



Parking Management Systems

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Photo: Courtesy of the Kansas Department of Transportation

Description: Parking management systems are used to make parking more convenient. These systems work to help the public quickly locate available parking, thus reducing the time spent looking for a parking spot, vehicle emissions, and drivers parking in unsafe/illegal alternative locations. Examples include rest area parking management systems, commercial vehicle parking information management systems, smart parking meters (allow public to pay using cash, credit card or smartphone), and parking reservation systems at tourist locations. Commercial vehicle parking management systems are particularly useful during adverse weather conditions when parking lots fill to capacity and commercial vehicle drivers must still adhere to their stringent hours of service requirements.

Vehicle detection technology (see [#TM5](#)) and cameras can be used to determine vehicle entry and exit from a parking lot to determine availability of parking spaces.

Parking information such as directions, parking availability, hours, cost and in some cases, ability to make a reservation for a parking space, are available through websites, mobile applications and dynamic message sign (see [#TTI3](#)).

Rural Transportation Critical Needs

- Crash Countermeasures
- Emergency Services
- Operations & Maintenance
- Rural Transit & Mobility
- Surface Transportation & Weather
- Tourism & Travel Information
- Traffic Management

Issues Addressed

- Congestion and Delays
- Inefficient Signal Operations
- Parking Challenges
- Vehicle Detection
- Road Closures
- Travel Time
- Speed
- Alternate Routes
- Dynamic Traffic Control/Operations
- Special Event Management
- Inefficient Use of Road Network

Strategies Achieved

- Road User
- Road
- Vehicle
- Safety Culture
- Engineering
- Emergency Response
- Enforcement
- Education





Applicability

- Parking management systems can be tailored to an area's needs and can be as low cost as providing information (maps, websites, etc.) on where nearby parking lots are located. Parking management systems are useful in rural areas with tourist attractions or special events that draw in large crowds, in small urban areas where the population increases as new students arrive for the school year, and for long-haul truckers to identify where/if parking is available reducing the number of fatigued drivers on the road.

Partnerships

- Applications benefit from collaboration among numerous agencies, which may include:
 - Departments of Transportation (Federal, State, Local)
 - Law Enforcement
 - Local Businesses
 - Tourist Destinations
 - Trucking Companies
 - Federal Motor Carrier Safety Administration (FMCSA)

Key Components

- Integrated Traveler Information Systems
- Mobile applications
- Vehicle Detection
- Cameras
- Dynamic Message Signs
- Public Education Campaigns for New Parking Technologies
- Smart Parking Meters

Examples of Implementation

• Commercial Truck Parking Detection Study

The University of Florida's Transportation Institute evaluated [vehicle detection technologies](#) at interstate rest areas to determine commercial truck parking availability.

• Michigan Department of Transportation Smart Truck Parking

Michigan Department of Transportation installed a [truck parking information system](#) that provides truck drivers with real-time parking availability information via a website, smartphone app, dynamic message signs, and connected vehicle technology. 29% of truck drivers surveyed for this project stated that they regularly drove while they were fatigued because they could not find parking. This real-time parking information works to reduce the number of fatigued drivers on the roadway.

• Billings, MT Parking Meter Upgrades

The City of Billings, Montana is upgrading aging parking meters in the downtown area to "[smart parking meters](#)," which will allow the public to pay using their credit card. The public will be able to add time to the meter using a smartphone application if necessary.

• Yosemite National Park Day-Use Parking Reservation System

Yosemite National Park is pilot testing a [reservation system](#) for day-use parking lots near the park's shuttle stops. This system will benefit visitors by ensuring that they will have parking available before they visit the park and encourages visitors to use the shuttle system.

• Mid America Association of State Transportation Officials (MAASTO) Truck Parking Information Management System

Eight states, including Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Ohio, and Wisconsin, have coordinated to develop a [real-time parking information](#) for long-haul truck drivers using DMS, smart phone applications, and traveler information sites. Enhanced parking information will provide many benefits to the area including fewer illegally parked trucks on highway shoulders and ramps as well as fewer drowsy truck drivers on the road.





Implementation Considerations (Pro)

- The public spends less time looking for a parking space.
- Reduced frustration.
- Reduced vehicle emissions.
- Reduced congestion.
- Reduces the number of fatigued commercial vehicle drivers looking for a place to park.

Implementation Considerations (Con)

- New parking meters may be confusing to the public and may require public education.
- New technologies may be considered too pricy or just another tax on the public.

Opportunities for Future Expansion

- Connected vehicles will be able to communicate with nearby parking meters (V2I) to assist the driver in finding available parking.

Additional Resources

- Federal Highway Administration, *Active Parking Management*, found here: <http://ops.fhwa.dot.gov/atdm/approaches/apm.htm>
- *Advanced Parking Management Systems: A Cross Cutting Study*, found here: http://ntl.bts.gov/lib/jpodocs/reports/14318_files/14318.pdf





Useful Tip

Adding public parking locations to a city or tourist destination website is a low-cost way to reduce the number of drivers who may be confused about parking availability.

Cost Range

(Cost/financial information, where noted, is based on 2016 dollars (unless otherwise specified). Cost/financial information is estimated, and will vary based on size and scope of project, number of units, etc. In general, capital costs include initial purchase costs of hardware, software, and other required equipment. Maintenance and operations costs include staff time to operate, monitor and maintain systems; data collection; system upgrades; evaluation; etc.)



Capital Costs: The total capital costs for this tool are low (less than \$50,000) to higher (above \$250,000) depending on the system used and the number of parking spaces. The cost to purchase and install “smart parking meters” in Billings, MT was \$665 per meter. More advanced parking management systems that use vehicle detection sensors, dynamic message signs, and electronic pay systems are estimated to cost \$290 to \$925 per parking space.



Operations Costs: The operations and maintenance costs for this tool are expected to be low (less than \$50,000). These costs would include the costs to keep parking information up to date, or to maintain any equipment used to determine parking availability.

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