INDUSTRY EXPERT COLUMN Aviation Ground Operations PAGE 12

ELEBRATING

INTERNATIONAL The Evolution of Training PAGE 26 GROUND SERVICE PROVIDERS Driven by Data PAGE 30

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GREEN SOLUTIONS

How GSE manufacturers are bringing more sustainability to ground handling.

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PAGE 36

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COVER STORY

14 Green Solutions

How GSE manufacturers are bringing more sustainability to ground handling.

FEATURES

20 The Costs of Ground Damage

Ground damage is far too common and repairing damaged aircraft is costly, but with the right training and tools, damage can be avoided altogether.

26 The Evolution of Training

Ground handlers in Oceania and the surrounding area have adapted to ensure personnel have the knowledge required to safely turn around aircraft.

30 Driven by Data

Asset management technology helps ground service providers increase efficiencies.

34 Untethered Communication

Utilizing a Bluetooth-enabled dongle, the 121-Ground Crew Headset allows personnel to stay in contact with other crew members wirelessly.

DEPARTMENTS

- 8 Business Buzz
- 36 Product Hangar
- 42 Celebrating 30 Years

PERSPECTIVES

- 6 Editor's Note
- 12 Industry Expert Column

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A look at three key areas where new advancements can be most valuable and easily integrated.

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Editor's Note



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How will Mergers and Acquisitions Impact Ground Handling?

Ground service providers continue to combine resources in order to enter new markets and strengthen their offerings.

n the last several months, a number of announcements have been made regarding acquisitions within the ground handling sector.

Most recently, SATS announced a proposed acquisition of Worldwide Flight Services (WFS). According to a release, the deal aims to better serve air cargo customers in SATS' hubs in Asia, Europe and the United States while complementing new growth markets in Latin America and Africa, among others.

The proposed transaction, which is anticipated to be complete by March 2023 pending shareholder and regulatory approvals, would significantly expand SATS' footprint as WFS operates in five of the top 10 cargo airports in North America and Europe, Middle East and Africa (EMEA) while SATS is present in four of the top 10 cargo airports in Asia, including Hong Kong, Taipei, Singapore and Beijing.

"This acquisition has been carefully selected to fit our strategy of significant scale and value-added growth," Euleen Goh, chairman of SATS, said in a release. "We look to bring the newly added capabilities to strengthen our partnership with our customers and support the drive for competitive standing of Singapore's Changi Airport Hub."

"By bringing together our respective strengths, we will be able to build on our trusted relationships around the world," Craig Smyth, WFS CEO, said in a release.

Prior to the SATS/WFS announcement, Agility announced it acquired Menzies Aviation and intends to combine the business with National Aviation Services (NAS), establishing a combined presence in 58 countries.

When the companies merge, the combined company will operate under the Menzies Aviation name and provide air cargo, fuel and ground services.

"We will have the scale and resources to expand and grow as the industry recovers from the COVID-19 pandemic," Hassan El-Houry, who will serve as chairman of the combined company after previously being the CEO at NAS, said in a release. "Commercial aviation is a key engine of global economic growth, and our customers need partners they can count on as flight volumes return."

Domestically in the United States, ground service providers are growing via acquisition as well. Alliance Ground International (AGI) announced it will acquire Airport Terminal Services (ATS). The is the third major acquisition made by AGI since October 2021, having previously announced the pur-

chase of Total Airport Services (TAS) and Maestro International Cargo.

"As AGI is a cargo handler working with cargo freighter operations, this opportunity with ATS will allow us to build our presence in the airport terminal and passenger side of the business," AGI CEO Jared Azcuy said in a release. By bringing together our respective strengths, we will be able to build on our trusted relationships around the world



Mergers and acquisitions are not new to the ground handling space. Handlers have combined resources to enter new markets and strengthen their offerings for many years.

But with each new deal, the industry's landscape is altered. In the past, we have seen similar changes as airlines merged. Similarly, consolidation of GSE manufacturers has made an impact. How these recent examples of mergers and acquisitions influence the ground handling world are yet to be seen. Will these larger entities have more resources to better serve airline customers and attract new people to the labor pool? Will the recent acquisition prompt other companies to partner and consolidate in order to stay competitive?

I welcome your insight and feedback on this topic. Please email me at josh@AviationPros.com to share your thoughts. **GSW**

Tractor Tales

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TOP NEWS

Worldwide Flight Services To Be Acquired by SATS

SATS Ltd. has reached an agreement to acquire Worldwide Flight Services (WFS) from an affiliate of Cerberus Capital Management. The transaction is valued at an enterprise value of €2.25 billion.

The transaction will bring together WFS, an air cargo handler with leadership positions in the Americas and Europe, and SATS, a provider of aviation services in Asia.

"WFS has become the leading global air cargo logistics provider thanks to our commitment to customers, our experienced team, and our partners at Cerberus," said Craig Smyth, WFS CEO. "As we look to our next stage of growth, this combination will deliver exciting benefits for our customers and our people. We have great respect for SATS and enjoy similar values. By bringing together our respective strengths, we will be able to build on our trusted relationships around the world."

"WFS is an industry leader because it has dedicated people and an unwavering commitment to customers. Our proposed acquisition is a transformational opportunity for SATS and will create

AAT Is First Cargo Terminal Operator In Hong Kong To Achieve IATA Lithium Battery Certification

Asia Airfreight Terminal Co. Ltd. (AAT) became the first cargo terminal operator

in Hong Kong to attain the Centre of Excellence for Independent Validators Lithium Batteries (CEIV Li-batt) certification by the International Air Transport Association (IATA). The CEIV Li-batt certification program establishes a global leader and a go-to provider of mission critical aviation services. In our newly combined markets, SATS and WFS will be at the heart of global trade flows, operating in the world's busiest airports and supporting the biggest companies," Kerry Mok, SATS CEO, commented.

WFS will become a wholly owned subsidiary of SATS and the WFS management team will continue to lead the business. The transaction is subject to customary regulatory and SATS shareholders' approval and is expected to close by March 31, 2023.

Upcoming Events

Nov. 1-3

Abu Dhabi Air Expo 2022 Abu Dhabi, UAE

Nov. 8-10 TIACA Air Cargo Forum Miami, Florida

Nov. 29-Dec. 1

Annual GHI Conference Amsterdam, Netherlands

Dec. 6-8 MEBAA Show Dubai, UAE

Jan 24-26, 2023

NBAA Schedulers and Dispatchers Conference 2023 Nashville, Tennessee



baseline standards to improve competency and quality management in the handling and carriage of lithium batteries, alone or with finished products, along the supply chain.

AAT crossed this milestone together



with its parent company SATS Ltd. (SATS) – an Asian provider of food solutions and gateway services.

As a group, SATS is the first ground handling agent in the world to attain the IATA certification. "We are honored that AAT is the first cargo terminal operator in Hong Kong to obtain IATA CEIV Li-batt certification. This clearly recognizes AAT's efforts and commitment to the highest service standards and operational excellence in handling lithium batteries," said Kuah Boon Kiam, CEO at ATT. "This certification highlights our capabilities to handle finished products or components with lithium batteries safely and reliably. It strengthens the confidence of our customers in our ability to handle all types of special cargo."

"We congratulate AAT in becoming one of the first ground handling companies to

achieve CEIV Li-batt certification. Carrying products containing lithium batteries is a growing market for air cargo. Ensuring that these are flown safely and securely is critical. This new certification will give AAT's customers even more confidence that their consignments containing lithium batteries are being transported efficiently and reliably." said Brendan Sullivan, IATA's global head of cargo.



IAG Cargo Trials Electric Terminal Tractor at LHR

IAG Cargo has begun to trial an electric terminal tractor, known as the Terberg YT203EV, at London Heathrow airport (LHR). The company reported this is the first electric Terberg operating airside worldwide.

By replacing an existing terminal tractor with an electric Terberg, approximately 30 tonnes of CO2 will be saved per vehicle per year – this is the equivalent of planting over 1 million trees or taking more than 6,000 cars off the road.

IAG Cargo is trialing the electric Terberg for 12 months.

"We're delighted to be partnering with Terberg to trial the first electric Terberg at London Heathrow – this is an exciting advancement for IAG Cargo as we strive to lead on sustainability and be fit for future," David Rose, chief transformation officer at IAG Cargo, said.

IATA Highlights Air Cargo Priorities: Sustainability, Modernization, Safety & People

The International Air Transport Association (IATA) highlighted four priorities to build resilience and strengthen air cargo's post-pandemic prospects. The priorities, outlined at the 15th World Cargo Symposium (WCS), which opened in London on Sept. 27 are achieving net zero carbon emissions by 2050, continuing to mod-



ernize process, finding better solutions to safely carry lithium batteries, and making air cargo attractive to new talent

"Air cargo had a stellar year in 2021 achieving \$204 billion in revenues. At present, however, social and economic challenges are mounting. The war in Ukraine has disrupted supply chains, jet fuel prices are high and economic volatility has slowed GDP growth. Despite this, there are positive developments. E-commerce continues to grow, COVID restrictions are easing, and high-value specialized cargo products are proving resistant to economic ups-and-downs. Going forward, achieving our net-zero commitment, modernizing processes, finding better solutions to safely carry lithium batteries, and making air cargo attractive to new talent are critical," said Brendan Sullivan, IATA's global head of cargo.

General Aviation Moves Closer to an Unleaded Future

The FAA on Sept. 1 signed on supplemental type certificates to allow General Aviation Modifications Inc.'s 100-octane unleaded fuel (G100UL) to be used in every general spark-ignition engine and every airframe powered by those engines. The move was hailed by the industry as a major step in the transition to an unleaded GA future.

The FAA's approval of the use of G100UL fuel in all piston aircraft directly addresses the industry's long-standing goal of finding solutions that can be used for the entire GA piston fleet.

"I'm proud of GAMI, the industry team, and the FAA for persevering over the long term and getting a fuel that the FAA has recognized as a viable alternative to low lead," AOPA President Mark Baker said.

In 2021 the FAA approved STCs for GAMI covering a smaller number of Cessna 172 engines and airframes, and then expanded the STC-approved model list (AML) to include essentially all lower-compression engines. Though that was seen as an encouraging step forward in the years-long path to supply unleaded aviation fuel to the piston aircraft fleet, the STCs did not include aircraft needing the higher-octane fuel that accounts for two-thirds of avgas consumption. The Sept. 1 announcement by the FAA addresses the needs of those higher-compression engines.

All fuel manufacturers continue to be encouraged to follow through with their own formulations, Baker said. "We'd like to see several fuels available that all work together and blend together. Competition is always a good thing for the markets."

TIACA Announces Launch Customers for BlueSky Sustainability Verification Program

The International Air Cargo Association's (TIACA) BlueSky program, open to the entire industry, not just TIACA members, is ready to launch live operations with the first wave of participants representing organizations from the airline, airport, freight forwarder, ground handler and GSSA sectors.

The TIACA BlueSky launch participants include Amsterdam Airport Schiphol, Astral Aviation, Brussels Airport, CHI (Cargo Handling International), Edmonton International Airport, Etihad Cargo, Flexport, HACTL (Hong Kong Air Cargo Terminals Limited), Strike Aviation and Swissport.

"We are very pleased to see such strong launch support from some world-class innovative organizations," said Steven Polmans, TIACA chair.

"This program will enable all participants to assess where they are on their sustainability transformation journey, which will collectively demonstrate the leadership of the air cargo industry in tackling this important topic," Polmans continued.

Phase 1 of the program is an evidence-based desktop verification process designed to assess the applicants'



progress against a number of critical sustainability criteria.

The eight areas of assessment criteria include decarbonization; waste elimination; biodiversity protection; support for local economies and communities; impact on society improvement (lives and well-being); efficiency and profitability (digitalization); employee engagement, retention and development; and partnership building.

"Sustainability is an increasingly important topic for businesses globally and as an industry which connects the world, it is critical that we all have strategic plans in place to ensure our sustainability credentials are demonstrated in an evidenced and neutral fashion," said Glyn Hughes, director general at The International Air Cargo Association. "The TIACA BlueSky program aims to provide that solution. We are excited to see the program launch and invite all industry stakeholders to take a look."

PEOPLE

Swissport Appoints Dave Lynch as New Group CIO

Dave Lynch is the new Swissport International AG group chief information officer (CIO) and becomes a member of the Executive Leadership Team. He succeeds Giuseppe Genovesi, who stepped down from his position in July. Lynch joins Swissport from FirstGroup, a leading private sector provider of public transport in the UK.

"We are delighted to announce Dave Lynch as our new Group CIO," said Warwick Brady, Swissport president and CEO. "Swissport has a long track record of product and service innovation ranging from our industry-leading position in hub and large base operations, supported by our advanced resource planning and staff rostering, to our pharma centers in the air cargo business, to digital innovations such as our cargo app and kiosks, which helped digitize cargo logistics. With his vast experience, Dave has what it takes to bring Swissport to the next level of process integration and digitization, supporting a further enhanced service delivery."



Lynch

AGI Appoints Bijaoui to Help Drive OU Expansion



Plans in Europe Alliance Ground International (AGI) has reached

an agreement with Olivier Bijaoui to act as advisor to help with the next phase

of its expansion strategy to add passenger and cargo ground handling operations outside North America.

Bijaoui has been a prominent figure in the ground handling industry for 35 years and brings great knowledge and experience to AGI's already well-established senior management team.

"This is an exciting development for us to fulfil our desire to expand our service offerings beyond North America," said Jared Azcuy, chief executive officer, AGI.

"Olivier's expansive experience in the international airport services market will be invaluable to our growth trajectory."

"AGI's investment and growth in North America has been very impressive and I look forward to help mirror its success in Europe and beyond," said Bijaoui.

Oudkerk joins Qatar Airways Cargo as Senior Vice President, Cargo Sales and Network Planning

Just as Qatar Airways Cargo has launched its Next Generation concept, introducing an entire new way of doing business throughout its organization, the carrier welcomes a new member to its senior leadership team.



Oudkerk

Liesbeth Oudkerk will be responsible for the cargo carrier's sales and freighter network planning, focusing on digital transformation in order to improve customer support as well internal processes, mainly digitalization, which is a key element in Qatar Airways Cargo's new approach to business.

"I am thrilled about my new position and firmly believe in Qatar Airways' vision of the industry," Oudkerk said. "I look forward to bringing my expertise to such a diverse and committed team. I am honored and proud to accompany it all the way to the top." Since Qatar Airways Cargo prides itself in diversity of its staff, coming from nearly 100 countries, altogether speaking 40 languages and with varied age groups as well as cultural backgrounds, it seems that Oudkerk has found the ideal environment to contribute her expertise and several years of knowledge.

An asset to the Next Generation project, Liesbeth brings with her over 25 years of experience in the airline sector, having worked for KLM, where she occupied leading positions in various departments, including digital transformation and cargo network and freighter management.

"We are delighted to welcome Liesbeth to our team," said Guillaume Halleux, chief officer of Cargo at Qatar Airways. "She couldn't have joined us at a better time as we have just set the Next Generation strategy in motion. Her extensive knowledge and expertise of the air cargo industry will be truly invaluable to us in these changing times."

NEW DEALS

AeroVect and dnata Partner to Deploy Autonomous GSE

AeroVect is partnering with dnata to pilot and deploy autonomous ground support equipment (GSE), designed to enable superior productivity, reliability and safety in ground support operations at airports served by dnata in the United States and around the world.

"We are beyond excited to partner with dnata, the leading global ground handler, and help them accelerate the transformation of their logistics operations at the world's busiest airports," said Eugenio Donati, co-founder of AeroVect. "With a deep passion for innovation and unwavering commitment to service excellence, dnata is the logical partner for AeroVect as we bring GSE automation to market at scale globally."

"We constantly invest in technology and leading-edge equipment to further enhance efficiency and deliver world-class services for our customers across our global network," said Bartu



Korgul, head of GSE, dnata. "We look forward to piloting and deploying Aerovect's innovative solution in our operations at some of the world's busiest airports."

dnata will soon begin piloting AeroVect's self-driving technology at a major airport in the United States, where a tractor powered by the AeroVect Driver will transport cargo autonomously from a cargo warehouse to one of the airport's terminals. Over the next few years, the two companies aim to deploy as many as 100 ground support vehicles equipped with AeroVect's self-driving technology at major airports worldwide, including Dubai International (DXB) and Dubai World Central (DWC).



Avfuel Collaborates With GAMI to Commercialize Unleaded Avgas

Avfuel Corporation is using its logistics and distribution expertise to collaborate with General Aviation Modifications, Inc. (GAMI) on the commercialization of the engineering company's high-octane unleaded avgas, G100UL.

"Today is a momentous occasion for the aviation industry," said Craig Sincock, Avfuel Corporation's president and CEO. "Aviators have long been in search of an FAA-approved, viable, unleaded avgas solution, and GAMI receiving a functional fleet-wide approval for its G100UL is cause for celebration. Avfuel, via Avfuel Technology Initiatives Corporation (ATIC), is proud to collaborate with GAMI on the logistics of the fuel's distribution. Further, we extend a hearty thank you to GAMI for its decades of dedication to the leaded fuel problem, and the FAA for its thorough, steadfast vetting of G100UL."

"This is a big day for the industry. It means that for a lot of our general aviation communities, and especially for a high fraction on the West Coast, relief is on the way," GAMI co-founder, George Braly, said. "And it means that our industry will be able to go into the future and prosper, and provide the essential infrastructure for this country for everything from Angel Flights to critical training of our future airline pilots."

Along with earning the FAA's approval to use G100UL in all spark-ignition piston aircraft and engines in the general aviation fleet, G100UL has also successfully proved to be able to replace and mix with 100LL avgas, a key characteristic for an unleaded avgas solution as it embarks on the ambitious task of replacing low-lead avgas location by location.

Menzies Aviation wins engineering contract with LATAM Airlines

Menzies Aviation has secured its first engineering contract in Australia with long-term customer, LATAM Airlines. The



agreement will see Menzies provide a full suite of engineering services to LATAM at Sydney Kingsford Smith Airport (SYD) and Auckland International Airport (AKL).

"We are thrilled to announce our latest contract win with LATAM Airlines. We have built a strong relationship with the airline in Latin America, which has assisted with the growth of the partnership through this extension in Australia and New Zealand," Alistair Reid, executive vice president Oceania, South-East Asia and China - Menzies Aviation, said. "Not only does this contract mark a significant expansion of our services for LATAM but introduces our engineering offering to Australia. This milestone paves the way for the growth of our engineering capability across the region in the coming years."

Industry Expert Column

AVIATION GROUND OPERATIONS: 5 Tips for Addressing Labor Shortages, Delays and Baggage Disruption

As the airline industry navigates current challenges, technology and wearables can increase process efficiencies with existing headcount, enhance worker experience and gain operation insights to drive improvement.

BY ANDREAS KOENIG

ir travel has been a little bumpy lately. Under-staffed airline and ground operations and maintenance crews, flight delays, cancellations, and lost and delayed luggage are contributing to overworked ground crews, disgruntled passengers and poor

airline performance. Here are five tips aviation operations teams can apply to right-size their technology spend by focusing on smart human-centric technology solutions for quick relief.

APPROACH PROBLEM-SOLVING WITH A HUMAN WORKFORCE IN MIND

Pilot shortages are not the only labor issue facing airlines and the industry at large. Aircraft mechanics, flight line employees, baggage handlers, customer service and other ground operations and service roles are also short staffed. This issue is neither new nor likely to



go away soon. Yet it requires a new approach to introducing new technology. Wearable technology can streamline processes for your workforce.

Make sure it is human-centered, augments the way your personnel work today and intelligently connects them to the Internet of Things (IoT) so you can build toward future digitization strategies.

2 ESTABLISH PROPER GUIDANCE AND PRIORITY HANDLING

Aside from industry expertise, precision and agility are instrumental for critical aviation processes. Take aircraft maintenance for example. Everything hinges on logistics.

That's why you need data capturing technology at the source of asset handling, service transaction or process workflow that allows for immediate feedback and proper guidance.

Just received a spare part for an aircraft on the ground (AOG) that needs express handling? A wearable barcode scanner can automate a dedicated AOG alert to make sure everything is on the right fast track.

Maintenance teams work more efficiently, with up-to-the-minute information and real time tracking.

3 ALLOW FOR HANDS-FREE BARCODE SCAN-NING IN BAGGAGE HANDLING

Surging air travel demand and staffing shortages are contributing to unprecedented lost and delayed checked luggage and baggage handling across the globe. However, throwing any technology at the problem won't solve the chaos.

The right design and form factor are key. Different luggage sizes and bulkiness are a seemingly insurmountable obstacle for some scanning technology. The job is strenuous and requires both hands by handlers. Make sure your staff do not have to pick up a clunky barcode scanner and drop it off after every scan. Choose scanners that are hands free and a natural extension of the way your baggage handlers work.

Done correctly, this can lead to invaluable efficiency gains.

For example, Talma, one of the largest airport services companies in Latin America, turned to smart wearable barcode scanners from ProGlove to realize a 50 percent gain in baggage handling processes, and 100 percent more efficient use of personnel. The efficiency improvement was so great that Talma was able to strategically relocate operators to other critical areas of operations.



aviation cannot rely on paper as its sole guiding principle.

Unnecessary paper-based instructions waste resources and are error prone. One of our airline customers found that they could reduce flight delays by 15 to 20 percent by eliminating paper in their catering operations by using wearable barcode scanners.

CAREFULLY EVALUATE MOONSHOT TECHNOLOGIES

Whenever a crisis hits, some pundits claim that you should have seen it coming, and often propose an exploratory and arguably "groundbreaking" technology that promises to solve all problems.

To that end, there is much talk about how automation and robotics will solve the issues facing the aviation industry today.

While automation and robotics can indeed help in certain areas, other areas are not feasible. And these systems are incredibly complex and costly. So, stay calm and carefully evaluate those shiny, new technologies that promise a moonshot. Instead, look for affordable investments that work intuitively with your workforce and can deliver an immediate impact.

As the airline industry continues to navigate today's challenges, operations teams should look to smart uses of technology and wearables to increase process efficiencies with existing headcount, improve worker experience and ergonomics and gain operational insights to drive continual process improvement. **GSW**

ABOUT THE AUTHOR ANDREAS KOENIG

Andreas Koenig is CEO of ProGlove, a company that builds the smallest, lightest, and toughest barcode scanners in the world, connecting workers to the Internet of Things.





How GSE manufacturers are bringing more sustainability to ground handling.

BY JOSH SMITH

cross the industry, ground support equipment (GSE) manufacturers are striving to meet customer demands for more electric equipment. The following are just a few examples of how equipment is helping ground handlers, airlines and airports meet sustainability goals and adopt equipment powered by alternative energy.

TLD TO PHASE OUT MECHANICAL DRIVELINES BY 2024

Officials at TLD identified three main challenges currently facing the ground support industry – the need for sustainability; growing and developing the skills and competencies of the workforce with new technologies; and a constant cost challenge in a competitive world.

To simultaneously address these challenges, TLD is introducing its Alternative Power Source solution to customers and announcing its objective to stop mechanical drivelines by the end of 2024.

According to Valentin Schmitt, CEO of TLD Group, the major hurdle on electrification today, which is shared by the company's entire customer base, is the gap with infrastructure. This includes the position of and type of chargers, as well as the number of chargers or charging slots.

"The differentiation of our Alternative Power Source strategy is to propose our customers standardize around electric GSE, but with various types of power sources – batteries, hybrid systems with on-board generators, hydrogen fuel cells, or on-board chargers compatible with 400 Hz," Schmitt says, adding with different, interchangeable building blocks individual customers can define the electric GSE that will fit with current infrastructure and continue to evolve as the infrastructure grows.

Moving forward, Schmitt says all mobile GSE from TLD will come with a "future ready" electric driveline. The Alternative Power Sources of these drivelines include fully electric options with TLD's iBS lithium-ion batteries; hybrid versions with its iHS or ipHS hybrid packs; and hydrogen.

"This is a major push towards sustainable aviation, with a set of technical solutions allowing to decouple the electrification of the GSE, expected by all players, from the infrastructure, which might take longer to adapt and will propose different alternatives depending on the regions," Schmitt says.

By decoupling the electrification of the GSE from the infrastructure, TLD officials say ground handlers can embark on sustainability goals immediately and use the natural renewal of a fleet to grow the electrification ratio. This will allow customers to avoid facing a "CapEx wall" in 5 or 10 years with a large part of the fleet to be renewed in a short period, Schmitt says.

"The standardization of the solution around a few components that will be available for all GSE – TLD and non-TLD, by the way – will simplify the maintenance training and improve the adaptation of the teams' skills to those evolving technologies," he says.

A key challenge for TLD was developing a one-size-fits-all solution, with a battery or hybrid pack being common for almost all GSE.

"This is not only bringing simpler maintenance, a lower inventory for parts, or simpler training. It is allowing (customers) to swap those systems from one application to another, aging the batteries over several lives in those different applications. This will drive the TCO even lower," Schmitt says.





Moving forward, officials at TLD say all of its mobile GSE will come with a "future ready" electric driveline.

Electric and hybrid solutions are now available on more product lines and should be available on almost everything by the end of 2022, according to Schmitt.

"We believe that every customer today has, at a different level, a sustainability agenda. And for those who don't, I am sure they are actively working on it to avoid losing ground against the competition," he says. "There is a lot to learn, but this is also lowering the cost base and creating competitiveness for the future."





presented a prototype of a hydrogen powertrain developed for ground equipment at the GSE Expo Europe.

AVIOGEI INTRODUCES HYDROGEN HYBRID POWERTRAIN

At the GSE Expo Europe, Aviogei presented a small-scale prototype of a hydrogen hybrid powertrain developed for ground support equipment.

The hydrogen powertrain, installed on a vehicle for passengers with reduced mobility (PRM) is being carried out in collaboration with the Industrial Electronics Laboratory of the Electrical and Information Engineering Department at the University of Cassino and Southern Latium.

Aviogei also exhibited electric powered equipment, like these passenger stairs, at GSE Expo Europe.



"Hydrogen will play a key role in the transition to renewable energy sources," says Andreas Cesarini, CEO at Aviogei Airport Equipment. "It is the best choice for at-scale decarbonization, as it is an inexhaustible source that can be produced from many sources and has a high-energy power – about 2.5 times more than methane. Aviogei has contact in progress with Italian airports that have ongoing hydrogen projects."

Along with the University of Cassino, Aviogei began a project for hydrogen

propulsion equipment in 2013. But at that time, it was too early for the technology to be accepted at airports, Cesarini explains.

"Now the landscape has totally changed and airports are already organizing an appropriate infrastructure for the accumulation of hydrogen cells," he says, noting some Italian airports have launched green hydrogen storage and distribution initiatives.

As a member of H2IT, Aviogei is focused on the development of hydrogen powered solutions. H2IT is the Italian Hydrogen and Fuel Cells association, which brings enterprises, research centers, universities, technology clusters and local entities together to work in the hydrogen sector in Italy.

"H2IT aims at stimulating the creation of the infrastructure for the use of hydrogen, ensuring a leadership role for Italy in the international market. We have also partners for the fuel cells and we are collaborating with lab research," he says.

Still in the development phase, Aviogei's first goal has been to achieve the feasibility and performance of a hybrid propulsion system powered by hydrogen and lithium polymer batteries. From there, Cesarini says the goal is to expand offerings and further support customers' decarbonization efforts.

"The project will have an important impact on the decarbonization of the airport industry, contributing to the achievement of the objectives of the airports committed to the net zero targets," he adds. "In particular, the European aviation industry is strongly committed to reaching net zero CO2 emissions and contribute to the goals set in the European Green Deal and the Paris Agreement."

While this initial hydrogen project has been applied to a PRM vehicle, Cesarini says the company intends to extend the use of the technology to all of its GSE production.

"We have detected interest in this new technology and in our programs," he concludes.

IBT EXPANDS BEYOND eGSE

Having supplied its JetAire PCAir and Jetpower 400 Hz products for several years, officials at JBT AeroTech note the company's commitment to saving fuel and reducing aviation's carbon footprint.



JBT aims to reduce challenges and costs associated with ramp electrification through its AmpTek solution.

Cover Story



More recently, points out Gary Walter, vice president – global sales and customer care at JBT AeroTech, JBT has introduced a series of electric pushback tractors, mobile stairs, cargo transporters and 15k to 30k cargo loaders in addition to environmentally focused defense products.

JBT is continuing to broaden its green focus beyond its family of eGSE with its AmpTek, iOPS and JetDock solutions.

JBT aims to reduce the challenges and costs associated with ramp electrification through its AmpTek solution.

"For example, charging stations can be too far from work zones, electrical grids may need upgrading, and laying power lines and civil works can prove disruptive. All these realities are expensive and time-consuming and act as impediments to going green," Walter says.

AmpTek gets power to battery chargers in a unique way that avoids or reduces infrastructure costs and minimizes GSE transit times to remote charging locations.

"AmpTek intelligently uses excess power available at the boarding bridge gate and distributes that surplus power to the battery chargers. Battery chargers can be located at the gate close to the work, grid upgrades are avoided, there is almost no construction work involved and the AmpTek devices intelligently monitors battery status and health," Walter says.

JBT officials have also sought a solution for getting the most out of current GSE fleets while using a minimum of fuel. Walter says the iOPS Fleet Management telematics system can make a difference.

"With iOPS you can manage your fleet in real time on your mobile or desk-mounted devices," he says, noting tracking engine idle time, for example, can save money and fuel by eliminating wasted hours of engine run time.

iOPS users can reduce GSE travel time and related wear and tear by monitoring fleet traffic patterns and establishing efficient fleet use plans. Unexpected maintenance and downtime can be avoided with notifications for pending preventive maintenance (PM) needs and status updates. What's more, aircraft auxiliary power unit (APU) burn time can be reduced.

"Our customers are aggressively monitoring their gate processes for hooking up their PCAir and ground power devices so that APUs can be shut off," Walter says.

"These are a few samples of what iOPS Fleet Management telematics can do for managers," he adds. "The savings can be tremendous and the benefit to the environment incalculable." JetDock is designed to provide environmental benefits through faster turnaround times by assisting operators of cargo loaders, boarding bridges and more to dock quickly and safely with parked aircraft.

"With JetDock both aircraft damage and turn times are reduced. The lidar, sensors, and sophisticated adaptive software get your GSE to the aircraft door in record time so passengers and cargo move on and off the plane as expeditiously as possible," Walter says. "This translates to a reduction in wasted fuel for your GSE and for the aircraft APU."

According to Walter, JBT's new eGSE has been well received by airline and cargo customers. He says the company is continuing to invest in developing new battery powered GSE while expanding research and development efforts to other, non-traditional projects that have an immediate and positive impacts on the environment.

"With AmpTek, iOPS and JetDock, we augment and hasten aviation's efforts to walk the green path and reduce our industry's carbon footprint," he says.

WAEV'S MODULAR APPROACH TO eGSE

Waev Inc. has recently introduced lithium-powered tow tractors that meet payload requirements of all-day duty cycles to assist airports in meeting demands to cut carbon emissions. The company's Li-ion Tiger and Bigfoot lines do not produce emissions, require minimal maintenance and utilize common parts to ease the transition to a lithium-ion fleet.

"And the infrastructure requirements can scale with the fleet, as required, starting with as little as dedicated 110v-240v single-phase outlets up to 480v fast charging options," says Gerry Hoadley, director of ground support equipment at Waev. "This makes the transition much easier and allows it to be done in phases."

The Li-ion Tiger is a conventional baggage/cargo tractor, has a towing capacity of up to 60,000 pounds and can be equipped with a 36kWh or 48kWh power module. The tractors can be charged using Waev's standard on-board 6.6kW charger or equipped for 480v fast charging. For smaller operations that require less capacity, the Bigfoot XL burden carrier can tow 10,000 lbs and can be equipped with an array of battery options.





"We use only LiFePO4 cells in our lithium power modules which is known to be one of the most stable chemistries in the battery industry," Hoadley says.

"At the end of the serviceable life of our power modules, the cells can be utilized for energy storage in things such as power walls and off-grid power sources," he adds.

Most serviceable components used in the Tiger tractors are based on industry standards, so service parts from existing fleets can often be used. The modular chassis eases the maintenance transition too. The chassis can accommodate battery packs or internal combustion engines (ICE). Then if a customer wants to convert a diesel-powered tractor to battery power, the chassis easily allows it.

"We're developing the repower packages now to provide customers with everything needed to upgrade legacy ICE powered tractor fleets," Hoadley says.

What's more, the Li-Ion Tiger's anti-rollover system automatically slows to a safe speed when a driver enters a turn too aggressively, mitigating the chances of a roll-over.

According to Hoadley, customer feedback about the new tractors have been positive and more airlines and ground handlers are turning to lithium-ion battery technology. He suggests that anyone interested in using li-ion-powered equipment do their homework and better understand how their fleet can utilize the technology.

"We need to do a better job of informing fleet managers about all considerations of electrification," Hoadley says. "Yes, you will you have to train and remind operators to plug in the tractors, but you can opportunity charge – or top-off – without causing damage to the battery, something non-lithium batteries struggle with.

"You can charge on a dedicated, single-phase outlet (110v to 240v), but you can charge quicker with infrastructure upgrades like 480v fast smart chargers," he adds.

ITW PILOTS MARK II AT JFK

When ITW GSE conducted a 120-day pilot at John F. Kennedy International Airport's Terminal 4 (JFKIAT) for its battery-driven electric ground power units (eGPUs), it allowed international carriers like Singapore Airlines and Emirates to use ITW's Mark II 180 kVA unit.

Since then, officials at ITW GSE say the eGPU has gained wider adoption across America, including at San Francisco International Airport (SFO) where United Airlines is using the unit to power a Boeing 777-200. As the largest terminal at JFK Airport was undergoing expansion, JFKIAT wanted to promote a sustainable environment which included the reduction of greenhouse gas emissions. By incorporating zero-emission ground support equipment, airport officials could achieve their goal and have an alternative to diesel powered GPUs thus reducing the use of fossil fuels and CO2 emissions.

"We are helping airports obtain their

airport carbon accreditation, which is the only institutionally endorsed, carbon management certification standard for airports," says Alberto Rocha, sales director, Americas, at ITW GSE. "All these efforts are paving the way for airports in North America to manage and reduce their carbon emissions."

According to ITW GSE officials, the 180 kVA unit reduces CO2 and NOx; requires almost no maintenance; reduces noise pollution to improve the working environment; is not dependent on fossil fuel; and provides flexibility as it can easily be used indoors in hangars or maintenance facilities as well as outdoors wherever it is needed.

While ITW GSE's 28 VDC and 90 kVA units helped pave the way for the introduction of the Mark II 180 kVA unit, challenges still existed around acceptance and the cultural change of using an eGPU that does not need fuel. But ITW officials say they worked with customers to inform industry members and train them about the technology.

"The unknown can be scary, and people tend to let others take the leap first because it is safer. Therefore, it is part of our job as innovators to educate and prove those fears to be untrue. This is what we did with the eGPU," Rocha says.

Infrastructure was also a barrier for adoption as many airports do not have enough charging points for eGSE. However, in last year or two positive change has begun to happen, and airports are installing more chargers for ground support equipment, according to ITW GSE officials.



ITW's 180 kVA unit reduces CO2 and NOx, requires almost no maintenance and reduces noise pollution.



ITW GSE conducted a 120-day pilot at JFKIAT for its batterydriven electric around power units.

With a complete family of battery-driven eGPUs, the product line covers all aircraft needs. However, officials at ITW GSE say they will continue to supply the aviation industry with clean, reliable and cost efficient GSE systems.

KALMAR BUILDS ON ITS eGSE REPUTATION

As the GSE industry increasingly adopts electric-powered equipment, Kalmar Motor is relying on its 14 years of experience producing electric conventional and towbarless tractors.

In 2008, facing global economic downturn, Kalmar owner and managing director Magnus Johansson faced three options. The first was to scale down the company to meet the sales and production requirements. The second was to maintain its current workforce and hope the downturn wouldn't last. Option three was to invest in the future with development and production of full electric powered tractors.

Johansson opted to move forward with the electrification of the Kalmar Motor product range.

"The goals for producing full electric power tractors with lithium-ion batteries was to create tractors with the same operational capability of the diesel version but with a fraction of the operating costs and most importantly, reduce CO2 emissions," says Sean Bryan, technical sales manager at Kalmar Motor. "Following the investment of company resources Kalmar Motor's first full electric powered tractor, the TBL50EL was delivered to SAS airlines in 2009."

According to Kalmar officials, SAS reduced its operational and maintenance costs after deploying the TBL50EL. More product development was completed as SAS used the tractors at Kastrup Airport (CPH) in Copehagen. Now, 60-70 percent of Kalmar's production is electric powered tractors operating in Sweden, Denmark, Norway, Finland, Germany, Portugal,





France, UAE, India, China, Japan, Hong Kong, New Zealand, USA and Japan.

While electric pushbacks and tow tractors offer reduced emissions and lower operating and maintenance costs, charging infrastructure has been a question facing the industry.

"Generally the challenge for ground handlers is that the infrastructure for charging power is controlled by the airport authorities and even though they encourage ground handlers to use electric equipment on the airport, they are not so fast to react to requirements," Bryan says. "This is something that we are sure will change over time and we do acknowledge that adapting the airport for a complete change would be very difficult. However, a staged transition of equipment type is much simpler for all involved."

Since the first TBL50EL was delivered in 2009, Kalmar Motor introduced the TBL190EL and TBL800EL in 2015, followed by the TBL180EL and the TBL100E. Kalmar's conventional range of tractors includes the FB150E, which was first delivered in 2010, followed by the FB250EL and then the FB600EL.

Today all of the company's aircraft towing tractors are available in full-electric drive with many models now exclusively available as electric units.

"We have also developed our systems and created a multitude of charging options, including regenerative charging, AC charging, DC charging, 400Hz charging, range extender charging and GPU/range extender charging to cater for all customer operational demands," Bryan says. "The next step is quite possibly the introduction of hydrogen fuel cell recharging of the tractor batteries to give even cleaner and more efficient charging options."

TEXTRON'S COLLABORATION WITH PCS AND GM

Since 2013, Textron GSE has worked with Powertrain Control Solutions (PCS) and General Motors (GM) to integrate GM technologies into products that meet the unique and rigorous requirements of the GSE industry.

That relationship has continued and ultimately resulted in the newly released TUG Endurance Baggage Tractor.

"Textron GSE is committed to sustainability and being a catalyst for its customers and the industry to achieve their



The lithium TUG Endurance uses a J1772 connector for Level 2 AC charging.

sustainability initiatives. The TUG Endurance baggage tractor is the perfect example of designing a product that considers customer requirements for performance, productivity and safety on a global scale," says Matt Chaffin, vice president and general manager at Textron GSE. "Emphasis was placed on building a product with technology specifically for ground support applications that could evolve as electrification becomes paramount in the future."

According to Chaffin, the TUG Endurance was developed based on direct feedback from customers.

"Textron GSE explored various technologies and identified an opportunity to collaborate with two industry-leading companies: General Motors and PCS," Chaffin says. "Together, GM and PCS have developed an integrated driveline, specifically designed for Textron GSE products that utilizes GM's lithium-ion battery systems.

"The driveline will allow Textron GSE to leverage GM's experience in electric propulsion solutions, honed over more than 25 years of developing a variety of electric vehicle systems and other zero-emissions innovations."

Among its features, the TUG Endurance leverages high-capacity GM and PCS lithium technology, utilizing the J1772 connector for level 2 AC charging, as well as DC fast charging. The systems constantly monitor for ground faults, disconnected connectors or other potential hazards, and include a manual safety disconnect for lock-out/tag-out procedures. In addition, the systems will incorporate innovative safety features introduced by PCS into the GSE industry, such as electronic transmission controls, and an electric parking brake, both of which communicate with the vehicle's electric drivetrain and other onboard systems to enhance safety.

Additional features include a single chassis with the choice of a cab forward or cab aft driving position; an electronic parking brake that automatically engages if someone leaves the seat, or the tractor shifts into neutral; an electronic shifter and



throttle to deliver ease of use with an automotive experience and enhanced safety; an automatic park brake application and release, which is programmed into the operation logic reducing operator error; and brake i-booster – an electric assist on brake activation to reduce the effort required, but in the event of a fault, the driver still has mechanical braking.

What's more, the tractor offers the ability to integrate vehicle telematics for benefits such as swipe access, collision monitoring, fault monitoring, geofencing, etc. The TUG Endurance features autonomous ready control systems; a modular design; Bluetooth remote diagnostics; a multi-function display to communicate hours, fuel level or state of charge; a standard e-hitch; and standard LED headlights, stop/taillights, side repeaters and back-up light. The vehicle is designed with drive by wire for increased operator comfort; and it offers an interchangeable drivetrain that enables globally compliant gas and diesel models to be upgraded to lithium as infrastructures evolve.

One of the biggest challenges was designing a single product that met a wide variety of customer needs, according to Chaffin.

"The primary focus of our efforts on the TUG Endurance was around capturing high take-rate options and incorporating them into the standard design either as standard features or as plug-and-play add-ons," he says. "This helps increase throughput in our factory and increases overall product quality and reliability."

The TUG Endurance baggage is available in a lithium powertrain, which Chaffin says assists both customers and the industry in achieving sustainability objectives as they require no maintenance and offer zero tail pipe emissions.

The lithium TUG Endurance uses a J1772 connector for level 2 AC charging, and DC fast charging.

"This type of charging is prevalent in the automotive industry and can be found in ground support equipment such as buses, catering trucks and high lifts. Utilizing these charging platforms can help alleviate infrastructure constraints," Chaffin says.

"Most customers are aware of the shift to high voltage systems and many of them are already pursuing that technology on their own," he continues. "Customer feedback was supportive of the direction we chose for the TUG Endurance EV drivetrain and were complementary of the automotive level of safety and quality integration."

According to Chaffin, Textron GSE is always looking for ways to enhance its product solutions.

"Collaborating with GM and PCS will enable us to explore additional opportunities to synergize and electrify products across our brands," he concludes. **GSW**

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Ground Handling

The Costs of Ground Damage

AT A STREAM & A R

Ground damage is far too common and repairing damaged aircraft is costly, but with the right training and tools, damage can be avoided altogether.

Ground damage – it's ugly, costly and often times all too avoidable. From misjudging distance while operating a piece of ground support equipment (GSE), to a technician forgetting to secure their tools, there's no shortage of ways to haphazardly damage aircraft.

It is no wonder then that as Jason Mann, general manager, Western Jet Aviation, notes, ground damage occurs with far too much frequency.

"It's too common," Mann says. "There's a light pole out here on the ramp next to us that's bent from coming into contact with a Global Express wing. Crazy things happen all the time that you wouldn't expect to happen."

What is and is not considered ground damage is broad. In many ways, it's easier to list what is not considered ground damage than what is, and capturing data on accidents can be challenging.

"From our, IBAC's [International Business Aviation Council's], point of view, we are looking at tracking and capturing any damage to GSE and aircraft in an airside environment. It's not an easy task to capture data from a sector where in most parts, globally, there is no requirement

BY WALKER JAROCH

to report any damage. There is a specific definition of 'accident' in ICAO Annex 13, which does mean many airside incidents fall outside the scope of this definition," explains Terry Yeomans, director of the International Standard for Business Aircraft Handling (IS-BAH) program.

"Ground damage" is a term used across the aviation industry to describe any damage to aircraft that occurred while the aircraft was on the ground, says Brandon Popovich, manager of safety and training at the National Air Transportation Association (NATA).

"This term covers a vast range of areas on the airfield as well as several different. scenarios. Some of the most common areas on the airfield where ground damage takes place is on the ramp or apron. Aircraft can taxi into another aircraft, into GSE, or into a structure. Other areas of ground damage can occur while the aircraft is parked and being serviced with GSE to include fuel trucks, tugs, golf carts, GPUs, lavatory carts, potable water carts, O2 racks, people, etc. The most common amongst aircraft service providers is aircraft damage occurring during the tow operation. Whether on the ramp apron or during hangar movements,

towing is the most common area for damage to occur," he says.

He adds that ground damage is defined as any deformity of the aircraft structure, make-up, build or components. The deformity may be caused by the aircraft striking another aircraft or structure, movable or stationary, while under its own power or an aircraft being struck by a moveable object, whether human powered or not.

"Ground damage, as the term is used today, may not include damage caused by normal forces applied to the aircraft either during flight or while under its own power during taxi. Flat tires, tire damage occurring during taxi, damage caused by inclement weather or damage caused by wildlife, whether during flight or stationary," Popovich says.

The Causes

Often times, the causes of ground damage, no matter the source, comes down to simple human error.

"I have found that haste, inattention and inadequate training are some of the leading causes of ground damage. The ramp is a dynamic and challenging environment. Factors include staffing,



staffing talent, GSE capabilities, traffic, congestion, ramp design, weather, among other physical hurdles. Emotional stress is an additional factor. Emotional stress can be exacerbated by personal well-being, employer culture, service pressure, decision-making awareness," Popovich describes.

Mann agrees, adding that in his personal experience it comes down to people simply not paying attention to what they're doing and their surroundings.

"It's really a matter of individuals paying attention to what they're doing and everybody doing their part and not getting distracted by either things that are going on at home or things that are going on their phone. There's so much social media and everything. People are looking at their phones and not what they should be looking at," he says.

Mann estimates that 50 percent of the time when they see ground damage, it's a result of somebody not paying attention, with the other 50 percent being caused by someone rushing a job, trying to cut corners.

Yeomans says that from the limited data they have collected over the past six years, they see:

- Aircraft coming into contact with GSE/ ground vehicles accounts for 26 pecent of damage;
- Aircraft towing/pushback is a factor in 25 percent of the incidents;
- Aircraft coming into contact with other aircraft accounts for 10 percent;
- Aircraft coming into contact with an immovable object, including buildings, light posts, etc., is 15 percent.

"[The areas that are most at risk for damage] for the business aviation sector: wingtips/leading edges, such as low wings and swept wings, ailerons, nose cones and nose gear," Yeomans adds.

"The empennage and trailing edges of lift surfaces," adds Popovich. "The tail of the aircraft holds many servicing points which requires the most attention. This area is active during ground servicing and can, at times, have more than several pieces of GSE staged or connected to the aircraft simultaneously. During



tow operations, the aircraft may need to be pushed into a position or into a hangar. These hangar operations are the leading cause of aircraft damage and although not isolated to the trailing edge of control surfaces or empennage, see much of the damage due to the nature of the movement."

Western Jet Aviation works predominately on large cabin Gulfstreams, and Mann details where they are often seeing ground damage occur.

"The wing tips, tails, as far as towing, and in general, wing trailing edges are really prone to seeing some ground damage because you're loading and unloading baggage behind the wing. You're doing maintenance on engines, so you have engine stands and things behind the wing. So those are the areas that tend to see dings more often than other areas," he says.

Damage and Costs

Damage to an aircraft can be costly and must be considered prior to any flight operation, says Popovich.

"Some damage is obvious, and the flight crew will shut down the operation. Other damage may not be obvious to the eye and may require an inspection. Due to the nature of flight, the stresses placed upon the aircraft during the flight, and the uncertainty of the damage that may have occurred, some flight crews will request a maintenance inspection to eliminate the possibility of internal component or structural damage," he says.

Most aircraft damage is known immediately as the aircraft itself has made contact with an object or an object has made contact with the aircraft. A common term used amongst aircraft service providers is "bent metal" i.e. an aircraft has been damaged and "we bent metal." Although this is the most common indication of aircraft damage, damage is not limited to bending metal.

"Towing operations are one of the leading causes of aircraft damage. During tow operations some aircraft are limited with the angle at which the nose gear can be turned. Several aircraft manufacturers have installed towing limiters or oversteer indicators. Although most

Ground Handling

of these limiters or oversteer indicators are in view of the tow operator, some are not. Some indicators must be inspected prior to flight while others illuminate an oversteer indicator in the cockpit," Popovich continues.

Mann says that it is normal, especially with older aircraft, to see more wear and tear

"It's not uncommon to see a little scrape or something on a flat trail, a wing trailing edge. Other times, it's a minor ding that requires a local repair. Especially as the aircraft get older, it's not uncommon to see little wear and tear in that area," he says.

Knowing when a scrape is more than meets the eye is key, Mann says.

"For the most part, a scrape is really just a scrape. It's just superficial. Maybe it is just for the paint, that kind of thing. And then there's damage limits. So, the

maintenance manual and the aircraft structural repair manual have damage classifications. So, any kind of obvious dent or tear or any real physical damage is definitely going to affect airworthiness and it's going to require an immediate repair," he says.

Even knowing that the aircraft has been damaged can be tricky. It's not unheard of for an aircraft to receive damage at one location and for it not to be noticed until it's arrived at another.

"These aircraft, they're being built lighter and lighter. And so, it's not that difficult to actually cause some damage and it might be that something gets a really small little ding in it. And maybe in the lighting, you don't even realize that it occurred. Maybe you're looking in a different light or under different conditions, and you might notice that there is some small damage somewhere," Mann says.

Damage can often go unnoticed when it has been done to a composite material.

"Oftentimes, composites are a rigid surface and oftentimes they may take some impact damage that doesn't create any surface damage, but the composite itself might become delaminated and soft, but you might not see it until you physically touch it or do an NDT test on it," Mann describes.

And repairing a composite material is not always so straight forward. Depending on the extent of the damage, a material might require more specialized equipment, which smaller repair stations may not have.

"There's different kinds of repairs. It depends on the extent of damage. Sometimes if it's small, a localized repair can be done, which can often just be a matter of cutting out the damaged area, filling it, and then putting some additional doubler



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material on the backside of the composite. But if it's a large repair, those big composite pieces, they have to come off and go, a lot of times, into an oven. So those can take things like an engine cowling or wing faring. Those are areas that can see ground damage and they can take up to six months to get repaired," details Mann.

Mann says the cost of these repairs can often times be approximately \$50,000 to \$100,000, but there's more to consider than mere monetary costs.

"Honestly, for an organization like ours, when it comes to the cost of the damage, it's not so much about even the monetary cost, but we're dealing with individual customers in this environment. And so, you might lose trust with your clients if you damage an aircraft. That's the biggest loss and the biggest cost associated with ground damage," Mann says.

Yeomans adds that other hidden costs



Ground damage is defined as any deformity of the aircraft structure, makeup, build or components.

of ground damage might include:

- Productive time lost by employees and supervisors attending incident;
- Clean-up and start-up of operations interrupted by the incident;
- Time to hire and retrain other individuals to avoid repeat incidents;
- Time and cost for repair or replacement of damaged equipment or materials;
- The cost of losing a valued customer

due to poor performance or late supply of services;

- Poor or eroded morale among employees;
- Possible penalties or other sanctions applied where the incident is determined to be caused by a violation of regulations;
- The cost of completing the paperwork generated by the incident.



Ground Handling

Preventing Incidents

With almost all damage being the result of human error, the first step to preventing ground damage from taking place is through training and procedures.

Popovich says some of the best practices are:

- Ensuring proper clearance during taxi. Ramps can be congested, and ground crews should try to move GSE or other movable objects out of the way. This can be done using parking markers, painted guidelines, wingtip clearance indicators, etc.
- While servicing aircraft, some procedures could include:
- Always consider the aircraft's Circle of Safety;
- Reduce speed;
- \circ Be deliberate, intentional and slow;
- Stayed focused on the task, avoid distractions;

- Use a guide person when maneuvering close to aircraft;
- Position smaller GSE by hand, if needed;
- Eliminate the 3-point connection;
- Consider all factors.

Another best practice is to customize GSE components to eliminate possible hazards. Purchase extended cables, hoses, couplings etc. Use GSE with larger diameter tires for ease of maneuvering, or use GSE that is designed to be moved by hand.

"My best advice is training, training, training. The procedures are pretty standard and in place, but it's really a matter of continually reminding people of what the procedures are, because humans tend to deviate or forget. "So, repetitive training and keeping your staff aware of what the costs are of their lack of awareness," Mann says.



The cost of ground damage repairs can there's more to consider beyond money.

Yeomans suggests identifying opportunities to avoid complacency in the workplace can be key to avoiding damage.

"Effective training, identifying your top safety concerns, analyzing and mitigating the risks from those safety concerns, measuring safety performance against realistic targets, proactively identifying improvement opportunities. In essence having an effective safety management





be as much as \$50,000-\$100,000, but

system working as the core of the management system for day-to-day operations," he says.

Mann stresses that just as important as preventing damage is knowing when and how to report it.

Developing a culture that allows ground staff to know it is okay to report damage without fear of retaliation is an important element.

"You really need to make sure that your staff knows that it's okay to report damage. Safety is paramount in our industry. So, you don't want anybody to feel like they need to worry about their job and not report a safety issue," he says.

Although procedures vary amongst aircraft service providers, Popovich says some common procedures for reporting damage are for the crew involved to immediately report the incident to a supervisor, a member of management or to their higher-level direct report.

The supervisor or staff member with the higher level of responsibility should contact the flight crew and make the initial contact. The ground crew should not move or adjust the scene until an investigation has determined it's OK to do so.

There are, however, exceptions., like if the scene is dangerous or additional

damage could occur if the aircraft is left as is.

"Reporting damage must be customized to each service provider's operation. The best practice would be to use the chain of command. The ground crew involved with the damage should report the damage to their immediate supervisor. The supervisor would either make the initial contact with the flight crew or contact their next level supervisor or manager. The initial procedure should not take more than a few minutes as the flight crew needs to be notified right away. The flight crew can then decide whether or not to take the incident to their superior considering the condition of the aircraft," Popovich says. GSW

ABOUT THE AUTHOR

WALKER JAROCH Walker Jaroch is editor of Aircraft Maintenance Technology (AMT).



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The Evolution of Training

Ground handlers in Oceania and the surrounding area have adapted to ensure personnel have the knowledge required to safely turn around aircraft.

he priorities of aircraft ground handling companies have changed since the pandemic and training for ground operations has reflected this change. Additionally, current infrastructural constraints are also impacting aircraft ground handling.

According to UAS International Trip Support, to achieve improved performance and safety in global ground handling, there is a need to think in terms of innovation, technology implementation and sustainability.

"It is all about working to improve the customer experience. Operators and commercial airlines are under pressure to minimize costs while consistently delivering on-time. They are also aware that great ground handling is one of the most important components of smooth operations," a UAS spokesperson says.

Training and Infrastructural Constraints

Concerning training, there has been an increased focus on "Operational Refresher" type training – especially during 2021 – to support team members who were

BY MARIO PIEROBON

stood down during the pandemic and away from operations for extended periods, according to Adam Whittle, training manager at Swissport Australia.

"This training was targeted at confirming both the competence and confidence of our employees to return to operational duties safely. During the pandemic the Australian commercial aviation industry saw an exodus of highly skilled and qualified workers," he says. "This has had a significant impact on the number of employees available to perform complex operational duties such as towing, pushback, loading supervisor, etc., and it is driving demand for upskill training into 'high skill roles' within accelerated timeframes, i.e., normal timelines to progress from entry level roles to senior/complex roles have reduced."

Low unemployment and labor shortages have significantly impacted recruitment pipelines, according to Whittle.

"Employee attrition remains high driving significantly higher volumes of initial/induction training than pre-pandemic," he says. "We used the time during the pandemic to re-think our training approaches and significant investment was made into updating our training materials, making them more relevant to a contemporary workforce. This has seen much greater utilization of e-learning and multimedia within the training process."

William Chew, head of learning and development at dnata Singapore, points out that the company has scaled up the use of e-learning in training with increased use of animations, live-action videos and 360 videos, to better illustrate the learning concepts and tasks.

"The pandemic has fast-tracked the incorporation of different approaches to learning," he says.

For example, Chew notes blended learning, which is a combination of instructor-led and e-learning, and flip-classroom training, where learners complete e-learning modules before entering the classroom to apply their knowledge, are deployed where suitable.

"We are exploring using virtual reality (VR) in training to create a more immersive, interactive and realistic training environment," he adds.

From an infrastructure constraint perspective, UAS officials point out

To support personnel who were stood down during the pandemic or away from operations for an extended period, refresher training carries great importance.



that inefficiencies may occur with so many ground service providers working side-by-side.

"Over the past decades we have seen

consistent efforts by IATA to set the standard for ground handling excellence globally," the UAS spokesperson says. "Service providers agree that there are certain challenges that could be improved if certain systems were implemented or changes made to regulatory frameworks, operational standards, safety polices or data sharing, for example."

Some infrastructural challenges have also been around with regard to ground handling training, according to Whittle.

"There have been constraints on training facilities due to the significantly higher number of concurrent induction training courses being delivered," he says. "In one of our ports, we have provisioned more than 70 laptops to support training activity, in addition to existing infrastructure already in place."

Opportunities and Threats

Currently, aircraft ground handling training presents both opportunities and threats, according to Whittle.

"One opportunity is the use of technology to improve the effectiveness of training, drive consistency in training and improve the learning experience," he says. "In addition, many of our airline partners are becoming more open to the concept of recognizing the prior skills/ experience/training of our employees and appreciate that duplication of training (i.e., completing identical training for multiple airlines) may increase risk, rather than reduce it."

Swissport Australia is working with its airline partners to focus on "differences" training to help its team members perform their roles more effectively.

"With a significant change in the composition of our workforce, there is also an



International

opportunity to re-calibrate/re-baseline safety culture and organizational values through the training being provided to new employees. While this is an opportunity, it's also a threat if we don't manage this carefully," says Whittle.

Chew adds 5G networks, cloud-based technology platforms and artificial intelligence (AI) technologies and data analytics offer many opportunities.

"The expansion of 5G networks and cloud-based technology platforms could allow, e.g., improved collaboration and access between various stations during VR training and better support scalability of content," he says. "AI technologies and data analytics, for example, could also support the recording of information and processing of data during sessions with multiple learners to help both facilitators and learners with immediate feedback and improvement."

According to UAS officials, moves to enhance ramp safety and efficiency are key.

"This can mean more efficient design or shared, up-to-the-minute info on bottlenecks, etc. Collating data from multiple industry sources in realtime and sharing it would go a long way to enable

Online training in the ground handling industry is in a steep growth phase, accelerated by the pandemic.



Among the current threats, Whittle mentions the so called "greenon-green" risk.

"New team members working alongside other new/inexperienced team members present a challenge. We rely on 'buddy' training to help consolidate the skills and experience of new team members and in some locations, more than 50 percent of our workforce have less than six months' total operational experience," he says.

"In addition, the large volume of training in some locations means that there may not be enough trainers to support requirements."



Airlines are rapidly scaling up – and sometimes scaling back – operations and changing aircraft fleet compositions in response to travel demand, says Whittle.

"This presents challenges in meeting the required volume of training and the specialized skillset training that is required, e.g., upskilling from bulk loaded to containerized aircraft," he says.

Online Training

Online training in the aircraft ground handling industry is currently in a steep

AUSTRALIAN FBOS EARN IS-BAH STAGE 3 CERTIFICATION

BY JOSH SMITH

ExecuJet, part of the Luxaviation Group, recently achieved International Standard for Business Aircraft Handling (IS-BAH) Stage 3 accreditation at two FBOs in Australia.

"To have the effectiveness of our safety regulation identified as part of a globally recognized accomplishment is a huge achievement for the team at ExecuJet and Luxaviation and reflects the hard work of our employees," says Darren McGoldrick, vice president, ExecuJet Asia Pacific.

According to ExecuJet officials, these locations in Sydney and Melbourne are the first FBOs in Australia or New Zealand to secure Stage 3 accreditation and are the first in the company's global network to achieve this status.

IS-BAH accreditation verifies the company's safety management activities, McGoldrick explains. What's more, IS-BAH further provides a platform for ExecuJet's FBOs to test processes and ensure that the highest standards of safety are delivered on the ground.

"In sustaining a positive safety culture, IS-BAH demonstrates safety as not just a long-term

goal, but a daily practice that is fully integrated into our business operation," McGoldrick says.

He says the IS-BAH program has enforced a company-wide commitment to safety internally.

"Through the implementation of this enhanced safety culture, our front-line staff go to work knowing they work for a company that strives to find a better way to operate," McGoldrick says. "In turn, this drives motivation and engagement, advancing our outstanding level of customer service and quality across our network. The knock-on effect of securing IS-BAH certification means that our community adheres to the highest standards in all aspects of the business aviation industry."

Earning Stage 3 IS-BAH registration came with challenges. For example, shortly after ExecuJet's Australian locations received Stage 2 registration, the COVID-19 pandemic brought regional lockdowns, uncertainty and stress, which slowed down the Stage 3 certification process.

"Asia Pacific, particularly Australia and New Zealand, implemented stringent border

restrictions that limited people in the country from moving around as much as usual," McGoldrick says. "However, the short-term safety regulations were necessary in minimizing the effects of the pandemic and have since been lifted, allowing us to continue with the IS-BAH auditing process."

With Stage 3 IS-BAH certification at its FBOs at Kingsford Smith Airport in Sydney and at Essendon Airport in Melbourne, ExecuJet is expanding its presence in the region with the opening of a new terminal at Auckland International Airport in New Zealand with plans to begin IS-BAH registration at the facility in the coming months.

"A large focus for us over the next few years, will be working towards IS-BAH accreditation at Auckland International Airport to maintain a consistent safety culture across the Asia Pacific region," McGoldrick says. "We hope that by leading an example in aviation safety, we can start implementing these standards more rigidly across our global FBO network." growth phase, accelerated by the pandemic, according to Chew.

"It will become increasingly more common to enhance instructor-led practical training with blended learning," he says. "Obtaining the knowledge of operational and safety concepts and theories via online training provides learners with suitable background before going into practical and on-the-job training."

Swissport Australia utilizes online and digital learning for training its airport team members, where it is the most appropriate tool for the job, according to Whittle.

"It is especially suited to very standardized training where consistency in message and content is critical, i.e., knowledge transfer is a key outcome. Examples of where this type of training is deployed is most commonly during induction training or even knowledge based 'recurrency' training," says Whittle. "We rarely leave employees to undertake online training solo/in isolation, especially for induction/onboarding. This type of training is nearly always delivered in an environment where a qualified trainer is available for support, to answer questions and clarify questions participants may have as well as debrief each training module before the training group moves onto the next topic or into the practical training environment for hands-on experience."

The new ground handling training curriculum being introduced by Swissport Australia sees many traditional presentations being replaced by engaging, digital learning courses that incorporate activities and contain multimedia, such as videos, GIFs and more.

"These courses help participants to understand the 'why' we do, 'what' we do and to see 'how' the task is performed in a very consistent way that is not influenced by trainer bias, operational constraints, weather, etc.," Whittle says. "The courses can be delivered in an e-learning format and debriefed by a trainer or presented by a trainer in lieu of a standard PowerPoint presentation. Participants can see an entire task being performed and then have that activity broken down into small, easily understood content chunks."

Airline Specific Requirements

A peculiarity of the training business is the need to cater for airline specific requirements in aircraft ground handling training.

"Airlines provide airline-specific training materials and conduct trainthe-trainer sessions, which we as their partner enhance by localizing and contextualizing the content," says Chew. "dnata also has its internal global system, which is in line with international regulatory requirements and incorporates best practices, SOPs and work instructions across its network.

"These are used during internal training sessions and localized according to equipment type or local regulations," he adds.

Whittle observes that many of Swissport Australia's airline partners refer to the training already provided by Swissport to its employees and adopt a "differences" approach.

"In this way, the unique or specific requirements for an airline are overlayed across our standard operating procedures," he says. "This is allows our team members to focus on key differences they must implement to ensure the individual needs of our customers are fulfilled." **GSW**

ABOUT THE AUTHOR

DR. MARIO PIEROBON Dr. Mario Pierobon provides solutions in the areas of documentation, training and consulting to organizations operating in safety sensitive industries. He has conducted a doctoral research project investigating aircraft



ground handling safety. He may be reached at mariopierobon@az-all-in-one.com.



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Ground Service Providers



Asset management technology helps ground service providers increase efficiencies.

hat are the battery levels on specific electric ground support equipment (GSE) units? When will the batteries need to be charged? When will GSE need to be maintained or replaced? Is there enough GSE or are there too many pieces of equipment at a gate? Is there enough ground personnel? What do aircraft turnaround times look like in real time? If a flight is delayed, who's responsible and where was the delay?

To help answer these questions, ground service providers of varying sizes are using asset management technology.

"Asset management at the most basic level is the process of tracking, maintaining, upgrading and retiring

BY REBECCA KANABLE

operational assets over the course of their respective lifecycles," says Santosh Nachu, general manger of EBIS software at Tronair.

The company's EBIS GSE Enterprise Asset Management (EAM) was purpose-built for GSE maintenance operations.

"Enterprise Asset Management (EAM) systems enable the collection of various measures and management of the aforementioned processes through modules such as maintenance tracking, work order management, warranty management, inventory management, etc."

Optimization is a desired outcome of any well-run asset management program, says Nachu. For instance, how many GSE assets of a certain type are needed to minimize total cost of ownership (TCO), while also ensuring a desired level of asset uptime and availability to serve the number of turns desired? What combination of preventative maintenance schedules, parts catalogs and labor hours spent on a piece of GSE maximizes its life, while also keeping costs below the price of acquiring new GSE?

"Asset management, in and of itself, does not deliver optimization," Nachu says.

"However, the ability to accurately and reliably collect data from various sources, both human and machine, contextualize them to generate metrics that are important to the organization; and apply industry best practices and policies to control these metrics are

necessary conditions to achieve optimization."

Nachu says optimal asset management is a journey that starts with identifying and

tracking assets.

"Once a repository of assets is identified and can be updated over time, the objective may move to better understand the condition of these assets by accurately measuring various inputs such as usage, mean time between failure. labor costs. parts costs, productivity, etc.," Nachu says. "After the right measures are accurately and reliably acquired, they can be





transformed into specific metrics that become the dynamic parameters and constraints used to optimize functions such as total cost of ownership, fleet size, fleet lifecycle."

What Are the Benefits?

Under the brand name XOPS, Resonate MP4 develops airport and airline ground handling solutions, including fleet (motorized and non-motorized), operations and data management systems, as well as vehicle access control.

"Generally, customers are looking to gain efficiencies either for their own benefit or their customers' benefit," says David Read, general manager at Resonate MP4.

Traditionally, an operations manager might review a monthly report done by multiple people gathering data. Read says that's not as relevant today.

"People want to know in real time what's happening," he says. "Am I turning around 100 percent of my flights on time today? If not, where are the differences?"

Keeping a digital record of activities is becoming more the norm.

"Commercial contracts are often requiring hard evidence of SLA [service level agreement] performance," Read says.



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Ground Service Providers

The benefits of digitized asset management are many.

According to Matthias Moulinier, product director for ADVEEZ, better knowledge on GSE usage and maintenance can increase the lifetime and performance of the assets, prevent accidents through better maintenance and safer driving and decrease asset depreciation by keeping vehicles working longer.

Benefits also include a safer working environment, cost savings from energy and fuel management, better and safer driver training and decreased greenhouse gas emissions.

As the turnover and aircraft rotations are increasing in most of the airports around the world, Moulinier says it is critical for ground handlers to enhance operations and safety during shifts. But most important is getting

reliable data that can be used immediately to be able to be reactive during actions, he explains.

"Finding quickly the right GSE for the right gates at the right moment is critical to be efficient during perfectly timed operations," Moulinier says. "Accurate and real-time information on the assets are crucial, particularly with last-minute changes with aircrafts."

According to Read, common questions about asset management technology include "How does the technology help ground service providers improve their business?" and "How can the savings from those efficiencies be passed on to the airlines for whom they work?" Then, he says there are more specific requirements.

"Can you reduce how much fuel I use, or can you help me manage my green commitments/emissions, or





can you improve safety? How can I get my staff and/or assets to be more efficient?" he says.

"We have some smaller, more specialized customers with less assets (vehicles, GSE and non-motorized equipment) but they require a very high level of precision, performance and consistency for the operation," Read adds, noting examples of specialized needs may include aircraft fueling, air conditioning and catering. "Being able to digitally report in real time, record and audit precise information on the arrival and departure times from the aircraft turnaround site, as well as the exact contents delivered to the aircraft is critical for meeting contractual performance."

Telematics and Beyond

Asset management allows fleet managers to increase asset usage and value over time to get the best ROI. However, Moulinier explains, telematics systems, which are usually placed directly on the asset, are the hardware that connect. and send critical data from an asset to a cloud or web platform.

Elements of asset management technology have been in use by some airlines and ground handlers for a decade or so, according to Read, adding use of the technology has gone beyond the basics of locating a vehicle on a map.

"Ultimately, you need to know in much more detail, down to the nearest meter or half meter where is the vehicle, who is driving it, how fast is it going - all this information in real time," Read says.



The introduction of electric GSE has created a new demand for asset management technology, he says.

"It's quite easy to estimate how much fuel is in a vehicle," Read points out. "It's not as easy to estimate remotely and accurately how much battery is left in a vehicle."

Today, Read sees demand for more granular enriched data than there was 5 or 10 years ago

"And 5 or 10 years ago technology just couldn't provide that richness of data," he notes.

Examples of sophisticated functions that Nachu highlights include the ability to:

- Ingest telemetry data and utilize it for setting accurate maintenance schedules or determining part component life:
- Get real-time data on costs and availability of parts via direct integrations to suppliers to help streamline parts forecasting, costing and ordering;
- Visualize asset performance data or push them real time to other dashboarding tools via application programming interfaces (APIs).

ADVEEZ recently introduced new features on Localeez, its web and app platform. For example, to help increase safety, the mobile app includes an OSHA checklist. There is also a GSE driving score that indicates, in real time, the driving style including harsh breaks or turns, harsh accelerations or speeding.

To meet accreditation guidelines such as Airport Carbon Accreditation or achieve carbon management objectives

in compliance with the Paris Agreement,

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and working time reports to monitor the unnecessary usage of the asset motor and reduce the emissions.

Access control or speed control via geofence features are available as options.

"ADVEEZ has designed in its Localeez platform geofence zones that are active in real time," Moulinier says. "One of them is automatically controlling the speed of the GSE and usually it is drawn around the aircraft at the gate. Reliable and real-time data allows (users) to reduce automatically the speed approaching the aircraft with a precision to the meter. At a pedestrian speed around the aircraft (5km/h), we are avoiding many GSE accidents that have happened in the past on the ground. With this technology, the working environment is definitely safer for everyone." GSW

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Product Profile

Untethered Communication

Utilizing a Bluetooth-enabled dongle, the 121-Ground Crew headset allows personnel to stay in contact with other crew members wirelessly.

BY JOSH SMITH

round service providers have many time-sensitive tasks to perform while carrying out a safe aircraft turnaround. Any added efficiency makes a ground handler's job smoother, particularly when preparing for and executing a push back.

Replacing a corded headset with a wireless version, for example, allows ramp agents greater range on the ramp and reduces potential hazards on the ground, according to Steve Brown, vice president at SRS Tactical.

The 121-Ground Crew Bluetooth Wireless Ground Mechanic Headset and dongle allow instant wireless communication between personnel on the ground and the flight deck.

The headset, which is manufactured by A-Kabel in Norway, has been offered by SRS Tactical as the 121-Ground Crew model for approximately 10 years.

"Once the Bluetooth headset and dongle have been paired, the user simply turns the units on and they automatically connect to each other," Brown says, adding that pairing the two components takes a matter of seconds.

Utilizing Class 1 Bluetooth technology, the dongle's range provides a ground service provider with clear communication within a 50-meter radius.

"The other option is a wired option," Brown says, adding a 25-foot curly cord connects the flight deck to the pushback tug. "This has its limitations, together with service issues, with constant strain on connectors, cables being run over or cut, tripping hazards. Dangling cables often have worn down connectors that need replacing."

The 121-Ground Crew headset uses a Bluetooth piconet, which ensures that the headset and dongle cannot cross-talk with other units accidentally.

> "We do a version that will connect to another headset to provide full duplex communication via Bluetooth between headsets," Brown explains. Without cords present, there is less equipment to carry in each tug. "The operator has more freedom to move and less risk of tripping over cables, leading to possible accidents," Brown says.

The headset's quick-positioning, noise-canceling microphone filters out background noise to aide clear speech transmission. The Bluetooth adaptor's dongle interfaces with aircraft via a simple connection into the external ICS via 1/4-inch stereo connector. If the aircraft has a dual plug connection, SRS Tactical offers an adaptor for 1/4-inch female to dual 1/4-inch connectors.

As an added safety measure, the dongle can be connected to the nose wheel The Bluetooth adaptor's dongle interfaces with aircraft via a simple connection into the external ICS via 1/4-inch stereo connector.

safety pin to ensure removal before take-off.

The 121-Ground Crew headset and Bluetooth adaptor each operate on two AA rechargeable batteries. The equipment's intelligent charger can detect if normal alkaline batteries are inserted, which prevents them from being charged accidentally.

There is no need for the headset and dongle to be re-paired between battery changes or when turning on/off. What's more, both the dongle and headset units can also be charged via an external socket.

The reliable equipment has undergone firmware updates since it was originally launched.

The hi-visibility fluorescent green and yellow color options and added hearing protection - including a noise reduction rating (NRR) of 21 decibels - provide ground service personnel additional safety benefits.

Brown adds that customer feedback has been favorable, specifically in regard to the clarity of communication and the simplistic set-up and use. One example of its user-friendly function is a flashing LED that indicates the headset and dongle are in operation.

Additional features include an on/off volume control positioned on the ear shell for ease of use and high attenuation ear cups for enhanced hearing protection.

The headset's quick-positioning, noise-canceling microphone filters out background noise to aide clear speech transmission. And the headset includes a removable high-visibility headband cover.

To keep the 121-Ground Crew headset in good working condition, Brown advises users to replace hygiene kits regularly and to allow the equipment to dry out if it becomes saturated. He adds that long-term cost savings can be achieved due to reduced repair costs. For example, all of the 121-Ground Crew headset's metal parts are made of stainless steel for increased durability. **GSW**

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Product Hangar

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This traditional over-ear headset provides wired ground-to-cockpit communication on the apron. It complies with EU regulation EN 352 and may be used as personal protective equipment. The headset is available with CT-ASR (ambient sound reception), which means that ambient noises, such as warning noises, can be heard at any time via external microphones.

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FAMA LITE - REAL-TIME DATA WITH GSE PLUG-AND-PLAY SOLUTION ADVEEZ

With two CAN bus plug or one and an OBD plug, the FAMA lite adapts to most of the current motorized GSE range in any brands. Real-time data is available on the Localeez mobile application or web-platform such as location, working, moving, in use, idle time, shock detection or the hour-meter. Easy and fast to install, maintenance is minimal and can be managed over the air. Access control or speed control via geofence features are options to choose. FAMA lite enhances safety during apron operations.



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Advertising Index

ADB SAFEGATE Americas LLC	
Air Ocean Pro's	
Alberth Aviation	
David Clark Company	5
Engine Distributors, Inc	
Fortbrand Services LLC	
GLOBAL GROUND SUPPORT	27, 40
Goldhofer Aktiengesellschaft	
Ground Support Specialist LLC	
GSE International Inc.	
Hydraulics International, Inc.	
Intl Airport GSE Expo	
JBT GSE	
Mallaghan Engineering Ltd	
Memo Corporation	
Mercury GSE	7
Mototok International Gmbh	25, 37
Page GSE	
Par-Kan Company	
Schweiss Bi-Fold	
Stinar Corporation	2
Total Control Systems	24
Victory GSE	

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Anniversary



Forming the Committees that Create Industry Standards

Although industry groups have evolved through the years, the dedication to make GSE and ground handling operations safer remains the same.

significant objective of Ground Support Worldwide throughout the last 30 years has been to bring key stakeholders within the ground handling community together.

As part of that mission, I took the opportunity to attend a recent meeting of the SAE AGE-3 Aircraft Ground Support Equipment committee to learn more about the group.

Like the publication's previous editors, we have an article lined up for the December/January issue intended to

get the word out about the work being done by the AGE-3 committee to bring people from the GSE, airline and airframe sectors together to collaborate on industry standards aimed at making ground handling safer.

Stay tuned for more on that.

But while attending the latest SAE AGE-3 committee meeting, I got the opportunity to chat with committee chairman Scott Barninger, director of GSE at Piedmont Airlines, to better understand how the committee dedicated to GSE standards came to be in its current state.

SAE International, which was founded in the early 20th century, is a professional standards organization for engineering professionals in various industries. SAE develops and publishes technical standards based on best

BY JOSH SMITH

practices identified and described by SAE technical committees across various industries, including aerospace.

"What we produce are called voluntary standards. They don't carry the force of law," Barninger says. "The way these standards get enforced is I, as a consumer – an airline user, tell you, the manufacturer of GSE that I want to buy your stuff, but you have to conform to SAE.

"OEM manufacturers typically look to the SAE specs when designing their products because people want to know

that they're com-

pliant," he adds. Previously, standards for ground support equipment were addressed by the AGE-2C Vehicle Maintenance and Aircraft Servicing Committee. That group was a subcommittee of the

AGE-2 Air Cargo and Aircraft Ground Equipment and Systems Committee

"Once upon a time, there was a committee – AGE-2," Barninger says. "And it had two subcommittees – 2A, which was cargo and 2C, which was GSE."

Because of the specific nature of the GSE standards, Barninger explains the subcommittee sought approval from SAE to form a separate committee. This allowed the GSE committee to ballot documents independently.

The AGE-2C subcommittee became the AGE-3 Airport Ground Support Equipment committee and the AGE-2A cargo portion became the AGE-2 Air Cargo committee.

"We're basically AGE-2C related and elevated from a subcommittee status to a full committee status," Barninger says. "In other words, our ballots go straight to Aerospace Council now. Whereas, before they had to go through AGE-2 ballot and then to Aerospace Council."

The GSE standards group further evolved when the Aircraft Ground Deicing Steering Group split away from AGE-2C to form its own specific committee known as G12.

"When it became apparent that deicing was this hugely complex subject with lots of sub-ramifications, they became G12," Barninger says.

As mentioned, a more detailed article about AGE-3 is slated for our final issue of the year. But in the meantime, if you'd like to learn more about the group's objectives and how to get involved, visit the SAE's website to contact the committee.

"If you have an interest in this industry, we look for members – not just from the engineering community, designing and building the equipment – but from the airline community, the people using the equipment and from the airframe OEMs because the equipment is being designed to work on them," Barninger says. "The more we can get from that mix of people, the better the standards are going to be.

"So anybody involved in any one of those categories and has an interest in working on standards, I would encourage them to contact us." **GSW**





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