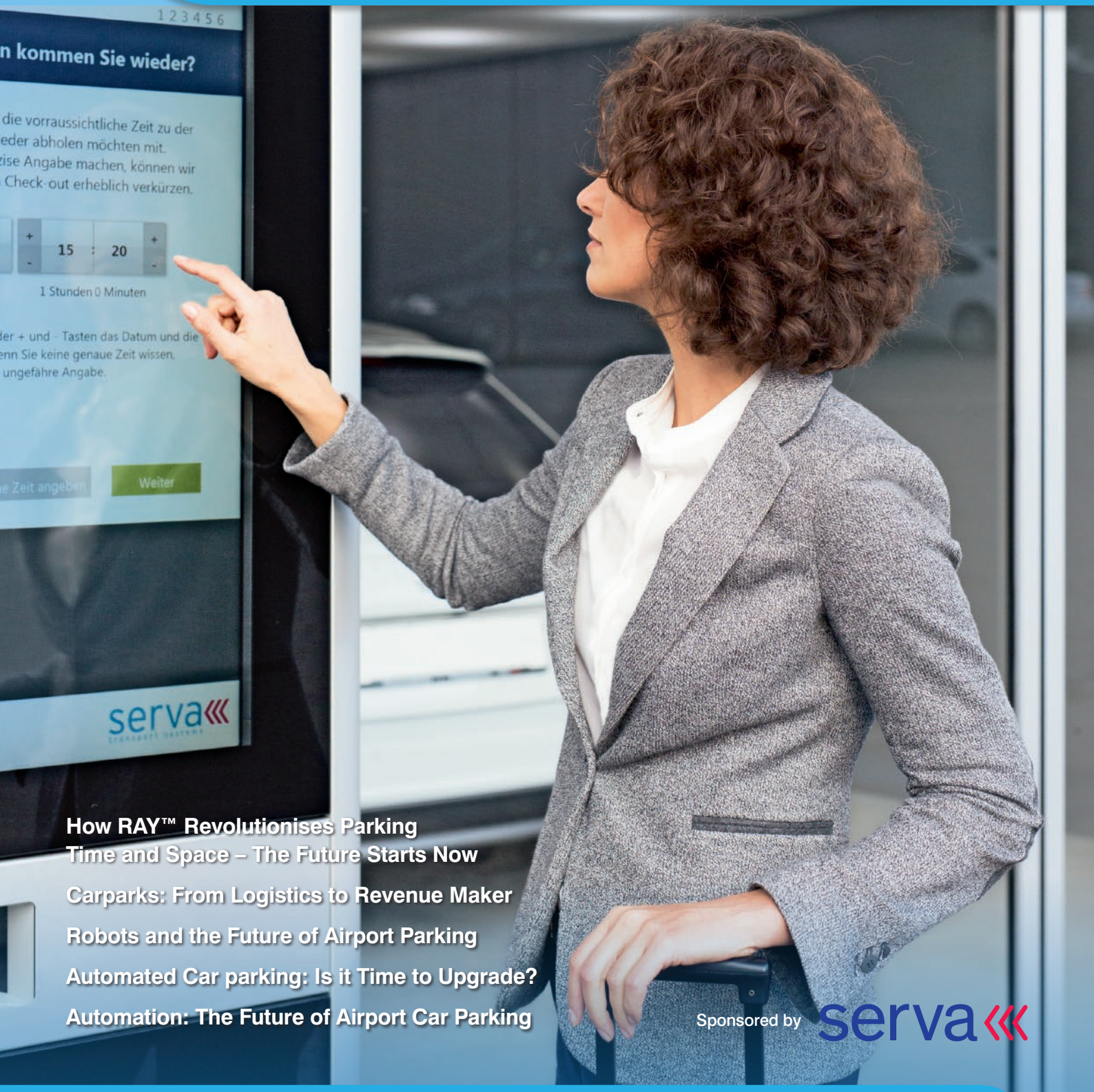
SPECIAL REPORT

Next Generation Automated Parking Systems for Future Airport Operations



How RAY™ Revolutionises Parking Time and Space – The Future Starts Now

Carparks: From Logistics to Revenue Maker

Robots and the Future of Airport Parking

Automated Car parking: Is it Time to Upgrade?

Automation: The Future of Airport Car Parking

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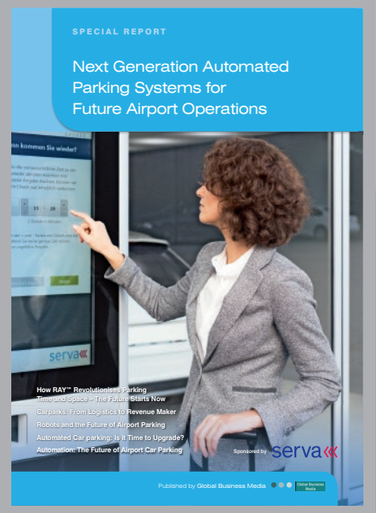

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Foreword

RETURNING FROM holiday recently I had the same kind of experience thousands of travellers do. Embarking from the plane, struggling across the terminal with arms full of bags and finally trying to remember where in the gargantuan car park, we have left the car. If only there was someone who could do it all for me. And now there is.

The first article of our report comes from an innovative company pioneering a new automated parking system at Dusseldorf. Serva Transport Systems has produced a robotic parking system which takes your car upon arrival, stores it away and then delivers it ready for your return. It's already enjoying success at Dusseldorf and plans are now in the pipeline to roll similar systems out elsewhere.

We will then look at the wider commercial landscape and focus on how airports are turning to carparks as revenue generating mechanisms. With slim profit margins elsewhere, non-aviation revenue is becoming more important. Automated features such as concierge services and non-cashier automated pay stations are helping to drive performance forward.

We will then turn our attention to the next generation of futuristic products as emphasised by the system at Dusseldorf. James Butler will examine what new technologies can do, while Jo Roth will look at the transition from development to commercial sustainability. He asks whether new technologies will simply be a premium service or something which can truly revolutionise parking.

Our final article considers the future. With technology still in a developmental phase in many cases, there is potential for more exciting innovations in the future. We'll look at how automated parking services can develop and some of the trends which could govern the business over the next few years.

Tom Cropper
Editor

Tom Cropper *has produced articles and reports on various aspects of global business over the past 15 years. He has also worked as a copywriter for some of the largest corporations in the world, including ING, KPMG and the World Wildlife Fund.*

NEXT GENERATION AUTOMATED PARKING SYSTEMS FOR FUTURE AIRPORT OPERATIONS

How RAY™ Revolutionises Parking Time and Space – The Future Starts Now

Serva Transport Systems

In today's world, time is the most valuable asset and one that you luckily may not need to waste in car parks any longer.

Only 40 Minutes until Take-Off

I'm accompanying businessman Fabian K who behind the wheel of his luxury class salon, appears to be completely relaxed whilst turning into the car park at Dusseldorf Airport. To my inquiry whether he was not a little nervous about being late for his flight, he replies "What do you mean late? We have PremiumPlus parking." Ah well…I have no idea what he is talking about but my tension turns into curiosity.

Only 35 Minutes until Take-Off

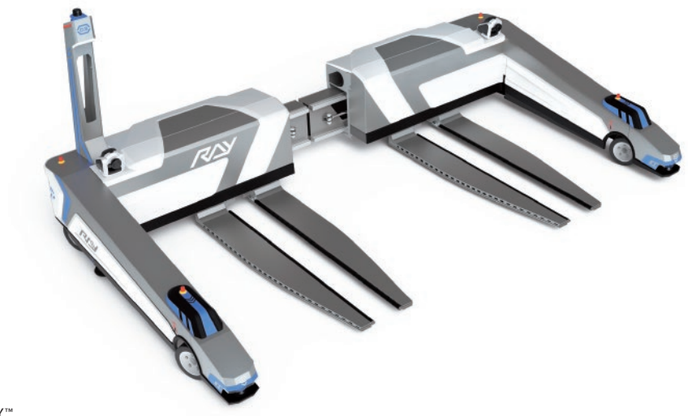
Something is different when we arrive at the gate to the P3 car park gate 5 minutes later. Instead of taking a parking ticket, Fabian K inserts his credit card into the booth and promptly retrieves it. The gate then opens and as we drive through, I am thinking to myself: "No way are we going to find an empty parking space in here". However, we are already slowing down. I am looking straight into a bright screen and start to feel a little like Captain Picard. The screen, though, proceeds to prove his undeniable better guidance skills by graphically indicating our reaching the final parking position. We come to a stop and get out of the car.

This is indeed exclusive parking, but doesn't this mean it is terribly expensive? As I am about to find out, this futuristic "garage within a car park" is just a stopover, designed to actually reduce parking fees.

With his smartphone, Fabian K scans a QR code displayed on a nearby terminal and says; "Let's go; my car will park itself." And suddenly it is happening. A U-shaped vehicle appears out of nowhere and stops on the side of the parked car.

"May I introduce you to RAY?", says Fabian K, presenting me a fully automated parking robot. RAY is approximately 2.5 meters wide and four, five…no six meters long. Astonished, I watch, as RAY aligns itself to perfectly fit the length of Fabian K's car. While the frame starts to extend, a guardrail appears in the middle and something else is happening within the U shaped vehicle. Gently, two pairs of rails, similar to those of a fork lift, adjust themselves to the dimensions of the car and are locked in place. With his "arms" wide open, RAY then moves towards the car, wraps itself around it on three sides and lifts it up. In that instant, the thought of a true car lover crosses my mind: "Aren't car owners worried about scratches on the bodywork?" Looking more closely, however, I notice that RAY is only touching the wheels. The bodywork is out of bounds. To further alleviate any worries that vehicle owners might have, the operating system takes a 360 picture of the car at its arrival, documenting its condition, which the car owner can compare to when picking the car up again.

During the implementation phase, Serva Transport Systems will manage the adaptation of hardware and software to existing conditions and assume the project management



RAY™

I watch, fascinated, as RAY gently moves away with the loaded luxury class salon. “Come on”; says Fabian K pulling me away from this science fiction moment, “or else we’re going to lose the advantages of this service.” As a typical car driver, who has often driven to the last floor of a spacious car park in order to find an empty parking space, I know immediately what he is talking about. RAY can save you an incredible amount of time and Dusseldorf Airport has been consistent in integrating this advantage. Independent of rails or other fixed structures, the airport operator can install this innovative parking system in exactly the spot where it is most appropriate for the often rushed travellers. And thus, we are able to cross the modern foyer of car park P3 and reach our terminal in less than three minutes.

Still 35 Minutes until Take-Off

It is obvious that “PremiumPlus” parking and the driverless transport system RAY are a big advantage but how does the whole thing work? As soon as we’ve passed through security check I ask Fabian K. After all, we still have plenty of time to chat.

It turns out; you only need two things for this quick parking service: a debit card and an App. Furthermore, to gain even more time on site, Fabian K reserved a parking space in advance. The reservation can be done directly on Dusseldorf Airport’s website. You merely need to provide arrival and departure times at and from the car park. For payment you enter your debit or credit card details. Your chosen card then becomes both your entry and exit pass allowing you to be charged only for the exact amount of time your car has spent in the car park. The final pillar consists of a free App: “DUS PremiumPlus Parking”, which can be downloaded at Google Play for Android or from the App Store for iOS. By scanning the QR code at the check-in terminal of the car park, your booking is completed. The driverless transport system RAY can now get to work.

A smart option is to give your flight number when making the reservation as the intelligent parking system, which makes up RAY, has a direct connection to the real time arrival data of all flights. Therefore, if a plane lands or takes-off earlier or later than expected, RAY automatically re-calculates the exact time at which your car needs to be ready and parks it in the appropriate direction for your departure. And what about other reasons for delay? If you wish to eat or shop at the airport for example. You can simply use the App to notify RAY.

On Cloud Nine/ Relaxed Over the Clouds

We are sitting on the plane to Munich: a city with an ever-increasing need for space and also the city with the highest price per square meter in the whole of Germany. As Fabian K stretches his legs – thanks to First Class – my thoughts turn to the amount of space required by a fully automated parking robot such as RAY. RAY can rotate on the spot as well as maneuvering forwards, backwards and sideways. What’s more, because of its design, RAY is always somewhat longer than the car it is transporting. How can this driverless transport system pay off in a densely populated area, in which every square meter is meticulously planned and used? I look it up on the internet and come to a surprising conclusion. The large spaces needed between parked cars – to allow passengers to get in and out – become redundant with RAY. Additionally, having a maximum of only two rows of parked cars, so that car owners can leave their parking place at any time – becomes obsolete. This is due to RAY’s patented organisational talent being able to park cars sideways in a variable number of rows. Moreover, the extremely maneuverable robot vehicle requires not six but only three meter wide lanes in a car park. If carpark operators include RAY in their planning process for a new car park they can improve the degree of space utilisation by up to 60% and up to 40% of additional parking spaces can be made accessible in existing car parks following the implementation of RAY.

I experience sudden enlightenment, which you can, too, by visiting www.serva-ts.com. All in all then, RAY can not only help traveling clients such as Fabian K but infrastructures as a whole. Currently, however, this does not seem to captivate my travel companion. He has in fact fallen asleep following this intense stress relief experience.

About the Developers of RAY™

Serva Transport Systems GmbH is based in the town of Grabenstätt-Chiemsee in Bavaria. With the development of the fully automated parking robot RAY™, the company decided to address the issues of rising demand in parking space, largely increasing land prices and time-consuming search for parking spaces by providing an innovative system. For their breakthrough invention of “Park service of the future”, Serva Transport Systems GmbH was honoured with the nomination for the German Founder Award in 2013. With Audi and Düsseldorf Airport, Serva Transport Systems GmbH counts some of the most internationally renowned mobility companies amongst its clients.

The idea originated within a team of German engineers, when today’s Managing Directors and former school buddies Rupert Koch and Leopold Meirer paid each other a visit. Meirer was then working in the USA and knew that the conventional conveyer belts, used for vehicles at the time, often jammed, paralysing the entire facility for hours. Working in logistics, Koch on the other hand, had in-depth knowledge about driverless transportation systems (DTS) for the beverage industry. Combining each other’s knowledge and know-how lead to the original concept of an unchained and thereby fail-proof transportation system which would move vehicles instead of beverage crates. A persuasive vision.

Addressing car park operators, fleet managers and logisticians in the automotive industry alike, the promises to implement “comfortable efficient parking” and “automatically storing more” are supported by a wide and comprehensive range of services. In the preparatory phase, these include feasibility analysis, scenario simulation for performance ascertainment and planning of implementation. During the implementation phase, Serva Transport Systems will manage the adaptation of hardware and software to existing conditions and assume the project management. Continuous operation following the implementation is also carefully maintained. A high level of safety is guaranteed thanks to RAY™ being CE certified according to the EU Machinery Directive 2006/42/EC as well as its redundant design. The service program is complemented with staff training, proactive maintenance and a 365 day overhaul guarantee.

The tried and tested use of RAY™ in Audi plants and at Dusseldorf Airport proves that the “future of parking” is already our present. The intelligent factory and the maximum degree of capacity utilisation of valuable floor space are a reality. Fully automated parking robots are ready for use for all types of vehicles from small cars such as the Smart to luxury class cars such as the BMW 7 series or Audi A8. RAY™ even goes beyond the achievement of autonomous parking as the driver does not need to look for a space. In addition, RAY™ will park with absolute precision and with complete safety. Yet another advantage that the trendsetting parking system has over most drivers finding themselves under time pressure in the stressful and hectic environment of an airport or a city.

Carparks: From Logistics to Revenue Maker

Tom Cropper, *Editor*

Airport parking is a major problem, but if handled in the right way, the solutions can create new lucrative revenue opportunities.

Demand for parking spaces is increasing. Motoring organisations predict there will be more than 39 million cars on the roads in Britain alone by 2030

WANT TO make money? According to the website Your Money.com, one of the most interesting potential investment propositions could be carparks[1]. With demand growing, this is seen as one potential growth area, especially in places of high demand such as airports. As air traffic increases, parking is becoming a greater issue for airport operators. For most it is a question of handling capacity. More travellers will need more parking spaces, but with land at a premium something has to be done to increase capacity. Increasingly, though, a body of opinion is growing which sees the car park as a new revenue generating opportunity.

Car Usage Surges

The business thinking behind the YourMoney investment advice is sound. Demand for parking spaces is increasing. Motoring organisations predict there will be more than 39 million cars on the roads in Britain alone by 2030. The search for parking spaces is a major headache for drivers. Estimates in the US suggest around 30% of traffic is caused by drivers circling in search of a parking space.

The problem is a massive one for cities, but it's also a considerable issue for airports. The last three years have seen strong consistent growth for the first time since the credit crunch of 2008. After years in the doldrums, passenger confidence is returning and future predictions for growth are promising. IATA's 20 year forecast predicts that passenger numbers could reach 7.3billion in 2034 representing a 4% annual growth rate. Demand is coming from all over the world but particularly in the Far East and in growing economies such as Brazil and India. There is, of course, no guarantee that these predictions will come to pass, but the implication is that, without an unexpected event such as a global recession, passenger numbers will grow rapidly. Even though more travellers are choosing to use public transport to get to the airport, this increase in passenger numbers is still likely to push up parking demand.

The strain on capacity will be immense. Gatwick's, 2012 masterplan shows that it does not have capacity for its expected growth. The issue is most severe in parking where it has only 24,000 long-stay parking spaces. If air travel increases as predicted, demand for parking is expected to outstrip supply by approximately 20%[2]. The obvious solution is to expand the infrastructure and build new carparks, but doing so is difficult, expensive and controversial. Space is at a premium and any proposed expansion of an airport meets with considerable opposition from local communities.

Cutting Costs and Delays

The problems go further than just capacity. Customers are more empowered than ever before. Most have a choice of more than one international airport and they are likely to choose those which offer the best experience. Parking is one of the most severe causes of stress for passengers. Anything airports can do to reduce the time will improve the customer experience.

Moves are already being made in this direction. Airports around the world have moved to automatic parking, which allow passengers to pay on foot at machines without the intervention of cashiers. This takes less time and prevents bottlenecks and delays. Other systems make use of CCTV and internet technology to further reduce delays at the airport. The carpark management technology on offer from CP Plus, for example, allows drivers to book in advance and pay via mobile phones and computers. CCTV automatically reads number plates while also providing parking enforcement. The benefits come in faster transition times and fewer delays.

Making Money

Such systems also work from a financial point of view. Aviation is a rare beast – a rapidly growing market in which prices have progressively decreased over the last 20 years. Profit margins are slim, which means costs need to be saved everywhere. Automated parking and payment systems offer immediate benefits in that they remove the need for cashiers and so drive down payroll costs. Moreover, these can also prove to be revenue generating devices. Making money from aviation alone is becoming more difficult, which is why airports have turned to other sources.

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Speaking to Futureairport.com Colm Codd, Senior Vice President of parking at Dublin Airport outlined some of the reasons why parking was seen as offering opportunities.

"Parking is now a massive revenue generator for Dublin Airport," he explains. "Ireland, Australia, the UK and some of Western Europe have all moved to improve their parking income. Yet many airports in the US, Africa, the Middle East and Asia don't see parking as a real revenue generator; they see it more as an operational service that they have to support[3]."

Dublin Airport has been proactive in using automated systems, but others are going further. The issue of parking space has prompted entrepreneurs and innovators around the world to develop systems which can increase capacity, reduce delays and, more importantly, drive more revenue.

Baltimore/Washington International Airport is one of a number of hubs to have employed what it calls a smart parking system. Sensors embedded into the parking spaces in the carparks know when a space is unoccupied. It sends this information to a central parking management system which displays the number of spaces available in a carpark and on which floors. A red or green light over each space tells drivers if it is occupied directing them to an available parking space more quickly.

This represents a step forward, but it is only a small one in the greater scheme of things. Airports are now beginning to look at high tech systems which use robots to park the cars for passengers. The car can be left in a specially designed pod before robots take it away for parking. Premium services such as these are potentially valuable in driving more revenue and raising customer satisfaction levels.

Both these goals should be key for airport operators. Premium services open up a revenue stream which was previously missing. More than that, the ability to reduce delays eases stress and improves satisfaction. A 2013 survey into Airport Retail showed a distinct correlation between passenger satisfaction and growing revenues[4].

The data is there. The time has come for airport operators to pay serious attention to their carparks. No longer should they be regarded as logistical challenges. Instead they can become a revenue stream in their own right. Technology can increase the profitability of airports and streamline operations. What is more, there remains a gap between what the technology can do and what airport operators have taken on board. Closing this will play an important role in deciding where this technology goes next.

Robots and the Future of Airport Parking

James Butler, *Staff Writer*

How robots are revolutionising the parking experience for passengers and delivering substantial revenue gains for airports.

The benefits are clear: a shorter time frame between arriving at the airport and disembarking onto your flight, the ability to pay for only the exact amount of time spent in the carpark and a less stressful travelling experience

THE WAY in which we park cars at the airport is changing. And appropriately enough for any futuristic technology, it is destined to involve robots. Automated parking systems which make use of sophisticated robotics technology are increasingly being seen as the future. They help with customer satisfaction, improve revenue and save money. It looks, at first sight, like the stuff of science fiction, or a product for premium passengers only, but the truth of the matter is that this technology can apply to everyone – rich and poor alike.

Dusseldorf and Robots

In 2014, technology magazines quivered with excitement at the arrival of a new high tech robot parking system at Düsseldorf Airport. The idea was simple: passengers would no longer have to spend time searching out a parking space – they could simply drop off their car and let robots do it for them.

"Wouldn't it be nice if you could just have your vehicle magically appear? Well, if you're at Düsseldorf Airport in Germany you can," enthused Gizmodo at the time. "That's because RAY™, the parking robot concierge installed there, knows when your flight arrives, picks up your car in its mechanical arms and delivers it right to you."

The system allows you to drop your car off in a brightly lit pod which then scans its dimensions. A robotic forklift vehicle, catchilly entitled RAY™ then plucks up the car by the tires and takes it away for storage. By linking up with arrivals and departures information, the system also knows when you're coming back. It therefore collects the car and delivers it back to the pod in time for your arrival.

The benefits are clear: a shorter time frame between arriving at the airport and disembarking onto your flight, the ability to pay for only the exact amount of time spent in the carpark and a less stressful travelling experience. For airports, it addresses, also, space issues. With parking demand growing rapidly along with the number of passengers, this system makes much better use of existing space, packing cars tightly in multiple rows and multiple directions. It's the definition of doing more with less.

History

In many ways, this is the epitome of futuristic gadgetry. However, perhaps the most surprising thing is this technology is not quite as new or unprecedented as most people might think. The earliest use of automated car parking was in 1905 at the Garage rue de Ponthieu. An internal paternoster elevator transported a car to the selected level where it was parked by attendants. Throughout the 1920s in the USA, multi storey carparks featuring automated parking systems sprang up in cities such as LA, New York, Cincinnati and elsewhere. Today, modern versions of these systems are being used delivering a higher degree of automation and sophistication. For example, a new installation in LA uses technology to deliver fully automated attendant-free technology. The driver simply parks up, waves a key fob at a kiosk and the system takes care of the rest. Systems as these have obvious benefits to time-pressed businessmen who have the money to pay for the convenience. Unsurprisingly, they are now being seen as a good fit for modern airport travellers.

Parking is a time sensitive business. The deadlines one must hit in order to make a flight are tight. This is one of the major contributions to relieving passenger stress. A system which can simplify the process, reducing the time between parking the car and arriving at the boarding gate is invaluable. Today, such systems are becoming easier and more effective than ever thanks to the confluence of different complementary technologies.

Today's high tech system resembles, in many ways, those earliest products from 1905. Its basic

NEXT GENERATION AUTOMATED PARKING SYSTEMS FOR FUTURE AIRPORT OPERATIONS

method is the same. The driver drops off the car at a place of his or her convenience. It is then taken away and parked before being returned. However, whereas in 1905 the system relied on paternoster lifts and human parking attendants, today's relies on a sophisticated network of automated technology which conducts the whole process seamlessly.

Connectivity is the key to this process. The technology available has been available for some time. Where this product has come into its own is the ability of different systems to talk to one another. A major factor is the growth in the use of mobile phones. Customers can download a simple App with which they control the process. They can pay for the service via their credit or debit card, which then becomes their key. The system then connects to flight departure and arrival information to automatically deliver the car when the plane is due to land. It continues to function even if the flight is delayed. Continuously updated information allows it to adjust to the latest time schedule. So, if your flight is delayed, the system will react accordingly.

Dusseldorf's system is perhaps the most advanced currently in use around the world, but others are in the pipeline. Some are generic systems for use in multiple locations, while others were designed specifically with the challenges of airport parking in mind. They are sophisticated and do bring an additional expense. The questions being asked at the moment are – Do they work? Are customers prepared to pay a little extra? And is the ROI sufficient justification for the upfront capital investment?

The only real answers come through practical use. The early signs at Dusseldorf and elsewhere have been promising. Those early entrants are reaping the benefits by being able to generate additional income and to set themselves up as being technologically advanced and futuristic – all of which pays dividends for PR and marketing. As a relatively new technology it may be unproven but it represents one way in which airports can gain a critical edge over the competition.

Automated Car Parking: Is it Time to Upgrade?

Jo Roth, *Staff Writer*

Automated car parking is an exciting new technology, but can it help airports with their most overriding business priorities?

Automated carparks offer an enticing proposition: minimal effort and maximum convenience for customers and the ability to save money and make better use of space for airports

"DOUBLE, OR triple your car parking volumes." This is the bold claim typical of many providers of automated car parking services. These products, which offer complete stress-free parking though high tech robotics, provide clear benefits for the aviation industry. However, with only a few pioneering airports around the world having incorporated these systems, other operators may be torn. On the one hand, the costs of such installations are considerable, but on the other the benefits to the airport operations and the business as a whole have the potential to be transformative. This article will examine the key factors operators should take into consideration when planning a purchase.

Does the Money Add Up?

Automated carparks offer an enticing proposition: minimal effort and maximum convenience for customers and the ability to save money and make better use of space for airports. They work by allowing passengers to quickly drop off their cars and have them automatically parked by robots, then having them redelivered upon their arrival.

All of which is undeniably attractive. However, the most pressing questions are:

- Is it a pleasant luxury?
- Can it improve the airport performance?
- Will it make more money than it costs?

Of these, arguably the most pressing questions will surround cost. Each of these systems represents a considerable investment – new infrastructure, equipment and technology. For airports working within tight budgets and with profit margins already slim, the question will be, will its benefits justify the cost?

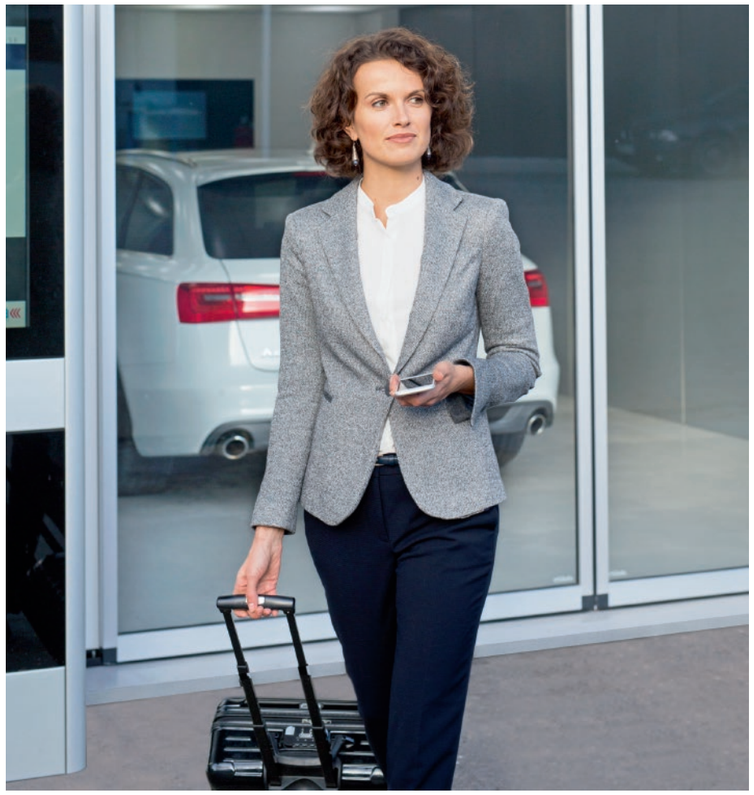
To take this step, operators will have to decide what it is they want the system to do. Are they looking to drive revenue, improve the passenger experience or make better use of parking space? Bringing all this together, they will be in a much better position to decide whether the capital outlay is worth the return on investment.

Will Passengers Pay?

For all the added convenience, there are problems. Using the additional benefits of premium automated payment options will cost money. Daily rates for premium robotic parking systems, such as the one at Dusseldorf, are inevitably slightly higher, than other conventional options. The question is whether passengers will see the convenience as being worth the money. In other words – how much is that added convenience worth?

So far, the early omens appear good. After an initial trial at Dusseldorf, the concept has become a major part of the airport's offering. More than that, it has generated positive headlines with press from around the world covering the product. This not only drives revenue but enhances the airport's reputation as a sophisticated global travelling hub at the cutting edge of technology. The attraction of technology such as this goes far beyond practicalities or convenience. It plugs into a very basic enthusiasm for all things high tech, creating an image of luxury and sophistication that improves the overall standing of the entire airport.

The benefits go further. Demand for parking is growing, as passenger numbers steadily climb, but space is at a premium. There is a limit to how far any airport can expand. With focus growing on airports' impacts on the surrounding environment and community, they have to make the best of the facilities they have. According to the manufacturer of Dusseldorf's system, this has the potential to increase parking capacity by 60% to 70%. The savings come in various forms. Cars can be packed more tightly in multiple rows and spaces can be narrower since cars do not need room for passengers to disembark. The more efficient use of space enables a more productive and cost-effective operation. From a cost perspective, therefore, the proposition appears to be highly compelling.



Does it Work?

As with any new technology, uncertainty will always exist about whether or not it can work in practice. In this respect, the developers of these systems need to overcome concerns from both the airports and the customers. Airports are naturally wary of investing considerable sums of money in products which are unproven. Passengers have a natural suspicion of automated technology. For some, distrust in technology is enough to overcome any of the benefits the system can bring. Any machine can go wrong, so the obvious question is: what happens if the technology experiences a glitch?

Is the sensor technology good enough to avoid the possibility of any damage to the surface of a car?

Ultimately, the only way to answer such concerns is for the system to prove itself. Introductory rates have encouraged first time users to take up the service and, as more and more airports adopt the technology, they are proving themselves in the real world. Equally, this is a new and evolving technology. Systems are being updated and continuously improved. Sensors are being refined offering greater accuracy and reliability. Deals are being struck which can make use of in-car technology and mobile Apps to offer more refinement to the passenger journey.

With the system at this early stage, the potential for further improvements is high.

Choosing Providers

Although this is a new technology there are already a number of providers. Much will depend on an airport operator's choice of solution. Some have developed software and systems which are capable of seamlessly integrating with existing systems and technologies. Others have more generic solutions which require significantly more upheaval and investment. The clear advantage lies with those providers who have developed systems tailor-made for the aviation industry as opposed to those for carparks or business clients.

The marketing of automated carpark systems bills them as offering transformative technology for passengers and airports alike. Ultimately it's too early to decide whether these new systems represent a new premium service available for high paying customers or if this is something which will offer a wider revolution in the way in which cars are parked and stored. Time will tell, but as the technology becomes increasingly more sophisticated and integrated, the future offers much more.

Automation: The Future of Airport Car Parking

Tom Cropper, Editor

Why smart parking and automation offer a signpost to the future for parking at airports.

As these systems start to refine their technology and demonstrate financial viability, they are beginning to open up a whole new world of opportunities

THE MARKET is currently full of entrepreneurs and businesses who are innovating new services designed to make parking easy. They range from number plate recognition systems, which make it easier to pay for parking, to valet services and robotic parking which do the difficult job of parking for you. As these systems start to refine their technology and demonstrate financial viability, they are beginning to open up a whole new world of opportunities. Airport manufacturers are beginning to embrace the concept of the carpark as a revenue generating tool – the next few years could witness a series of exciting new developments.

Smart Parking

Automated parking looks and feels very much like the stuff of science fiction, but it could become an everyday aspect of life in airports. This Report has already focused on the programme taking place at Dusseldorf Airport, where the technology has demonstrated successful daily use. Other systems do not rely on quite so much technology and instead make use of mobile technology to alert a human valet who then collects the car. Some use technology to help direct drivers to vacant parking spaces.

At various levels, these smart parking technologies could soon become the norm in airports. A report by Navigant Research suggests there could be more than a million smart parking spots around the world by 2020[5]. Those airports which adopt the best systems will steal a march on their competitors.

The Rise of Automation

Automation has also been used in a number of other areas. Automatic pre-booking parking systems use number plate recognition software to quickly charge drivers on exit. Auto ticketing systems have reduced costs and the amount of time it takes to get from the carpark. But it's the automatic parking services which have the potential to truly take the market forward. They give carpark management teams the ability to start generating revenue through premium parking services. Parking will then evolve from a logistical exercise to a revenue opportunity – and, in turn, this will increase the attention airports pay.

That would be a departure from the current situation where the majority of airports worldwide still have not embraced revenue opportunities in carparks. Their focus instead is on managing capacity, reducing the turnaround time from car to terminal and, where possible, encouraging more people to travel by public transport. As premium services increasingly demonstrate their value, attitudes can be expected to change, which will spark a rapid development in services and technology.

Those early adopters, therefore, may have gained themselves first mover status in a market of considerable potential. Their eyes go far beyond the aviation market – to town carparks, hotels, logistical companies and many others. But it's at airports where the need is demonstrated most clearly and it is here that the potential exists for big returns.

Refining the Technology

Even so, there is room for improvement. Automated parking systems are beginning to prove themselves in the real market. But with technology still in the relative early stages, much of the focus must now be on refining and perfecting the technology.

Sensor technology is already proving highly advanced. All the leading developers argue that their systems are already sophisticated enough to identify objects and to park cars in tight gaps with no scratches. Developments are constantly underway to improve the technology, reducing any risks of damage or accident and improving the accuracy of measurements. This will enable cars to be slotted into ever smaller gaps saving space and money.

Most of all, though, this technology needs to be accessible. Other systems have been used, such as Parkit in LA. This delivers fully automated parking services without the need for an attendant. Drivers use their key fob to activate the system which takes their car away. They can then also use their fob to activate the retrieval system on their return. However, to truly be useful, all systems need to be compatible, to make the fit as easy to use as possible. The use of flexible and adaptable software will play an important role in breaking down some of the cost barriers standing in the way of installation. This system is used in a regular city carpark and as such it's difficult to achieve the full scale automation you see with systems being introduced in airports.

One option being investigated is to achieve greater connection between different technological platforms. Serva Transport Systems who trialled and developed their automatic parking system entitled RAY™ at Dusseldorf Airport have announced plans to further develop the technology through co-operation with Volkswagen. Their cars will communicate directly with the automated parking system via Bluetooth to clarify any security queries which would otherwise have been dealt with at check-in.

Other mobile parking solutions come in the form of Bosch's parking assist App. This downloads directly to cell phones and allows cars to be parked via remote control from the curb side. It makes it easier for cars to be parked in tighter spaces even if they do not offer room to open doors. The attraction of this App is that it enables cars to be packed together more tightly and into smaller spaces, allowing carpark operators to improve space utilisation[6].

Some of these technologies are already here and in use. Many are very new and more are on the way. The market is perhaps at the stage where innovators have identified a problem and an opportunity – namely an increasing demand for parking spaces. They are developing new systems to cater to this market and, as they prove to be successful, they are reaching the attention of airport operators. Increasingly, they seem willing to fully embrace the exciting opportunities they bring and, as they do, their investment will spur innovation forward at an accelerated pace.

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