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YOUR GUIDE TO THE LATEST DEVELOPMENTS IN THE INTERNATIONAL AIRFREIGHT INDUSTRY

ACL AIRSHOP: OPTIMISE THE UTILISATION OF ITS ASSETS

CARGO TECHNOLOGY IN THE DIGITAL AGE

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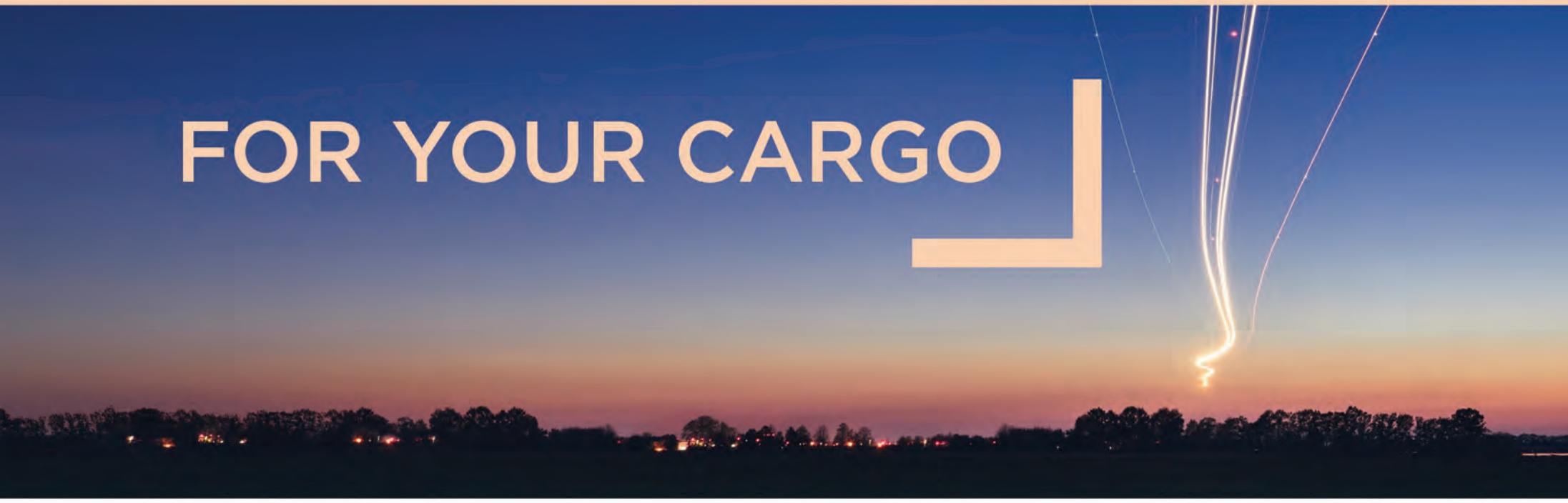

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CARGO TECHNOLOGY IN THE DIGITAL AGE

Air cargo technology encompasses a wide range of advanced systems and solutions designed to optimise the transportation, handling and management of goods transported by air. These technologies aim to improve efficiency, security and sustainability in the wider air cargo industry.

To judge how far air cargo technology has come and will yet develop, it is informative to consider what the technology was like when scheduled air cargo flights began, back in 1944 wartime USA.

Scheduled air cargo flights officially started with a 19-hour flight from New York City to Southern California in October 1944. American Airlines loaded up a DC-3 with more than 6,000 pounds (2.7 tonnes) of cargo and flew the first scheduled air cargo flight, from LaGuardia Field to Burbank, California.

Black & white photographs of the loading would show plenty of labour and little handling technology as men physically loaded wooden boxes of merchandise, stacking them in the aircraft like they were stacking at the time into railway cars and ship cargo holds. Records were kept on paper and there was no ability to track and trace any consignment in real-time.

Eighty years later it is clear there is a very different picture when one stands in a cargo terminal or on the cargo apron. Millions of tonnes of cargo are handled at the world's airports by fewer people than loaded that DC-3 eighty years ago.

The relatively low number of people presently working in air cargo loading and handling can be attributed to several factors. Firstly, the air cargo industry has increasingly adopted automation and advanced technology to improve efficiency and reduce the need for manual labour. Automated systems for sorting, loading and unloading cargo have significantly decreased the number of workers required.

Air cargo loading requires specialised skills and training. Workers need to understand weight distribution, safety protocols and the handling of various types of cargo. The need for specific training can limit the number of qualified personnel.

The nature of the job often involves working in harsh conditions, such as extreme temperatures, noisy environments and irregular hours, including nights, weekends and holidays. These conditions can make the job less attractive to potential workers.

The industry is heavily regulated, and workers must comply with stringent security and safety standards. This includes background checks, security clearances and adherence to safety protocols, which can be barriers to entry.

Now, if time travel permitted those 1940s aircraft loaders to arrive eight decades into the future, they would be astounded by the modern air cargo handling eco-system. They would see vast warehousing storing hundreds of empty and filled ULDs in stacks that tower over mere people, automated systems that can locate an ULD anywhere in the world in real-time and technology that can protect the most perishable and vital of cargoes.

However, one thing that still connects the men in wartime New York and the men and women working in the most modern digital warehouse is straightforward and has not changed: air cargo handling allows for the rapid and efficient transport of goods over long distances and plays a critical role in supply chain management by ensuring that goods move swiftly from manufacturers to consumers or businesses as it supports international trade by facilitating the movement of goods across borders. That at least, has not changed.

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ACL AIRSHOP: OPTIMIS UTILISATION OF ITS ASS

"In recent years, ACL Airshop has made significant progress in recycling both the aluminium parts of our ULDs and the plastic waste used in our nets and straps"

It is often asserted that insurance is very expensive, until you need it. Likewise, should airline managers or bean-counters ever question the cost of utilising ULDs (Unit Load Devices), think of the cost of not having them.

The annual spending by airlines and other ULD owners on equipment to move clients' airfreight around the globe can be about $300 million. These costs can vary per airline depending on how they manage and handle their ULDs. As this is not the core business of an airline, a separate department or outsourcing can be a solution to reduce these significant costs. Not being able to carry cargo due to a shortage of ULDs also has an obvious big impact on an airline and its bottom line causing loss of revenue. These are the opinions of Jos Jacobson, COO of E Hemisphere and managing director of global at US-based ULD lessor ACL Airshop.

At a time when ULDs must comply with growing international and national regulations, which can vary and be complex to navigate, are regulatory issues impacting design and manufacture?

International sales director Jasper van Gelder says: "This is more a question for ULD manufacturers who must comply with various international and local regulations and certifications. ACL Airshop purchases its ULDs from leading OEMs, as we are not involved in the design and manufacture of ULDs. Of course, all ULDs owned by ACL Airshop meet international and local standards."

Safe disposal matters

Disposing of old or damaged ULDs can have environmental implications, especially if they are made of non-recyclable materials. What is ACL Airshop doing to build in 'greener' materials?

van Gelden says: "In recent years, ACL Airshop has made significant progress in recycling both the aluminium parts of our ULDs and the plastic waste used in our nets and straps. Some composite materials remain a challenge to find the right way to recycle and/or dispose of, especially due to the difficulty in separating the different parts. Secondly, we only invest in ULDs that are well recyclable and still lightweight.

"Since we do not produce ULDs, we focus on more efficient logistics and optimize the global transportation of our ULDs in a cost-efficient way. This process is continuous, and our operational teams are constantly working on reducing transportation costs. Additionally, our well-designed and user-friendly ULD control system also supports the optimisation of our assets worldwide and ensures that we have the right product at the right place at the right time."

The company launched an app designed to play a vital role in the daily operations of stakeholders in the airfreight supply chain. How successful would ACL Airshop's technology and IT systems director Harold Eifing judge the FindMyULD app to have been?

Eifing says: "The FindMyULD app plays an important role in the daily operations of our customers, ACL Airshop staff, and 3P stations. We have different use cases for the app, such as ULD management, MRO support, and inventory and leasing insights. This helps our customers be more efficient and make informed decisions based on the information displayed in the app. As part of our IT roadmap, we will continue to invest in the FindMyULD app and add more functions

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that will further support and benefit our customers, 3P stations, and ourselves."

Eifing notes that The Internet of Things (IoT) is moving airfreight operations forward over the coming next decade. He also says: "IoT is still in an early adopter phase but is becoming more mature and standardized. For ACL Airshop and our customers, having reliable ULD stock information is essential, which can be achieved through IoT. We have seen significant benefits for our customers who have fully digitised their ULD fleet. IoT can be used not only for tracking ULDs but also for process automation, such as handovers, MRO, leasing and order processes. ACL Airshop will continue to invest in automation to help our customers optimise ULD management.

"The global ULD market is around 1-1.2 million ULDs and has been quite stable over the years. The passenger market is now recovering to pre-pandemic levels while the cargo market is showing a correction from the high demand during COVID-19. The challenge for not only airlines but also for companies like ACL Airshop is to optimise the utilisation of our assets and invest where we see the market demand is growing. In the event of regional shortages we first look to how we can solve this within our inventory instead of immediately purchasing new ULDs. This whole process is complex as also high sea transport costs have an impact on the decisions we make in our supply chain."

What is the typical lifespan of an ACL Airshop ULD? Van Gelder says: "In general, the average lifespan of our containers is around seven years, with pallets lasting a few years longer, but it all depends on the handling and specifications of the ULDs as well as the utilisation of our assets. It also depends on the type of container and whether a container/pallet is flying in a closed loop (less damage) or not."

ACL Airshop was the first on the market with Bluetooth IoT technology to keep track of ULDs. Bluetooth technology works well in a closed-loop network but depends on a reader network. When destinations continuously change, other IoT technologies are more appropriate. In the last two years, telecom operators have rapidly rolled out IoT networks with global coverage and standard protocols. ACL Airshop will utilise these networks with GPS trackers that use additional technologies like WiFi, Bluetooth, and LoRaWAN to provide better localisation anywhere in the world.

Route to greater efficiencies

A reduction in the ULD fleet by up to 20% is possible, but also more accurate ULD stock and status information helps to become more efficient.

Eifring says: "From a ULD management perspective, with a complete digitalised ULD fleet, we do not need to receive the mostly manually entered IATA messages like SCM, UCM, and LUCs."

What are the latest innovations in ULD materials and construction? What ACL Airshop see in the market is that there is less focus on new or exotic composite materials to further reduce weight or increase the strength of ULDs. Instead there is more focus on designing ULDs that are safer – fire resistant – or easier to handle.

He adds: "The imbalance between global supply and demand continues to be one of the major issues of the airline industry. Through ad hoc leasing, they can cover shortages, and through proper ULD control and our management system, and better analyse and predict shortages or overstock."

Due to e-commerce, there is high demand throughout the year for ULD, Jacobsen reports, with possibly less seasonality at the end of the year. However, when peaks or lows occur, this is where ULD management software can help. By looking at historical data and trend lines, an ACL Airshop ULD control system can prevent these shortages or overstock. ACL Airshop can determine with all the historical data where certain ULD types are best positioned throughout the year. This is where its lease stock is positioned.

Future trends

The future will be a smarter ULD with better localisation options (GPS) and more automation standards by airlines, combined with handlers and agents. This will help with higher utilisation of the ULD fleet. Maybe the ULD will tell the customers in the future where it needs to go and how it should be returned. Traditional messaging like UCM/SCM messages will become less relevant and will be replaced with digital messages.

Globalisation will increase and manufacturing and demand might happen in the same region, there could be more need for smaller aircraft flying regionally. The world will become more connected, and traditional trade lanes will slowly change. Asia will continue to drive the supply side, concludes Jacobsen.

"ACL Airshop was the first on the market with Bluetooth IoT technology to keep track of ULDs"

HOW IOT IS SHAPING AIRFREIGHT TECHNOLOGY

"Operational efficiency is another area where IoT makes a substantial impact"

The Internet of Things (IoT) is more than just a buzzword in the modern airfreight industry. It is becoming extremely important to real time airfreight operations for a number of reasons.

The IoT refers to a network of interconnected devices that can collect and exchange data with each other over the internet or intranet. These devices range from everyday household items like refrigerators, thermostats and light bulbs to industrial machinery, wearable health monitors and even smart city infrastructures.

In essence, IoT enables these "smart" devices to communicate with each other, making our lives more convenient, efficient and informed. For example, a smart thermostat can learn your daily routine and adjust the temperature of your home accordingly, potentially saving energy. A smart refrigerator can track the contents inside and notify you when you are running low on milk or other groceries.

At its core, the Internet of Things is about creating a seamless, integrated ecosystem where devices work together to improve the quality of life, increase efficiency and foster innovation. This interconnected world, driven by data and automation, represents a significant shift towards a more intelligent and responsive environment.

This is why the IoT is playing a pivotal role in the airfreight industry, revolutionising how goods are transported and managed. One of the most significant advantages IoT brings is the ability to track and monitor cargo and cargo equipment in real time. This capability ensures that shipments are not only secure but also accounted for at every stage of their journey. With sensors providing continuous updates on the location of goods, as well as environmental conditions such as temperature, humidity and pressure, the transportation of sensitive items like pharmaceuticals and perishable goods becomes more reliable and efficient.

Operational efficiency is another area where IoT makes a substantial impact. By integrating IoT devices, airfreight companies can optimise routing and reduce delays, thus improving turnaround times. The automation of inventory management and asset tracking also reduces the likelihood of manual errors, streamlining the loading and unloading processes and boosting overall productivity.

IoT is instrumental in predictive maintenance, a critical aspect of airfreight operations. Sensors embedded in aircraft, including cargo aircraft, and ground equipment continuously monitor their condition, enabling the prediction of maintenance needs before any failures occur. This proactive approach minimises downtime and prevents unexpected disruptions, ensuring that operations run smoothly and safely.

Supply chain visibility is greatly enhanced through IoT, offering a comprehensive overview of the entire logistics process. This improved visibility aids in better decision-making, enhances coordination among various stakeholders and increases transparency. Real-time data sharing among shippers, carriers and receivers ensures timely updates and facilitates the efficient handling of shipments.

Regulatory compliance is another area where IoT proves beneficial. The precise data logs generated by IoT devices help in meeting stringent regulatory requirements, making inspections and audits more straightforward. This ensures that airfreight companies adhere to international shipping standards without the hassle of manual documentation.

Customer satisfaction sees a significant boost due to the enhanced tracking and monitoring capabilities provided by IoT. Clients can receive accurate and timely updates about their shipments, leading to better customer service, leading to higher levels of trust and satisfaction among customers.

Cost savings are an essential benefit of IoT in airfreight. By optimising operations and maintenance, IoT helps reduce operational expenses. Better utilisation of assets and a decrease in losses from mishandling or delays translate to substantial cost savings for airfreight companies.

Security is another critical area improved by IoT. The technology enhances cargo security by monitoring and alerting for any unauthorised access or tampering. Geofencing technology ensures that shipments follow designated routes and alerts authorities in case of deviations, further securing the transported goods. Companies like IBM have developed solutions that combine blockchain with IoT to enhance the traceability and security of shipments, ensuring that all data related to a shipment is immutable and transparent.

IoT tackles global ULD shortage

Two IoT technologies can help airlines maximise the use of their ULDs and simplify return practices by encouraging timely returns: Bluetooth Low Energy (BLE)-enabled ULD tracking and demurrage automation.

BLE tracking uses Bluetooth tags affixed to containers or pallets to automate end-to-end tracking of assets. BLE readers capture the movement of ULDs with attached BLE tags, enabling real-time tracking whether the assets are in the air or on the ground. In addition to location, other sensor-based, condition-related information -such as precise temperature, movement, and humidity - can be monitored for shipments. Tags can also be added to ground service equipment, like dollies, providing full control over a carrier's equipment.

This technology offers real-time visibility into the exact location of ULDs, identifies who has custody of them at any given time and easily traces asset movements to clarify any discrepancies between stakeholders. However, while BLE tracking can tell you where your assets are, it does not manage when demurrage starts and stops, or when assets should be returned.

Companies like Worldwide Flight Services (WFS), one of the world's largest air cargo handlers, have enhanced real-time shipment visibility and cost-efficient unit load device (ULD) asset management solutions by deploying Descartes Core Bluetooth Low Energy (BLE) readers across its global cargo operations.

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AGV TAKES TO THE FLOOR FOR AIRFREIGHT

"An AGV is a self-propelled vehicle that uses marked lines, radio waves, lasers, or vision cameras for navigation"

The Automated Guided Vehicle (AGV) market is estimated to reach a value of $13.83 billion and expand at CAGR (Compound annual growth rate) of 10.2% by 2032. According to Polaris Market Research predictions, the AGV market was expected to generate revenue of $5.78 billion in 2023 and is expected to reach $13.83 billion by 2032, growing at a CAGR of 10.2% over the forecast period from 2024 to 2032.

The market for automated guided vehicles is bolstered by the booming popularity of e-commerce and rising demand for automation in material handling across various sectors, including aviation facilities such as warehousing. In several instances, AGVs can serve as a replacement for human labour, offering significant cost benefits to operating firms. In addition, AGVs can carry out processes of fixed automation systems such as conveyors. The growing applications of the technology in various sectors such as healthcare, manufacturing, automotive and logistics are further fuelling the expansion of the industry.

An AGV is a self-propelled vehicle that uses marked lines, radio waves, lasers, or vision cameras for navigation. It is used for tasks that conveyors, forklifts, and manual carts typically handle. There are several different types of AVGs in market, including pallet trucks, unit load carriers, forklift trucks, tow vehicles and assembly line vehicles. Unit load carriers are designed to carry specific parts or products, whereas forklift trucks and towing vehicles are designed to act as stock robots for warehousing. The movement of AGVs is guided by software and sensors. The pathways that AGVs take are usually predefined, but some automated guided vehicles with the most advanced technology come with dynamic navigation capabilities.

AGVs In airfreight use

Three years ago, DHL Supply Chain announced the implementation of 15 automated forklifts in its warehouse operations at Tyrefort in the UK's West Midlands. The indoor robotics transporters work up to 11.5m high – which DHL said was believed to be a first in the logistics industry – reaching high warehousing racks to handle a range of pallets, stillages and waste cages. Safety features including lidar and camera obstacle detection, bumper tip sensors and side bumper bars, were all designed to minimise interaction with manual trucks operating in the same facility.

Last year, Worldwide Flight Services (WFS) an AGV forklifts trial at its cargo terminal in Barcelona Airport. The trial, featuring Linde AGV forklift trucks, was planned to span seven months and be concluded

Operational Excellence team was able to see the solution already in use in a logistics warehouse facility managing import and export shipments in the automotive industry.

The AGV forklift trial explored how the vehicles are able to reduce the number of transport tasks currently undertaken by Cargo Agent personnel, giving them more time to conduct other important duties, as well as assess opportunities for productivity improvements. Safety and security remain the number one priority, and this trial will be done in accordance with Racking Safety Requirements and strictly adhere to safety distances for transportation.

"We are very much looking forward to seeing how the use of AGV technology can enhance our cargo warehouse operations. We have chosen to do this first AGV forklift trial in Barcelona because it is a prime cargo station in the WFS network and one of the leading locations supporting our Operational Excellence initiatives. Our team in Spain are helping to drive the introduction of new technologies into our operations and to provide the proof-of-concept we need before we roll out these solutions at other cargo stations in our network," said Jimi Daniel Hansen, vice president operational excellence – EMEAA at WFS.

"We are very much looking forward to seeing how the use of AGV technology can enhance our cargo warehouse operations"

in April, 2024. If successful, this technology would be implemented across other WFS stations in the Europe, Middle East, Africa, and Asia (EMEAA) region.

The trial aimed to determine if AGVs can reduce the transport tasks currently performed by cargo agent personnel, allowing them more time for other critical duties, and to explore potential productivity improvements. Two types of AGV forklifts were used in the Barcelona facility within the inbound and outbound operational areas. They will move cargo from the breakdown areas to racking storage locations within the warehouse as well as to the cargo delivery area.

"We have allocated dedicated pick-up areas for the trials in addition to 156 pallet storage rack locations," said Barcelona station manager Marc Grau.

The trial was integrated at WFS's Cargospot Mobile warehouse management system, supplied by CHAMP Cargosystems, with AGV Robotic WMS to provide a one-system solution.

WFS is actively exploring opportunities presented by automation solutions, with trials also including AGV ground handling tractors to move cargo between warehouse and airport apron operations. As part of its evaluation process for this latest proof-of-concept, WFS's

SKYCELL CLOSES SIGNIFICANT FUNDING EFFORT

"This means for a typical pharma customer today we save more than 250,000 tonnes of CO2 every year without compromising quality"

SkyCell, a Swiss technology company revolutionising the pharmaceutical supply chain with its hybrid containers, has closed its $116 million Series D funding round, securing $59 million from Tybourne Capital Management and CC Industries. This latest round of funding solidifies SkyCell's position as one of Europe's leading deeptech companies amid the rapid growth of the pharmaceutical industry, driven by high-value biologics that require meticulous transportation.

SkyCell employs a multifaceted strategy to safeguard the pharmaceutical supply chain, integrating temperature-controlled containers, sophisticated software, and big data analytics. Each month, SkyCell containers protect over $2.5 billion worth of pharmaceutical products, including millions of vaccine doses, cancer treatments, diabetes care, and diagnostic solutions transported by air globally.

The company's proprietary cold chain technology, combined with its SkyMind software platform, underpins its success in maintaining the integrity of pharmaceutical goods. SkyMind enhances shipment and asset management through automation and real-time visibility, enabling pharmaceutical companies and their suppliers to optimise supply chain decisions based on risk, cost, and carbon dioxide emissions.

With access to historical data from its extensive fleet of connected containers and advanced predictive analytics, SkyMind significantly improves the predictability and prevention of medication loss. Part of this software suite includes the Decarbonise tool, which allows clients to forecast, track and report CO2 emissions, as well as optimise transportation routes to minimise their carbon footprint.

The new investment will fuel SkyCell's global expansion, with a particular focus on growth in the US and Asia. This strategic expansion aims to enhance the company's ability to protect high-value pharmaceutical goods across increasingly complex global supply chains.

Welcoming the new investment, Richard Ettl, co-founder and CEO of SkyCell, said: "It is such an exciting time to be a technology provider to the pharma industry as the sector experiences fast growth from new, blockbuster biologics coming to market. At the same time, the industry has recognised the need to decarbonise the supply chain, as more than 70% of pharma is shipped in a one-way solution, which will shortly see fees introduced for disposal. Our reusable 1500X container saves on average 50% CO2 or in absolute terms eight tonnes CO2e per use.

"This means for a typical pharma customer today we save more than 250,000 tonnes of CO2 every year without compromising quality. And finally, digitalisation is coming to pharma supply chains – moving away from manual worksheets to integrated workflows that leverage S+O data (simulated and operational data) from our proprietary pool of billions of data points. Combined with the power of AI, this enables significant reductions in both cost and risk for our customers. With this new investment, we can further optimise supply chains and create truly sustainable logistics."

SkyCell is a purpose-led technology company transforming the pharmaceutical supply chain through a combination of proprietary software, hardware, and big data. It is the leading manufacturer of temperature-controlled door-to-door container solutions that allow pharma companies to optimise their supply chain by reducing and even predicting the risks associated with delivering sensitive drugs by air. Its proprietary software solution combines simulation data with operational data (S+O data), enabling pharma companies to have real-time, end-to-end oversight of every shipment around the world getting life-changing drugs to consumers faster.

SkyCell's technologies are designed with sustainability at their core, significantly reducing the risk of in-transit failure and minimising environmental impact. With a market-leading low rate of less than 0.05% temperature excursions, SkyCell's solutions ensure the integrity of healthcare shipments. Additionally, the company's innovative containers cut the CO2 emissions of each shipment by nearly 50% compared to the average rate.

SkyCell operates as a climate-neutral company (Scope 1 and 2 compensated) and is committed to achieving end-to-end net-sero emissions by 2040. Its sustainability goals are science-driven and aligned with the Paris Agreement and the United Nations Sustainable Development Goals, underscoring its dedication to both environmental responsibility and global health.

A GUIDE TO AIRFREIGHT TECH TERMS

As the airfreight tech industry becomes increasingly complex, there is a growing number of terms being used. Not all ACW readers will be familiar with all the terms in contemporary use so here is a quick explainer of certain terms you might come across in your daily work.

Deeptech:
Deep technology (also deep tech or DeepTech) or hard tech is a classification of organisation, or more typically startup company, with the expressed objective of providing technology solutions based on substantial scientific or engineering challenges.

Automated and digital booking systems:
Electronic Air Waybills (eAWBs): These replace paper-based documentation, making the booking process digital, faster and more efficient.
Online booking platforms: Allow customers to book shipments online, providing real-time pricing and availability.

Cargo Management Systems (CMS):
These integrated platforms manage the entire lifecycle of air cargo shipments, from booking to delivery, including inventory management, scheduling and billing.

Internet of Things:
The Internet of Things (IoT) describes devices with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the internet or other communications networks. The Internet of Things encompasses electronics, communication and computer science engineering.

Tracking and monitoring technologies:
Radio-Frequency Identification (RFID): A wireless system comprised of two components: tags and readers. The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag. It is commonly used for tracking shipments in real-time.
Blockchain: A blockchain is a distributed ledger with growing lists of records (blocks) that are securely linked together via cryptographic hashes. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree, where data nodes are represented by leaves). Since each block contains information about the previous block, they effectively form a chain (compare linked list data structure), with each additional block linking to the ones before it. Consequently, blockchain transactions are irreversible in that, once they are recorded, the data in any given block cannot be altered retroactively without altering all subsequent blocks.

Automated handling systems:
Robotics and Automated Guided Vehicles (AGVs): Used in warehouses and cargo terminals to move and sort packages. AGVs are used for transporting cargo within warehouses and terminals. AGVs can move pallets and containers without human intervention, following predefined paths or using advanced navigation systems.
Automated Storage and Retrieval Systems (ASRS): Enhance the efficiency of storing and retrieving cargo.

Security technologies:
Ensuring the security of air cargo is critical. Technologies like advanced screening systems, biometric access controls, and surveillance systems are used to protect against theft, tampering, and other security threats. Additionally, blockchain technology is being explored for secure and transparent documentation of cargo movements

Optimisation and planning software:
Load planning software: Optimises the loading of cargo into aircraft, ensuring efficient use of space and weight distribution.
Route optimisation algorithms: Improve delivery times and reduce fuel consumption.

Artificial Intelligence (AI) and machine learning:
Used for predictive maintenance of aircraft, optimising supply chain operations, and improving customer service through chatbots and automated responses.

Big data:
Big data refers to extremely large and diverse collections of structured, unstructured, and semi-structured data that continues to grow exponentially over time. These datasets are so huge and complex in volume, velocity, and variety, that traditional data management systems cannot store, process, and analyse them.

Container loaders and unloaders:
These machines automate the process of loading and unloading cargo containers from aircraft. They can handle heavy loads and ensure precise placement within the aircraft.

High-reach cargo loaders:
Used for loading and unloading cargo from the upper decks of large aircraft, these loaders can lift containers and pallets to significant heights while maintaining stability and precision.

Cargo handling robots:
Robots equipped with advanced sensors and AI can sort, move, and stack cargo with high efficiency. These robots are especially useful in automated warehouses and logistics centres.

Automated Storage and Retrieval Systems (ASRS):
These systems use cranes and conveyors to automatically store and retrieve cargo from high-density storage racks. ASRS are controlled by warehouse management software, optimising space and improving retrieval times.

Pallet dollies:
Specialised trailers used to transport cargo pallets on the ground. These can be manually or automatically guided and are designed to fit seamlessly with cargo handling systems at airports.

“Robots equipped with advanced sensors and AI can sort, move, and stack cargo with high efficiency”

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