROFIT		PRIVATE SECTOR NON-PROFIT		GOVERNMENT			
			PRODUCT VENDOR	BUSINESS	TRADE ASSN.	CHAMBER	LOCAL	STATE	FEDERAL	
PPP-7 City & County of Denver/DIA/TOC Information Links	partnership - public lead							★	★	
PUBLIC TRANSPORTATION ALTERNATE MODES										
PTAM-I Summit Stage Transfer Center - ADTS/ATIS Operational Test (ea)	public/private partnership - public lead			★				★		
PTAM-2 Transit Incentives Promotional Program	public/private partnership - private lead			★					★	
PTAM-3 Hogback Multi-Modal Transfer Center Phase II (mt)	public/private partnership			★				★	★	
PTAM-4 Vail/Gypsum Multi-Modal Transit Center	public/private partnership			★				★	★	
PTAM-5 Public Transit System Cooperative Management Program	public/private partnership - private lead			★					★	
PTAM-6 Intelligent Bicycle System	public/private partnership - public lead							★	★	★
PTAM-7 Transit Referral Service	public/private partnership - private lead			★					★	
SAFETY/WARNING										
SW-1 Incident Investigation Sites (ea)	partnership - public/private		★						★	
SW-2 Excessive Speed Warning System (mt)	public								★	
SW-3 Avalanche Detection and Warning System	public								★	



TABLE IV-8
FINANCING PROGRAM :
FUNDING ARRANGEMENTS , TYPE OF PROJECT . LIKELY FUNDING PARTNERSHIPS

PROJECT	PRIMARY FUNDING ARRANGEMENTS	TYPE PACKAGE	PRIVATE SECTOR FOR PROFIT		PRIVATE SECTOR NON-PROFIT		GOVERNMENT		
			PRODUCT VENDOR	BUSINESS	TRADE ASSN.	CHAMBER	LOCAL	STATE	FEDERAL
SW-4 Advanced Technology Roadway Delineation	public							*	
SW-5 Regional Incident Control Centers	public							*	
SW-6 Animal Alert Warning System	public							*	
SW-7 Tunnel Video Surveillance Systems	public							*	
SW-8 Emergency Response (ea) Information System									
TRAFFIC MANAGEMENT/OPERATIONS									
TMO-1 Peak Period Congestion Pricing	public								*
TMO-2 Bus/HOV Lanes	public								*
TMO-3 Automated Reversible Lane Program (mt)	partnership - public/private			*				*	
TMO-4 Recreational Area Peak Return Trip Incentive Program	partnership - private lead			★	★			★	
TRAVELER INFORMATION SYSTEMS									
TIS-1 Georgetown Gusty Wind Sensor/VMS System (ea)	partnership - public lead			★	★				
TIS-2 Ten mile Canyon/Vail Pass/Vail Icy Rd Sensor /VMS Systems (mt)	partnership - public lead			★	★	★	★	★	
TIS-3 Information Kiosk Program	partnership - private lead	needs TOC and PIO			★			★	
TIS-4 573-ROAD Information Service	partnership - public private	need TOCs and PIOs			★			★	
TIS-5 Vail Super-HAR/VMS Program (mt)	partnership - public lead		★			★	★	★	



**TABLE IV-8
FINANCING PROGRAM :
FUNDING ARRANGEMENTS, TYPE OF PROJECT. LIKELY FUNDING PARTNERSHIPS**

PROJECT	PRIMARY FUNDING ARRANGEMENTS	TYPE PACKAGE	PRNATE SECTOR FOR PROFIT		PRNATE SECTOR NON-PROFIT		GOVERNMENT			
			PRODUCT VENDOR	BUSINESS	TRADE ASSN	CHAMBER	LOCAL	STATE	FEDERAL	
TIS-6 In-Vehicle Travel Advisory Demonstration Project	partnership - public/private			*					*	
TIS-7 Road/Weather Map Broadcast Information System	partnership - public/private			*					*	
TIS-8 Idaho Springs Intelligent Rest Area (mt)	partnership - public/private		*	*		*	*	*	*	
TIS-9 Regional Portable VMS Acquisition	partnership - private lead	need II-2 for partnership		*	*		*	*	*	
TIS-10 Recreational Area Live Video Broadcast System	partnership - private lead			*					*	
TIS-11 Link Travel Time HAR/VMS System	partnership - private lead			*					*	
TIS-12 Eisenhower Tunnel Motorist Information System (mt)	partnership - public/private	need II-2 for partnership							*	

. Recommended for funding in the Smart Path Business Plan, 2/95.
 ea = recommended for early action in the I-70 Rural IVHS Corridor Master Plan
 mt = recommended for medium-term action in the I-70 Rural IVHS Corridor Master Plan.

PROJECT-SPECIFIC FINANCE RECOMMENDATIONS

Suggested finance recommendations for the projects contained in the I-70 Rural IVHS Early **Action Executive Summary and Appendix** are detailed and discussed by functional classification. The financing recommendations provide an overview on how these and similar ITS projects can be taken from the concept stage to deployment.

Commercial Vehicle Operations. Commercial vehicles comprise a large portion of the traffic that uses the I-70 West Corridor. CVO include large vehicles that transport goods using the surface transportation system. ITS services included in this category are those that increase productivity, reduce risk of accidents, and reduce costs. They also define methods to ease restrictions while



remaining in compliance with safety regulations and create safer travel corridors, lower shipping costs, and improve CVO efficiency.

ITS applications can contribute to seamless border crossings, safe transport of hazardous materials, vehicle tracking, and information dissemination to the driver and regulatory agencies. These applications include:

- automated roadside safety inspection
- on-board safety monitoring
- electronic purchase of credentials
- real-time communications
- automated mileage/fuel reports/audits
- electronic payment services

The set of CVO projects are listed in Table IV-9 Project descriptions are contained in the **Early Action Projects Executive Summary and Appendix.**

TABLE IV-9 COMMERCIAL VEHICLE OPERATIONS EARLY ACTION ITS PROJECTS	
PROJECT NAME	ESTIMATED COST
cvo-1 Electronic Tag Hazardous Materials Monitoring	Equipment: AVI Sites \$20,000 each GPS Receivers: \$5,000 each Computer System: \$50,000 each
cvo-2 Dumont/Downieville Automated Port of Entry	Capital Cost: \$750,000-\$900,000
cvo-3 Dynamic Truck Warning Operations	Capital Cost: \$500,000 per site
cvo-4 Eisenhower Tunnel Over-Height Vehicle Detectors	Capital Cost: \$200,000

Financing Commercial Vehicle Operations Projects. One project, CVO-1, should be self-sustaining because the user can be identified clearly, can be charged in an efficient manner, and the resulting fee should not hamper commercial activity. The other projects are for the general safety and welfare of the traveling public and, as such, are probably appropriately financed primarily with CDOT revenues. There is an opportunity for private and local government support for minor portions of these projects.

- **CVO-1, Electronic Tag Hazardous Materials Monitoring**, is a system which tags and tracks vehicles carrying hazardous materials; it would improve the administration of an existing regulatory requirement. As such, it is reasonable to expect this program to be self-supporting financially. The State could lend GVS receivers to truck drivers who would return them when exiting the State for a use fee plus refundable down payment in case the instrument is not returned or damaged. To ease cash-flow circumstances, CDOT could arrange a lease-purchase arrangement with the vendor. To function, this project assumes that ports of entry and weigh/check-in stations along I-70 can use these electronic transmitters.
- **CVO-2, Dumont/Downieville Automated Port of Entry**, is a set of technological improvements to the existing port of entry to improve the timing and quality of vehicle and cargo checking. These improvements would enhance private transport efficiency for vehicles conforming to



State requirements and may improve the capture rate of transport violators, A substantial portion of these improvements could be funded with an increase in user fees. For example, if capital costs could be spread over 5 years, then a 3 percent increase in Port of Entry fees for 5 years would fund the capital **costs. This project is included in the Smart Path Business Plan and is recommended for early action in the I-70 Rural IVHS Early Action Projects and Corridor Master Plan.**

- **CVO-3, Dynamic Truck Warning Operations**, is a set of detectors, installed in the pavement along steep downward grades which measure vehicle weight and advise truckers of advisable safe speeds via variable message signs. This project is of general benefit to the traveling public in that it reduces truck-related accidents and is of specific benefit to trucking companies and their drivers. Since there is no way to identify the trucks benefiting from the program, it is difficult to impose a user fee. Since the message is clearly helpful and not punitive, a local chamber of commerce, local government, or local business selling goods or services to truckers, might want to co-sponsor the variable message sign in return for sponsorship recognition on the sign. A FHWA-funded operational test on the west side of the Eisenhower Tunnel is underway. **This project was recommended for funding in the Smart Path Business Plan. The first system has been installed on the downgrade at the west portal of Eisenhower Tunnel.**

- **CVO-4, Eisenhower Tunnel Over-Height Vehicle Detectors**, is a replacement project. New vehicle detectors would decrease maintenance costs associated with the existing outdated equipment, and reduce traffic delays by signaling messages to offending drivers and to other traffic. Similar to CVO-3, this project is of general benefit to the traveling public and is a replacement of an existing system; it is likely that CDOT would need to finance a substantial portion of the project. A portion of CDOT costs would be offset by reductions in maintenance costs associated with outdated equipment. A local chamber of commerce, local government or local business might want to co-sponsor the variable message sign in return for sponsorship recognition on the sign.

Communications Systems. Collection and dissemination of information relies on communications systems to send raw data for processing and transmitting reliable information to the end user. Real-time weather, traffic and road conditions information has value to the traveling public, those considering a trip, resort operators, businesses engaged in commercial transport of goods, road maintenance crews, and others. ITS technologies for sending and receiving data include:

- AM and FM sub-carriers
- cable television
- cellular
- microwave
- land lines (fiber, coax, TWP)
- local area broadcast
- infrared
- spread spectrum
- satellite
- commercial radio/television

Among the 8 communications systems projects, 2 are considered “backbone” projects because they are essential to making many other ITS projects work. The backbone projects include establishment



of regional traffic operations centers (CS-1) and installation of a fiber optics (CS-2). Several relatively low cost projects will likely be funded with public sector funds only. Table IV-10 summarizes the communications systems projects.

TABLE IV-10 COMMUNICATIONS SYSTEMS-EARLY ACTION ITS PROJECTS	
PROJECT NAME	ESTIMATED COST
cs-1 Regional Traffic Operations Centers (TOCs)	Capital Cost: \$200,000-\$800,000 per site
cs-2 High-Capacity Data Transmission Links	\$50 per linear foot
cs-3 Real-Time Road/Weather Information Electronic Relay	\$20,000 per installation
cs-4 Voice/Data Communications Upgrades	\$10,000 to \$20,000 per site
cs-5 Weather Station Centralized Communication Links	\$10,000 per site
cs-6 Corridor-Wide Cellular Telephone Coverage	\$250,000 to \$500,000 per cell
cs-7 HAR Broadcast Messaging System	start-up: \$50,000; Annual: \$5,000
cs-8 Mobile Two-Way Information Communications	start-up: \$50,000; Annual - \$10,000

Financing Communications System Projects. Two of these projects (CS-1 and CS-2) are fundamental to many subsequent projects.

- **CS-1, Regional Traffic Operations Centers (TOC)**, are facilities where data would be aggregated, processed and disseminated to other information-providing systems and where maintenance and emergency response services would be dispatched. Two Traffic Control Centers (TCCs) exist at Hanging Lake and the Eisenhower Tunnel. While CDOT would likely need to assume a lead role in establishing these as regional TOCs, some costs might be recouped by charging private-sector users for collected data. Examples might include radio and television stations. Emergency response services might be able to fund a portion of TOCs for dispatch services, particularly if the TOC is able to replace an existing service.
- **CS-2, High-Capacity Data Transmission Links**, involves the underground installation of cable that can transmit data, audio and video communication. Fiber optic cable has been identified



as the most reliable technology. Earlier in 1995, the Colorado General Assembly amended state statutes to allow private installation in its public right-of-way. The capital cost of installation will likely be born by a private sector vendor who will in-turn charge its users. Several states, including Maryland and New Jersey, have succeeded in facilitating the installation of fiber optic cable and generating revenues or receiving improved communications services for their state. ***This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.***

- ***CS-3, Real-Time Road / Weather Information Electronic Relay***, is a relatively in-expensive display of current information regarding road and weather conditions using variable message signs. It is dependent on CS-1 and is benefitted by CS-2. At \$20,000 per installation, it is reasonable to expect ski areas, cities, chambers of commerce, major resorts, and other local businesses to co-sponsor the installation of ***these*** signs. ***This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan and is recommended for funding in the Smart Path Business Plan.***
- ***CS-4, Voice /Data Upgrades***, are interim improvements in communication between TOCs until a fiber optic system is installed. The equipment would include modems, facsimile and telephones, This is an internal CDOT need which will likely be funded only with CDOT revenues. ***This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.***
- ***CS-5, Weather Station Centralized Communication Links***, is a network of centralized processing units at each TOC which assembles, processes and disseminates information from existing weather stations using whatever communications media is available (twisted copper wire, optic fiber, microwave or RF). The National Weather Service is the primary provider of weather information; they provide their services in four ways. The costs of some services are free while other services, such as NEXRAD, are sold to vendors and re-sold to large television and radio stations. There is an outstanding opportunity for further partnering between the National Weather Service (NWS and CDOT since the NWS wants access to CDOT's observation networks.
- ***CS-6, Corridor- Wide Cellular Telephone Coverage***, involves installation of additional cells to provide complete and continuous coverage along the I-70 corridor. Because this is a regulated private-sector industry, CDOT must rely on the two cellular phone operators (US West and Cellular One) to make these improvements.
- ***CS-7, HAR (Highway Advisory Radio) Broadcast Messaging System***, is a set of standard and customized messages for broadcast over the AM 530 radio frequency. This system assumes the operation of TOCs; the quality and accuracy of the information can be improved as technology is installed. Assuming that Federal Communications Commission (FCC) requirements are met, this program should be self-sustaining via sponsorships which are announced as part of the message.



- **CS-8, Mobile Two-Way Information Communications**, is system of communication between private transit providers that travel the I-70 corridor and TOC operators using two-way radios or cellular telephones. Drivers would report traffic volumes at preset intervals; TOC operators would provide upcoming weather and road condition information to the drivers and would use driver reports to update their data base for broad dissemination. Transit providers should be willing to participate in return for information. Information displaying their sponsorship could be displayed on the vehicle exteriors.
- **CS-9, Hanging Lake Tunnel Control Center**. This project is not included here because it was added to the Early Action Projects list after this evaluation was performed.

Data Collection & Aggregation. Data collection and aggregation projects include the hardware and software necessary to gather information. Methods and technologies include vehicle location systems (sign posts, LORAN, GPS) that use GPS receivers, differential transmitters, and radio voice and data communication technologies. Roadway and weather condition information can be collected through TOCs using inductive loops, closed-circuit television and image processing.

- Data collection sources can include sensors, video surveillance, traffic probes, emergency reporting systems and information systems.
- Data aggregation can be accomplished at a central facility and disseminated to travelers via kiosks, signs, and in-vehicle systems as well as to operating agencies and service providers. Data aggregation tools include software and hardware to collect, categorize and separate data from sources.



**TABLE IV-11
DATA COLLECTION/AGGREGATION SYSTEMS- EARLY ACTION ITS PROJECTS**

PROJECT NAME	ESTIMATED COST
DCA-1 Vehicular Probe Data Collection TOC Aggregation	\$20,000 per vehicle for sensors; \$20,000 per roadside reader \$50,000 algorithm development
DCA-2 Weather / Ice Sensor Data Collection / TOC Aggregation	\$50,000 to \$100,000 per site
DCA3 Video Surveillance Data Collection / TOC Aggregation	\$25,000 per installation
DCA-4 Avalanche Detection Research	\$50,000 to \$500,000
DCA-5 Eisenhower Tunnel Approach Vehicle Detectors	\$75,000 per approach
DCA-6 Basic Data Fusion	\$50,000 to \$250,000

Financing Data Collection & Aggregation Systems. These projects break down into several logical sets for purposes of financing. Most of these projects can be self-sustaining.

- **The Weather and Traffic Project Set** includes DCA-1, vehicular probes, DCA-2, data sensors, and DCA-5, vehicle detectors and the fundamental data interpretation project, DCA-4, avalanche detection research, and DCA-6, basic data infusion. This information package can be sold to broadcast and cable television station, radio stations, the American Automobile Association, "900" telephone services, and to the Federal Aviation Administration on a subscription basis. Communications companies can, in turn defray their costs by selling "sponsorship" of the information service to resort associations, chambers of commerce, and individual businesses.
- The **Video Package** includes DCA-3, video surveillance and DCA-6, basic data infusion. This information package can also be sold to broadcast and cable television stations on a subscription basis.

Education & Training. Most agencies are unfamiliar with or skeptical of advanced technologies and ITS applications as a solution to their transportation problems. Traditional, internal agency procedures are sometimes so ingrained that new technologies cannot be introduced. An internal education program to foster interest in and promotion of ITS is essential if internal acceptance of ITS applications are to be considered.



TABLE IV-12
EDUCATION / TRAINING - EARLY ACTION ITS PROJECTS

PROJECT NAME	ESTIMATED COST
ET-1 Trained Caller Program	start-up-\$75,000; Annual-\$10,000
ET-2 I-70 West Corridor Road Show	Start-Up-\$10,000; Annual-\$5,000
ET-3 Smart Driver / Vehicle Program	\$500,000
ET-4 Traveler Information Community Service Program	Start-Up-\$25,000; Annual-\$10,000
ET-5 Public Acceptance Program	Start-Up-\$50,000-\$75,000; Annual-\$10,000

Financing Education/Training Projects. Four of the five programs are relatively inexpensive to start (\$185,000) and to maintain (\$35,000). They are: ET-1, Trained Caller Program; ET-2, I-70 Corridor Road Show; ET-4, Traveler Information Community Service Program, and; ET-5, Public Acceptance Program. The on-going costs associated with education and training regarding ITS technologies is a logical function for CDOT to fund with its HUTF revenues. Start-up costs might be obtained from vendors whose products are featured in the presentations. Activating these programs provides CDOT an opportunity to build constituencies for ITS among the trucking industry, local governments, private citizens and local civic organizations, and within CDOT. **ET-5 is recommended for finding in the Smart Path Business Plan.**

The fifth relatively expensive program, ET-3, Smart Driver/Vehicle Program, might be financed using these resources. Equipment manufacturers might provide vendor financing or sell their product at a reduced cost in return for recognition as a sponsor; commercial delivery services would likely be willing to have the devices installed at no cost to them. If there was a way to track their vehicles, they might pay for the service.

Emergency Response. Incident management and response is crucial within rural areas due to long travel distances, isolation, inadequate communications and under staffing. Delays or errors in notification of the nature and location of an incident often exacerbate the safety and mobility of other travelers.

ITS technology applications include driver and personal security systems, automated collision notification, and hazardous materials incident notification. Coordination between the Colorado State Patrol, CDOT maintenance crews, local police and fire response units, emergency medical teams, hospitals and other response teams to assist travelers with vehicle breakdowns, accidents and emergency medical services is paramount.



TABLE IV-13
EMERGENCY RESPONSE - EARLY ACTION ITS PROJECTS

PROJECT NAME	ESTIMATED COST
ER-1 Hot Spot Courtesy Patrols	Annual: \$600,000
ER-2 Good Samaritan Reporting System	start up-\$10,000; Annual- \$10,000
ER-3 Corridor-Wide Call Box System	\$5,000 per site
ER-4 MAYDAY Operations	\$25,000 - \$75,000
ER-5 Emergency Services District Program	Start Up-\$25,000; Annual-\$5,000

Financing Emergency Response Projects. This set of projects is relative inexpensive and offer substantial private for-profit and private non-profit participation opportunities because there are profit-making opportunities and because there are clear visible opportunities for advertising and sponsorship.

Several emergency response projects are logically packaged with and dependent on other projects.

- **ER-1, Hot Spot Courtesy Patrols,** is part of the “emergency patrol” project set which also includes legislative change (II-2), Move-it/Remove-It Legislative change (II-3), and communication links (PPP-3). Hot spot courtesy patrols might be co-sponsored by the AAA, cellular or other telephone communications companies, local chambers of commerce and local governments. Local governments might cross-train their staff who volunteer and provide them compensation time in return for service on the hot spot courtesy patrol. Towing services that would like to be called might help finance the operation by paying a fee to become an “official” response unit on a flat monthly basis and/or a per service basis. **This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.**
- **ER-2, the Good Samaritan Reporting System,** is part of the “emergency patrol” project set which also includes public information officer training (II-4), and communication links (PPP3). The only cost requirements are for advertising the program, the cost of the long-distance charges, and the equipment and staff to receive the calls. At a minimum, participating telephone communications companies can be expected to provide toll-free reporting services for free as part of their public service regulatory requirements. Telephone companies may also be willing to help finance the advertising in return for recognition.
- **ER-3, the Corridor-Wide Call Box System,** should be self-sustaining because pay telephones which are used are profitable operations. HB 95-1287 now allows a commercial operation within the public right-of-way. An addition prerequisite is installation of fiber optic cable. **This project**



is recommended for early action in the I-70 Rural IVHS Corridor Master Plan and for finding in the Smart Path Business Plan.

- **ER-4, MAYDAY Operations**, is a system for motorists to call for help if stranded in remote areas. Under a federally-funded operational test grant, 2,000 test vehicles are being equipped with GPS location tracking devices and two-way cellular telephones for reporting problems and automatically determining the vehicle location.
- **ER-5, Emergency Services District Program**, is a program to coordinate all emergency response activities to increase efficiency; it requires primarily staff coordination, once the program is operational. On-going costs might be financed by participating emergency response agencies, such as fire districts. Start-up costs might be born by CDOT.

Environmental/Economic Impacts. ITS technologies can improve existing roadway systems to the benefit of the environment by improving air quality, by reducing idling and stop/start conditions, and avoiding capacity improvements, such as roadway widening. ITS applications such as real-time information dissemination and inter-modal facilities can encourage travelers to delay trips during heavily-congested periods and encourage carpool, rideshare and mass transit use.

ITS applications, such as intelligent rest areas and information centers and multi-modal transit/transfer facilities, can invite regional travelers into rural communities to use local services. Local involvement can create economic development opportunities.

TABLE IV-14	
ENVIRONMENTAL/ECONOMIC IMPACTS -EARLY ACTION ITS PROJECTS	
PROJECT NAME	ESTIMATED COST
EEI-1 Alternate Fueled Vehicles Program	\$5,000-\$7,000 per vehicle
EEI-2 Sensor/Chemical De-Icing Program	Installation: \$40,000 per site Program Development: \$5,000
EEI-3 Sanding/Storm Water Runoff Program	\$35,000 per structure
EEI-4 Economic Development Partnership Program	\$20,000
EEI-5 Mobile Emissions Testing Stations	\$50,000 per station

Financing Environmental /Economic Impact Projects. There is not a significant opportunity for private participation among these projects other than approaching vendors to reduce the cost of their product as a way of demonstrating its utility.



- **EEI-1, Alternate Fuels Vehicle Program**, is a program which can be implemented one company or one agency at a time. For example, the Public Service Company of Colorado has recently funded and implemented where many of their fleet vehicles have been retrofitted to burn less pollutant-emitted fuels. CDOT staff can market the success of this program to other public and private parties, such as county departments of public works, ski companies, and commercial transit services.
- **EEI-2, Sensor/Chemical De-icing** is a program where pavement sensors would be installed at known icing/snow accumulation areas to detect when pavements are nearing freeze/icing conditions.
- **EEI-3, Sanding/Storm Water Runoff** is a program involving the installation of a series of check-dams along the downgrades of I-70 west of the Eisenhower Tunnel to catch and divert roadway runoff. This program will probably be financed by CDOT with the possibility of financial assistance from vendors that want to demonstrate the usefulness of their product to CDOT and other agencies. CDOT might enhance the attractiveness of financing a demonstration project by offering to feature the results in subsequent presentations of ITS technologies.
- **EEI-4, Economic Development Partnership Program**, would establish a forum between local economic development officials and state transportation officials for identifying problems and needs associated with transportation and economic issues. The program can be financed substantially with in-kind contributions of staff time from various agencies.
- **EEI-5, Mobile Emissions Testing Stations**, is a regulatory program. Outside of vendor support, the private sector will not likely want to participate. ***This project is recommended for medium-term action in the I-70 Rural IVHS Corridor Master Plan.***

Institutional Issues. Institutional issues are rules, regulations and procedures that affect how public agencies conduct business. Examples include use of public rights-of-way by the private sector, sole source working relationships between a public agency and a for-profit organization, the competitive bid process, intra-and inter-agency cooperative programs, and intra-and inter-agency communications.



**TABLE IV-15
INSTITUTIONAL ISSUES-EARLY ACTION ITS PROJECTS**

PROJECT NAME	ESTIMATED COST
II-1 Proactive Legislative Change Campaign	\$20,000 to \$40,000
II-2 FCC Rule-Making Permit Process	\$10,000
II-3 MOVE-IT / REMOVE-IT Campaign	\$5,000
II-4 Public Information Officer Training Program	Start Up: \$10,000; Annual-\$5,000
II-5 Corridor Incident Management Plan	\$50,000
II-6 I-70 West Corridor ITS Coalition	Annual: \$5,000-\$10,000
II-7 ITS Implementation Team Regional Task Force	Start-Up: \$5,000; Annual - \$1,000

Financing Institutional Issues Projects. Among these projects, 2 require legislative changes, 2 are new organizations, one involves training and one involves preparation of a plan. Costs associated with these projects are typically commitment of in-kind staff time, not an explicit outlay of funds.

- **The Two projects requiring Legislative Changes** are 11-2, which requires application to the FCC to allow advertising via highway advisory radio and ten-watt transmitters, and 11-3, which would allow moving vehicles from the roadway before law enforcement officers appear on the scene. These require staff support from the Legislative Council's Office, CDOT, the Division of Telecommunications, and the Department of Public Safety. II-1, which involves sole-source contracting and procurement procedures and allowing use of public rights-of-way for commercial use, was accomplished earlier in 1995.
- **The Organizational projects** are 11-6, the I-70 Corridor ITS Coalition, and 11-7, the Regional Task Force. The Coalition would intentionally be funded outside of CDOT, since its primary purpose would to lobby for ITS projects within the corridor. The Task Force would require minimal outlay of cash, but would require staff commitment of public sector agencies.
- **II-4, Public Information Officer Training Program**, is part of the emergency patrol project set. This program would involve the training of existing and possibly additional staff regarding how to operate the advanced technology products and services to be introduced. CDOT would logically provide the training; individual operating agencies could commit their staff, as appropriate.
- **II-5, Corridor Incident Management Plan**, would likely be financed by CDOT with substantial in-kind staff support from local emergency response agencies, such as the State Highway Patrol and local emergency response agencies. This is also part of the emergency patrol project set.



Public/Private Partnerships. Public/private partnerships are potential associations where private sector businesses join with state or local transportation agencies to help design finance, implement, construct, operate and/or maintain improvements that support ITS applications. Examples include installation of hardware to collect and use information that can be sold to the public, financial support to construct and equip infrastructure in return for advertising, and joint use of rights-of-way.

**TABLE IV-16
PUBLIC /PRIVATE PARTNERSHIPS -EARLY ACTION ITS PROJECTS**

PROJECT NAME	ESTIMATED COST
PPP-1 Metro Traffic Control/TOC Real-Time Information Relay	start-up - \$10,000 to \$25,000 Annual - \$5,000 to \$20,000
PPP-2 Television Station Video Surveillance	start-up - \$5,000 to \$20,000 Equipment, per location: \$50,000 Annual: \$25,000
PPP3 Communications Links	Start-Up: \$10,000 to \$25,000 Annual: \$10,000 to \$20,000
PPP-4 Traveler Information Systems	\$10,000 to \$50,000
PPP-5 Adopt-A-VMS Program	Annual: \$5,000
PPP-6 Colorado Ski Country USA / Region ITS Task Forces	Annual: \$5,000
PPP-7 City & County of Denver / DIA / TOC Information Links	\$25,000 to \$50,000

Financing Public/Private Partnerships. This includes a wide variety of projects. With the exception of initial staff time to introduce these concepts, each could be self-sustaining with private sector support.

- **PPP-1, Real Time Information Relay,** would provide traffic, road and weather conditions from I-70 locations outside of the Denver metropolitan area. This project is part of the video surveillance project set and is now possible due to the passage of HB 95-1287. This project could be self-sustaining by selling the service to broadcast television and radio stations. CDOT would retain a contractor to provide aerial surveillance and would transmit this and other information to Traffic Operations Centers, which would, in-turn feed the information to its subscribers.



- **PPP-2, Television Video Surveillance**, would provide video coverage of actual traffic, road and weather conditions from monitors along the I-70 corridor. This service could be coordinated by CDOT and managed by the private sector. A private entity could install cameras and sell the service to broadcast and cable television stations; alternatively, individual stations and networks could install their own equipment if they offered their service to others for a fee. Again, passage of HB 95-1287 now makes this project legally possible.
- **PPP-3, Communication Links**, is the installation and maintenance costs associated with public use of improved technology, including fiber optic cable and cellular services. It is one of several backbone projects which establishes the foundation for a variety of public communications services. It is reasonable that costs associated with these improvements would be born by the companies winning the opportunity to install their communication system within the CDOT rights-of-way.
- **PPP-4, Traveler Information Systems**, are site-specific travel information centers; PPP5, Adopt-A-Variable Message Sign Program, is sign-specific. These are two relatively low cost projects where local governments, local chambers of commerce, resort and reservations systems, local television and radio stations, and other businesses could manage the entire project. The benefits to the sponsors are having visitors stop in their community and use their services.
- **PPP-6, Colorado Ski Country USA / Tourism Region ITS Task Forces**, are partnerships established to explore opportunities to use transportation technology to market to visitors. Costs associated with these task forces would be in-kind commitment of staff CDOT staff could help initiate the task forces and provide technical support.
- **PPP-7, Denver International Airport Travel Operations Center Information Links**, involves establishing an ATIS within Denver International Airport to aid travelers gain information regarding travel along I-70. The facility would be seen by millions of travelers. There is substantial public relations value that can be captured by car rental agencies, commercial transit providers and City & County of Denver. These, plus the technology vendors providing the equipment, are the logical funding partners. The Denver Aviation Fund would be asked, at a minimum, to provide rental space in its terminal at no cost.

Public Transportation/Alternative Modes. Encouraging use of modes other than the single-occupancy vehicle can reduce traffic congestion and environmental impacts. Examples of ITS applications include the following:

- transit vehicles as probes
- information centers for transit
- in-vehicle real-time road advisory systems
- "super" buses
- high-speed mass transit
- advanced intersection traffic control
- rideshare management with real-time matching
- automated fare payments
- inter-modal facilities
- in-vehicle traveler information
- vehicle location systems for schedule matching
- intelligent bicycle/recreational trails



**TABLE IV-17
PUBLIC TRANSPORTATION / ALTERNATIVE MODES-EARLY ACTION ITS PROJECTS**

PROJECT NAME	ESTIMATED COST
PTAM-1 Summit Stage Transfer Center APTS/ATIS Operational Test	\$800,000 to \$1,500,000
PTAM-2 Transit Incentives Promotional Program	Annual: \$25,000 to \$50,000
PTAM-3 Hogback Multi-Modal Transfer Center Phase II	\$750,000 to \$5,000,000
PTAM-4 Vail / Gypsum Multi-Modal Transit Center	\$750,000 to \$1,000,000
PTAM-5 Public Transit System Cooperative Management Program	Start-Up: \$25,000 to \$40,000 Annual: \$10,000
PTAM-6 Intelligent Bicycle System	\$1,500,000 to \$3,500,000
PTAM-7 Transit Referral Service	Start-Up: \$50,000; Annual: \$15,000

Financing Public Transportation/Alternate Modes Projects.

- ✓ *PTAM-1, Summit Stage Transfer Center APTS/ATIS Operational Test, is proposed as an intermodal transfer center designed to accommodate regional trips along I-70 and local trips within Summit County which arrive via single-occupancy vehicles, bus, van, carpool, bicycle and pedestrian modes. Summit Stage, the local transit provider, is working to purchase land for the center. The project will proceed in a phased manner; technological improvements will be added as financing becomes available. This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.*
- ✓ *PTAM-2, Transit Incentives Promotional Program, is best financed by travel agencies, in conjunction with resort and recreation service providers. CDOT might convene meetings to introduce the concept. To "jump start" the program, CDOT might offer a modest challenge or matching funds for innovative promotional programs.*
- ✓ *PTAM-3, Hogback Multi-Modal Transfer Center Operational Test Phase I includes limited facilities such as a telephone booth-style information kiosk, landscaping and lighting and minor improvements to parking and bus staging areas. Phase II would enhance the facility with additional parking and public transportation service accommodations. Phase II improvements are proposed as a partnership with private investors, wherein the private party might lease land from CDOT and manage a range of services including retail, restaurants, resort area ticketing, and shuttle service. This project is recommended for funding in the Smart Path Business Plan.*



- **PTAM-4, Vail/Gypsum Multi-Modal Transit Center**, is a facility similar to the Summit Stage (PTAM-1) and Hogback (PTAM-2) Multi-Modal Transit Centers. Financing concepts discussed for the Summit Stage would apply to the Vail/Gypsum facility.
- **PTAM-5, Public Transit System Cooperative Management Program**, is a concept within which private transit providers could provide superior service and increase ridership through cooperation and improved vehicle tracking devices. CDOT might convene a meeting and provide initial technical advice regarding the merits of the concept and the potential availability of federal or state financial or technical support. It would then be up to potential participants to activate the program. Increased user fees could offset operations costs.
- **PTAM-6, Intelligent Bicycle System**, is a high-technology tolled travel way for high-speed bicycle touring and training, adjacent to a recreational trail. Right-of-way would likely be available from the federal government (BLM or US Forest Service), capital costs might be covered by Colorado Lottery revenues, which will increase due to a reallocation of GOCO funds, On-going operations and maintenance costs might be covered in part by toll revenues and in part by existing local government park and recreation service staff.
- **PTAM-7, Transit Referral Service**, would offer a toll-free call to a voice messaging service which would provide information regarding public transportation service. CDOT or the regional transportation agencies may need to finance the start-up costs. Private transit providers would finance the on-going operations and maintenance by paying a fee for inclusion in the voice messaging service. The user fee could be structured to recoup start-up costs over time.

Safety/Warning. Safety and warning systems can provide critical information in reducing the number and severity of collisions caused by impaired drivers, vehicle component failures, and degraded infrastructure conditions. Advanced technology systems can provide warning about driver, vehicle, infrastructure and environment by monitoring conditions and transmitting information.

TABLE IV-18	
SAFETY / WARNING-EARLY ACTION ITS PROJECTS	
PROJECT NAME	ESTIMATED COST
SW-1 Incident Investigation Sites	\$10,000 to \$50,000 per site
SW-2 Excessive Speed Warning System	\$60,000 per installation
SW-3 Avalanche Detection & Warning System	\$100,000 to \$200,000 per installation
SW-4 Advanced Technology Roadway Delineation	Per Mile: \$10,000; Annual per site: \$5,000
SW-5 Regional Incident Control Centers	\$200,000 per location
SW-6 Animal Alert Warning System	\$500,000
SW-7 Tunnel Video Surveillance Systems	\$100,000 to \$200,000 per site



Financing Safety & Warning Projects.

- **SW-1, Incident Investigation Sites**, are pull-outs from the I-70 roadway which provide a safe refuge to clear vehicles and debris from the travel lanes. Land would be provided by CDOT within its right-of-way; CDOT road maintenance crew could provide maintenance service at little additional charge. These sites could contain a telephone call box, installed by a private vendor at no public cost, since the telephone would be self-sustaining. **This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.**
- **SW-2, Excessive Speed Warning System**, transmits messages to violating vehicles through variable message signs. These facilities could be self-sustaining through the issuance of tickets to traffic speed violators via mail or State Patrol officers. This project is recommended for medium-term action in the Rural I-70 Corridor ITS Plan.
- **SW-3, Avalanche Detection and Warning System**, are advanced-technology devices which would be installed at known high avalanche probability locations with transmitters to regional transportation operations centers subsequent dispatch. Reliable technology is not in place.
- **SW-4, Advanced Technology Roadway Delineation**, is an edge-of-payment lighting system to aid drivers in inclement weather. CDOT will likely select locations for these relatively expensive improvements based on safety characteristics. This is likely to be a CDOT expense with a high public acceptance. **This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.**
- **SW-5, Regional Incident Control Centers**, are “war rooms” within transportation operations centers, designed to detect, dispatch and follow-up on incidents. Other emergency response communications networks need to be in place prior to development of control centers.
- **SW-6, Animal Alert Warning Systems**, sensors would detect objects entering the roadway, provided through variable message signs, for warning motorists. These might be financed in part through variable message sign “sponsorships.” Likely sponsors might include local governments, local chambers of commerce, resort associations, the American Automobile Association and others.
- **SW-7, Tunnel Video Surveillance Systems**, are color cameras and monitors which would improve vehicle identification and incident detection within tunnel bores and along tunnel approaches. This fundamental safety improvement will likely be a CDOT expense. The service is not “visible” to the public and advertising or sponsorships are unlikely.
- **SW-8, Emergency Response Information Systems**, This project is not included here because it was added to the Early Action Projects list after this evaluation was performed.



Traffic Management/Operations. Traffic management and operations applications reduce congestion, improve mobility and increase safety by incorporating changes to the roadway or roadway operations. Some examples of traffic management and operations include:

- transportation demand management to encourage non-peak period travel
- identifying/improving alternative routes
- creating reversible lanes during peak periods
- HOV/bus lanes
- improved signal, ramp metering, sign control

TABLE IV-19 TRAFFIC MANAGEMENT / OPERATIONS-EARLY ACTION ITS PROJECTS	
PROJECT NAME	ESTIMATED COST
TMO-1 Peak Period Congestion Pricing	Per Location:\$2,000,000 to \$5,000,000
TMO-2 Bus/HOV Lanes	\$600,000 per mile
TMO-3 Automated Reversible Lane Program	Equipment: \$3 50,000 Annual, per site: \$20,000 to \$50,000
TMO-4 Recreational Area Peak Return Trip Incentive Program	Annual: \$10,000 to \$20,000

Financing Traffic Management & Operations Projects.

- ***TMO-1, Peak Period Congestion Pricing***, is among the most expensive projects and likely to be among the most controversial because it is contrary to a fundamental premise of the traveling public, interstate highways are free. Since it is punitive or regulatory in nature, it is unlikely that private sector interests will want to visibly co-sponsor the project. Tolls would be intended to influence drive-time decisions but would not be established with the intent to recoup operations and capital costs. Due to the challenges as well as the potential benefits in air quality, the federal government may be more likely to participate in this project than in a number of others.
- ***TMO-2, Bus/HOV Lanes, are also*** quite expensive. Unlike peak period congestion pricing, HOV lanes have a visible benefit to the traveling public. They are typically financed with FTA and regional transit agency funds with minor participation by the State.
- ***TMO-3, Automated Reversible Lane Program Extension***, is less expensive and would likely have very high public acceptance. As such, it is a logical improvement prior to adding a bus/HOV lane and imposing peak period congestion pricing. While the primary financial and management responsibilities are likely to be CDOT, there is opportunity for private sponsorship because the project would be visible and liked. Resort associations, individual resort destinations, the American Automobile Association, and major corporation could co-sponsor



the program in return for recognition on the extensive set of signs necessary to direct traffic. Sponsorship could be sold for a week, a month or a season and could be sold for all or a portion of the 25-mile stretch. ***This project is recommended for medium-term action in the I- 70 Rural IVHS Corridor Master Plan.***

- ***TMO-4, Recreational Area Peak Return Trip Incentive Program***, is a volunteer-based program whereby travelers would be offered incentives in the form of discounted lift tickets, lodging, meals or other recreation service in return for a commitment not to travel during peak times. This program could be self-sustaining, but for a continuing management and marketing effort by CDOT staff.

Traveler Information. Traveler interfaces provide road, weather, traffic, accident and tourist information to the traveling public to improve their trip related decisions. Information may be transmitted through personal computer, telephone, and radio receiver to information centers, signs and in-vehicle communication devices. ITS applications can relate to the roadway, the roadside or the vehicle and can include the following:

- roadside kiosks
- intelligent rest areas
- highway advisory radio
- variable message signs
- in-vehicle navigation and route guidance aids
- road/vehicle communications
- electronic “yellow pages”
- links with tourist/recreation facilities

TABLE IV-20	
TRAVELER INFORMATION SYSTEMS-EARLY ACTION ITS PROJECTS	
PROJECT NAME	ESTIMATED COST
TIS-1 Georgetown Gusty Wind Sensor/VMS System	\$400,000
TIS-2 Tenmile Canyon/Vail Pass/Vail Icy Road Sensor/VMS Svstems	\$300,000
TIS-3 Information Kiosk Program	Per Site: \$50,000 to \$100,000
TIS-4 573-ROAD Information Service	Start-up: \$10,000 to \$15,000 Annual: \$50,000 to \$100,000
TIS-5 Vail Super-HAR/VMS Program	\$300,000
TIS-6 In-Vehicle Travel Advisory Demonstration Project	\$1,000,000
TIS-7 Road/Weather Map Broadcast Information System	\$600,000 to \$800,000
TIS-8 Idaho Springs Intelligent Rest Area	\$850,000 to \$1,500,000
TIS-9 Regional Portable VMS Acquisition	Per Unit: \$40,000 to \$60,000
TIS-10 Recreational Area Live Video Broadcast System	Per Site: \$10,000 to \$25,000
TIS-11 Link Travel Time HAR/VMS System	Per Site: \$150,000 to \$300,000
TIS-12 Eisenhower Tunnel Motorist Information System	\$300,000

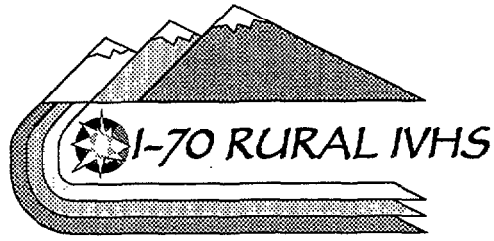


Financing Traveler Information Projects. Many of these projects have a high potential for private participation because they broadcast useful messages to the traveling public.

- **TIS-1, Georgetown Gutsy Wind Sensor/ IVHS System,** would measure and broadcast safe speeds, given high wind conditions. Opportunities to sponsor this program could be marketed to local businesses who serve the traveling public, chambers of commerce, destination resorts, and commercial vehicle operators who want to express concern regarding safe travel. **This project is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.**
- **TIS-2, Tenmile Canyon/Vail Pass/Vail Icy Road Sensor/VMS Systems,** is a program wherein roadway pavement would be instrumented with surface sensors to measure surface and subsurface temperatures for dew, frost, ice, snow, black ice, and chemical composition. Data would be relayed automatically to the traveling public via variable message signage. Due to the visible public benefit, co-sponsorship among ski resorts, local chambers of commerce, and resort towns appear reasonable financing choices. **This project is recommended for medium-term action in the I-70 Rural IVHS Corridor Master Plan.**
- **TIS-3, Information Kiosk Program,** is a set of stand-alone enclosed units to be placed at rest areas and scenic overlooks; these units will provide travelers with road, weather and traffic conditions information. If sponsorship of the kiosk is allowed, then this project should be self-sustaining through local businesses, chambers, governments, and resort associations. A sponsoring organization could finance the improvements and commit to maintaining the facility.
- **TIS-4, 573-ROAD Information Service,** is traffic, road and weather information through voice messaging. This project can be quite cost-effective if used in conjunction with other related projects, such as the Public Information Officers, and the Traffic Operations Centers. On-going costs for this information service can be recouped through sponsorships, "this message is a service of . "
- **TIS-5, Vail Super HAR/VMS Program,** would be a traffic management system which advises motorists where to park and appropriate routing. There are opportunities for private sector involvement because of the opportunity to display sponsorship on the variable message signs, the high volume of travelers that will see the message, whether or not they exit at Vail, and the caliber of national and international attention on Vail. **This is recommended for early action in the I-70 Rural IVHS Corridor Master Plan.**
- **TIS-6, In-Vehicle Travel Advisory Demonstration Project,** is a program where vehicles are outfitted with on-board hazard warning systems and drivers are alerted to pertinent weather and traffic problems. This demonstration project might be co-sponsored by companies using I-70 on a regular basis, such as private transit operators, express package delivery services and Colorado-based businesses that use I-70 for deliveries. The sponsors could use their participation as a selling tool that their deliveries (people and cargo) will be more timely and their travel trips safer due to superior information. The exterior of the vehicles could include a message regarding their sponsorship.



- **TIS-7, Road/Weather Broadcast Information System**, provides visual images of road and weather conditions for broadcast over television stations. It requires the installation of roadway and roadside sensors and detectors plus a geographic information system. One straightforward financing approach would include the sale of a video feed from CDOT to broadcast and cable television stations.
- **TIS-8, Idaho Springs Intelligent Rest Area**, would incorporate an ATIS feature which provides real-time traveler information and advisories. Private sponsorship of the capital facility and on-going maintenance and operations could be from the local business community, Clear Creek County, destination resorts, or the American Automobile Association. **This project is recommended for medium-term action in the I-70 Rural IVHS Corridor Master Plan.**
- **TIS-9, Regional Portable Variable Message Sign Acquisition**, would be positioned at recurrent trouble spots and construction/maintenance activity zones. A variety of businesses related to safe travel might be logical sponsors if their sponsorship were visible on the sign.
- **TIS-10, Recreational Area Live Video Broadcast System**, is a relatively expensive program which would provide live broadcast to monitors at locations visible to travelers, such as ski areas and resort lodges; travelers could determine when to begin their trip based on viewing the monitor. Likely sponsors would be the ski areas or lodges offering the service.
- **TIS-11, Link Travel Time HAR/INHS System**, provides real-time information on travel times, based on traffic counts and weather conditions; the signs would be placed at travel origins, such as ski areas, and key locations along I-70. Private sponsors could locate this useful service in their facility.
- **TIS-12, Eisenhower Tunnel Motorist Information System**, would be installed prior to and over the portal entrances of the Tunnel. Similar to TIS-9, businesses related to safe travel might be logical sponsors if their sponsorship were visible on **the sign**. **This project is recommended for medium-term action in the I-70 Rural IVHS Corridor Master Plan.**



BUSINESS PLAN AND

**APPENDIX A
PUBLIC/PRIVATE
PARTNERSHIP CASE STUDY**

Case Study of I-70 Rural ITS Summit Stage Transfer Center Colorado

Executive Summary

A public-private partnership has been formed to carry out the Summit Stage Intermodal Transfer Project, which is currently in the planning process. The transfer terminal has been recognized as a public need that would allow the regional bus system to better service the area's residents and tourists. The project features an ITS component involving an Advanced Traveler Information System and an Advanced Public Transportation System.

The project's success to this point is closely related to the CDOT's support and interest gained by the partnership. Another key is the regular meetings of the members of the partnership. A current issue facing the partnership involves the conditional use of property for the transfer facility only, and is not directly tied to the functioning of the partnership itself.

1. Project Information

A. Project Description

Summit Stage, the public transportation operator for Summit County, operates a hub-and-spoke, fixed-route, year-round bus system serving the Breckenridge, Copper Mountain, and Keystone resort areas and the towns of Breckenridge, Dillon, Frisco, and Silverthorne. The service is provided to any resident or visitor to Summit County, with no fare collected. Operational costs are borne by a local option 1/2 percent sales tax.

The system offers a chance to test and evaluate the integration of an Advanced Public Transportation System (APTS) with an Advanced Traveler Information Systems (ATE) which serves the eastern segment of the I-70 corridor (Summit County to Denver). The project involves development of an intermodal transfer center in the Frisco area, designed to accommodate regional trips along I-70 and local in-county trips. This facility is planned for a location near I-70 at the entrance to Frisco.

Summit Stage is currently building a operating and maintenance facility, also near Frisco, which does not involve a partnership.

B. Modes included

- bus
- intercity bus
- express bus for ski resorts
- carp001
- vanpool
- s o v
- bicycle
- pedestrian
- park and ride
- airport shuttle

C. Total Cost of Project/Cost-Sharing Arrangements

\$1.75 million currently budgeted for the Phase I, including the following:

- \$750,000 funded entirely by local funds (1/2 percent sales tax)
- \$1 million funding through CDOT

The innovative feature was the State enabling legislation in 1990 that currently provides \$1.8 to \$2.0 million per year in operating funds from sales tax revenue.

D. Current Status of the Project

Summit Stage has just closed on the property on which the multimodal facility is currently planned. They are currently negotiating with the Town of Frisco for the necessary permits to construct the facility. The Frisco Planning Commission has recently recommended to the Town Council that a Conditional Use Permit be granted for the particular site. The Council has yet to act on the recommendation pending resubmittal of the development application.

Concurrently, the District Office of the Colorado Department of Transportation (CDOT) is interested in early implementation of the ITS component in order to use the \$1 million windfall capital funds before the expenditure deadline. CDOT and DeLeuw, Cather also see phase one of the project as an opportunity to implement ITS technologies such as a basic traveler information kiosk and GPS locators on Resort Express buses.

E. Future Plans for the Project

Summit Stage is planning to improve the overall service, based on the additional capability the multimodal facility will offer. The following examples are in the conceptual stage at this time and there are **no** specific plans. The center could serve as a car rental hub and intercitybus transfer point. The opportunity exists for Resort Express buses and other express bus services from Denver to use the facility. The Summit County Chamber of Commerce is also considering making the facility a visitor information center.

An evaluation program is to be developed for the ITS Operational Test. This project could include ATIS/APTS integration from Denver to Grand Junction, on the western border of Colorado, along the I-70 corridor.

Included in the technologies will be electronic information kiosks that can be accessed from commercial or passenger vehicles.

A very long range possibility would be to add passenger rail service either on an existing rail line or using the I-70 right-of-way.

II. Partnership Description

A. Steps in Developing the Partnership

In the 1980's, Summit Stage provided access to ski resorts in the county. "Ski the Summit" was a privately funded organization funded by the resorts to develop a public relations program. The county and towns wanted the Stage to provide service to town and county residents as well as to tourists. Operational support was added when the Colorado legislature provided authority to counties and municipalities to levy the local option sales tax specifically for transit. Summit County voters approved the additional 1/2 percent tax through a referendum.

Amy Ostrander, who had experience as a manager in the Public Utilities Commission in Colorado, became director of Summit Stage in 1992. A Board of Directors ("transit board") was appointed by the County Commissioners representing the towns, the resorts, and the public. Concurrent with the formation of the transit board, CDOT District 1 was formulating plans for an ITS rural corridor project along the entire length of I-70 from Denver to Grand Junction. When Summit Stage and CDOT recognized the need for a multimodal transfer facility, and the funding for operations of the system reached a level of stability, the Stage initiated the formation of a partnership to plan and build the facility.

5. Partners: Roles and Responsibilities

The following are the roles and responsibilities of the members of the partnership:

- Summit County — County Commissioners provide political support and oversight and are the official approval authority of recommendations presented by Summit Stage. It assures that public interest is represented in the implementation of plans and programs of the Stage.

Colorado - Summit Stage Transfer Center

- Summit Stage — A county agency, whose Board of Directors (11 persons, including 4 towns, 3 resorts, 3 public members, and the Summit County Manager) provide approvals of operating policies and plans and oversee funds. The Board is appointed by the County Commissioners. To the director of the system, the Board is a community coalition since it represents both public and private interests.
- CDOT Regional Transportation Office — Interest in construction and maintenance; responsible for administration of the one-time “windfall” funds for transportation projects across the state (\$75 million statewide).
- DeLeuw, Cather and Company, a private engineering firm — Consultant to CDOT; facilitates the partnership by assisting in the grantsmanship function for ITS funding; brings ITS technology options to the project as a future extension.
- FHWA — Incremental funding of ITS improvements, which is seen as an important element of the future system.
- Summit County School District — Original landowner that provided property for the development of the multimodal facility.

C. Person/Organization Most Responsible for Development of the Partnership

- Amy Ostrander, Summit Stage
- John Unbewust, CDOT Region 1 Transportation Director

D. Person/Organization Most Responsible for Maintenance of the Partnership

- Joe Sands, County Commissioner
- Barbara Schroeder, DeLeuw, Cather and Company (facilitator of the ITS component)

E. Organizations Indirectly Involved in the Partnership

The following is a list of the organizations indirectly involved in the partnership.

Colorado - Summit Stage Transfer Center

- Felsburg Holt & Ullebig, a private engineering firm — Transfer Facility Evaluation and Facility Development Plan, Transportation Development Plan Update 1995 - 1999
- Private Transit Operators (Resort Express) — Unlikely to have future direct involvement in the partnership
- Vans to Breckenridge -have requested space in the facility.
- FTA -Funding of projects through Section 16(b)(2)
- CDOT planning unit — Planning responsibility for highways and transit.
- Ski/resort-area operators — Operate their own internal transit/circulation systems; also possible future user of the multimodal facility
- ☪ Summit County Chamber of Commerce
- Denver International Airport
- Local press in Summit County — Have provided good coverage of the project and its progress

F. Organizations That Should Be Officially Involved

Those that should be officially involved:

- All area Chambers of Commerce
- Colorado Ski Country USA
- Ski resorts
- Planning - CDOT Central Office
- Denver International Airport
- City and County of Denver
- Clear Creek, Jefferson, and Park Counties

III. Partnership Evaluation

A. Motivation Behind Formation of Partnership

The following is a list of the motivations of motivations behind the formation of the partnership.

- To build a multimodal transfer facility that would serve multiple purposes for the community and be able to operate and expand the facility
- To provide the core infrastructure investment for the Summit Stage system
- To provide an equitable service to all county residents, and all visitors (including the towns)

B. Goals of the Partnership

The following are the goals of the partnership:

- Development, funding, and operation of a rural transportation system
- Development of a multimodal transit center
- Improve the communication system
- Environmental goals, such as air quality improvement
- APTS/ATIS integration (in a later phase)
- Integration of all local transit systems
- Keep flexibility and focus for future improvements and expansions of the system
- Keep the partnership together to resolve future issues and transportation needs in the county

C. Success in achieving goals

Even with considerable problems facing the partnership in the past and present, the overall project to date is considered very successful by the Director. The Town of Frisco recognizes a public need for the facility, but has significant concerns for the project's technical issues. CDOT sees the potential of the project as being very successful in improving communications and transportation along the I-70 corridor.

D. Legal Issues

State Legislation contains a requirement that funds must be used for project construction within a specific time frame.

E. Technical Issues

The following are the technical issues which were encountered in the partnership:

- Commercial Development Permit and Conditional Use Permit; a copy of the overall site plan showing the location of adjacent wetlands is shown in the Appendix.
- All site development components (e.g. layout, placement, phasing, ADA standards, etc.)
- Funding
- Communications system improvements
- ITS technical components
- Consideration of the intermodal transfer facility's role in the overall corridor transportation system

F. Institutional Issues

The following are institutional issues that were encountered in the partnership:

- Land use -whether to use the property for transfer facility (public use) or for commercial expansion projects, which would add to the tax base.
- A multimodal facility has been included in the town's master plan for several years, but without a specific location approved at the present time.
- The school board took 18 months to determine that the buyer of the property at the chosen location could be the County and Summit Stage (lengthy negotiations).

Colorado - Summit Stage Transfer Center

- CDOT is using this project as a means of improving its public image (from traditional “highway” approach to multimodal approach).

G. Barriers to Forming and Maintaining the Partnership That Were Overcome

One barrier was the traditional approach to solving the capacity problem, which is building more lanes.

H. Barriers That Were Not Overcome

The following are barriers which were not overcome in the partnership:

- CDOT feels that it is not actively involved.
- The town planner for Frisco does not consider the town a partner in the Summit Stage operation or in the development of the multimodal facility; instead, she sees Summit Stage as “another developer coming to Frisco.”
- There is incomplete communication on important issues from the Town of Frisco to the Summit Stage.
- Coordination of independent carriers such as Resort Express and Vans to Vail.

I. Favorable Outcomes of the Project

The following outcomes were not anticipated but are seen as a direct result of the partnership’s efforts:

- Additional \$1 million funding from CDOT as a windfall, one-time project
- Incremental funding from CDOT
- School district providing land on which to develop the facility

J. Unfavorable Outcomes of the Project

None were identified.

K. Changes Needed in the Partnership Arrangement

The following are changes in the partnership arrangement that would have increased favorable outcomes:

- The transit operator has considered some type of alternate dispute resolution process with the town and commercial interests involved.
- There should be more regular meetings for Summit Stage and CDOT.
- A more intensive campaign may have resulted in an increased understanding of the project and the benefits to the town and to local commercial interests.
- ☞ CDOT needs to have an increasingly stronger role in the partnership.

☞ *Applications of Techniques/Elements of the Partnership Arrangement*

None were identified.

M. Keys to the Success of this Partnership

The following are keys to the success of the partnership:

- The facility is a needed public service because of the increase in tourism in the county, a reflection of growth in Summit County in general.
- An environmentally sensitive community sees the project as positive, and this helps to promote the service.
- The system is seen as a positive element in helping to relieve traffic congestion in the towns and resort areas.
- There has been a widespread acceptance of advanced technology ideas for the project, and the recognition that they do have potential to help solve the areas traffic problems.
- Expanding transit service and subsequent expected increases in ridership of the Summit Stage is seen as relieving funding pressures to widen Colorado Route 9 between Frisco and Breckenridge.

Colorado - Summit Stage Transfer Center

- Members of the partnership meet on a regular basis.
- There has been complete support from CDOT for the project, especially in the ITS component.

IV. Follow-up Information

A. Continuing or One-Time Partnership Arrangement

Continuing.

B. Documentation on Project

- Corridor Planning and Feasibility Analysis, by DeLeuw, Cather Company, for CDOT.
- Summit Daily News article, August 4, 1995.
- Rocky Mountain News articles, May 5, 1995.

Key Contacts

- Amy Ostrander, Director, Summit Stage, P. O. Box 68, Breckenridge, Colorado 80424; (790) 453-1339, FAX (790) 453-1241
- ☞ Barbara Schroeder, Business Development Manager, DeLeuw, Cather And Company, 1700 Broadway, Suite 1016, Denver, Colorado 80290; (303) 863-7900, FAX (303) 863-7110

NCHRP Project 8-32(4)

Case Study Report

Project: I-70 Rural IVHS, Summit Stage Transfer Center
Colorado

File: 46

Type of Partnership: public-private-commuuity

Interviewer(s): Dr. Edd Hauser
Ms. Amy Breese

Interviewees:

Amy Ostrander, Director
Richard J. Burns, Supervisor
Summit Stage
P.O. Box 68
Breckenridge, CO 80424
790/453-1339
790/453-1241 (fax)
Date: 8/9/95

Amy Ito, Community Development
Town of Frisco
P.O. Box 4100
Town Hall, 1st and Main
Frisco, Colorado 80443
(303) 668-5276
(303) 668-0677 (fax)
Date: 8- 1 0-95

Barbara Schroeder
Business Development Manager
DeLeuw, Cather, and Company
1700 Broadway, Suite 10 16
Denver, CO 80290
(303) 863-7900
(303) 863-7110 (fax)
Date: 8- 1 1-95

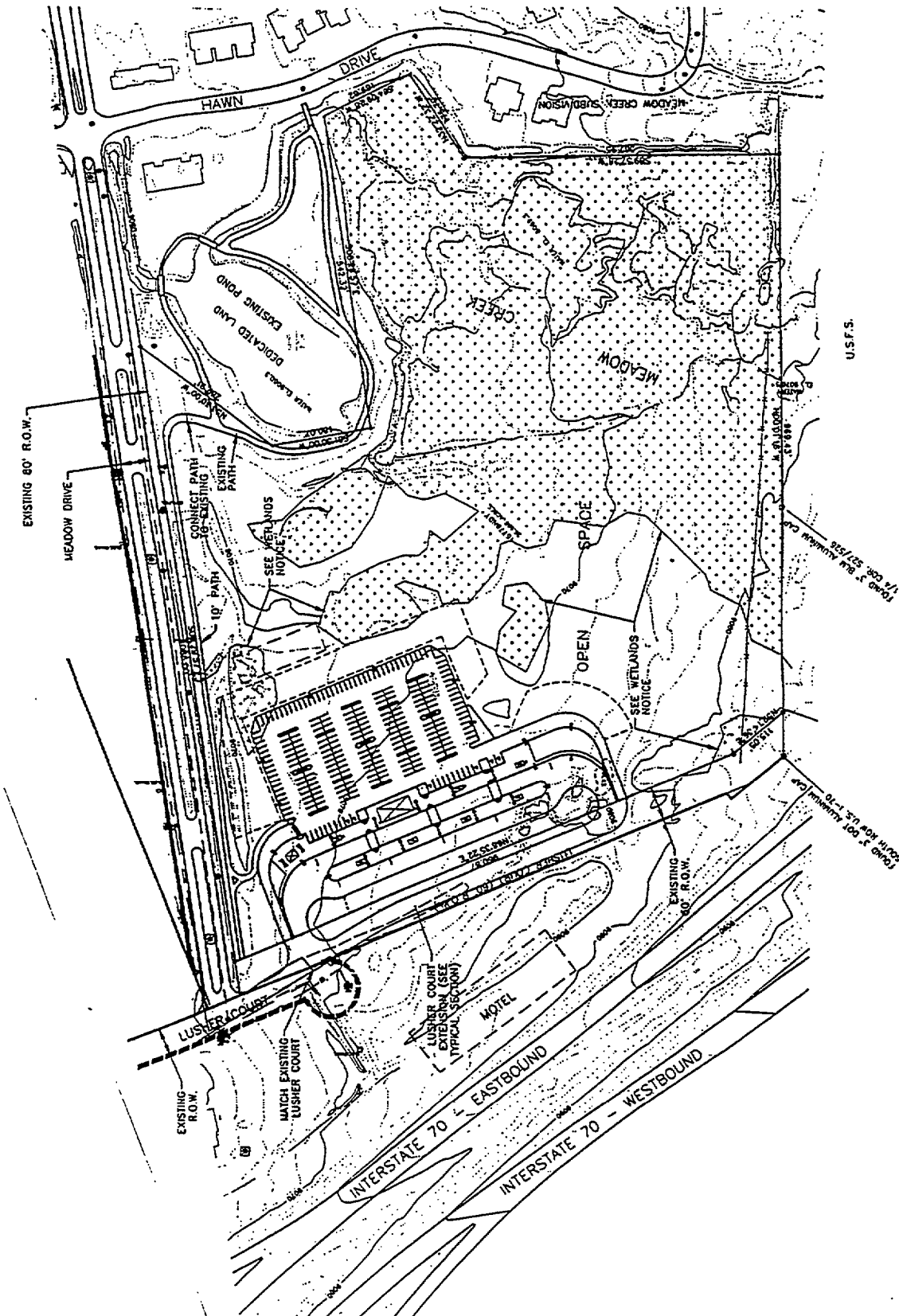
Phone interviewees:

Jay Ufer, President
Resort Express
Post Office Box 1429
Silverthorne, Colorado 80498
(303) 468-0330
Date: 8-1 5-95

Terry Tiehen
Colorado Department of Regional Transportation
18500 Dart Colfax
Aurora, Colorado 80011
(303) 757-965 1
(303)343-0596 (fax)
Date: 8-1 5-95

Joe Sands
County Commissioner
Post Office Box 68
Breckenridge, Colorado 80429
(970)453-2561-352
Date: 8-1 8-95

Note: This case study report was prepared based on personal interviews with the persons indicated. Although it is intended to represent their ideas and opinions, responsibility for how those ideas and opinions have been interpreted and recorded remains solely with the authors.



WETLANDS NOTICE:
 EXACT LOCATION AND LIMITS OF WETLANDS AS SHOWN - SUBJECT TO FURTHER ANALYSIS.
 FINAL LOCATION AND AMOUNT TO BE SET AFTER FINAL ANALYSIS IS COMPLETE.
 ALL FEDERAL WETLANDS REGULATIONS TO BE OBSERVED.

**FELSBURG
 HOLT &
 ULLEVIG**

SUMMIT STAGE TRANSFER CENTER	
OVERALL SITE PLAN	
DATE: ...	PROJECT NO: ...
DATE: ...	DESIGNED BY: ...
DATE: ...	DRAWN BY: ...
DATE: ...	SHEET NO: ...