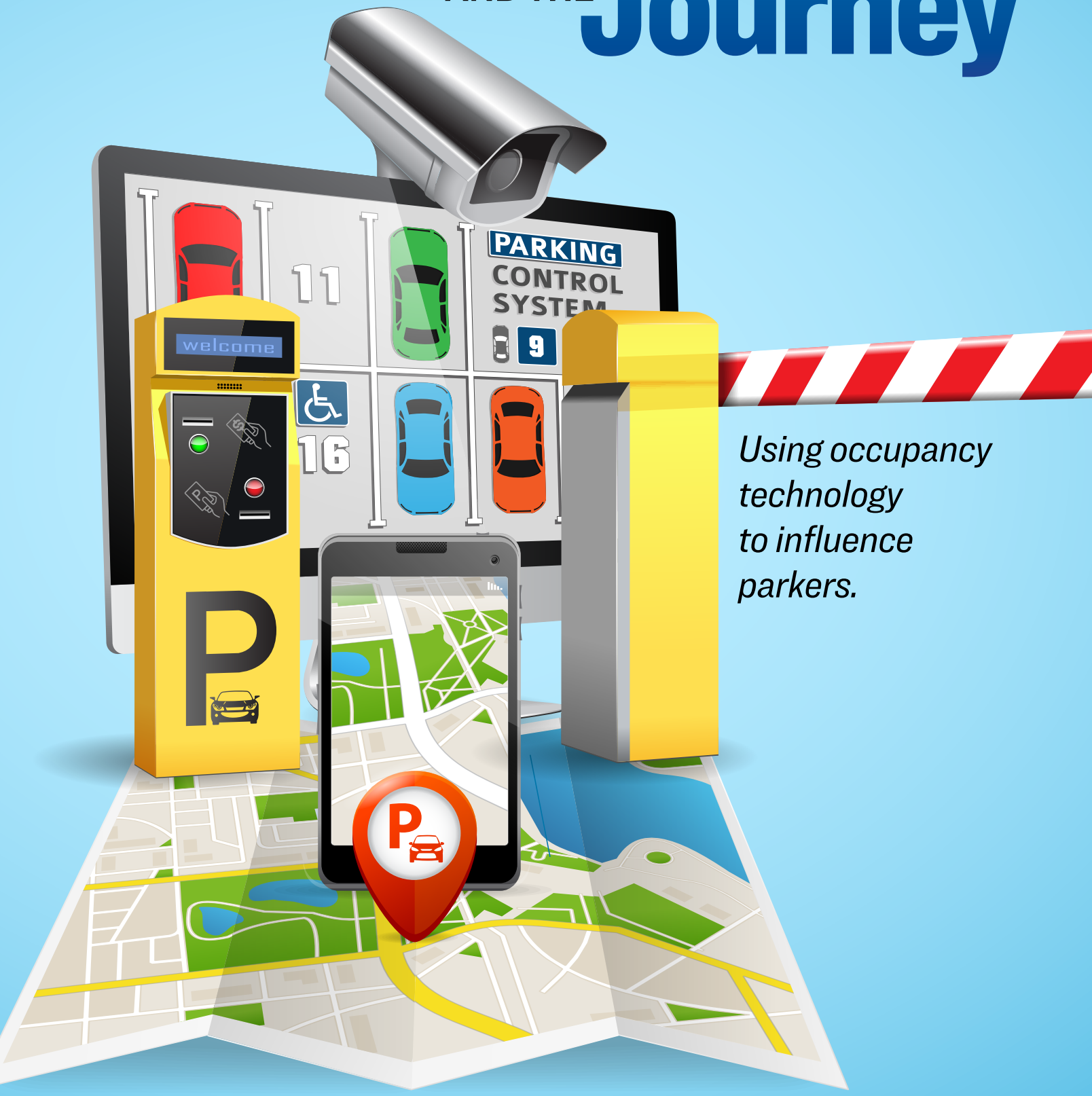
Parking Guidance AND THE Journey



Using occupancy technology to influence parkers.

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SALLY NEEDS TO BE AT HER DESTINATION in 55 minutes and she's never been there before. Does she take mass transit? Ride-share? Or does she drive—and park?

Whether attending a downtown meeting, connecting with friends for a concert, or making your way to the airport for a flight, we make these decisions many times every week. Driving and parking are still top-of-mind for many, though alternatives such as ride-share are growing in popularity.

The challenge for parking operations is to provide information that enables consumers to understand their options and make an effective mode decision based on the specific needs of each journey. This article provides insight into determining a consumer's information needs during such a decision process and describes some of the common technologies used to provide parking guidance information—key information used in the decision.

Every traveler's journey can be segmented into four simple phases, regardless of whether it's a common trip or a one-time visit to a new destination.

Phase 1: The Pre-Journey

Before setting a foot out the door, the consumer needs to decide which mobility option is best for getting to the destination. But what makes up the best option? Primary factors include reducing cost and maximizing convenience.

Most parking operations want to leverage their facilities with an objective to fill spaces and generate revenue. For a parking operation, the pre-journey is the most important phase; this is where the battle is won or lost. If a consumer chooses not to drive, he or she won't become a parker.

The pre-journey decision can be made in an instant when it comes before a simple trip to the grocery store or other routine errand. Or it can take significant research and planning to coordinate complexities such as distance, familiarity, multiple parties, modal transfer, carrying goods, and the like.

Understanding who your likely parking customers are and providing them useful and relevant information to assess their options will increase the probability that your facility is the selected option during the parker's journey. Understanding that customers prioritize their desirable needs differently for various types of journeys will help parking operations better present parking options that interest the consumer.

What are the considerations a traveler makes to reduce cost and maximize convenience of a journey? The cost of a trip is the real cost plus the indirect cost. The real cost is how much is paid out-of-pocket for ride-share, gas, train ticket, taxi, tolls, and/or parking. The indirect cost includes hard-to-define costs such as less convenience, longer time, and stress waiting for others like ride-share to arrive. For example, consider traveling to the airport with two oversized suitcases by subway versus driving. The lower-cost option is subway, but it comes with the high stress and struggle with heavy baggage in cramped, public spaces.

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Parking operations have the ability to charge different rates to different customers based on their usage. A person parking for a local lunch hangout on a lunch break values time and thus a higher fee for a shorter period of time, while a student going to class probably appreciates economic parking on the top of the garage ... unless it is raining.

Convenience can also mean offering flexibility. What if a meeting finishes early or a baseball game goes into extra innings? Is the traveler tied to a transit schedule or waiting for a taxi, or paying surge-pricing for a ride-share at peak time? If driving, will traffic be light or gridlocked?

Parking operations must understand they are but a stop along the traveler's route to a final destination. How close is the lot to the place he or she wants to go? How far is the walk? Is there a shuttle? Are there stairs? Is it safe? What will the weather be? Is it central to multiple destinations?

Amenities offered by the parking operation—reservation of a prime parking space, a car wash coupon, or shuttle or valet services—can drive more business to the parking operation while increasing the opportunity cost of alternatives.

As a further example, if your parking facility supports an office building, how you share information about parking options is different to tenants or non-tenants. You can educate tenants about parking options every day by sharing information on daily parking options, weekend parking options, and local event parking options. With the right information they may not even do an online search if they know they can park in your facility for non-work activities. However, if your facility supports an event district, you probably need to rely on online tools and other means to communicate information to most customers, some of whom may not know you exist and will likely do a search or rely on their destination to provide recommendations for transportation.

When you understand who your customers are, you can tailor your parking services to meet their needs and address their considerations, offering amenities to attract the type of clientele you want.

The table below provides some examples of communication methods and considerations for three types of common journeys.

A parking facility should also consider the mobility services it is competing against when promoting its parking services. Again, cost and convenience come into play. For example, it is easier for a single person to use ride-share than it is for a family of five. Also, consumers have to consider the ability to quickly request a ride-share during high-demand periods. A parking operation can effectively compete by providing attractive rates that fit a consumer's parking times and explaining the conveniences available (preferred parking space, covered parking, valet, etc.) to reduce potential anxiety and ease their journey.

Understanding the needs of the consumer will help you tailor parking options to best fit these needs and communicate them to the customer in a way he or she can understand and compare to ride-share options.

Phase 2: The Travel Phase

During the travel phase, the consumer has selected a mobility option but continues to evaluate next steps while in motion.

Sometimes a consumer will pay for parking during the pre-journey phase and know where they are going. Other times, consumers will have a general idea of where they will park and start the journey with the plan to select parking as they get closer. With the growing use of mobile devices and connected vehicles, consumers are able to receive updates on traffic and space availability and even purchase parking from their car or phone.

Customers who have already purchased parking are likely to need updates on traffic as well as step-by-step directions to their parking. This is the level of service many consumers are beginning to expect via their phones.

Consumers who have not purchased parking look for options as they approach their destination. Just as in the pre-journey phase, the consumer will be researching their options to purchase parking.

Going to Work	Going to an Event	Going to the Airport
Communicating ■ Signage and promotions in building ■ Employee parking options and deals on tenant website ■ Referrals from coworkers ■ Internet research—monthly parking	**Communicating** ■ Event website and ticketing information ■ Consumer sites (yelp, etc.) ■ Third-party services (Ticketmaster, parking reservation sites) ■ Online maps	**Communicating** ■ Airline loyalty programs ■ Availability of pre-referrals from friends ■ Booking/reservations website for parking or airline ticket ■ Online research and planning
Considerations ■ Costs and proximity ■ Use of apps to check availability, reserve, and pay ■ Ease of parking access (electronic credentials/permits)	**Considerations** ■ Cost and proximity ■ Premium services (easy or fast exit) ■ Use of apps to check availability, reserve and pay ■ Ease of parking access (electronic credentials/permits)	**Considerations** ■ Location of airline check-in ■ Duration of trip and expense ■ Shuttle ride or no shuttle ride ■ Remembering where you parked

Is your facility providing space availability information in real time, can a customer purchase parking while enroute to your facility, and do you have a method to allow a consumer who purchased parking enroute to enter the facility?

As parking facilities sell their parking services, they should include the ability to share information on apps. It is also important to have a method to allow consumers to enter the facility if they reserve parking enroute.

Phase 3: Arriving

Phase 3 involves arriving at the parking lot (assuming that the traveler decided to drive/park or is taking a ride-share to a drop-off lot). Remember that for the consumer, arriving at the parking lot does not finish the journey. To the parker, the parking lot is a modal transition or a waypoint in the journey to the final destination. Many customers desire and expect additional information to complete their trip.

Useful information to navigate the last mile will likely come from the facility. The facility should consider the information needs of customers who have prepaid (direct them to their specific parking area and offer step-by-step directions to their destination) and those who are still considering where to park (pricing, location, conveniences). Typically, this information is best shared with signage.

There are two areas to consider placing signage: roadway and entry, and internally. Roadway and entry signage is used to provide specific instructions or space-availability information for arriving vehicles. Directing consumers to open spaces or other parking facilities is important for those desiring to purchase parking. Providing instructions to consumers with prepaid permits is just as important.

Offering effective directions in a very visible way can affect drivers' decisions to use a parking facility again the next time.

Internal signage directs consumers to the correct area of a parking facility or to an open space. The signage can be fixed or digital, providing information about open spaces in aisles.

Technological advances have improved wayfinding, helping drivers find spaces and then find their way to their ultimate destinations.

Internal signage is also important to help consumers get from the parking facility to the final destination quickly and easily. Providing directions and clear instructions to the various destinations from the parking facility delivers on the service consumers expect and improves the likelihood that consumers will drive versus use a ride-share or mass transit the next time. If you want consumers to return for a future visit, make sure they do not get lost on their way to their final destination.

Phase 4: Final Destination

Phase 4 is arrival at the final destination. Go back to the beginning: Consciously or not, Sally conducts a mental review of her completed journey and the overall experience. Would she choose the same journey next time, or choose something different? Is there opportunity to reduce cost or increase convenience the next time? Will there be a next time for this trip? Did she learn something new that she can apply to future journeys?

The Lesson: Occupancy Data Drives Decisions

Occupancy data provides value in the past, present, and future. It lets a parking operation look backward to seek correlation with pricing, weather, and other factors; it lets a parking operation publish live information to parkers through signage and apps; and it points to trends where spaces might be available in an hour or in a week.

Occupancy data influences the parker's journey. From the pre-journey decision to the signage at the

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facility, the parker is assessing options. An informed decision comes from having relevant information, or data, on which to base the decision.

Occupancy data must be timely for consumers, and generally the closer to the destination the more accurate and timely the data must be. For example, signage in a garage must have timely data, while signs on a highway/roadway only need to approximate.

Presentation of data is important. A parking operation with confidence in the data will present stall/level counts, while a parking operation with lower confidence may present approximations using ranges or red/yellow/green status.

Finally, occupancy data must be transportable. It needs to be easily shared with signage and apps and other systems. Any data that communicates with a parker, either directly or indirectly, has an opportunity to influence the journey. The IPI Data-Ex standard (parking.org/ipi-dataex) helps make parking data more interchangeable and widely distributed

Occupancy Detection Technology

Occupancy counts generally fall into two approaches:

- Area counts. Vehicles are counted as they enter or exit/depart a specific area. The area can be a lot, garage, level, aisle, or any region containing multiple spaces. The number of vehicles at any given time in the area is the difference between the entry count and exit count.
- Space counts. Vehicles are counted in individual spaces. The occupancy in this case is the sum of all spaces with vehicles present.

As a general rule, the cost-per-space of implementing a count system increases as the area counted gets smaller.

In many cases a parking operation may use a mixture of area counts and space counts to get a sufficiently detailed picture of parking occupancy. Some parking areas are more critical or more valuable than others and require a higher degree of accuracy, especially when data is shared with consumers in real-time.

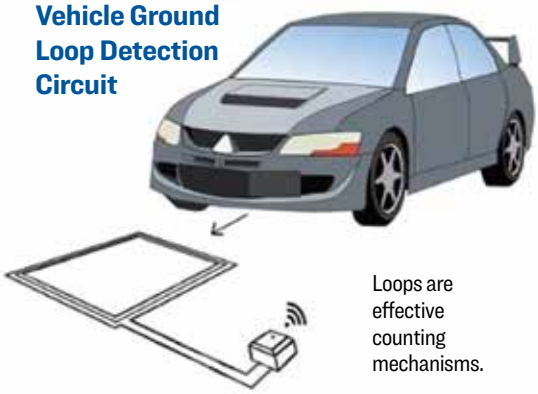
The table below summarizes today's common technology.

Loops are the granddaddy of counting technologies and probably don't need much explanation. Loops (and similar magnetic-flux technologies) detect vehicles using induction, which generates an electrical signal as metal passes nearby. They are relatively inexpensive but can easily be tricked by a

Technology	Garage/Off Street	Surface Lot/On Street	Constraints
Loops (hysical count)	In lane (entry, exit, aisle)	In lane (entry, exit, aisle)	Needs distinct aisles to count vehicle
Proxy counters (logical count)	PARCs, meters	Meters, mobile pay, third-party vehicle, mobile LPR	Requires significant data to build statistically accurate data from real-time transactions
Space sensors (physical count) ultrasonic, mag flux, laser	Overhead, on-ground, or in-ground	On-ground or in-ground	In lane counters have varying accuracy In space tend to be very accurate
Cameras (video analytics)	Usually in the lane	In lane or birds-eye	Data detail provided by in space for significantly less cost
Visual counts	Manual	Manual	

shopping cart or other hunk of metal, and calibration is required from time-to-time. To help with directionality, multiple loops can be used, and drive lanes are sometimes implemented to keep cars aligned over the loops. Loop counters mostly require cutting into the ground, though their cousins, tube-counters and pressure-sensors, are often surface-mounted. These are all area-based count technologies.

Vehicle Ground Loop Detection Circuit



Loops are effective counting mechanisms.

Overhead sensors can be used for both zone-based and space-based counting. The underlying technology often uses ultrasound or infrared lasers to measure the distance to the object below the sensor. Obviously for such technology to work, there needs to be a ceiling to affix the sensor, so this technology is best in garages; additional trussing is needed for open-air mounting as on a surface lot or garage rooftop. Cost-per-space varies depending on whether the solution is implemented for area counts or space counts. For area-counts, just like loops, accuracy is improved when vehicles are aligned into predictable drive lanes; for space-counts each space is monitored actively while ignoring cars in transit through the facility.

Ground sensors are the opposite of overhead sensors; these are mounted on-ground or recessed in-ground. A variety of detection technologies can be employed, including mag flux (loops on a chip), ultrasonic, and infrared, and many times a single sensor includes multiple detection technologies to reduce errors. They are generally considered to be accurate but also expensive to install and maintain. Most commonly, the sensors have long-life batteries and use wireless communications to transmit occupancy data every few minutes. Each individual space is monitored, though some systems are capable of using statistics to interpolate occupancy where not every space contains a sensor. As a ground-based device, consideration should be given to the possible impact of equipment for cleaning or snow removal.

Overhead sensors can be used for both zone-based and space-based counting.

Video analytics is a relative newcomer to vehicle counts, and there are a variety of solutions. Each uses a form of artificial intelligence and pattern matching to classify an object as a vehicle. Area-based counts use video streaming technology to count vehicles in a lane and determine direction, while space-based counting

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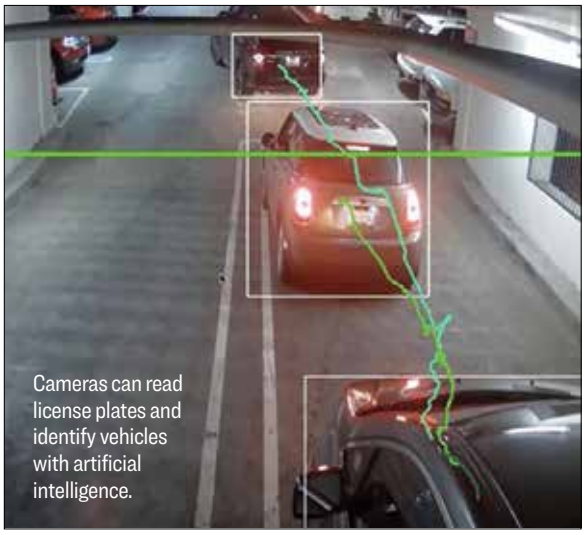
Cameras can read license plates and identify vehicles with artificial intelligence.

is done with cameras using still images or video clips. Technology can be limited by obstructions such as trees, sufficient lighting, and choice of mounting location. As high-end camera technology becomes cheaper to collect, the cost-per-space drops dramatically. In some cases the camera may also be able to read license plates.

What's the cheapest way to count? Not to count at all! Instead of counting vehicles, you count something that represents the vehicles, such as payments or transactions. Gathering pay-by-space or pay-by-plate data from a meter in real-time is also an approximate indicator of occupancy. Perhaps the vehicle will leave early or stay later (or perhaps not pay at all), but in some parking operations these payments representing parking durations are enough to take a guess at occupancy; this may be sufficient to feed to parkers to help them make decisions about their journeys.

Consumers have many options to transport themselves to their destinations on a journey. Driving and parking is a relevant option for many of these journeys. To better show the parking options to consumers, parking facilities need to consider who their customers are and how to best position parking services to them.

Video analytics can identify vehicles that have overstayed, simplifying enforcement.

Being able to share relevant information to consumers across the four phases of a journey is important to delivering a level of service that encourages consumers to continue to park themselves.

This is the difference between meeting customer needs and just parking cars.

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