Communications

Because the ITS field devices and the transportation agencies involved are spread over a broad area, a communications system is required to tie the operations together and allow agencies to communicate with each other.

CDOT ITS has maintained the Metrowide Fiber Network, a loop of fiber cable that connects the traffic management centers, allowing the distribution of CCTV video feeds and other data to transportation agencies within the region. T-REX constructed a companion fiber communications system to connect both the existing and the new ITS field devices to the CDOT traffic operations center. The network also connects the traffic operations centers of the several transportation agencies within the region, providing the infrastructure to develop a regional approach to traffic management.

Traffic Management Center

Except for the ramp metering system, all of the intelligent transportation systems installed and expanded by the T-REX Project are monitored and controlled from the CDOT traffic operations center. The ramp meter system is operated by CDOT Region 6, which is connected directly to the traffic operations center.

The traffic operations center is staffed 24 hours a day, seven days a week allowing both T-REX and CDOT to manage traffic within and near the project area during construction. Courtesy patrol dispatch and incident management response are also coordinated out of this center by Southeast Corridor Constructors, the T-REX contractor.

TRANSIT APPLICATIONS

The T-REX project also includes ITS applications directed toward light rail and bus passengers as well. The three ITS systems that will be implemented in late 2006 are:

- Parking Management System: this system will monitor and display information on availability of parking space at major light rail park-n-Ride facilities.
- Platform Traveler Information System: this system will provide transit passengers real-time light rail and bus departure/arrival times. See the example below.
- Transit Signal Priority: this system coordinates signal operations near light rail stations to give preference to buses leaving the stations.

THE TIME IS 7:10
A TRAIN TO MINERAL IN 3 MIN
INTRODUCTION TO ITS

Intelligent Transportation Systems, commonly called ITS, is the application of advanced technology for transportation. Technology has been commonly used in transportation for the last several decades to both enhance operations and safety. An excellent example of this is the application of technology to traffic signals. These devices are now computer-controlled systems that safely promote traffic flow at an intersection. In the last few decades, technology applications have advanced and are often used to improve the efficiency of the transportation network. Other commonly used systems are:

- Ramp metering - that control access to freeways to improve traffic flow on the freeway
- Traveler information systems - systems that allow transportation agencies to disseminate information regarding upcoming traffic conditions

The Colorado Department of Transportation (CDOT) operated and maintained some ITS applications in the project area before the start of T-REX. This included a traveler information system involving dynamic message signs (DMS) and highway advisory radio (HAR). These devices broadcast traveler information regarding major events impacting traffic conditions. In addition, CDOT uses surveillance cameras at select locations to provide CDOT staff a view of traffic conditions. For the past 11 years, CDOT has maintained a traffic operations center that monitors traffic conditions, controls the traveler information systems and assists in the response to incidents.

ITS Planning on T-REX

In the planning stages of the T-REX project, a framework and concept for the deployment of ITS applications were incorporated into the project. The purpose of ITS as part of T-REX construction is twofold. First, ITS applications serve as tools to mitigate congestion created by T-REX construction. Second, this major construction project is an opportunity to more cost-effectively expand the scope of the existing intelligent transportation systems. There are five goals for ITS in the T-REX project:

1. Increase Data Gathering and Surveillance: this goal increases the scope of the transportation network surveillance. During construction, this surveillance assists in determining traffic conditions both within the project area and the surrounding traffic network. This network surveillance provides transportation agencies a real-time view of the status of the transportation network, which is used to support the other ITS goals below.
2. Enhance Incident Management: this goal provides the infrastructure and services to enhance CDOT’s ability to identify and respond to incident conditions in the region.
3. Provide Corridor System Management: closely linked with network surveillance and incident management, this goal provides the infrastructure to implement coordinated corridor traffic control and management strategies.
4. Increase Traveler Information Dissemination: this goal provides the infrastructure and devices required to disseminate information to the traveling public. An informed traveling public benefits as it can make both pre-trip and en-route decisions to improve its driving experience.
5. Provide Integration Between Agencies: this goal provides the infrastructure that connects transportation systems across jurisdictions, sectors and modal boundaries. This integration allows data sharing and coordinated control and incident response across jurisdictions.

T-REX INTELLIGENT TRANSPORTATION APPLICATIONS

Ramp Metering

Before T-REX, CDOT Region 6, responsible for state highways and the interstates in metro Denver, operated and maintained a ramp metering system in the project area. The system controlled northbound freeway access from the ramps during peak hours.

Early in the project, T-REX expanded the system to include all freeway ramps northbound and southbound, within the project area along I-25 and I-225. Ramp-metering operations are maintained during all construction phases, relocating ramp-metering equipment as necessary. Early deployment of ramp metering has allowed T-REX to effectively manage and maintain traffic flow on the freeway during construction.

Closed-Circuit Television Cameras

CDOT ITS operated and maintained several closed circuit television (CCTV) cameras at select locations within the project area before T-REX construction began.

Early in the project, a number of additional cameras were installed in the region. The added cameras allow T-REX to monitor regional traffic conditions during construction. The cameras will continue to benefit travelers after the project is complete. The camera images are also available to other agencies and the news media.

Dynamic Message Signs

T-REX is installing several new dynamic message signs (DMS) within both the project area and within the region. The DMS on the interstates will expand the existing network of DMS used by CDOT. The regional DMS were installed to support multi-jurisdictional incident management plans developed for the T-REX project.

Freeway and Arterial Vehicle Detection Systems

Using non-intrusive technologies, T-REX installed vehicle detection systems to monitor traffic both on the freeway and on major arterials in the region. Traffic data collected by these systems helps the traffic operations staff monitor and manage regional traffic during construction. This traffic data, including observed average speeds and observed congestion classification, is also shared with the traveling public through the media, the project’s web site and through an e-mail notification system.