



## INTRODUCTION

Intelligent Transportation Systems (ITS) is the application of electronics, communications or information processing, used singly or in combination, to improve the efficiency or safety of a surface transportation system. ITS can connect vehicles, travelers and highways, helping to improve the travel experience by providing information such as roadway congestion locations, accidents, construction delays, optimum routing, weather conditions, and traveler information. The application of ITS projects can often provide a more cost-effective impact on congestion and safety when compared with roadway expansion.

According to the Federal Highway Administration Final Rule (23CFR 940), all federally-funded ITS projects are required to conform to a Regional ITS Architecture that meets all requirements of the National ITS Architecture. ITS and transportation planning must be consistent. OKI's Regional ITS Architecture is contained in the 2012 report, OKI ITS Architecture Update and Strategic Plan (OKI ITS Plan). The ITS Architecture identifies stakeholders and existing ITS elements in the region. It represents a shared vision of how each agency's systems will work together in the future, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the region. The Strategic Plan lists future ITS projects and estimates the timing of implementation and project cost. OKI's ITS Plan is updated every four years, concurrent with the update of this Regional Transportation Plan. The ITS Plan guides OKI and its member agencies in planning, programming and implementing integrated multi-modal ITS over the next 10 years.

## ITS COMPONENTS

An ITS plan is comprised of one or more technology systems depending on a metropolitan area's needs. The OKI ITS Plan documents each stakeholder's current and future roles and responsibilities in the operation of the regional ITS systems across a range of transportation services. There are eight services covered as part of the architecture.

### Traffic Management

Traffic management involves arterial and freeway traffic control, traffic monitoring, incident management and the coordination of the roadway system with railroad operations. Incident management is the operation of systems to provide rapid and effective response to traffic incidents including systems to detect and verify incidents, along with coordinated agency response to the incidents.



### Public Transportation

The use of technology to improve public transportation operations includes electronic fare collection and fare management, as well as real-time transit information.



### Traveler Information

Traveler information is the operation of systems to provide emergency call taking, public safety dispatch and emergency operations centers. It can also provide travel information to the public via television, radio, internet, mobile device or in-vehicle systems.



### Emergency Management

Emergency management involves disaster response and recovery.



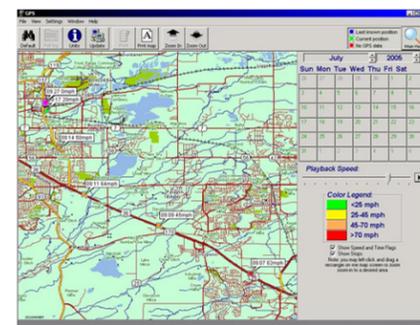
### Maintenance and Construction Management

Maintenance and construction management is the operation of systems to manage the maintenance of roadways in the region, including snow and ice clearance. Maintenance and construction management includes the managing of construction operations.



### Archived Data management

Archived data management is utilized for transportation planning and can involve traffic counters as well as speed and travel time data collection.



### Archived Data Management

Archived data management is the operation of systems to collect transportation data for use in non-operational purposes such as planning and research.



### Commercial Vehicle Operations

Commercial vehicle operations is the development of systems to administer permits, check credentials and safety information, and enforce commercial vehicle regulations throughout the state so as to make it safer to operate a private or commercial vehicle on the state roadways.

## EXISTING ITS ELEMENTS

The most extensive system of ITS technologies in the OKI region is the Advanced Regional Traffic Interactive Management and Information System (ARTIMIS). ARTIMIS evolved from OKI's interest in reducing congestion from interstate reconstruction and its potential to optimize freeway system efficiency, improve safety and benefit air quality. ARTIMIS was initiated by OKI's completion of a feasibility study in 1988, followed by a preliminary engineering design in 1991. Through the teamwork of OKI, the Kentucky Transportation Cabinet (KYTC), the Ohio Department of Transportation (ODOT) and local governments, ARTIMIS was designed to provide consolidated traffic management without regard to state and local political boundaries. When it came fully on line in early 1998, ARTIMIS became one of the first ITS in the country to provide seamless freeway traffic management across state borders. Components of ARTIMIS include freeway control, incident management, traveler information and archive data management. ARTIMIS covers 98 miles of the region's freeway system with the heaviest traffic.

In 2012, the downtown Cincinnati ARTIMIS traffic control center is scheduled to close. The functions of ARTIMIS will be relocated to ODOT's "Buckeye Traffic" control center located in Columbus, Ohio. The control center is the point from which traveler information is disseminated and traffic is managed. Traffic controllers will continue to receive local traffic conditions from existing pavement sensors, monitoring stations and traffic cameras. KYTC will continue to partner with ODOT to fund operation of the control center and maintain all existing ARTIMIS services to Boone, Campbell and Kenton counties.

ARTIMIS expedites the relay of information on incident occurrence, cause and location to those involved in emergency response such as 911 dispatchers, police and fire departments, paramedics, towing services, and emergency management services. To further expedite incident response and removal, the incident response program includes a freeway service patrol that provides gas, minor repairs or other assistance to disabled vehicles.

ARTIMIS provides traveler information on up to the minute traffic problems through a combination of changeable message signs strategically located throughout the system, a highway advisory radio frequency, the Buckeye Traffic web site ([www.buckeyetraffic.org](http://www.buckeyetraffic.org)) and a traveler advisory "511" telephone service that can be accessed anywhere in the region.

In addition to ARTIMIS, several other ITS technologies are already in place in the region. These include the city of Cincinnati's traffic control center, automated public transit vehicle location systems and advanced fare boxes, the city of Cincinnati/Hamilton County Regional Operations Center which coordinates special event monitoring and disaster response, and ramp metering on I-74 in Hamilton County. Clermont County's ITS and traffic operations center is scheduled to begin in 2014.

## RECOMMENDATIONS FOR ITS

As freeway traffic continues to increase, ITS infrastructure will become increasingly important for reducing congestion and maximizing the efficiency of the transportation system. As part of OKI's ITS Plan, a list of needed ITS projects with estimated costs was compiled through several stakeholder interviews and workshops. Figure 11-1 lists several key projects. The estimated cost of these key ITS projects is nearly \$16 million. Additional needed ITS projects can be found in the OKI ITS Plan.

Figure 11-1: Key ITS Projects

| Project  | Cost        |
|--|-------------|
| Traveler information for Cincinnati parking facilities – Variable Message Sign, mobile or on-board notifications | \$1,250,000 |
| Transit Automated Vehicle Locator system   | \$450,000   |
| Work zone safety improvements  | \$75,000    |
| I-75 and I-471 ramp metering   | \$6,000,000 |
| Bus signal priority along key transit corridors  | \$800,000   |
| Emergency vehicle signal priority  | \$800,000   |
| Increase service patrols   | \$1,600,000 |
| Transit vehicle updates including electronic fare boxes and real-time passenger count                            | \$3,000,000 |
| Additional ARTIMIS message signs (I-74, I-275 and SR 32)   | \$1,650,000 |

Source: 2012 OKI ITS Architecture Update and Strategic Plan.

The total cost for all needed ITS projects in the region is about \$102 million (Figure 11-2). Further study is needed to address such issues as specific infrastructure needs, phasing, deployment procedures and more refined cost estimates. Operating and maintenance costs for the needed ITS projects are estimated at \$5 million per year. This 2040 Regional Transportation Plan recommends reserving nearly \$64 million for ITS projects. Any ITS project that conforms to the OKI ITS Plan and meets fiscal and air quality constraint requirements of this 2040 Regional Transportation Plan may be eligible for federal funding.

Figure 11-2: Total Cost Estimates for ITS Projects (includes operation and maintenance)

| Identification Number | County                             | Project Name                        | Description   | Recommended Cost Estimate | Needs Cost Estimate |
|-----------------------|------------------------------------|-------------------------------------|---|---------------------------|---------------------|
| 109                   | Butler, Clermont, Hamilton, Warren | Ohio ITS Projects                   | Implement OKI ITS Plan recommendations in Ohio  | \$46,500,000              | \$79,610,000        |
| 522                   | Boone, Campbell, Kenton            | Kentucky ITS Projects               | Implement OKI ITS Plan recommendations in Kentucky  | \$15,640,000              | \$19,423,000        |
| 805                   | Dearborn                           | I-74 Eastbound ARTIMIS Message Sign | Construct large, dynamic, truss-mounted message sign to alert traffic approaching I-275 before the SR 1 interchange of congestion/safety emergencies and alternate routes | \$550,000                 | n/a                 |

| Identification Number | County   | Project Name         | Description                                       | Recommended Cost Estimate | Needs Cost Estimate |
|-----------------------|----------|----------------------|---|---------------------------|---------------------|
| 809                   | Dearborn | Indiana ITS Projects | Implement OKI ITS Plan recommendations in Indiana | \$1,600,000               | \$3,000,000         |

*Source: 2012 OKI ITS Architecture Update and Strategic Plan.*

## SUMMARY

The optimization and expansion of ITS is an important strategy for managing congestion, while improving safety and security of the region's transportation network. Rapid advances in technology will continue to alter the ITS tools available and the OKI region will realize more efficient transportation investments with the deployment of these technologies.