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A note from the editor

Welcome to the Spring 2020 issue of *Airside International*, whose theme is the environmental impact of airport apron operations and how that impact can be mitiugated. In particular, the conversion of GSE to electric power is a frequent feature within the pages of this magazine.

In Megan Ramsay's examination of the changing world of high lifts and loaders, she looks at how suppliers of these specialised forms of GSE are increasingly moving to electric-powered options for environmentally conscious customers.

Meanwhile, Goldhofer has supplied one of its F11e electric tugs into a local German gateway, indicating that suppliers of many other types of GSE are seeing increasing demand for non fossil-fuel-powered equipment.

Airports and airlines are playing their part too; we have seen Etihad Airways and Brussels Airport collaborate recently on a special 'eco-flight' between the capitals of the UAE and Belgium, while dnata has turned around a flydubai flight at Dubai International Airport using only what it describes as 'zero-emissions' GSE.

Elsewhere, autonomy is another subject of investigation this Spring. Rob Coppinger investigates the potential of electric autonomous vehicles, while the editor was at Toulouse-Blagnac Airport to see the first public display of an autonomous baggage tractor demonstrating its capabilities on the French airport's apron.

Also recently, Aurrigo – best known for its autonomous baggage dolly that has undergone trials at London Heathrow Airport's Terminal 5 – has developed a system to alert a dolly driver to unsecured baggage: a not insignificant problem on the ramp.

Numerous other technological developments are considered in this issue of *Airside*. Transpoco has worked closely with manufacturer Schmidt on a bespoke de-icing monitoring solution for Dublin Airport Authority, while Israel's hoopo looks at the way asset visibility technology can be used to improve the efficiency of airside operations.

Fascinating work is being done by Sarcos Robotics of the US on easing the burden for workers in the aviation and other industries that need to move heavy loads on a regular basis. It is collaborating with Delta Air Lines on applications that might be of interest to the US carrier as regards its innovative Guardian XO exoskeleton.

Tri-Logical Technologies is offering GSE operators another weapon in their fight against ramp rash – collisions on the ramp involving GSE and aircraft – while a number of GSE suppliers have announced new product designs or improvements to existing lines. Mallaghan, for example, is to supply a large number of customised maintenance platform lifts (MPLs) to Delta, while Western Global is now marketing a range of transportable fuel tanks designed with the demands of the aviation industry in mind.

Finally, we talk to both ADELTE and Aviramp about the world of the airport boarding bridge and aircraft access infrastructure, while ramp training procedures and GSE leasing form two of the subjects of the bigger feature pieces within this issue.

We hope you enjoy the issue.

Mike Bryant
Editor
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TEXTRON GSE

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Loaders go electric

Climate change – and the contribution of flights to global CO_2 emissions – is top of the agenda across the aviation industry. And that includes the ground operations at today's ever-busier airports, where electric loaders are becoming increasingly common. *Megan Ramsay* reports

It is widely accepted that aviation contributes 2% of the world's manmade CO2 emissions. Measures such as investing in newer, more efficient aircraft can mitigate the carbon footprint of flights, but the equipment that serves an aircraft while it is on the ground is just as important.

Indeed, the International Air Transport Association (IATA) includes a Ground Support Equipment and Environment (GSEE) technical group, which focuses on the technical, functional and safety aspects of GSE as well as the impact that equipment has on the environment.

In this context, it is hardly surprising that the main trend in the high lifts and loaders market – as is the case for other types of GSE – is electrification of the equipment.

According to TREPEL managing director Carsten Schimkat, the main drivers of this trend are not only the increasingly stringent emissions standards (and noise regulations) that apply to airside operations, but also customer demand for cleaner, greener equipment.

Like other GSE manufacturers, "We are keeping pace with these requirements by electrifying our equipment," Schimkat sums up simply.

"The latest developments are the towbarless tractor, the Charger 380 – and the electric version of our 14-ton loader, the Champ 140."

TREPEL's new electric tractors and loaders, which use well-established 80V technology and infrastructure, offer similar performance to diesel-operated equivalents, with zero emissions, low maintenance requirements and long autonomy.

The Champ 140 electric loader combines the advantages of a lower and maindeck loader with excellent reliability, TREPEL says. The unit can handle all pallets and containers up to a weight of 14 tons and a length of 20 feet at lower and maindeck level.

TREPEL describes the Champ 140 as "the workhorse amongst the maindeck loaders". It has been delivered to more than 100 countries.

Among the users of TREPEL GSE today is Hong Kong Air Cargo Terminals Ltd (Hactl). Paul Won, general manager – operation services, notes that most of Hactl's loaders are now TREPEL Champ variants.

"Hactl only operates new equipment – sometimes purchased outright and sometimes leased," he says. "We currently operate 16 maindeck loaders, varying in capacity from 14 to 30 tons, and 16 lower deck loaders, with 7-ton capacity."

Growth

At the moment, the handler is undertaking a GSE fleet replacement programme, under which some of its older equipment will be retired and replaced. Additional units will be introduced to the fleet in response to the changing nature of the cargo moving through Hactl's facility, as well as its increasing workload.

"As part of this process, a new maindeck loader with a larger 35-ton capacity has

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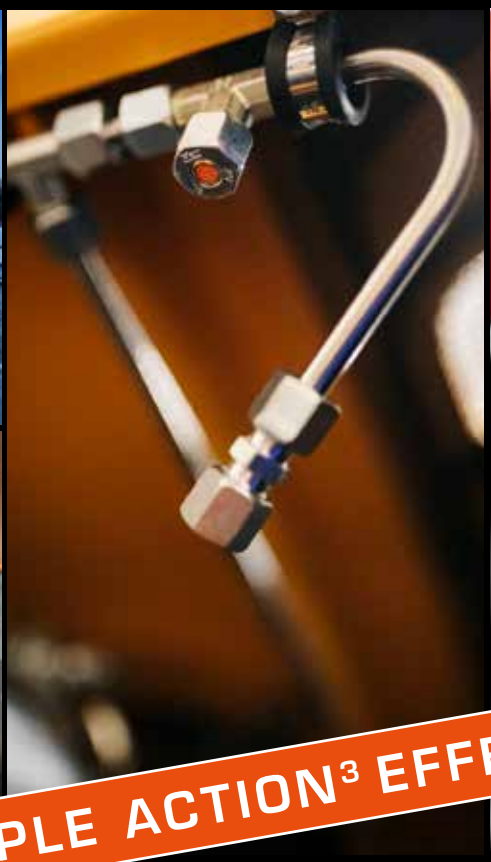

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been purchased and will enter service during the first quarter of 2020," Won reveals.

"Hactl's ramp handling business is the fastest-growing area of its operations, as we are currently the only handler in Hong Kong which can provide both terminal and ramp handling for freighter operators," Won goes on. "This all-in-one service is finding increasing appeal among carriers."

In fact, on 3 November last year, Hactl handled no less than 104 freighters in a single day – breaking its previous record of 102, set on 5 November 2017.

Of the total, 88 freighter flights were fully handled by Hactl, both on the ramp and in its SuperTerminal 1 facility.

Hactl chief executive Wilson Kwong says: "To have successfully processed 104 widebody freighters in just 24 hours is a clear illustration of the immense scale of our operations and resources.

"Recent new business wins, together with growth in demand ahead of Thanksgiving and Christmas, have come together to achieve this impressive result," Kwong remarks, highlighting the hard work of the Hactl team in ensuring that every aircraft was turned around on time.

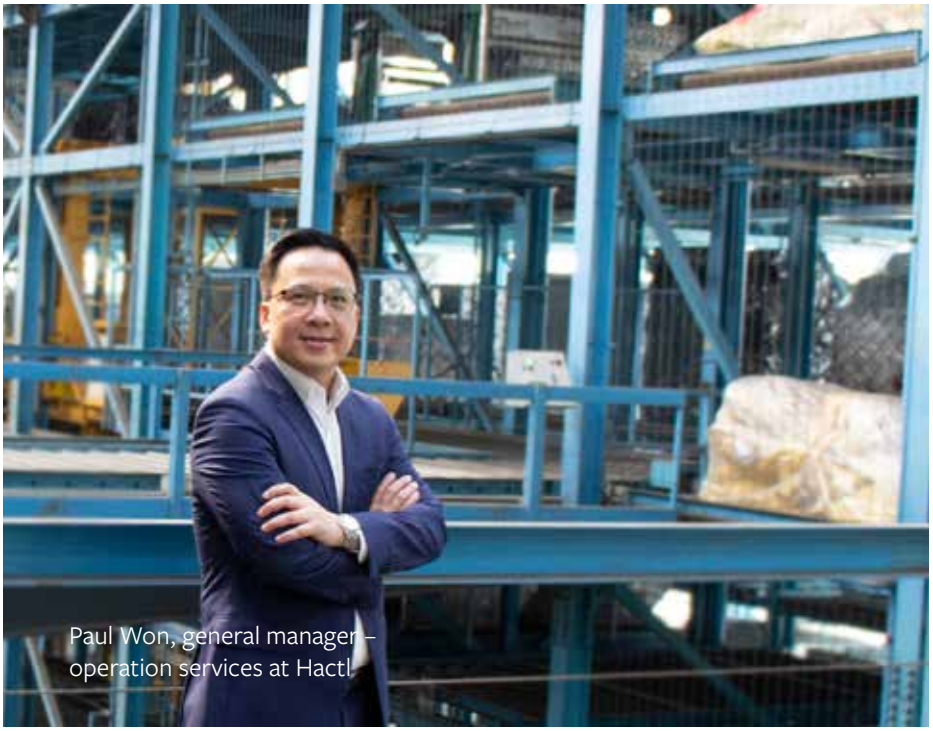
"With anticipated continuing growth in this area, further improving our efficiency – while also paying proper attention to our environmental impact – is a high priority. We'll continue to innovate and invest in this aspect of our business, as we do in all other areas," Won adds.

Swissport, meanwhile, is also focusing more and more heavily on electric GSE. Between 2016 and 2018, the handler increased the number of electric units in its fleet from 925 to 2,420 vehicles, including electric cargo lifters and battery-powered aircraft pushback tractors.

In its 2019 Sustainability Report, Swissport says: "The workhorses of the air cargo industry on the ground are the high loaders, maindeck loaders and other mobile platforms that can lift cargo containers and pallets into the bellies and tubes of passenger and cargo aircraft. In just a few minutes, lifters can transport over 100 tons of payload to the largest cargo aircraft. And here, [as elsewhere in GSE], electricity has started to replace diesel.

"A common model, the Champ 70, made by TREPEL, can lift up to 7 tons of freight to a height of 5.6m – in just 12 seconds," the handler continues. "This allows it to easily reach the belly cargo holds of all passenger aircraft. The quiet energy comes from a battery with a capacity of 37kWh. This corresponds to the battery capacity of a current mid-range electric car."

The first electric Champ 70W with lithium battery was exhibited at *inter airport* Europe in Munich in 2009. At the same show a decade later, TREPEL presented its



Paul Won, general manager – operation services at Hactl

Most of Hactl's loaders come from TREPEL

reconceptualised electric Champ 70We NEO. The unit's tripartite power system allows longer use of battery power, and energy can be recuperated when lowering the main platform.

Other options on the market include JBT AeroTech's Ranger electric loader and its Commander 30i electric loader – an environmentally friendly all-electric variant of its popular Commander unit.

Eric Born, president and CEO at Swissport, notes: "Ultimately, sustainable business contributes to positive results and to value creation, increasing our flexibility to invest in environmentally friendly equipment and in social matters.

"With our ambitious multi-year fleet modernisation programme, Swissport will further raise the share of electrically powered vehicles to at least 50% by 2025 and continue to reduce its carbon footprint."

Overall, however, Won at Hactl does not feel that manufacturers of cargo lifts and loaders are developing their products fast enough and in the right way to keep up with what their customers are trying to achieve.

He explains: "The availability of environmentally friendly technology in cargo loaders is currently disappointing. There is not yet enough choice, particularly in electrically powered loaders with higher capacities (up to 35 tons), which are essential to our operations.

"Token adoption of new technology is not enough: obviously, any new equipment must have at least the capabilities of the older designs it replaces, and it must also be competitive. We hope to have more a competitive environmentally friendly GSE product range available in due course."

Transferable technology

In fact, although there is still some way to go, manufacturers of all types of GSE are certainly moving towards more environmentally friendly equipment using electrical power and other low-emissions power sources to replace diesel power. This is increasingly evident in forklifts, passenger steps, belt conveyors and tractors, for example.

And while, as Won points out, the development of cargo equipment is lagging behind other types of GSE, developments from one area are naturally likely to be adopted elsewhere, just as technology has moved from consumer markets to the airside environment.

Thus: "We anticipate that driverless vehicles and automation will begin to be seen in GSE in the foreseeable future," he says. "Hactl has been taking the first steps in preparing for this, by digitising and automating current information and processes through the use of mobile computing apps."

Back at TREPEL, Schimkat is confident that the trend for greener GSE will continue. "There will be more and more electrification due to the emission requirements" across all types of GSE, not just loaders.

TLD Highlights

Among developments during 2019, TLD notes that "The GSE industry's move towards electric powered equipment has intensified greatly within the last year with airport and country initiatives being a contributing factor."

TLD's 838-reGen electric 7-ton loader is widely popular. Its energy regeneration system, which harvests energy during the platform lowering process or during deceleration, uses super capacitors to prolong battery longevity. The unit can operate for a full day, making it comparably to a diesel equivalent. TLD has expanded its reGen family to include a 14-ton electric loader, the 929-reGen, which uses 80V Li-ion batteries.

TLD also highlights its iBS system: "a modular concept that consists of 80V DC, 277Ah [battery] packs, rated at IP 67, that can be paralleled to increase capacity for more demanding applications". The iBS system is compatible with all TLD electric GSE including its TXL-838 reGen, TXL-929-reGen and TXL 737-E aircraft loaders.

Plus, TLD says it has developed a retrofit version of its Aircraft Safe Docking System (ASD) that can be installed on TLD or third-party equipment, including belt loaders, cargo loaders and passenger steps, to reduce the likelihood of aircraft damage.

"TLD has also recently developed the ASD+ system, which allows for even safer cargo loader docking through automated steering to the aircraft doors," the company says in its 2019 highlights. "As per the ASD system, ASD+ is becoming available on new equipment as well as for retrofit," it points out.

Hactl's efficiency is critical to Hong Kong International Airport's operations

For instance, electric versions of TREPEL's aircraft tractors, Challenger 150 and Challenger 280, are already available. Among the feedback emerging with the expanding establishment of electric GSE: "We have noticed that longer distances are at the expense of the battery and lead to a higher power consumption," Schimkat observes.

Other considerations

While environmental performance is a top priority for handlers today, they have other things to consider when selecting loaders.

Emirates Airline, for instance, created a special catering high loader to serve its A380 aircraft. The unit was designed to lift safely over the wing and extend to reach the fuselage, so as to accommodate the upper first-class galley without tipping over and damaging the wing, Emirates outlines.

And just recently, with regard to another specific application, Delta Air Lines opted for bespoke maintenance platform lifts from Mallaghan Engineering (see story elsewhere in this issue for full details).

Dungannon-based Mallaghan says its MPL22, MPL22t and MPL32 models are available as electric, gasoline, or diesel options and are suitable for use across a wide range of aircraft, including widebody jets.

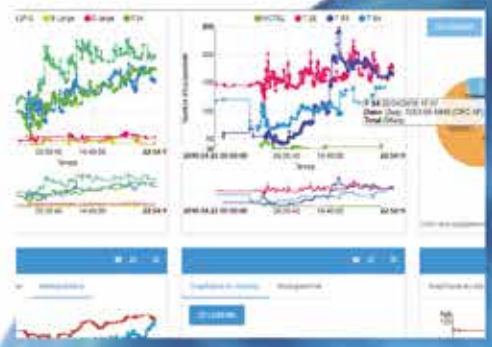
When selecting loaders of any type, it is very much a case of finding units that tick several boxes. As Won says: "Increasingly, we are looking at equipment that can deliver what we need, while also enabling us to reduce emissions."

Hactl's very high volumes of traffic, its round-the-clock operations, its large customer base (comprising over 100 airlines) and the fact that its ability to operate quickly and efficiently without interruption is critically important to Hong Kong International Airport's overall operations, all mean that the handler places reliability above all other considerations, Won says.

Plus: "Safety is also of great importance to us. Hactl is quite prepared to invest in equipment that addresses all these requirements, and will continue to do so when it supports continuous improvement in our operations."

Won feels GSE manufacturers are well aware of what their customers need – even if developments are not always as quick as might be desired.

On the other side of the equation, airlines must trust their handlers to select the correct equipment for the required function, keep it properly maintained for reliability and safety, and ensure it is operated in accordance with best practice by fully trained and experienced staff.



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Playing the long game

Competitive life cycle costs and reductions in environmentally harmful emissions are encouraging the adoption of electric GSE, but the process of introducing fully autonomous vehicles will be a long journey. *Rob Coppinger* examines the issues

In late September last year, US low-cost carrier (LCC) JetBlue announced that it would be converting its baggage tractors and belt loaders fleet to electric power to help reduce noise, improve energy efficiency and lessen JetBlue's environmental footprint: all reasons that GSE operators frequently give when turning to electrification.

The LCC is rolling out the largest fleet of electric ground support equipment (eGSE) of any airline at New York's John F Kennedy International Airport (JFK). All the equipment is being purchased and will be fully owned by JetBlue.

Switching a large part of its GSE fleet – more than 40% of it – at JFK from diesel to electric power will cut 1,700 tonnes of carbon dioxide emissions, reduce fuel consumption by 200,000 gallons a year, and facilitate cost savings of more than $500,000, the airline estimates.

JetBlue's investment has also received government backing. The installation of 38 charging hubs with 118 charging ports gained financial support from the Port Authority of New York and New Jersey (PANYNJ) through the Voluntary Airport Low Emissions (VALE) Program, which offers Federal Aviation Administration (FAA) grants.

The grant covers 75% of the charging stations' cost. The 118 ports will charge the new fleet of 59 electric bag tugs and 59 electric belt loaders. VALE grants are awarded to airports to help them improve air quality and provide air quality credits for future development.

"Our strategy right now is to prioritise airports where we can partner with airport authorities for funding and also places where there are regulations ahead of the [nationwide legislative] curve," says JetBlue's manager of sustainability and environmental social governance, Sarah Bogdan.

TREPEL offers a range of electric GSE

She adds that California is one such area. A large percentage of JetBlue's GSE fleet in California is already electric because the state government there has more stringent requirements than those of other US states. "The operation there is also really good for electrical vehicles," Bogdan observes.

JetBlue does not have plans to move to 100% electric GSE at its US airports though. Bogdan explains that not all GSE vehicle types have proven electric alternatives, and some do not fit into how the airline works at certain airports. And while converting all baggage tugs and belt loaders system-wide is something that the airline could do, as Bogdan points out. "We have units only a few years old, so it does not make environmental or financial sense to take them out of service early."

As equipment comes to the end of its useful life, however, replacing units with electric-powered models makes more sense. Thus, in February last year, United Airlines and the Chicago Department of Aviation announced that they were to spend more than US$1 million buying new electric ground support equipment with help from the Environmental Protection Agency (EPA), replacing diesel vehicles at Chicago O'Hare International Airport.

Support for such projects from the US government has a long history. In 2014, Seattle-Tacoma International Airport set out to install 576 charging locations by September of that year as part of its efforts to save $2.8 million on fuel costs as well as about 10,000 tonnes of annual greenhouse gas emissions.

A $31 million project, it received $5 million from the US

Government's Department of Energy and a further $3.5 million from the FAA. In January last year, United announced that it was introducing ITW GSE 7400 electric ground power units (eGPUs) at Los Angeles International Airport, reducing noise pollution and cutting its GPU carbon dioxide emissions by 90%.

Now its efforts are underway at JFK, the next step for JetBlue is "a significant fleet of eGSE" to be introduced at Boston Logan International Airport this year (2020). JetBlue has been operating eGSE for its ground operations in Long Beach, California, while Logan has already been a recipient of government support for eGSE.

In December 2018, EPA awarded a $541,817 grant to the Massachusetts Port Authority to replace diesel-powered GSE in operation at Boston with the goal of replacing all such equipment with available electric alternatives by 2027. If achieved, this is expected to reduce non-aircraft emissions at Logan by almost 40%.

The month before JetBlue announced its JFK plans and their expected benefits, across the Atlantic British Airways (BA) had publicised the outcome of two years of electric pushback tug use. Over that two-year period, approximately 100,000 of its aircraft had been pushed back using the fully electric tugs of Mototok, rather than traditional diesel tugs.

The British flag-carrier now has 25 Mototoks operating at its short-haul aircraft stands at London Heathrow International Airport's Terminal 5. In its August 2019 announcement, BA said that pushbacks formed part of its long-term plan to reduce emissions from all vehicles at Heathrow.

BA's pushback operators use the

JetBlue has invested in electric GSE

British Airways is using remote-controlled electric Mototok tugs at London Heathrow Terminal 5

remotely controlled Mototok Spacer 8600 while wearing a wireless headset to keep in direct contact with the pilots on board an aircraft as it is pushed out to the runway.

Handling change

Airport ground services provider Swissport has been amongst the big handlers switching its GSE fleets to electric. "When through-life total cost of ownership (TCO) is considered, our deduction is that lithium-ion powered GSE offers a compelling case for power, due to the reduced maintenance and fuel costs [that are achieved]," says Swissport vice president global fleet management David Burgess.

He explains that the cost differentiation between fossil fuel-powered GSE and electric GSE is quite marginal for assets that use lead-acid batteries; moreover, there is an increased cost for units that are powered by lithium-ion battery packs, but the lower overall TCO makes the difference. "And not forgetting the positive environmental impact of reducing our carbon footprint and reduced noise pollution on the ramp, making the working environment far more pleasant for our staff," he adds.

On 16 October 2019, Swissport had 2,581 electrically powered vehicles in its fleet, or 15.7% of its 16,393 motorised assets. The target number for electric GSE is almost 8,200. Swissport has ordered more electric GSE to meet its fleet strategy of having 50% electric-powered GSE by 2025. The handler's wide-ranging GSE fleet includes electric cars, baggage tractors, belt loaders, cargo loaders, forklifts, passenger boarding stairs and passenger buses.

"Our most populous asset that is electrically powered is baggage tractors. And Swissport has 1,540 baggage tractors at 91 stations worldwide," Burgess explains.

"[Airport] stations are focusing more on demand planning so that we 'right-size' the fleet to meet operational demand. It follows that our fleet size will fluctuate; so, we don't get hung up on a specific figure," he says. Burgess also points to the ground handling and cargo operating environment being "quite dynamic", with regular fluctuations in asset holdings.

Rise of the robots: remote control

Swissport has also started using electric lithium-ion powered GPUs in tests. "We have trialled a number of electrically powered products, recently including a remote-controlled pushback," Burgess says, "increasing the probability of achieving turnarounds in the future using only eGSE."

Another example of remote-control GSE can be found in French GSE supplier TLD's TPX-100-E, an electric towbarless tractor designed to push back commuter and single-aisle aircraft. The TPX-100-E can now be operated by remote control and the technology was demonstrated on an EasyJet A320 at Gatwick Airport in October last year.

There is also the TaxiBot, which Israel Aerospace Industries developed as project leader and which TLD manufactures. An aircraft's pilot controls the TaxiBot, an electric vehicle that attaches itself to the aircraft's nose gear and drives the aircraft to its runway, without resorting to use of the aircraft's jet engines. This began operation at New Delhi International Airport in October 2018.

A different example of an autonomous vehicle is EasyMile's TractEasy, an autonomous electric tow tractor. Based on TLD's Jet 16 product, the TractEasy can drive up to 25 kilometres per hour, has a maximum traction capacity of 25 tonnes and employs laser radar, cameras, satellite navigation, inertial measurement units and odometry to navigate a pre-mapped area. It can be used indoors or outdoors, and is designed to operate alongside cars, pedestrians and bikes. A fleet of TractEasys would be run from a single control centre.

Swissport is looking to become an operator of autonomous GSE. Burgess notes: "Autonomous GSE is very much on our radar. Indeed, Swissport recently had a close collaboration with an airline and GSE manufacturer who has developed an autonomous passenger boarding stair capability."

Burgess explains that Swissport is closely monitoring developments. Burgess thinks that the industry needs "a little more time to develop a strategy and business case for autonomous GSE on the ramp." But, he's confident that autonomous, electric GSE is part of the ramp of the future, and Swissport is monitoring developments closely.

Whether electric or fully autonomous, the combination of eGSE product maturity, availability of charging points and various other operational considerations all represent constraints on the full adoption of electric alternatives, even with government grants that can ease the financial burden. As in the case of privately owned cars, electric power is increasingly associated with autonomous operation in the GSE arena and there remain some questions surrounding airside electric vehicles and self-driving robots.

"Our strategy right now is to prioritise airports where we can partner with airport authorities for funding"

Sarah Bogdan,
JetBlue

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Optimising runway de-icing operations

Transpoco, a Dublin, Ireland-based telematics and aviation fleet management software provider, has developed a bespoke de-icing monitoring solution for a major airport client – Dublin Airport Authority (DAA) – in collaboration with GSE vehicle manufacturer, Schmidt

Transpoco's technology solves two problem for Dublin Airport's operator: the lack of visibility of vehicles moving around the airport; and the lack of a digital record of where, or how much, potassium acetate is being used in the Schmidt de-icing equipment clearing its paved areas.

The airport team has also been unable to robustly report the completion of all necessary de-icing work to airport operations and environmental agencies as and when required.

Thus, says Andrew Fleury, CEO of Transpoco, the airport operator approached Transpoco to provide a telematics solution for its de-icing vehicles, as it was aware of similar Transpoco technology having been implemented on many government (specifically local authority) vehicles in the past.

Schmidt de-icing sprayers were already fitted on the airport vehicles and, following a review of what was required, Transpoco recognised that to extract the specific data and reports requested by DAA, they would work with Schmidt to create the correct operating software on the vehicle control units and then integrate all the necessary supporting technologies.

Transpoco hardware is connected to the Schmidt control unit via a specialised wiring harness. This harness gathers the output data from the control unit and then the telematics device transmits this information in real time back to the Transpoco operating system for interpretation and updating on the cloud-based software platform.

End-users can then review data in near real time and run specific reports based on selected time, location or vehicles.

To successfully integrate the Transpoco monitoring technology, the software on the control systems in the de-icing equipment had to be updated so that the data feed was compatible and readable by the Transpoco devices.

As a result of the installation of the new technology, the DAA operations team is now able to provide accurate, real-time reports of usage and coverage on site to ensure aircraft stands, aprons and roadways are treated appropriately and in a timely fashion.

Fleury observes: "The development of this bespoke technology is another example of how Transpoco can adapt its product to the many varying needs of the aviation world."

The co-operation with Schmidt also demonstrates how the Transpoco team can form productive partnerships to deliver the ideal solution to the customer, he suggests.

Moreover, Fleury points out: "Thanks to our skilled development team and the opportunity to adapt a vehicle manufacturer's software, we have produced a solution that can be offered to the industry at large".

Design and development

Transpoco initially started working on the airport de-icing technology around the autumn of 2018, and the new system went into operation during the 2018-19 winter season, Fleury recalls.

"The principle of the Transpoco telematic technology was already in use on many local authority vehicles and it was adapted to deal with the specific de-icing issues that are involved in airport operations.

"One of the biggest issues that needed to be addressed by the airport operator in this case was efficiently managing the use of glycol. The airport wanted records, hard data and evidence of when and where glycol had been spread on runways and ramp.

"Environmental protection and financial efficiencies can be achieved by reducing misuse and leaching of glycol and provide information to help aircraft operators on the airfield," he points out.

Furthermore: "The data available on the Transpoco platform is not just limited to glycol levels. With the combination of telematics data from the vehicle and data from the Schmidt control unit, we can show not just where the glycol was spread but [also] concentration levels and other factors.

"When you combine this data with the information from the telematics of the vehicle including operator details, journey taken, speed of route, idle locations, etc, you can provide powerful insight into how the winter maintenance operations are performing."

The Transpoco technology is now installed on the Schmidt Airport Sprayers (20m, 24m and 45m) at Dublin. The airport vehicles are Mercedes trucks with Schmidt de-icing equipment installed on them. But, beyond this gateway, Fleury considers that the system is "likely to be taken up at other airports over time and can be adapted to all types and makes of de-icing equipment".

In fact, he says: "The technology can be used on other de-icers – the path that extracts data was made specific to the Schmidt equipment in this case, but the boarding can be used on any other manufacturer.

"Customisation is likely to be required to a certain extent in each new case, but the de-icers have an operating unit that controls spread rate and the Transpoco telematics unit can interpret and transmit the data off the control unit, so it can also be applied to any other equipment."

Fleury confirms: "The de-icing telematics was defined by the airport operator and built by Transpoco and is therefore proprietary to Transpoco."

Building on past experience

Transpoco had previously worked with Schmidt vehicles on behalf of its county council clients, which have used Schmidt equipment in their winter maintenance fleets.

However, this was the first time that Transpoco had worked with Schmidt on airport vehicles, and the collaboration "demonstrates how its technology can be adapted to any equipment", says Fleury.

And he concludes: "Transpoco is not aware of the development of this exact telematics solution being used anywhere else."

Transpoco has technology implemented in over 60 different countries and at airports in cities including Madrid, Barcelona, London, Paris, Lisbon and Brussels, as well as Dublin.

Autonomous baggage tractor displays its capabilities

In December, *Airside International* was at France's Toulouse-Blagnac Airport to witness the first public demonstration of the AUTONOM TRACT AT135 autonomous baggage handling unit, based on GSE supplier Charlatte Manutention's T135 baggage tractor. The five partners in the programme – Charlatte Autonom, Air France, Toulouse-Blagnac Airport, TCR and G3S – were also on hand to offer their thoughts to the assembled media

"The autonomous baggage tractor could be a breakthrough in terms of technology on the ramp"

Jan De Leeuw,
TCR

The live demonstration of the still-in-development autonomous baggage tractor at Toulouse-Blagnac last year followed some weeks of testing at the south-western France gateway. These trials have continued into 2020, but the demonstration in December reflected how far the partners have come with the unit, which is designed to "improve baggage flow performance and ramp safety at airport hubs".

The AT135 is being marketed under the auspices of Charlatte Autonom, a joint venture of GSE supplier Charlatte Manutention and French autonomous driving systems specialist NAVYA, but development has taken place in collaboration with not only Toulouse-Blagnac Airport but also French flag-carrier Air France, French ground handler Groupe 3S (G3S) and Belgium-based GSE leasing and maintenance specialist TCR.

AUTONOM TRACT has been seen before. The project dates back to Autumn 2018 when NAVYA and Charlatte Manutention announced they would create a subsidiary to develop autonomous tractor solutions, particularly for moving baggage at airports. However, it had only been publicly seen prior to the December demonstration as a stationary unit, so that event represented a significant step forward.

Charlatte Manutention's T135 baggage tractor has a proud history. There are thought to be more than 12,000 T135s in operation around the world, so the basic platform is certainly sound. NAVYA brings its expertise in autonomous driving, especially its expertise in the software required for safe and efficient autonomous vehicle control.

In fact, about 130 NAVYA autonomous shuttles are currently in service at locations as varied as university

The Charlatte Autonom autonomous tractor being demonstrated at Toulouse-Blagnac Airport

campuses, city centres and business parks, informs Diego Isaac, head of marketing at Charlatte Autonom.

Origins

Bastien Devaux, Charlatte Autonom's managing director, takes up the story. He recalls that much of the driving force of the AT135 programme came from Air France, which – having taken a glimpse into the ramp of the future – wanted to investigate the potential of autonomous vehicles playing a role in its aircraft turnarounds.

Joining the programme alongside Toulouse-Blagnac Airport, which has always been a 'pioneer' in terms of introducing new technologies, he says, was G3S, which handles many Air France flights, while TCR added its expertise in GSE operation, development and maintenance.

The operational trials that, at the time of the demonstration in early December, had been running for a couple of weeks and were to continue until the end of the year prior to a further phase of trials expected to begin in 2020, had benefited from the input of all these partners, says Devaux, and this was evident in the successful demonstration.

That took the form of an AT135 driving autonomously up to the stand from its parking station (following a pre-programmed course as set by a G3S handler).

The autonomous vehicle does not actually go right onto the aircraft stand: it stops just off the gate area and sounds a horn to alert a relevant nearby operator that the unit has arrived and is ready for further deployment.

The operator then sits in the cabin and turns the unit over to manual control. He/she drives the AT135 up to the aircraft, where a baggage loader can be fitted and bags then taken from the aircraft (or put into the hold, of course, in the case of a departing aircraft).

The process is reversed once bag transfer is completed. The operator drives the AT135 to the appropriate spot just off-stand and then, getting out of the vehicle, switches the unit to its autonomous configuration. The vehicle drives itself away to the baggage hall.

As shown when serving the Air France A321 at Toulouse during the demonstration, the vehicle in its autonomous driving mode can slow or stop when other GSE traffic represents a potential interference, and also comes to a halt on any stop lines on the apron.

So, how does it work? The unit is pre-programmed with a map of the apron and knows where it is on the ramp at any given moment through GPS technology. Cameras and Light Detection and Ranging (better known as LIDAR) offer 360-degree vision around the vehicle, providing data to the vehicle's control system as to potential hazards, while GPS and an odometer that measures the distance the unit has travelled constantly feed the

control system relevant information. The vehicle also interacts with traffic signals on the apron.

The autonomous driving concept has been proven, Devaux remarks, and not only with the AT135. NAVYA's autonomous shuttles have already been demonstrating for some time that efficient and safe autonomous driving is perfectly possible in a wide range of locations and working environments.

Although further testing on-airport is still needed for the AT135, to introduce it to different airport aprons and to different weather conditions, Devaux is very confident of its future applicability to ramp operations. The unit has already gone through hundreds of hours of testing, he points out, and different weather conditions have not caused any problems.

Because it employs a range of sensors and systems to discern and assess the area around it, the AT135 is not dependent on just one sensor type that might fail in certain weathers, Devaux notes. Yet, as a precaution, if the control system senses that it does not have the necessary information to proceed safely, it will come to a stop.

TCR expertise

TCR has been offering its experience and expertise to the AT135's development and trials. It has its own operation at Toulouse and has looked after the day-to-day maintenance of the unit, informs Thierry Mortureux, who is responsible for the Grand-Ouest region of France for TCR.

TCR has been collaborating with Charlatte on this programme since the beginning of 2019. It has provided input in regards to all sorts of aspects of the testing programme, says Mortureux, including but not limited to helping to define requirements the tractor should meet, technical specifications and development, the path that the AT135 ought to take between baggage hall and aircraft stands, and even the branding on the demo unit, as well as everyday maintenance.

With regard to the unit's requirements, "We see and talk to a lot of [GSE] customers and we see the potential for technological innovation such as this," says Jan De Leeuw, group commercial director for TCR, who is also the company's regional director for Belgium, the UK, Ireland, France and Italy.

He continues: "From our experience, the autonomous baggage tractor could be a breakthrough in terms of technology on the ramp." TCR is, De Leeuw emphasises, more than happy to invest in adding this sort of capability to the GSE fleets that it offers its customers, though of course there is always some risk involved with such ventures.

Certainly TCR's customers have been asking for this kid of technology, he confirms. Big airlines operating through

At the press conference, Charlatte Autonom managing director Bastien Devaux is in the middle

"This test is the first step towards a more widespread roll-out of autonomous vehicles at our airports"

Vincent Euzeby,
Air France

big hub airports (such as Air France) tend to be particularly keen – it is at the major gateways that the most significant cost savings might be realised in terms of autonomous operations. Another benefit might be seen in terms of safer driving, leading to less damage to GSE on the ramp, a significant consideration for those who operate large fleets of GSE.

Further testing at Toulouse is likely to be complemented by trials at other locations. There are ongoing negotiations with AENA, the Spanish national airport operator, to see if one or more Spanish gateways might act as test sites. Medium-sized, busy gateways would be ideal, as opposed to the likes of Madrid or Barcelona.

Of course, customers need to buy into the new technologies, while all sorts of regulatory requirements must be met (at the airport, local and national level) for any autonomous driving system such as this to go live on the ramp.

Air France and Toulouse-Blagnac Airport have also indicated their satisfaction with the progress made on the vehicle. Says Vincent Euzeby, head of IT and tech innovation at Air France: "By facilitating the use of an autonomous baggage tractor and perfectly integrating it into its operational processes, Air France's ambition is to further optimise its operational performance and improve its customers' travel experience. This test is the first step towards a more widespread roll-out of autonomous vehicles at our airports."

And Philippe Crébassa, chairman of the executive board of Toulouse-Blagnac, adds: "This test is a concrete step towards designing the Smart Airport, [which will be] more innovative, connected and more efficient for our customers. It was only natural that this world first took place at Toulouse airport, the pioneer city of aviation."

There are many obstacles and hurdles to overcome, but surely implementation of this sort of technology on the ramp cannot be too far away, given its potential benefits.

"A concrete step towards designing the Smart Airport"

Philippe Crébassa,
Toulouse-Blagnac Airport

dnata handles first 'fully green' turnaround

Dubai-based ground services provider dnata is keen to minimise its environmental footprint. As evidence of this, in December it handled its first ever fully-electric-GSE serviced commercial aircraft turnaround

dnata handled a flydubai B737-800 aircraft turnaround at Dubai International Airport's Terminal 2 at the beginning of December last year using only what it describes as "zero-emission" GSE.

Calling it "a significant milestone in its sustainability journey", the ground handler employed stairs for passenger disembarkation and boarding, electric conveyor belts for loading and unloading baggage and cargo, and electric baggage carts to move luggage to and from the 737-800.

An electric towbarless pushback tractor was used to push the aircraft out to its taxi point, while throughout the turnaround the aircraft was powered by Dubai International's Fixed Electrical Ground Power (FEGP) infrastructure.

dnata forms part of the Emirates Group and Sheikh Ahmed bin Saeed Al Maktoum, chairman of Emirates Group, flydubai and Dubai Airports, comments: "Sustainability is a key focus across operations at the Emirates Group, flydubai and Dubai Airports. "The UAE is a major global aviation hub, and in line with the country's vision to ensure sustainable development while preserving the environment, we are committed to taking meaningful initiatives and continually challenge our processes to deliver the highest possible value for all of our stakeholders.

"The green turnaround, involving a collaborative effort from airline, ground handler and airport operator, highlights Dubai's commitment and ability to make a difference by using resources in a sustainable manner."

Long-term strategy

This green turnaround is the latest step in what has been an ongoing focus on minimising the Emirates Group's environmental footprint. As part of that strategy, dnata has sought to move across to green GSE as and wherever it can.

It has already replaced a large number of its ramp vehicles, GSE and warehouse forklifts with hybrid or electric variants, while refurbishing selected GSE where appropriate to extend life-cycles, decrease engine emissions, reduce waste and update equipment to the latest safety and quality standards.

According to the handler, dnata currently operates more than 100 'eco-efficient' vehicles at Dubai's two airports – Dubai


dnata's Robert Powell

International and Dubai World Central (DWC).

In fact, dnata is currently looking seriously at the possibility of converting all its passenger handling operations at DWC to an entirely electric ramp GSE operation by late autumn of 2020.

Robert Powell, vice president, technical services, UAE operations at dnata, tells Airside that dnata has been progressively inducting electric GSE into the fleet as part of its environmental commitment and fleet planning strategy for some time now, and the green turnaround in December was not really a pre-planned event. It just happened to all come together that day.

"Although we had no specific plans to complete a green turnaround, we reached a critical mass of electric GSE that allowed us to facilitate this in our operation at Dubai International's Terminal 2," he recalls.

"DXB is a large operation, so rather than having electric GSE assigned to specific flights, it is now embedded through various parts of the airside operation across Terminals 1, 2 and 3," he points out. The next milestone in the handler's "sustainability journey" is the objective to make all the GSE in dnata's DWC passenger handling operations zero-emission in time for Expo 2020, which begins in late October.

Of course, dnata is not the only ground service provider to be improving its environmental credentials. "There is growing awareness around the role that the private sector plays in combating climate change and supporting the shift towards a more sustainable economy," Powell acknowledges.

Moreover, "Transparency around sustainability practices in operations is increasingly important to our customers. In many cases it also makes economic sense. Improving energy efficiency, cutting fuel consumption and reducing waste generation all result in a more cost-efficient as well as environmentally friendly operation."

But perhaps what sets dnata apart on this issue is its commitment to making the green issue central to its ongoing corporate strategy, he suggests. "We are dedicated to [minimising] our environmental responsibility and this underpins our core values as an organisation," Powell observes.

"To support the industry on the ground, we invest in the most modern, eco-efficient ground equipment possible. We also operate our assets in the most environmentally responsible manner, and in compliance with all local applicable environment regulations and standards.

"Furthermore, we develop and implement specific policies relating to energy, waste management and minimisation, as well as ground transport."

dnata's green GSE fleet currently takes in conveyor belts, aircraft tractors (both towbarless and conventional), baggage tractors, towable passenger steps with electric pedestrian control, and forklifts and material handling equipment.

That environmentally friendly fleet will only grow in size. "Consideration of electric, hybrid and alternative fuel options is now enshrined in our GSE procurement policy, where commercially viable," Powell declares.

"Like many airport operators, the infrastructure to support battery charging is a challenge, but we are working very closely with Dubai Airports on this. The reality is that across the range of GSE types, different solutions will be applicable to different operating environments and scenarios, with electric, hybrid, range extenders, fuel cell, alternative fuels, fixed services and even clean diesels forming part of the overall picture."

dnata is, for example, using propane-powered vehicles at Los Angeles International Airport; when asked if propane might be seen as an alternative to electric GSE as part of the handler's green strategy, Powell explains: "As noted above, different operating environments and scenarios will drive a range of different solutions.

"Propane is a more mature option in California and hence a viable alternative; for Dubai and indeed any other airport across our global network, the mix and availability may be different, but the common theme is our commitment to lowering our carbon footprint."

Established in 1959, dnata provides ground handling, cargo handling, travel, and flight catering services in 35 countries across six continents. It serves over 300 airline customers and, each day, the company handles more than 1,900 flights, moves over 8,500 tons of cargo, books at least 16,000 hotel stays, and uplifts over 320,000 meals.

"DXB is a large operation, so rather than having electric GSE assigned to specific flights, it is now embedded through various parts of the airside operation across Terminals 1, 2 and 3"

Robert Powell,
dnata

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Brussels Airport from the air

Etihad boosts its green credentials at Brussels

Etihad Airways recently operated what it describes as an 'eco-flight' to Brussels Airport as it continues to step up its efforts to 'go green'. The Belgian gateway is also making strides in this regard

The eco-flight from Abu Dhabi to Brussels took place in January and was intended to demonstrate a range of initiatives that are part of Etihad's commitment to sustainable practices both in the air and on the ground.

A B787 'Dreamliner' of the UAE's flag-carrier flew between the two capitals. Etihad points out that the 787 is the newest and most efficient aircraft model in its fleet, one – it claims – that consumes at least 15% less fuel than any aircraft type the airline has previously flown.

Furthermore, the aircraft followed an "optimised flight route" facilitated by the European air navigation service provider Eurocontrol to help reduce fuel consumption and carbon emissions.

The group CEO of Etihad Aviation Group, Tony Douglas, comments: "Sustainable practice is a critical and continuing challenge for the air transport industry, which is striving to reduce carbon emissions and waste, while meeting soaring demand for air travel."

He continues: "This year's national theme of the United Arab Emirates is '2020: Towards The Next 50'. Etihad is committed to working continuously with a range of partners as part of a broader national focus on environmental sustainability."

As part of its Etihad Greenliner Program, the airline's fleet of 787s will be used as flying testbeds for a range of sustainability initiatives, with Boeing joining Etihad as a partner in the research.

"Sustainable practice is a critical and continuing challenge for the air transport industry"

Tony Douglas,
Etihad Aviation Group

"Collaboration and shared striving by BAC and airlines"

Caroline Bossuyt,
Brussels Airport Company

Etihad is also playing its role in the development of sustainable aviation fuel (SAF). It is co-operating with fuel providers including Abu Dhabi National Oil Company (ADNOC) as well as Tadweer (Abu Dhabi Waste Management Centre) on future fuel options.

On the ramp

The carbon footprint of airside operations that supported the eco-flight was not forgotten. In Abu Dhabi, electric tractors were involved in the transport of freight and baggage between the terminal and the aircraft. Etihad recently took delivery of the first 10 of 94 such electric vehicles, which will all be introduced into service before the end of this year.

Ground power was used at both Abu Dhabi and Brussels to avoid running the aircraft's own fuel-powered auxiliary unit, while taxi time from the Abu Dhabi terminal to the runway is said to have been "expedited" in order to minimise the holding time with engines running.

Soon after the eco-flight, Etihad committed to a minimum target of net-zero carbon emissions by 2050 and to halving its 2019 net emission levels by 2035.

According to a statement, these targets will be achieved through a "mix of internal initiatives, collaboration with industry partners and adoption of a comprehensive programme of relevant carbon offsets, to be developed with specific focus on the requirements of the UAE and markets served by the airline".

The airport viewpoint

While airlines such as Etihad are looking to their environmental footprint, so too are gateways like Brussels Airport. It has launched its own 'green' initiatives, including using electric buses for passenger transport and compressed natural gas for its own airport vehicles.

First introduced in 2018, the airport now has a fleet of 30 quiet and emission-free fully electric buses.

Brussels Airport Company (BAC) is also exploring options such as the use of electric GSE for aircraft pushback, and the airport operator strongly promotes the use of 400HZ ground power units (GPUs) and pre-conditioned air units (PCAs) to serve aircraft while they are on-stand.

Meanwhile, service vehicles and company car fleets operated by BAC are gradually being replaced by compressed natural gas (CNG) and electric-powered models.

Caroline Bossuyt, compliance expert at Brussels Airport Company (BAC), recalls that BAC had a preparatory meeting with Etihad in order to discuss opportunities for collaboration as regards January's eco-flight.

Although it was decided not to organise a separate media event or specific actions by BAC to promote the occasion, it nonetheless reflected the "collaboration and shared striving by BAC and airlines for minimising their environmental impact", she says. As part of the airport operator's Sustainability Strategy, which looks to ensure "sustainable and balanced development of the airport", BAC has the specified objective of operating with net-zero carbon emissions, Bossuyt points out, while also looking to create less waste and undertake more recycling.

Aiming to be 'climate neutral', the airport offsets its CO_2 emissions. On the Airports Council International (ACI) scale of Airport Carbon Accreditation, Brussels Airport boasts a level 3+ (neutrality) score.

Besides the greener buses and GSE being introduced, as with the recent eco-flight aircraft taxi times are more generally kept to an absolute minimum at Brussels, Bossuyt observes. Aircraft only leave their gate if a timely take-off can be guaranteed and sufficient capacity for landing is available at the destination.

Plus, the airport operator strongly recommends SETI (single engine taxi in). BAC also promotes fleet renewal among its visiting carriers to include greener aircraft types through differentiated tariff structures, based on environmental criteria of noise and emissions.

BAC has 30 all-electric airport buses

With regard to waste, BAC has initiated a 'Waste Charter', together with packaging management specialist Fost Plus and various airport partners. 'Action programmes' with the aim of reducing waste and upping the rate of recycling at the gateway are now being developed, it confirms.

Finally, BAC is working with scientists to apply innovative technologies to reduce Ultra Fine Particle (UFP) levels at the airport and – together with the European Union and a number of airport partners – is investigating the options of sustainable fuel at Brussels.

As a result of its efforts brought together within its Sustainability Strategy, BAC hopes to operate with net-zero carbon emissions by 2050.

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Keeping things locked down

Aurrigo, the Coventry, UK-based company that developed an autonomous baggage dolly trialled at London Heathrow, has launched a new product – the Transport Safety System (TSS) – designed to end the problem of baggage and cargo falling from dollies being towed on the apron

The TSS system consists of a suite of sensors that, when installed on a dolly, are able to communicate wirelessly with another control unit fitted in the tow tug. If baggage or other cargo is not locked down correctly, warnings appear on a head-up display screen in the driver's cab and, if anything does fall from the dolly, the system will detect the change in weight and the tug will be automatically immobilised.

The tug will also be immobilised if the system detects any uncoupling of the towed dollies.

Aurrigo confirms that it is currently in discussions with a number of airlines, ground handling companies and airport operators about the potential of the system.

Miles Garner, sales and marketing director at Aurrigo, recalls: "Our work with International Airlines Group (IAG) and British Airways on the autonomous baggage dolly has given us the opportunity to explore some of the other issues facing the aviation sector and our engineers quickly identified a way of solving the costly issue of incidents involving damaged baggage and ruined cargo.

"There are hundreds of incidents every year where crashes happen due to driver

"The way we have designed our system means it can be easily retrofitted to tugs and dollies currently in use"

Miles Garner,
Aurrigo

error or the units not being stacked or locked in properly.

"Our Transport Safety System can help eradicate a lot of these as the tugs will not be able to move until everything is in place and, importantly, drivers will be immediately made aware if the situation changes."

Moreover, Garner adds: "The way we have designed our system means it can be easily retrofitted to tugs and dollies currently in use, or be integrated into the build process for new models."

Development

All of the TSS ardware and software was designed in-house at Aurrigo's Advanced Engineering Centre in Coventry. The development of the product was the direct result of Aurrigo receiving feedback from "various parts of the aviation sector", Garner says, "all asking for a solution to overcome the amount of accidents that happen when transporting luggage and cargo airside.

"These trends have definitely been noted by the senior management teams of airport operators across the world and they are proactively looking at how they can use technology to reduce accidents and speed up processes. TSS could be one of these solutions."

TSS has been in development for about six months now and is currently classed as an advanced prototype, Aurrigo confirms. "We're in the process of making a business case to enter into low-volume production with a number of potential customers, who are keen to trial the technology before agreeing to deploy TSS on live operations," Garner advises.

"There are two options on how we can take it forward. It could become one of the products in our range and, if this is the case, then production will be completed in Coventry.

Where we have a dedicated cell ready to be ramped up as soon as the first orders are placed.

"We're in the process of making a business case to enter into low-volume production with a number of potential customers"

Miles Garner,
Aurrigo

"Alternatively, we could team up with a tug manufacturer and look at developing the technology so that it is either retrofitted or built as standard," Garner informs.

"Interest is coming from all over the world, but the largest concentration of enquiries is emanating from the Far East and, in particular, Singapore. This is a part of the world where there is a real desire to be early adopters of new technologies," he adds.

Autonomous dolly

As described in the Autumn 2019 issue of *Airside*, Aurrigo began testing the world's first autonomous baggage dolly at Heathrow in May last year. A converted standard dolly, the autonomous unit is equipped with GPS, LIDAR (Light Detection and Ranging) and cameras to enable it first to identify its position on the apron and then to execute its ensuing movements safely.

The launch of TSS comes just a few weeks after Aurrigo completed the second phase of its autonomous baggage dolly trials at

Heathrow's Terminal 5

Phase 1 consisted of operating the autonomous dolly in a controlled environment in Coventry. This was quickly followed by Phase 2, in which Aurrigo took the technology to a dedicated part of Terminal 5 at Heathrow and collected empty ULDs on agreed routes.

"Our engineers are pleased with how the autonomous dollies have performed and this [satisfaction] has been echoed by staff at British Airways," says Garner. "There have been lots of things we have learned, as working airside is a massive challenge, with so many different journeys being made by vehicles of all shapes and sizes.

"This is what the trials are all about and a great way of helping to refine the technology. I think it's safe to say there is a massive opportunity here – there has been no major innovation in the 'tug and three' approach for over 60 years, and we're trying to change that."

Testing so far has "proved extremely successful and we are now discussing the third phase, which could see us complete trials in a live environment, transporting cargo and luggage to real-time flights", Garner informs.

Further ahead, the plan is to integrate recently demonstrated 'swarm' technology to allow the dollies to be platooned together in formation. "Now that is an exciting development," Garner enthuses.

And continuing to consider the future, Garner concludes: "We have built a track record for delivering manufacturing solutions and autonomous controls in the automotive sector, but, in the past year, we have also proven this expertise can be applied to improve the efficiency of the aviation sector.

"There are so many opportunities in this field and we're hoping that the introduction of TSS and the autonomous dolly will lead to further exciting collaborations."

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GSE leasing: the flexible option

For those GSE operators who are looking to avoid the initial expense of purchasing equipment, leasing offers significant benefits. And some GSE suppliers are specialising in meeting that need

One important player in the GSE rental business is AVIACO, which offers a wide range of refurbished equipment for both long- and short-term rental (as well as for purchase, if the customer wants this option).

CEO Danny Vranckx explains that the AVIACO offering is very much geared to meeting the needs of all customers, whatever they might be. The company will rent out GSE for one day or for as long as 10 years, whatever the client prefers, he informs.

Moreover, its prices are very competitive, especially when comparing the rent on AVIACO's refurbished GSE to other companies' fees for renting new equipment, he says. "We can bring a very cost-effective solution. And one of the reasons for this is that we have our own stock of fully refurbished machines.

"We have an inventory of about 700 units that we can deliver at very short notice," he adds.

Customers can be of all shapes and sizes, Vranckx observes. They can be big or small, located anywhere around the world, and comparatively rich or poor. But rental will always be a good option for those that prefer a flexible solution with no great up-front cost.

Based primarily in Belgium and the Netherlands, within reach of Brussels and Amsterdam airports and having access to nearby sea ports, AVIACO is well positioned to transport equipment to any destination around the world.

In October 2018, AVIACO opened the doors of a new workshop in Ampolla, Spain. The company employs nearly a dozen engineers at the plant, all of them with years of experience as mechanics and technical specialists, Vranckx explains. AVIACO also has branches in South Africa and Singapore that enable it to be close to the African and Far Eastern markets, all of which the company now serves.

Spare parts and technical back-up are also readily to hand.

AVIACO offers short- and long-term rental and lease options, as well as purchase – whatever the customer requires

GSE as a service

TCR is well known for its place in the GSE leasing market but Harold Delloye, senior business development manager for the APAC (Asia-Pacific) region at the Brussels-headquartered company, indicates that TCR is much more a supplier of 'GSE as a service' than a GSE leasing company.

TCR's mission is to provide its customers with the highest possible level of GSE 'availability', he explains – that is, the uptime of the equipment. This means providing high-quality units whose operators will benefit from extremely low levels of downtime caused by failures and the need for repairs.

Indeed, Delloye points out, this is exactly what TCR offers – across the more than 33,000 items of GSE that it has in its inventory, the equipment has an average uptime availability ratio of 94%. (Clearly, it is impossibility to have a 100% availability rate, given that all equipment needs to be serviced if it is to be maintained in good condition.)

Why is this so important? Because, says Delloye, the main task of GSE users – whether independent ground handling agents (GHAs) or the handling divisions of airlines – is to turn around aircraft quickly and efficiently. Turnaround delays create inconvenience and incur costs in the form of compensation payouts, which is why handlers' service level agreements (SLAs) tend to have on-time performance (OTP) at their heart and why GSE availability/uptime is so important.

Moreover, high levels of GSE uptime availability also mean that GSE operators can streamline their equipment inventories; as such, investing in quality actually leads to cost savings.

On top of all this, the flexibility in the leasing packages that TCR offers its clients is key to its success, Delloye continues. Its huge fleet of GSE available for lease, which takes in all equipment types from baggage tugs to big-ticket de-icers, enables customers to quickly up-scale or down-scale their fleets as required, as well as offering start-ups a ready way of quickly establishing themselves in the handling business at any given airport, at least in terms of their equipment fleet and maintenance requirements.

The GSE fleet requirements of independent GHAs especially in particular vary regularly, Delloye points out. A handler might be gearing up for business at a new station, withdrawing from operations at another, or upsizing or downsizing as the result of taking on a new carrier customer – all of which can entail a quick change in fleet size, which TCR is ideally placed to facilitate.

Other handlers might be changing the underlying nature of their GSE fleets – perhaps moving to greener equipment. Again, TCR can help here. It can also cater for the large number of customers whose operational intensity depends upon the season: busy summer months of activity might require more GSE such as passenger stairs, GPUs and even pushbacks, while winter might require de-icers.

Harold Delloye

Options such as sale and lease-back can also assist customers with more particular financing requirements or offer a desirable option simply because the client has decided to outsource GSE and have it managed by TCR. This is all part of the flexibility that TCR regards as key to its offering.

TCR equipment is to be found at more than 150 airports around the world, and all of its leased GSE is accompanied by a supporting maintenance package; at those airports where the company does not have its own repair and maintenance operation, it provides service support either through a local partner or via a bigger TCR station close by.

A leasing option takes away many of the 'headaches' that a GSE operator can suffer, Delloye says. 'As a frequently welcome alternative to ownership, TCR takes on the responsibility of looking after a customer's leased GSE, leaving the operator to concentrate on its core business of turning around aircraft.

Its customers – which range from big legacy carriers to low-cost carriers (LCCs), from globally active handlers to small independent GHAs, and from large airport hubs to small air gateways – are supplied with 'GSE as a service', with high-quality equipment provided in such a way as to offer customers the best possible flexibility and uptime availability. This in turn allows them to concentrate on giving their own customers the best possible service, Delloye concludes.

Investing in inventory

Rushlift is another of the GSE rental specialists currently active in this area of flexible GSE provision. It is part of Doosan Industrial Vehicle, one of the world's biggest manufacturers of forklift trucks, while Doosan Industrial Vehicle itself is part of South Korea's US$-21 billion Doosan Group.

Rushlift has invested heavily in its GSE rental capability in recent times. In May last year, for example, it announced that it would be investing £2.2 million ($2.8 million) in its national short-term rental fleet over the latter part of 2019 and into 2020. In fact, Tim Willett, Rushlift's operations director, told *Airside* in November that the vast majority of that money had already been spent – only pennies were left, he remarked.

That investment represented the largest short-term rental equipment spend ever made by the company, and has expanded Rushlift GSE's short-term rental fleet significantly. It is also a very new inventory: the entire fleet available for short or long-term hire is less than five years old.

The £2.2 million was used to increase Rushlift's inventory of Charlatte and TLD electric baggage tugs, air start units, pushback tugs, and trailers and baggage carts. The company's fleets of both electric and diesel-powered belt loaders and high loaders have also been significantly expanded. Given the focus of many customers on electric GSE, that addition of non-polluting equipment has been important, Willett notes.

Another priority for the acquisition programme was for Rushlift to be able to offer equipment designed to handle widebody aircraft. Covering what had previously been something of a gap in its portfolio, Rushlift has acquired a 70-tonne tug suitable for pushing back the A380, for example.

And the investment is not stopping there. When Willett spoke to *Airside* late last year, two-thirds of the GSE acquired by Rushlift in the second part of 2019 was already out on lease. And, with manufacturers' supply of GSE struggling to keep up with demand, Willett confirms that Rushlift will be acquiring a further 400 GSE units during 2020.

Unusually for the UK short-term rental market, Rushlift GSE will be introducing combination air-conditioning/ground power units that can cool, heat or power narrowbodied aircraft on the ground. Another priority of the 2020 investment programme will be TBD-produced top-driven passenger stairs, Willett informs

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Air Rail

– although, as in 2019, a whole range of equipment will join its short-term rental fleet.

"Our extensive and growing pool of reliable, well-maintained vehicles can be rented on a flexible basis, which helps airlines reduce exposure to both operational and financial risk," Willett observes.

All Rushlift short-term rental vehicles can be supplied at short notice to airport locations across the UK and are delivered fully serviced. Moreover, in what represents a significant upside for the company's service offering, it has airside workshops – at which GSE available for rental can be stored – at both London Heathrow and London Gatwick International Airports. (Rushlift is also expecting to open up a landside workshop at Gatwick soon.)

Rushlift's short -term rental deals cover periods from just a couple of weeks up to 12 months, with the GSE's transport to destination undertaken by Rushlift as required. The supplier has some of its own trucks, but also works with specialised trucking companies on delivery and recovery of its rented equipment from UK gateways.

It also offers options other than rental. For example, it has pure maintenance contracts with some customers, such as with handler Cobalt at London Heathrow. Lease to purchase is another option, as is 'pay as you go', offering customers further flexibility on their rentals. The latter option has been opened up by the rapid recent development in telematics in GSE, Willett notes. It might be a particularly attractive option for handlers involved in GSE pooling combines, and Rushlift works on both the Heathrow and Gatwick pooling forums. "We are working on various options for them now," Willett observes.

A relatively new player

A fairly recent entrant to this market is Germany-based HiSERV, which began offering leased GSE in 2017. It manages a young fleet of more than 4,000 units on short-term rental or pay-per-use basis. It also offers a wide range of additional

Air-Rail offers a full-service approach to leasing

Madrid, Spain-headquartered Air-Rail has been in the GSE distribution and service business since 1992, ands has moved towards (although not exclusively) a rental approach since 2015. Throughout, its focus has been on delivering a full-service offering – including maintenance, provision of spare parts and so on.

It is currently present in seven countries – Spain, Portugal, Morocco, France, Italy, the Netherlands and Malta – and has a customer base that includes Aviapartner, Iberia, Ryanair, GH Italy, Portway, Swissport, Atlántica de Handling (Binter Canarias), Airbus, and Toscana Aeroporti.

According to José Manuel García Arrechea, who handles airport and GSE business development for the company, Air-Rail's primary strengths lie in its:

- Flexibility, with ability to meet a full range of client needs, in terms of availability, terms, etc. Air-Rail charges through either a fixed rate or a pay per use rate
- Young fleet. The average age of its GSE fleet is less than 3.5 years
- Know-how and experience. Air-Rail has been in the market for over 25 years
- Competitive pricing
- Unique offering, supplying special products like the Yutong Electric Bus that is unique to Air-Rail and ready to be rented anywhere
- Regional presence and capabilities, enabling it to start new operations anywhere is needed (currently it is active across Europe and Northern Africa), including the deployment of a workshop

Air-Rail currently has approximately 2,000 GSE units either on lease or available for lease. Nevertheless, it is able to scale inventory up as required, whatever the customer's needs, García stresses.

García sees changing geographical patters in those taking up leasing options. "While in Western Europe, rental is something ground handlers are very used to, is not as common is other countries," he observes.

"Some of these companies purchase everything brand new, although they are analysing the possibility of moving towards renting, at least on big units such as buses, for example. On the other hand, other ground handlers are focused on buying second-hand equipment due to budget restrictions, not realising that they could have newer equipment (and therefore, improved operations) while not needing to invest much."

García continues: "From North to South in Europe, there is a mix, with northern countries looking to a mix of buy/rent, depending on the ground handler. In the south, except in Spain and Italy, purchasing is predominant. In our opinion, the GSE rental market will become stronger and will need to be more consolidated if ground handlers want to see the real benefits of it.

"Also, It is important to note, that, in our opinion, while the market shifts to a more electric fleet, ground handlers will likely tend to rent this equipment due to the higher costs involved. One example is the electric bus. All of our electric buses (currently, 14 operated in Spain and Italy) are rented."

As for the nature of Air-Rail's customers, as mentioned above they include Aviapartner, which rents most of its equipment and is present in numerous countries. Companies like Iberia or Atlántica de Handling (Binter) typically only rent for peak season. In terms of size, Air-Rail has customers that only operate in one region/airport, as well as companies that operate across 30 or more airports.

support services around its core GSE rental, including consulting, maintenance, fleet management and training.

With regard to those core short-term rental and pay-per-use packages, Roland Ückert, managing director of HiSERV, explains: "We provide our customers with tailor-made solutions, even for ultra-short rental periods. However, many customers are also interested in long-term rental solutions.

"The big advantage we are able to offer is a high degree of flexibility. The frequent objective is to optimise overall fleet costs."

Expanding, Ückert says that HiSERV offers four particular benefits to its customers in its service offering:

- Premium quality, having only the "newest units in our fleet"
- High levels of flexibility: with pay-per-use and short-term rental solutions, HiSERV allows its customers to rent units exactly according to their needs
- Supplying 'Smart' GSE: "while everyone is talking about this future topic, we are simply putting it into practice. Each of our customers can use our tracking solutions at no additional cost to further optimise their fleet deployment," says Ückert
- Finally, "We strive for long-term customer relationships. For us, this also includes negotiating fair and transparent pricing". In the case of longer term leasing of GSE, however, HiSERV can "optimise fleet costs best, particularly because we can provide additional services such as maintenance and procurement responsibility"

HiSERV's fleet covers a wide spectrum of equipment types, including tractors, belt loaders, high loaders, pushbacks, de-icing trucks and water trucks. Over the course of the last 24 months alone, HiSERV has invested more than 30 million Euros in new GSE units. And it will continue to do so in the future, Ückert promises.

HiSERV sees its potential customer base for short-term rental in private ground handling companies but also in airports with their own ground handling. For example, it currently has a number of de-icing units on rent with a large European airport just for a few months.

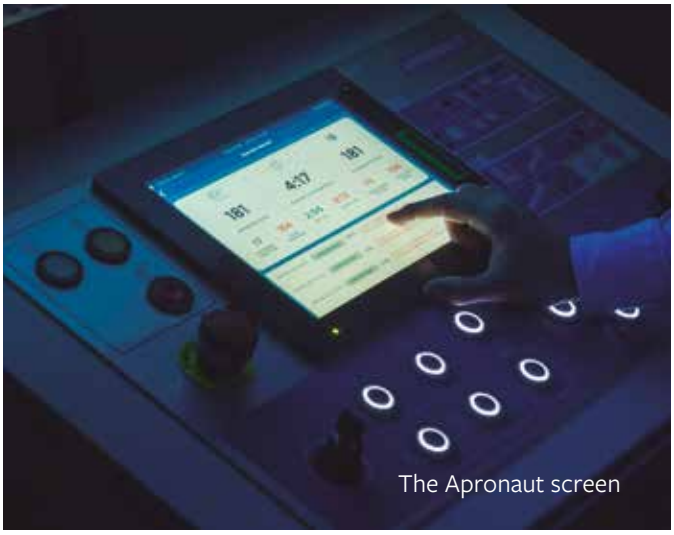
"Our extensive and growing pool of reliable, well-maintained vehicles can be rented on a flexible basis"

Tim Willett,
Rushlift

Bridging the technological gap

Barcelona, Spain-based ADELTE is a leading supplier of passenger boarding bridges (PBBs) and is well ahead of the curve on the technological developments relating to this aspect of airside operations

ADELTE's Apronaut hardware



The Apronaut screen

At *inter airport* in October last year, ADELTE was keen to show off its relaunched Apronaut training simulator for PBB operators. It has continued to promote its benefits, and Patxi Artiz, business unit director airports for the company, explains some of the designs of the improved system.

Apronaut allows potential bridge drivers to be trained quickly and efficiently. Each trainee can undertake far more simulated dockings than they ever could with real aircraft on real stands, Artiz points out. Moreover, they can be trained as if docking any given type of aircraft on any type of stand: the system can simulate any specific stand at any airport, once the relevant data is fed into the software.

Apronaut collects all the data from each trainee's performance, allowing the trainer to focus on where his or her trainees need to improve. That data can also be fed to the airport operator responsible for the particular PBB; through analysis of the various simulated docking procedures, it is possible to identify specific issues that need to be tackled, or potential improvements in docking procedures.

The simulator also allows qualification and certification of trainees against any parameters that the customer chooses, while the control panel (a key aspect of the relaunched Apronaut) can represent any boarding bridge – again – of the customer's choosing.

Improvements

Apronaut was first launched at *inter airport* Europe in 2011, and the relaunched system offers a significant capability upgrade. But it is far from all that ADELTE has been working on. Last year saw a number of major upgrades to the broader ADELTE PBB offering, Artiz explains.

The first of those upgrades is a capability called the Energy Recovery System (ERS). Whenever an electro-mechanical ADELTE PBB is moved downwards to its resting position, the ERS recovers some energy and sends it back into the electric grid, thereby offering efficiencies and savings.

The dead load of the PBB causes it to go down once the brakes

"We are going to be launching our fully contactless solution in three stages"

Patxi Artiz,
ADELTE

are released, thereby generating energy on the elevation motors, and this energy is sent to the grid, Artiz explains.

Another improvement developed last year was a specific new 'contactless' capability. An ADELTE bridge can now automatically stop 5mm before it comes into contact with the fuselage of the aircraft it is serving: an entirely new technology for a PBB, Artiz suggests.

2019 also saw the initial introduction of ADELTE's Remote Control Operating System (RCOS). This allows the PBB to be operated not on-site from the bridge but remotely, from an airport operations centre. This cuts down on manpower requirements. The system was, at the end of last year, being trialled in real conditions at an airport. If it proves a success there, it will be made available for use elsewhere.

But the improvements do not stop there. This year will see ADELTE introduce an automatic PBB levelling capability. As an aircraft rises or lowers when passengers disembark or embark, the PBB will be able to stay level with the plane automatically without having to deploy a levelling arm, and thereby avoid any need for contact with the fuselage.

Another new development this year will be hybrid autonomous driving capability. This will allow a PBB to dock using a pre-positioning system with the last 0.5m of the bridge's journey being autonomously – and precisely – controlled. This will, in all likelihood, be a stage on the path to fully autonomous driving capability later on.

Then, further into the future, ADELTE expects to be able to deploy a fully contactless PBB that will nevertheless be able to keep the weather out using technology similar to that used with today's hovercraft, Artiz says.

At present, once a bridge docking

procedure is completed, the PBB is in contact with an aircraft fuselage by way of three different parts. "We are going to be launching our fully contactless solution in three stages [to address those three in-contact components]," says Ortiz.

First, the bumper. This is a rubber bumper that is currently located between the docking ramp of the PBB and the aircraft fuselage. With the first stage of the ADELTE contactless system, ADELTE will prevent the bumper from touching the aircraft fuselage.

Second, the auto-levelling arm. This is the device that makes the PBB go up or down according to the aircraft's movement. With the new levelling capability, the second stage of the new contactless system, "We will be able to follow the aircraft movements without needing to be in contact with the aircraft."

Finally, the canopy. This is the closure element between the PBB and the aircraft that prevents the elements from getting into the PBB. With the new canopy technology, "We will not allow water, snow and so on inside the PBB while also not touching the fuselage of the aircraft. To do that we are thinking of different solutions; one of them would be blowing pressured air (similar to the technology used by a hovercraft)."

Predictive maintenance

From the maintenance perspective, ADELTE already offers built-in software that supplies comprehensive data regarding the status and engineering condition of all GSE used in handling operations during an aircraft turnaround process. The next stage will be to deploy an Internet of Things-based system that will communicate seamlessly with an Airport Collaborative Decision Making (ACDM) system, allowing airport operators to learn from the experience of the past as well as assess current operating conditions in order to optimise efficiency now and in the future.

The system will also alert airport operators of potential future problems, prompting remedial action, orders of appropriate spares, and so on.

Collaboration with airport authorities and aircraft manufacturers will be key to the successful development of these technologies and operating processes, Artiz concludes.

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Innovation in aircraft access

Aviramp is a supplier of a particularly distinctive type of aircraft access system. The Telford, UK-based company offers a range of mobile, walk-through boarding bridges for narrowbody and widebody aircraft

The mobile ramps for which Aviramp is perhaps best known are also used as static jet bridges as an alternative to costly fixed infrastructure.

Static Aviramps are in place at various airports now including San Francisco, Chicago, Boston (in the US) and Birmingham (in the UK). San Francisco, for example, operates three Aviramps statically as jet bridges and they will have 12 in total by the end of this year.

Terri Smart-Jewkes, global sales and marketing director at Aviramp, tells *Airside* that the company is "always striving to develop and innovate. Moreover, we listen to our customers and work with them to produce bespoke features to help with very specific operational challenges."

Many of these bespoke features now form part of Aviramp's range of optional extras that can be added to any standard unit. "In fact," says Smart-Jewkes, "Some of these features we believe should be fitted as standard, and therefore we have modified units to always incorporate certain elements and these can also now be retrofitted for customers with existing units.

"Plus, we are always investing in product development and will be launching our own turnaround kit in 2020, which can be purchased in its entirety or individually – this includes the Aviramp boarding product, steps and belt loader."

The unique nature of the Aviramp product offers a range of advantages, the company believes. Smart-Jewkes notes: "Aviramp's differentiator is that we offer a great deal of value to all stakeholders, including airports, airlines, ground handlers and passengers, as well as PRMs [passengers with restricted mobility].

"The Aviramp product delivers such a raft of benefits in terms of turnaround efficiencies and speed, huge cost savings, and – fundamentally – a streamlined all-inclusive passenger experience including delivering greater dignity for the disabled and elderly. The Aviramp's versatility is exemplified by the breadth of advantages it offers."

As Aviramp's product range evolves, it represents changing market demands. "Fundamentally, buyers want reliable, safe and low-maintenance ground support equipment, which the Aviramp delivers," says Smart-Jewkes. "Each airport and location has its own challenges, layout, restrictions, processes and peculiarities, and we work in a bespoke way with our customers, gleaning insights and understanding their challenges to come up with the right configuration for each.

"One size does not fit all. So we work collaboratively with customers and operations teams to deliver the right solution that works effectively for them."

Training for optimum performance

In order to get the best out of any GSE, operators need to know the equipment; that is why so many GSE suppliers put training at the heart of their product and service offerings

German GSE supplier Goldhofer provides a wide range of training for operators of its tugs and tractors; exactly what that involves depends on the individual customer's requirements. Stavros Hatziioannou, head of after sales and service in the company's Airport Technology operation, explains that Goldhofer will provide on-site training when a vehicle is purchased, while its after-sales offering also includes individual courses on request.

"In general, we always try to provide training for our customers' drivers and mechanics on-site," Hatziioannou informs. "In order to familiarise them with the new equipment and enable them to build up their confidence, participants are given an opportunity to perform their first push-backs and practise repositioning and hangar towing."

Goldhofer provides basic, advanced and continuous training courses, and their practical aspect – from the identification of parts and assemblies and their locations to working exercises – is of great importance, he continues. Moreover, the company will adapt the training course to the particular needs of the participants.

Standard Goldhofer training courses for a new tow tractor typically last between three and five days, depending on the vehicle involved. The programmes comprise driver instruction and technical training units. While driver instruction normally lasts a single day, the technical training is always geared to customers' specific requirements and the existing experience and knowledge of the personnel who will operate the equipment. Generally, Goldhofer allows for between two and four days, depending on the tractor model, for this section of the programme.

The range of training on offer covers introductory training for technical personnel, like the basic training the customer receives upon commissioning the vehicle, advanced courses, professional training sessions including maintenance and repair, and train-the-trainer courses.

Says Hatziioannou: "Our training packages

"In general, we always try to provide training for our customers' drivers and mechanics on-site"

Stavros Hatziioannou, Goldhofer

At JBT, equipment simulators may on occasion represent the 'best value for training'

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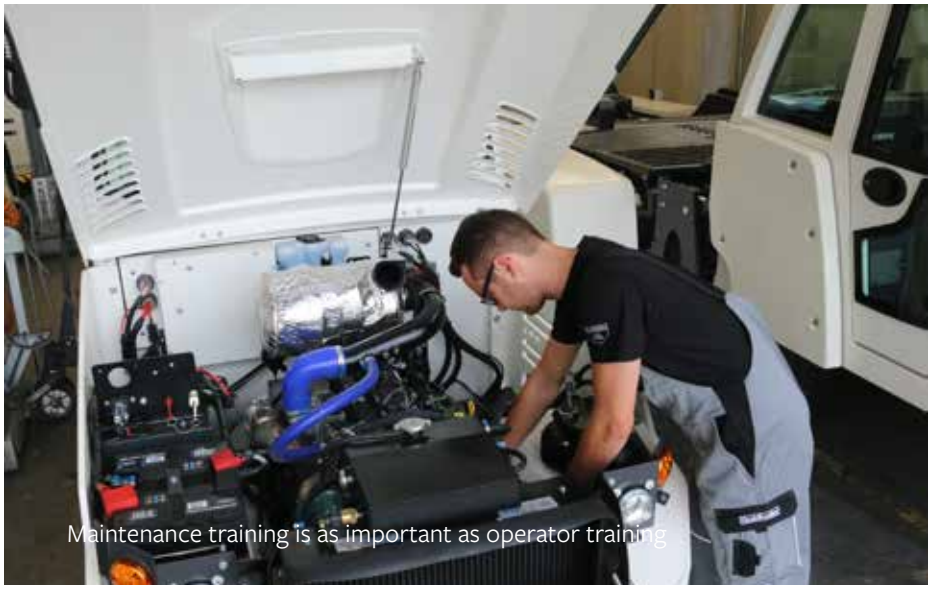
go far beyond the actual operation of the tow tractors. Our customers' drivers and engineers are able to build up their technical know-how and gain valuable practical experience in all aspects of the electrics, hydraulics and maintenance.

"The courses are individually tailored to customers' needs and in the ideal case are held on-site with experienced trainers so that customers' employees benefit from a hands-on experience under real-life working conditions."

Training obviously has a very high priority in view of the need to avoid injury and damage caused by incorrect operation of the units, as well as to guarantee a high level of vehicle availability, Hatziioannou notes. "We naturally wish to simplify how operators use our tractors, but at the same time operators have to comply with increasingly complex safety regulations. To meet these two requirements, we have integrated an intelligent user interface in the latest generation of our Phoenix tow tractors, for example.

"Instead of complexity and complicated procedures, the towbarless aircraft tractor – with its intuitive touchscreen, practical operator interface, emergency operation mode and remote maintenance functionality – offers easy handling that is quickly learned.

"In short, instruction is necessary because well-trained drivers and mechanics reduce total cost of ownership, increase vehicle reliability and maximise the return on investment," Hatziioannou concludes.



Maintenance training is as important as operator training

Operator training on a Goldhofer tug

Customised training packages

JBT AeroTech supplies a wide range of GSE and related services to the aviation industry, and – as with Goldhofer – training represents an important part of its overall offering and needs to be geared to the needs of the client. Says Eric Davis, JBT's director – global customer care, "Our customers' requirements determine when training for JBT equipment is provided. Many customers choose to include a training package as part of a new equipment purchase, while others choose to invest in training at a later date.

"This flexibility allows customers to decide what works best for their specific operational needs," Davis notes.

Its training offering covers all aspects of JBT equipment ownership: effective maintenance practices to maximise machine serviceability; theory-based systems application training for effective issue diagnosis; and best-practice operational techniques for efficient use of equipment.

Instruction can be provided at a customer's location if desired, at a JBT manufacturing facility or regional sales offices.

The length of the training package provided is dependent on the equipment model and type of training required, but typical training runs between three and four days. All of the training that

JBT offers can be provided at any stage of equipment life, and so – says Davis – "provides further flexibility for equipment operators to account for changing operational requirements".

JBT's operator training focuses both on functional operation of the equipment (pre-operational checks, normal operations and emergency procedures) as well as helping operators understand how to use the equipment safely and most efficiently.

"There are two primary techniques that we employ to share this knowledge with operators," Davis says.

First, "Hands-on training using real equipment is certainly the most effective," he believes. "Operators work the actual equipment in the same environment in which they will perform their jobs.

"However, hands-on training is frequently not the most practical or feasible in a variety of circumstances (because of weather, flight scheduling, equipment availability and so on). For these reasons, equipment simulators may provide the best value for training."

That second option, the use of simulators, is made available for training whenever it is convenient for the client. Simulators are not affected by weather or ramp conditions, they allow for greater trainee throughput, they can replicate multiple training scenarios not always available for hands-on training, and – most importantly – they provide a safer training environment for operators: one cannot damage aircraft or injure personnel in a virtual world.

JBT also offers maintenance training classes. These classes focus on two important areas of equipment upkeep: effective preventative maintenance and efficient issue diagnosis. While training on proper preventative maintenance is straightforward (covering maintenance procedures and schedules), proper diagnosis of issues is the crux of JBT maintenance training, Davis points out.

JBT employs a theory-based systems application approach to issue diagnosis. This method teaches equipment maintenance technicians the theory behind how various systems (mechanical, electrical, hydraulic, fluid and control) function and integrate with each other, offering what Davis describes as a systematic approach to issue identification and resolution.

Diagnosis of issues in this manner helps eliminate the 'parts changer' mentality, Davis continues, ultimately decreasing maintenance costs and reducing equipment downtime.

"Effective and comprehensive training is always a priority for JBT – experienced operators can use JBT equipment properly and more efficiently than can less experienced operators," Davis stresses.

"This in turn increases operational success and ultimately provides better value for the company.

"The increasing complexity of current generation ground support equipment in actuality tends to make it easier for operators, as more sophisticated control systems automate many functions that were previously accomplished manually. Ground crews are thus able to focus more on their core responsibilities of turning aircraft quickly, safely and efficiently," he adds.

The Vestergaard Deicing Simulator trains another de-icing operator of the future

Vestergaard: training a 'critical part' of the package

For Danish GSE supplier Vestergaard, training on its de-icers is a "critical part of the package" that the company offers, says vice president sales and marketing Lars Barsoe. Indeed, training on any Vestergaard equipment supplied to a customer comes as an integrated part of the purchase price.

Between two and four days of training are provided on any de-icer either purchased or rented from the company (the majority are bought) – with that training including both operational use and effective maintenance of the equipment.

With regard to operations, that will not cover local regulatory requirements or standards pertaining to the equipment's use around aircraft (which will differ across countries or states), but will take in everything else that an operator needs to make best use of the equipment – ie, not only for the safe use of the equipment, but to gain optimal benefit from its use.

This last point is vital, says Barsoe. Vestergaard de-icers offer a very high degree of capability but the benefits of its state-of-the-art equipment can only be maximised by a well-trained operator. So, training takes in all aspects of the functionality of the de-icer and how it is best operated.

With regards to maintenance, training covers the technical manual in its entirety, a process that usually takes two days. Pre-emptive maintenance is of course important to keep a machine in good working order, while effective, reactive repair and maintenance will get an out-of-action de-icer back into operation as quickly as possible.

Training is undertaken on-site for the customer. Some Vestergaard staff can provide both the operations and maintenance sides of the training package, but usually different people will travel to the customer to provide the different sorts of training. Even customers who already operate Vestergaard de-icers will be offered a brush-up on their skills, while also being trained on any new functionalities and capabilities the latest Vestergaard de-icers offer.

Technical training can also be performed at Vestergaard's own premises if the customer so prefers, while a final element of the Vestergaard training portfolio is its simulator, which can either be leased or bought by customers for realistic training.

"Our customers' requirements determine when training for JBT equipment is provided"

Eric Davis,
JBT

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ANA tests electric apron bus at Haneda

Japan's All Nippon Airways (ANA) has trialled a new, autonomous electric bus at Tokyo's Haneda International Airport as part of ongoing efforts to improve sustaiunability

The trials at the Japanese gateway took place for a little over a week between 22 January and the end of the month in collaboration with SoftBank Corp, a subsidiary of SB Drive Corp, Advanced Smart Mobility and BYD.

ANA and Tokyo-headquartered SB Drive, a specialist in autonomous driving technology for passengers and logistics, first began trials for the driverless bus in 2018. SB Drive's 'Dispatcher' technology checks the vehicle's surroundings for obstacles and potential hazards.

Advanced Smart Mobility is another Japanese venture that works in collaboration with the University of Tokyo, while BYD is a Shenzhen-based manufacturer of electric-powered buses and other vehicles, amongst other things.

ANA worked out a specific route for the bus to take during the tests; it covered the same 1.9km (1.18 miles) journey within a restricted area at Haneda Airport numerous times.

Says Tadakatsu Yamaguchi, senior director of the ANA Operations Support Centre, Quality Management and Planning team: "When we first started the trial, it was tested at a place near the airport where there is not much traffic. We next moved to the restricted area inside the airport and tried out a very short route. Then, we had the bus run through the actual bus road that we expect the bus to drive in the near future."

In fact, the vehicle covered a total distance of 237km over the course of the tests, Yamaguchi confirms.

Throughout the process, the bus was "evaluated based on its ability to perform the conditional automation with little human oversight", says ANA.

The airline adds that it will measure the bus up "to the highest performance

standards, and the tests are specifically designed to replicate common real-world scenarios". If all goes well, it plans to introduce the first autonomous electric bus to Haneda International Airport by the end of this year.

In fact, Yamaguchi reports that "We are highly satisfied with the results [of the trials], for this electronic autonomous bus was very quiet and realised a very smooth driving [performance].

"ANA is committed to actively embracing the most innovative technology to improve all aspects of the passenger travel experience," comments Shinzo Shimizu, senior executive vice president of ANA.

"Once fully implemented, the autonomous electric bus will allow us to provide a more convenient transit experience for our passengers while also improving efficiency for our airport staff."

Looking ahead: "As sustainability has always been a priority for ANA, we will continue looking for opportunities to make our products and services more eco-friendly," he says.

Yamaguchi adds: "We now know what the next challenges are, and we feel that we are moving forward to actually having this bus in operation in the future.

"Our goal is to have the airport working environment simple and smart, and in order to do so, we believe this technology is a very important factor."

ANA intends to start operations with just one electric autonomous bus at Haneda as part of its phased process of going greener."

"We had the bus run through the actual bus road that we expect the bus to drive in the near future... We are highly satisfied with the results"

Tadakatsu Yamaguchi, ANA

Goldhofer delivers new all-electric tug to local partner

German GSE manufacturer Goldhofer has sold one of its all-electric F110e pushbacks to local gateway Memmingen Airport

Lothar Holder, CEO at Goldhofer AG and head of its airport technology division, handed over the vehicle to Ralf Schmid, managing director of gateway operator Flughafen Memmingen, in December 2019.

Being fully electric, the F110e is more environmentally friendly than fossil-powered pushbacks, but it is just as powerful nevertheless. A derivative of the F110 (the world's best-selling conventional aircraft tow tractor, according to Goldhofer), like its diesel-powered counterpart it can manoeuvre aircraft with a take-off weight of up to 120 tons.

The F110e offers reductions in both exhaust and noise emissions for Allgäu Airport Memmingen, yet it can also be operated far more economically than conventional tractors, Goldhofer advises.

Goldhofer's Lothar Holder and Memmingen Airport's Ralf Schmid; credit Goldhofer

Flughafen Memmingen, together with its subsidiary service provider ALLgate, handles operations at Allgäu Airport Memmingen, Bavaria's third-largest commercial airport, and will operate the all-electric pushback.

Schmid observes: "If we are to achieve our climate neutrality target, we have to commit to a number of investments. In addition to a combined heat and power plant and a natural gas filling station, this also includes electromobility.

"With the introduction of an electric aircraft tow tractor, we have now taken a further step in this direction."

Holder adds: "We are delighted that Memmingen Airport has chosen to work with us in order to continue to move forward with its sustainability programme. We are convinced that the use of electric vehicles at Memmingen Airport will not only reduce emissions and energy requirements enormously but will also be significantly more economical than conventional systems."

Memmingen Airport is a regional airport serving the town in which Goldhofer's headquarters is located. Since opening in 2007, Memmingen Airport has grown quickly, and in 2018 handled almost 1.5 million passengers.

An extensive upgrade programme began in 2018. The runway was widened from 30 to 45 metres and a new airfield lighting system was put in place. The

"If we are to achieve our climate neutrality target, we have to commit to a number of investments"

Ralf Schmid,
Flughafen Memmingen

next steps include extending the baggage hall and installing a new instrument landing system for approach 06.

The purchase of the electric pushback represents a big step forward in the airport's environmental strategy, while helping to meet the growing ground handling requirements of the gateway.

The F110 is in use at various airports around the world. Several hundred models have been placed on the market since its launch. The Schopf company (which merged with Goldhofger in 2013) launched the electric version of the F110 in 2009 and, since then, several of the vehicles have been delivered to customers across different continents.

Following the acquisition of Schopf, Goldhofer's product portfolio has been updated step by step. With the introduction of the Bison series of pushbacks presented at the *inter airport* exhibition in Munich, Goldhofer Airport Technology introduced its new 'e-mobility' capability with its 400/680 V IonMaster Technology.

IonMaster is described by Goldhofer as "state-of-the-art e-vehicle technology for ground handling". Goldhofer's all-electric tractors use drive systems that have been tried and tested in the automotive industry. They are said to be the lowest maintenance vehicles of their kind, combining maximum operating comfort and minimum charging times.

The lithium-ion modular 400 or 680V batteries provide greater safety, higher performance and longer life than lead-acid batteries, without the need for a separate charging infrastructure, Goldhofer says. That contributes to "uncomplicated and absolutely safe" ground handling.

The Goldhofer Group employs approximately 800 staff. It is based in Memmingen and Ostfildern, Germany, and can trace its history back to 1705.

The Airport Technology division supplies a wide range of conventional and towbarless aircraft tow tractors, aircraft recovery systems, and cargo and baggage tractors.

Using asset visibility technology to improve airport ground operations

Ittay Hayut is the co-founder and CEO of hoopo, a provider of low-power, wide-area (LPWA) monitoring and tracking solutions. He tells *Airside* of four ways in which such technology can assist with airport ground operations

Geolocation technology for GSE tracking

hoopo is a provider of low-power, wide-area (LPWA) monitoring & tracking solutions. hoopo's proprietary technology enables end-to-end tracking both outdoors and indoors while keeping low ownership costs and extremely high power-efficiency. The unique abilities of hoopo's geolocation solution allow devices to transmit messages to long ranges while allowing batteries that last for years.

Airport ground operations logistics involves enormously complex processes, with thousands of motorised and non-motorised assets performing functions across a wide area, Hayut notes. Adding GSE tracking for continuous visibility and wireless connectivity to this dense mesh of resources allows more efficient utilisation, to the advnatage of passengers, staff and the bottom line.

This crucial technology brings ground handlers, airports and airlines significant benefits, he continues. The four most important are as follows:

1. Real-time location tracking

GSE tracking gives airport operations personnel immediate access to the location, whether indoors or outdoors, of every piece of relevant ground operations equipment equipped with the technology.

Operations will know where a piece of equipment is, whether it is stationary or in motion, and whether it is allowed to be where it is. Real-time alerts can instantly notify stakeholders should any asset leave its normal operating area or arrive at an agent's premises. This geo-fencing capability also helps prevent loss and unauthorised equipment misplacement.

Prior to GSE tracking technology, locating equipment often required phone or walkie-talkie contact with multiple parties, and occasionally a manual sweep of the airport grounds. This delayed important services, causing unnecessary back-ups and creating unhappy customers. Real-time tracking eliminates these barriers, Hayut notes.

2. On-demand GSE retrieval

Real-time location tracking offers another benefit in that GSE visibility renders all GSE resources available for immediate retrieval. If a particular piece of equipment is in use, that status is instantly evident to operations managers.

They can see, in real time, what equipment is being utilised and what equipment is idle. Idle equipment can be retrieved by relevant personnel with very little input from other staff members.

On-demand access to idle equipment allows for more efficient use of ground operations resources.

As an example, if operations managers know that a peak hour is approaching, the tracking platform on all GSE out of relevant parking areas can alert to facilitate rapid repositioning of assets, thereby leading to greatly improved fleet management.

3. Forecast disruptions in operating processes

GSE tracking technology allows managers to analyse equipment behaviour patterns across all daily operations. This can reveal hidden bottlenecks that are leading to inefficiencies and wasted money. It can also help forecast disruptions

"Adding GSE tracking for continuous visibility and wireless connectivity... allows more efficient utilisation"
Ittay Hayut,
hoopo

by granting visibility into the behaviour patterns that can lead to snowballing system failures.

These insights can help management avoid operational breakdowns in real time by identifying problematic situations before they can spiral out of control. Solutions will also be more evident and easier to implement.

4. Manage annual maintenance and procurement activities

GSE tracking reduces ground-time incidents and allows enhanced, proactive control over the condition and utilisation of all ground support equipment.

Operations personnel will have real-time information on hours logged and distances travelled in relation to the entire fleet. This can be matched against the actual utilisation of assets to allow easy tracking and retrieval for regular maintenance in due time.

As an added benefit, the efficiencies gained using GSE tracking technologies will extend the life of the fleet and increase the time between repairs, lowering maintenance costs. Lastly, analysing the utilisation of assets will allow managers to make data-driven procurement decisions and 'right-size' their fleet at every airport.

In short, Hayut considers, this sort of GSE technology yields cost savings and enables enhanced operations. All the enhancements and optimisations offered by GSE tracking solutions aim to generate accessible data to help ground handlers create a safer and more efficient environment. Assets will be able to accomplish more in the same amount of time, increasing operational efficiency.

Airports and airlines will enjoy better on-time performance and improvement in services. All of these mean more profitable operations and happier customers, he concludes.

Preventing aircraft damage through collision avoidance

The BodyGuard system from Israel's Tri-Logical Technologies offers GSE operators another option in their fight to minimise aircraft damage caused by unwanted contact with ramp assets

Michael Bar-On, vice-president products at Tri-Logical Technologies

BodyGuard sensors up close

Many of the bigger GSE suppliers are equipping their products with sophisticated collision avoidance systems as part of their standard package to buyers. These systems offer various functions, including but not limited to alerting the driver to proximity of the GSE to an object (most likely an aircraft), controlling the speed of the equipment as the distance narrows, and recording any incidents of impact.

But such systems are also available separately from specialist system providers – and retrofitting them on older equipment might also be a priority for some GSE operators.

One such specialist is Tri-Logical Technologies, which positions itself as "a leader in mobile resource management solutions". It offers systems designed for mobile equipment tracking, mapping, alerting, fleet management, maintenance and service management across the civil and defence sectors, including for transport-related applications.

Founded in 1994 and part of the larger Zivav Israeli engineering company, Tri-Logical Technologies offers two systems intended especially for the aviation business, designed to facilitate "better and safer control of ground airside operations for GSE fleet tracking, maintenance and airside workforce management".

Specifically, its Airport Mobile Assets Solution (AMAS) is a GSE fleet management tool, while its BodyGuard system meets the needs of those looking to minimise or eradicate unwanted aircraft contact with GSE.

Damage prevention

BodyGuard consists of a combination of sensors and telematic technology installed on a ramp asset. It co-ordinates an asset's approach to an aircraft by controlling its speed and stop procedures. Tri-Logical supplies both the hardware, including the sensors, and the software (although, while it produces the software and most of the hardware itself, it buys sensors from a specialist partner).

Designed with the International Air Transport

Association's rigorous Airport Handling Manual (AHM) 913 standards in mind, the system provides an equipment operator with visual and audible alerts regarding proximity to another object on the ramp, and disables any GSE involved in a collision.

BodyGuard can be retrofitted to any type of GSE, old or new, Tri-Logical says. It can form an integral part of an operator's wider Safety Management System (SMS). Its individuality lies primarily in combining two unique selling points (USPs), observes Michael Bar-On, vice president products at Tri-Logical: bringing together its adaptability and flexibility – "One size fits all", he says – and its certified adherence to strict IATA standards, alongside the command and control system that lies at the heart of BodyGuard.

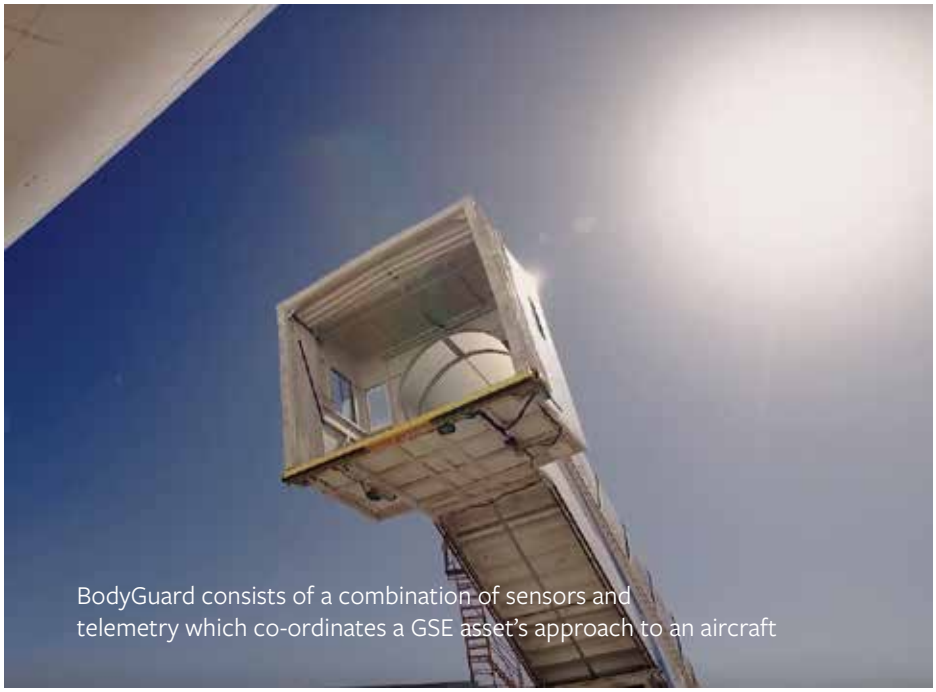
This latter system is the proprietary, patent-pending Adaptive Brake Control (ABC) technology that can be fitted to all types of engine/power train. The ABC software algorithms simulate a driver's braking actions to ensure optimal slow approach options in close proximity of an aircraft.

Success in operation

BodyGuard has been deployed in recent months by a certain Middle Eastern handler and as a result, says Tri-Logical, the ground service provider (GSP) immediately realised significant improvements in ramp safety. Since the start of last year, the handler has benefitted from retrofitting BodyGuard to several dozen different types of GSE within its fleet that together have handled more than 11,000 flights.

Since then, according to Tri-Logical, BodyGuard has recorded over 500 near misses for the GSP, in which the system automatically halted a unit's movement toward an aircraft to prevent a possible collision.

> **"One size fits all"**
>
> **Michael Bar-On,**
> Tri-Logical Technologies



BodyGuard consists of a combination of sensors and telemetry which co-ordinates a GSE asset's approach to an aircraft

The system has recorded any impact indication, enabling safety and operations managers to gather data and investigate each and every touch or near miss.

Moreover, says Tri-Logical: "The system also enabled the GSP to create a single harmonised system deployed on the different GSE to enable a quick and easy learning curve for the operations team, drivers and supervisors."

In fact, since BodyGuard's deployment by the handler on those few dozen pieces of the handler's GSE, "No damage has been inflicted on aircraft fuselages from system-equipped GSE."

All of this cuts down on costs incurred as a result of ramp damage, improves operating safety procedures, prevents delays to aircraft turnarounds caused by ramp rash, and even potentially lower future insurance premiums for GSE operators.

This handler is just one of a growing BodyGuard client base that Tri-Logical is developing – including, for example, Quality Airport Services (QAS), the Tel Aviv Ben-Gurion International Airport-based handler partly owned by Swissport, a large Turkish GSP and a Middle Eastern airline.

Multiple benefits

"BodyGuard is the only sensor and telemetry system in the market that can be deployed on any GSE from any manufacturer, on every GSE type and on any model," its developer asserts. It can be installed on new equipment and retrofitted on older units, and is fully compliant with the latest standards laid down by IATA and its ISAGO (IATA Safety Audit for Ground Operations).

BodyGuard operates and looks the same on all equipment and therefore both training and operation are easy, Bar-On points out. Meanwhile, the extensive data set recorded by the system can be analysed and relevant reports created not only to improve training procedures at the GSE operator, but also to maximise performance of equipment operators.

BodyGuard was only brought to market as recently as August 2018, Bar-On recalls, driven by demand from a local GSE operator wanting access to a telematics and fleet management capability. Now installed on equipment as wide-ranging as high loaders, belt conveyors, passenger steps, service platforms, and GSE trucks and lifts (including ambulifts), its applicability is wide-ranging.

Tri-Logical is particularly targeting what Bar-On calls "proactive" GSPs and self-handling airlines: those wanting to reduce incidents of damage and handle their ground operations more safely.

These may primarily operate in Europe, Asia and the US at the moment, but because of the IATA AHM changes, alongside the ever-increasing numbers of carriers who are pressing their handlers to prove they have a 'no-touch' policy for GSE and aircraft, the market for retrofitting GSE fleets with a system like BodyGuard is sure to become ever larger, Bar-On concludes.

BodyGuard can usefully be fitted to any GSE that might come into contact with an aircraft

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Sarcos technology offers potential for baggage handlers

Delta Air Lines is working with the US company Sarcos Robotics as it investigates possible airport-related applications of the Guardian XO robotic exoskeleton

Guardian XO (the 'XO' derives from the 'exo' of exoskeleton) is a full-body, battery-powered exoskeleton that allows its wearer to handle heavy loads repeatedly without risk of strain or injury. In fact, the exoskeleton is able to lift weights of up to 200 pounds multiple times across a single eight-hour battery charge period.

The operator bears none of the exoskeleton's weight, which passes directly into the floor through footplates underneath the operator's feet. Likewise, the user doesn't bear the weight of any load lifted by the exoskeleton. Guardian XO can be donned in under a minute and new operators require minimal training to use it.

Sarcos hopes that the Guardian XO will be available commercially before the end of this year, when it will be marketed on a Robotics-as-a-Service model. This will see customers charged for a fixed period of use of an XO, while Sarcos will be responsible for ensuring it is fully operational at all times.

Firth, though, an 'Alpha' phase of testing is to take place. And here, Delta is playing an important role, just as it has for the last couple of years.

Evolution

Kristi Martindale, Sarcos' executive vice president, product strategy and chief customer officer, tells *Airside* more about the test phase and about the history of the Guardian XO. Sarcos has been developing robotic systems since the 1980s, she says, initially coming out of the University of Utah but since 2015 operating as an independent commercial enterprise.

Now employing about 130 staff, Sarcos is benefiting from the large amount of investment it has made in robotics

technology over its history. Guardian XO's origins can be traced to a similar exoskeleton that was developed as part of a US Defense Advanced Research Projects Agency (DARPA)-funded programme launched in 2000, although that model was hydraulically powered.

Since then, reducing the power requirements of its exoskeletons has been the focus of much of Sarcos' work. The Guardian XO uses just 400W during typical operations – a lot less than its predecessor – and can be powered by off-the-shelf batteries.

The exoskeleton can be hot-swapped at a worksite within seconds without loss of power to the unit. Moreover, the battery can be charged to 90% capacity in just an hour.

An advanced control system has also been developed to make operations within Guardian XO as easy as possible. Multiple sensors integrated into the exoskeleton feed a proprietary control system that Sarcos calls 'Get-Out-of-the-Way'. This control system enables the exoskeleton to respond to its operators movements in milliseconds, so the operator can intuitively control the robot in a way that reflects their instincts and reflexes.

Following, or 'mimicking' the wearer's movements, the exoskeleton thereby becomes an extension of the operator inside it, says Martindale.

Delta began working with Sarcos as part of the company's X-TAG exoskeleton advisory group. X-TAG brings together 10 Fortune 500 companies across a variety of industries, including industrial manufacturing, utilities, construction and oil and gas, as well as aviation, which provide advice on their robotic needs.

Members of this group, including Delta, will now provide direct feedback on the Guardian XO's performance as they live-test the unit at their own places of work as part of the Alpha testing phase.

Delta is investigating potential applications for the exoskeleton, such as cargo handling, maintenance operations and possibly baggage handling. It will trial the system for perhaps a month, Martindale reveals, although the airline has not revealed where this testing will take place.

If all goes well, Sarcos hopes to be selling Guardian XO to customers before the end of this year.

Delta's MPLs

Mallaghan wins big US order

Northern Ireland-based GSE manufacturer Mallaghan has inked a deal with US carrier Delta Air Lines for the provision of customised maintenance platform lifts (MPLs).

The multi-million-dollar contract will see Mallaghan supply Delta with MPLs for use at airports across the US. The platform offers engineers easy access all around fixed-wing or rotary aircraft.

Parts for the MPLs are manufactured at Mallaghan's primary prodction site in Dungannon, Northern Ireland, and assembled at the company's Atlanta location.

Mallaghan employs some 450 staff across its Dungannon base and Atlanta manufacturing facility (Atlanta is also home to Delta Air Lines). It took on 10 new employees to support the increase in production required by this latest order. The manufacturer also has a presence at five other locations across the world.

Joe Santos, director techops maintenance for Delta Air Lines, declares: "Mallaghan Engineering has demonstrated a clear understanding of our business needs and [has] provided us with industry-leading equipment with a range of bespoke features including better manoeuvrability, decreased size and side-mounted engine hydraulics/mechanics."

He continues: "Delta Air Lines employs over 80,000 people globally, with 30,000 in Atlanta alone. We are very pleased [with] our recent contract with Mallaghan as it has allowed Delta to further support our TechOps Maintenance division and therefore our customers."

He concludes: "We look forward to continuing to work collaboratively with Mallaghan Engineering on future projects."

Next stage of expansion

Mallaghan is boosting its US presence through this and other operations, explains commercial manager Joe Griffith.

"Our latest partnership with Delta Air Lines represents the next stage in our US expansion plan," he says.

"Innovation within the aviation and ground handling industries is at the core of our business and we have worked very closely with Delta throughout the design and manufacturing process," Griffith states, adding: "As a result, our talented teams have

created truly bespoke equipment which successfully caters to the needs of Delta Air Lines' TechOps Aircraft Maintenance technicians."

The MPLs that Mallaghan supplies can support maintenance processes on a wide range of equipment, and come with various helpful features.

"The MPL22, MPL22t and MPL32 models are available as electric, gasoline or diesel options and offer a range of tailored features including dynamic braking, extendable overhead tie-off system, traversing platform, greater working height, and seating for up to three people," Griffith informs.

"Our maintenance platform lifts ensure that maintenance teams can position themselves safely by the aircraft and are suitable for use across a wide range of aircraft, including widebody jets."

Griffith observes: "We look forward to continuing to invest in and develop our product offering as well as our people.

Since the opening of our 50,000 sq ft Atlanta site in 2018 we have demonstrated a clear commitment to the local area, and we hope to carry on driving local economic growth well into the future.

"We are proud that the maintenance platform lifts ordered by Delta Air Lines will be used at airports across the US, and we hope to continue to maintain and develop close working relationships with airlines and airports globally in order to provide innovative equipment to suit the needs of a changing industry."

Mallaghan is expanding on the other side of the Atlantic, too. At *inter airport* in Munich in October last year the company handed over the keys of its first, all-new Mallaghan 50W airport bus to launch customer Ryanair. The Irish low-cost carrier has ordered 32 of the vehicles, with an option on a further 20. The Mallaghan 50W is said to be the largest capacity airport bus in the world.

Mallaghan's airline clients include Aer Lingus, British Airways, China Eastern Airlines, Emirates, Etihad, Qantas, Qatar Airways and SAS, as well as Ryanair and Delta. Its customers also include ground service providers such as Menzies and Swissport.

"Mallaghan Engineering has demonstrated a clear understanding of our business needs"
Joe Santos,
Delta Air Lines


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Western Global offers flexible fuelling options

Last year, Western Global, the Bristol, UK-headquartered manufacturer of portable tanks and dispensing equipment for the storage and handling of fuels and lubricants, launched a new range of transportable fuel tanks designed with the demands of the aviation industry in mind

Western Global's regional sales manager – fuel channel, Michael Truan

Western Global's ranges of TransTank and TransCube fuel tanks offer a solution for aircraft, ground vehicles and support equipment fuelling for both stationery and mobile applications.

The TransTank series are large stationary containers, while TransCubes are smaller mobile tanks intended for just about any aviation fuelling requirement. Both product lines meet JIG (Joint Inspection Group) and UL (UL is a global safety certification company headquartered in, Illinois) standards, and are suitable for AVgas and Jet A fuels.

TransTanks range in volume from 3,017 gallons (11,420 litres) to 17,726 gallons (67,100 litres), and can be positioned close to airport aprons or helipads for refuelling. Western Global offers a wide variety of pumps and accessories for the various functions that each TransTank might be asked to perform. With their modular design, TransTanks can be linked together easily to provide unlimited storage capacity.

The TransCube Aviation Series offers a flexible mobile fueling option. These double-walled tanks range from 132 gallons (499 litres) to 1,242 gallons (4,700 litres) in volume. They are readily transportable and can be used for either stationary or mobile fuel supply. These tanks can also allow operators to keep bulk fuel strategically located on-site, enabling them to refuel equipment without waiting for fuel deliveries.

According to Western Global, both TransTanks and TransCubes are "built with safety, security and maintenance needs in mind", and come with integrated weatherproof secondary containment, which eliminates the need for berms or basins.

"Innovation is at the forefront of what we do, and our aviation tanks are no different," comments Barry Truan, general manager for Western Global's North American facilities. "Like our other key industries – rental, construction, military, etc – we provide our aviation customers with safe, reliable and cost-effective fuelling solutions.

"Offering a collaborative series of products means more solutions for each customer's operation," Truan adds. "No matter the size of the aviation operation, we're able to create an ideal fuel and fluid solution for users' specific aviation needs. It's part of our commitment to make fuel tanks for aviation easy and simple."

Meeting customer demand

Michael Truan, Western Global's regional sales manager – fuel channel, tells *Airside* that the company sells the TransTank and TransCube as part of its diesel and gasoline product portfolios, but that these are an additional offering, specifically developed for aviation.

"Like all of our products, the aviation series was developed in response to customer demand," he explains. "Our global team of engineers considers customer requirements – along with global certifications and standards – to create a product that meets those needs.

"In other parts of the world, such as in developing countries, customers need easily deployable assets. Western Global is an ISO 9001-certified company, so our engineers go through many stages of design and testing to make sure the products are up to global standards."

The aviation tanks have "been in the works for roughly two to three years, and were officially launched onto the market in April 2019", Michael Truan says. And what really sets them apart from competitors is "the same USPs [unique selling points] and key characteristics of the traditional diesel and gas tanks in our offering.

"Western Global tanks are easy to ship and are delivered essentially as a complete tank, making them a simple choice for customers. They are aviation tanks made easy, with straightforward pumping systems that meet the needs of the customers, without compromising any regulatory approvals."

Michael Truan continues: "Another thing that sets our tanks apart is the 'over-certification'. Since we follow so many regulatory bodies' standards, these tanks can be operated almost anywhere in the world."

The new aviation series of products benefit from Western Global's long experience in the fueling business. They represent "the [company's] same overarching product – with some slight design tweaks – that we've had out in the field for 30+ years," according to Michael Truan.

However, they are geared particularly towards regional or private airports, medical flight operations and emergency services. Larger airports tend to have a pipeline or large storage tanks. The TransTank and TransCube tanks are more suitable for smaller operations that lack the infrastructure for that sort of set-up and need a flexible option.

TRANSFERPOD: for seamless refuelling

Supporting the new products are Western Global's TRANSFERPOD systems. These modules — which include pump and filter, direct to plane, truck load, and remote dispenser — can be used at any location to support a fuelling operation.

The standardised Western Global TRANSFERPOD aviation fuel modules simplify specification, procurement, maintenance and spare parts support. Their flexible, modular design enables operators to upscale easily in response to changing needs.

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