

PASSENGER TERMINAL WORLD



What Next?

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PARKING
How to maximize revenue as car pooling and autonomous vehicles hit private car ownership

INTERVIEW
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INVESTMENT
Key advice for airports embarking on an airline-led terminal investment project

wheels of fortune

How do you maximize your car
parking infrastructure against
a backdrop of shifting mobility?





■ Many airports have historically taken a 'build and forget' approach to their parking assets, only to discover that neglecting their infrastructure can be costly, impacting customer service and requiring retrospective action. "Interiors of airport parking structures are mostly dismal. Designers need to shift the paradigm from a structure for automobiles that happens to have people in it, to one for people that also happens to feature automobiles," comments Dave Albersman, senior planner with design consultancy Kimley-Horn.

According to the FAA, in 2016, in the USA alone, 41% of airport income unrelated to airlines came from parking. It is a revenue stream that demands to be nurtured.

"It is more important than ever that airports take a proactive approach to developing, maintaining and operating their car parking infrastructure," says Arthur Stadig, director of aviation services at Walker Consultants, a parking design and consulting practice. "For most passengers, parking is the first impression of the airport and the beginning of their travel experience. Having adequate, safe and convenient parking is vital. Airport facilities are under attack from the exposure to nature's elements and from human interference. Constant maintenance, care and investment in parking infrastructure are therefore essential."

MAIN & RIGHT:
Denver
International
Airport east
side parking
structure



In the USA,
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Autonomous vehicles, carsharing and the future of parking... – will we ever see the end of the privately owned car?

■ With the advent of autonomous vehicles (AVs) and the rise of the sharing economy, parking lots for privately owned cars could become a thing of the past, triggering a seismic shift in the airport parking business model.

"AVs have the potential to shape the airport landside in several ways," says Keith Thompson of Gensler Architects. "Whether privately owned or on-demand, the need to park on-airport will be lessened. This will likely trigger a need for more curbside space as those not parking will still require an interface with their vehicle convenient to the terminal. This could suggest some nearby staging areas akin to cell phone lots so that on arrival, passengers can summon their cars to that terminal-adjacent location without jamming the curbside. It will also likely require some larger policy decisions regarding where AVs provide access to the terminal versus manned vehicles."

This raises a security issue. What would prevent someone sending an unmanned vehicle-borne improvised explosive device into a terminal? It also challenges parking as a major revenue source for airports. If your AV can drop you off and take itself to a low-cost parking area or even back

home, where is the incentive to pay a premium for airport parking? The likes of Uber and Lyft have already started to impact parking bottom lines. AVs could remove the need to park altogether.

"Traditionally, ground transportation revenue is a small fraction of total landside revenue compared with public parking and rental cars," says Dave Albersman, senior planner with design consultancy Kimley-Horn. "If TNCs [transportation network companies like Uber and Lyft] and ultimately driverless cars capture significant market, airports need to revisit ground transportation charges as a way to recapture lost revenue for parking and rental cars. Reports suggest that the end of privately owned vehicles is in sight, yet there is scant analytical data to give planners guidance on how to plan for a possible new reality. In my opinion greater flexibility will be key. Now more than ever facilities need to plan for elasticity, to be able to accommodate any number of future possibilities."

Reimagining parking facilities

When constructing parking lots today airports will need to consider the potential for re-use. It

would be judicious, for example, to ensure the space between ground and the first floor has extra height, to make it possible to adapt it into office space in the future. Design changes might also allow for mechanical ventilation and lighting, a strengthened structure for the increased floor loadings required of occupied spaces, and provisions for emergency egress that would grow as the occupant load increases. Parking with sloped decks would be unsuitable for reuse.

"Perhaps the on-airport parking will need to be demolished to make space for these AV staging areas, and perhaps a charge will be imposed for their use," says Arthur Stadig of Walker Consultants. "Planning for fully autonomous vehicles that can park themselves should be undertaken for any new parking facility being developed. The idea is that many people will find on-demand sharing of vehicles preferable to ownership. This in turn reduces the demand for vehicles and the need for them to park, as they are continuously on the road. While some contemplate reduced traffic volumes and congestion due to AVs, the opposite might transpire. Today you drive to the airport and park. With an AV it would



RIGHT & BELOW:
 Parking can be a passenger's first impression of an airport, and it needs to be a positive one



For a growing number of airports this means investing time and money in creating strong relationships with parking maintenance firms to minimize wear and tear within the structure and make early repairs that otherwise might impact operations and revenue. Such a preemptive approach helps maintain the quality of parking facilities and improves the customer experience, but this is just one element in maximizing car parking infrastructure against a backdrop of shifting mobility.

Terminal integration

Parking facilities and terminal buildings are usually physically separated for several reasons. These include a need for terminal roadways and curbside activity along with security issues such as blast protection from a parked vehicle filled with explosives. Increasingly, though, parking garages resemble terminals, with the traveling public coming to expect amenities and high-tech conveniences to enhance their parking experience. Such additions are an attempt to seamlessly



Reports suggest that **the end of privately owned vehicles is in sight**



be cheaper and just as convenient to drive to the airport, send your vehicle home, then recall it upon your arrival. What was two vehicle trips becomes four in that scenario, meaning increased congestion on the regional roadways as a result."

Within the new shared economy, forecourt drop-off areas might become a premium experience, with any luxury and technology formerly associated with the car parking experience transferred to the terminal curbside. Vehicle control centers may limit AVs or carshares access to departures to those that have paid for a premium experience.

Plan for the unexpected

"Privately owned cars will still be around for a while," says Tanja Dik of Amsterdam Airport Schiphol. "The carsharing development will have an effect sooner than autonomous vehicles. The big question is when AVs will take over and what impact this will have. Autonomous vehicles have a much longer lead time because of governmental regulations. To be able to cope with the coming changes, airports have to be willing to adapt their infrastructure and business models to embrace



LEFT: The Navya autonomous shuttle bus is gaining popularity at airports around the world. It is currently being used at Heathrow and Frankfurt airports



and facilitate these new developments in mobility services," Dik comments.

Schiphol recently performed a test with the WEpod, a self-driving electric vehicle, that saw it pick up passengers at the airport's largest parking area and bring them to the central bus station to leave for the terminal. These tests taught Schiphol how to use innovative technology designed to improve the passenger experience.

If and when parking structure is no longer required, airports may end up with large chunks of real estate begging for commercial reinvention. Hotels and conference centers might be viable solutions, but as with so much that surrounds autonomous vehicles, there are as many questions as there are answers.

"In the same way that computers didn't lead to the paperless office, perhaps there are unexpected consequences of AVs that we have yet to fully understand or plan for," says Thompson. "From the perspective of what remains for on-airport parking, the biggest change will likely be an increase in the availability of charging stations for privately owned electric vehicles, with the eventual likelihood of an autonomous docking capability."

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ABOVE: New parking and rental car facility planned for Minneapolis-St Paul

bridge terminals and parking facilities. Some airports have extended wi-fi to their parking lots, while others are considering implementing baggage handling facilities. Solutions such as automated parking guidance systems (APGS) are becoming more prevalent, reducing the stress to the traveling public and improving customer service. None of this trumps physical proximity to the terminal, however.

“Architects need to approach the design of landside facilities differently,” says Kimley-Horn’s Albersman. “Airports that integrate parking, rental cars and ground transportation functions in a single structure near the terminal rather than in separate structures will be best served in the future. They allow for future flexibility and simple wayfinding. Good examples in the USA include Minneapolis, Fort Myers, Indianapolis, Memphis and Charlotte. Landside functions should be considered part of the terminal building and designed to convey the impression to the customer that they have arrived at the airport when they get to the parking facility, not when they get to the door of the terminal building.”

Simon Preece, commercial director at Bristol Airport in the UK, comments, “We work closely with the local planning authority and local community to integrate the parking infrastructure within the airport boundary. There is clearly demand for options that link the parking area or drop-off point to the terminal. The customer experience is enhanced where the journey from the parking facility to the terminal is simple, straightforward and under cover. There remains, however, significant demand for low-price solutions, which by definition are unlikely to be delivered by parking areas integrated into the terminal. To get around this there could be an on-demand autonomous transfer system that makes that journey far smoother.”



ABOVE: Denver International offers passengers six parking options
BELOW: Bristol Airport’s parking facilities have recently undergone a £20m (US\$28m) redevelopment

Bristol Airport is currently constructing a £9.5m (US\$13m) multistory parking garage – the first on the airport site, which will create more than 1,000 spaces within a short walking distance of the terminal.

Steve Vollar, senior partner at engineering consultancy Hill Cannon, which advises many airports, including the UK’s London Heathrow, London Luton and Newcastle, comments, “All the airports we work with are keen to make the entrance to their parking areas consistent with the appearance of their terminal buildings. They like as direct a link as possible between the airport and the car parks.”

The rise of the TNC

As with many improvements at major airports, upgrading and improving infrastructure are expensive. As a result, changes to parking systems are usually done on an incremental basis. If additional parking is needed, it is usually added to an existing parking structure or system.

Changes to the technology are implemented by adding onto existing systems. Airports that have the best opportunity to forward think are those carrying out total parking system replacements. In the USA, the likes of LaGuardia, Hartsfield–Jackson and Kansas City International are currently installing new terminal projects and/or

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undertaking total replacement of their parking systems. In this manner there is an opportunity for modernizing the parking to meet new landside planning needs such as transportation network companies (TNCs) like Uber and Lyft, AVs (autonomous vehicles) and newer technologies such as APGS.

The increasing use of TNCs is especially impacting parking and transportation. How and to what extent depends upon many variables. These include whether the airport is in an urban environment, the cost of parking, the typical distance people are traveling to the airport, availability of TNCs and other pricing factors. Dallas/Fort Worth's parking revenues, while up at its midpoint last year, were US\$3.9m down on the projected figure. One reason was the use of app-based transportation services. "That's clearly had an impact," says Sean Donohue, the airport's CEO. At Sydney Airport, revenue from parking and ground transport rose by 4% to A\$95m (US\$75m) over a similar period, a sound return but only half the growth of 2016.

One outcome of the TNC revolution is the greater requirement for curb space. In San Francisco for example, traditional shuttles have lost space to make room for pick-ups and drop-offs by TNCs. Such a scenario gives a flavor of what may be to come in the form of autonomous vehicles and ridesharing (see *Autonomous vehicles, carsharing and the future of parking*, page 108).

On-demand transportation company Lyft has agreements with almost 240 airports, while Uber has agreements with more than 100

"The likes of Uber are already significantly increasing demand on the terminal curbside," says Keith Thompson, principal and aviation and transportation practice area leader at Gensler Architects.

Thompson took the image below right of LAX over the 2017 Thanksgiving weekend. "It shows the upper level curb at LAX being used by arriving rideshare passengers with smartphones in their hands," Thompson continues. "Not only did this add to the gridlock on the upper-level roadway, passengers in some instances would venture out into traffic lanes to connect with their car/driver, thereby creating even greater traffic and safety impacts. It demonstrates how the rideshare services create new, unanticipated demands on the ground transportation infrastructure at airports that require a new, specific design approach."

RIGHT: Memphis International Airport ground transportation center
BELOW: Parking garage atrium at Raleigh-Durham International Airport



The importance of offering passengers a safe and secure parking option

In July 2017 the UK's London Gatwick advised passengers to use only airport-approved car parking operators when parking before they travel, after a non-approved company failed to return vehicles to more than 100 passengers.

Gatwick First Parking, a meet-and-greet parking company with no connection to the airport, reportedly ceased trading with no prior warning, leaving vehicles abandoned and their rightful owners unable to retrieve them.

The airport has since used its own license plate tracking system to help trace many of the missing cars, and has reissued parking guidance to passengers, strongly recommending the use of either official on-airport parking or companies registered with Gatwick's off-airport Approved Operators Scheme.

Run in partnership with the British Parking Association, the scheme was introduced to offer Gatwick passengers more confidence when choosing off-airport parking, and only features suppliers that have adhered to the approval processes of Trading Standards' Buy with Confidence program.

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Rideshare services create new, unanticipated demands on ground transportation infrastructure at airports



ABOVE: Electric vehicle charging points at Amsterdam Airport Schiphol

TNCs have risen steeply since 2014, when just a handful of US airports allowed them. Today, Lyft has agreements with nearly 240 airports, Uber with more than 100. Most are charging TNCs a fee to pick up passengers. At LAX, app-based services have brought in more than US\$40m since 2015.

In 2017, 50% of Schiphol Airport's parking near the terminal was demolished to make space for a new concourse

RIGHT: Short-term parking at Schiphol is just a three-minute walk from arrivals

A multimodal approach

Airport parking is still an essential customer need, however. Airport planners must now find the right mix in multimodal airport accessibility. The required infrastructure therefore should be flexible and future-proof. "We balance our time between the current parking business model and new mobility developments," says Tanja Dik, director of consumer products and services at Amsterdam Airport Schiphol. "Larger airports in or next to large cities often have the advantage of a smooth and fast public transport system connecting the most important areas around the airport. We are located in the middle of a strong economic area and offer an efficient and fast public transport system, with a large train and bus station in the heart of Schiphol. If airports are lacking such a public transport system, they should be even more focused on investing in excellent parking and mobility products to facilitate convenient access to the airport."

"For many airports, the primary mode of transportation to and from airports is the single-occupant vehicle," says Walker Consultants' Stadig. "Many people are dropped off at the curb by family and friends, or by taxis or TNCs. The use of transit and buses has its place in getting the public to the airport but I generally do not see any major changes or shifts in use patterns in the future. As such, airport planners should continue to design around the appropriate balance and mode split for their particular airport."

Flexible futures

Hill Cannon's Steve Vollar is currently working with Skyline Parking, a Swiss company specializing in automated parking facilities, both tower and underground silo.

"You put the car in and it disappears off into a robotic parking system," he says. "It's safe, secure and the vehicle is readily retrievable. Such solutions are finding increasing favor. Parking is about proximity but also about making the experience attractive so passengers will return rather than go to a competitor."

At Schiphol, they measure their solution against the airport's three parking pillars: 'Guide me', 'Relieve me' and 'Excite me.' "A parking area that can be easily found and which is clean and safe is of the utmost importance," says Dik. "Passengers are also looking for some kind of certainty and if you can facilitate pre-booking, this will give them the assurance that a space is available in a specific parking area. The passenger is then able to start their journey with no stress and is at ease when they enter the terminal, at which point they are open to new experiences and concepts."

In 2017 the airport had to adapt after 50% of its parking near to the terminal was demolished to make space for a new concourse. "This forced us to change our business model and our parking solutions to a different setup and use of parking space," says Dik. "It was challenging, but it taught us that flexibility is key for the future changes in mobility." ■



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