Bluetooth revolution

The emergence of technology able to affordably track and monitor containers – and the cargo inside them – means ULD specialists are now at the centre of a game-changing breakthrough potentially able to make mainstream air cargo fit for the digital age, reports William Hayes

After a 30-year search for an automated tracking system for unit load devices (ULDs), ULD specialists now find themselves at the centre of a game-changing breakthrough in the monitoring of ULDs and the freight in or on them – with the potential to bring mainstream air cargo more fully into the digital age.

This is, in no small part, thanks to the emergence of a new form of Bluetooth technology that has been developed in recent years for other industries but that now offers the kind of capabilities and cost structures that can work within an air freight handling environment. And various trials in the last two years have begun leading to the rollout of Bluetooth-enabled tracking technology by several carriers and ULD specialists, with others set to follow.

And so, after years of talking about safety, damage reduction, lighter and cheaper materials, and locating unit load devices ULD, Bluetooth and the emerging monitoring capabilities are the hot topic now for ULD specialists. As Klaus Demtröder, CEO of PalNet Air Cargo Products, observes: “The most significant development (recently in ULDs) is the development of Bluetooth Low Energy (BLE) tracking devices to locate the ULDs, pallets and containers, tracking devices which are getting more and more sophisticated and providing more information.”

Frustration with RFID

The flurry of excitement surrounding BLE can be partially explained by the frustration with and the effort expended on trials using the system that came before it. ULD tracking has long been a subject of concern for an industry whose primary goal is to ship valuable assets great distances, and for some time it was thought radio frequency identification (RFID) would be the answer to this problem.

However, the technology – experienced by the everyday consumer in the context of retail security tags – has its limitations, namely: range, infrastructure cost, interference with aircraft systems, and global coverage.

BLE, already widespread in consumer electronics, has not only shown potential in solving all these problems, but also promises the additional feature of monitoring conditions within the ULD – temperature, humidity and so on – all in real time, potentially also helping...
lead to the creation of an air cargo Internet of Things (IoT).

“We have been exploring RFID to locate ULDs for the past 25-30 years, but it never got off the ground for a number of reasons,” says Bob Rogers, senior advisor at Nordisk Aviation Products and vice president and treasurer of ULD CARE.

“BLE is an inexpensive mass market solution and data transmission is cheap now as well. So, all of a sudden it is possible to have a greater visibility of where ULDs are.” Rogers will not go so far as to call them ‘smart ULDs’ just yet though – a term some companies are now using in reference to the advanced capabilities of their new products – noting the challenge with the new technology available is “how to turn it into meaningful value”.

ULD pooling specialist Unilode has been developing and trialling ULD tracking for several years, and its CEO, Benoît Dumont, believes the possibilities will far exceed the original hopes of those that originally began developing these capabilities. He says: “What no-one is really mentioning is the ‘raison d’être’. We think it’s great, but the use case, the data, the implications of this technology are probably endless and we haven’t really grasped it yet.”

One consideration is the allocation of space at airports, which will not necessarily grow at the same rate as cargo and passenger volumes, says Dumont. “Knowing precisely where those units are, and at what time, and not relying on
delayed manual communication, will probably result in a better utilisation of those assets, which means removing them from storage by getting them in the air instead.”

**Sharing economy**
Such technology can facilitate a ‘sharing economy’ between ground handlers, cargo companies, airports and airlines to make the transport of freight a lot easier and smoother in the long run, the Unilode CEO adds.

Unilode’s Bluetooth-based tracking solution for ULDs was the winner of the IATA Air Cargo Innovation Award for 2019, chosen because it will allow customers to use the ULD as a proxy for air cargo located inside it to track location and transmit status updates on the temperature, light and shock exposure and humidity of the unit and its cargo.

Dumont expects the technology will improve control, visibility, transparency, accuracy and safety in the air cargo supply chain, delivering extra value to various stakeholders including airlines, ground handlers, shippers and freight forwarders and helping to solve common issues relating to ULDs and cargo. Since then, the company has unveiled several further developments, including successfully completing an in-flight trial of its ULD tracking solution.

**Bigger picture**
Adam Barrington-Spencer, VP for sales and marketing at ULD manufacturer Aerotuf suggests that emerging technological solutions can not only lead to greater efficiency and profitability for air cargo companies, but they can help contribute to a better world as well. “Today it is estimated that one third of the world’s food produced is wasted, 45% of that through the supply chain,” he says. “There is a gap in the market and a need today to find cheaper and more-sustainable solutions to support perishable, low-level pharma, and cosmetics trade lanes, as too much is being lost and current solutions are sub-optimal and expensive.”

While Aerotuf has been recognised individually by IATA for its temperature protective AeroTherm ULD (it won runner-up in the...
2019 Air Cargo Innovation Awards), it is the project it is involved in with Air New Zealand that appears most ground-breaking. An early mover in the BLE tracking game, Air New Zealand rolled out Bluetooth tags on its cargo containers and pallets back in November 2017. The technology was provided by Core Transport Technologies (Core TT), a New Zealand-based company that conceived of the Bluetooth tracking concept in 2016 and pioneered the use of it thereafter.

**Multiple uses**

“The existing process is based on finding out the location of an asset once it has arrived – be it late, the wrong location, or in poor condition (among other things),” says Core TT. “Having real-time monitoring of assets allows the client to immediately know when assets are behind schedule, being routed inappropriately, or in poor conditions” – for example, at the wrong temperature.

On the ULD-manufacturing side of things,

**The implications of this technology are probably endless and we haven’t really grasped it yet**

**BENOÎT DUMONT**

Aerotuf – thanks to its temperature-protected AeroTherm containers – is reported to have saved Air New Zealand $500,000 by the time of its runner-up showing at the IATA awards in May, a figure the airline estimated could rise to $12 million.

**Dumont:** The air freight ‘value chain’ is not optimised

---

**Your Strategic Partner for AIR CARGO SOLUTIONS Around the World**

**CUSTOM ULD SOLUTIONS**

ACL Airshop is a technology-driven global leader in ULD leasing and air cargo logistics solutions. With over 50 locations on 6 continents, ACL Airshop’s extensive global network provides the flexibility to obtain ULD equipment where you need it and when you need it. 

ACLairshop.com
“Our goal is to ensure not only that the product reaches its destination at the right temperature, but that we actively help contribute towards a greener environment and supply chain, by minimizing the use of ancillary equipment, reducing handling time, cost, food waste and of course reducing carbon footprint,” says Barrington-Spencer.

Whether Air New Zealand will benefit significantly from investing early in these technologies remains to be seen, but it seems likely that the potential uses of BLE within air freight and aviation will be even broader than when the tracking system was initially launched at the airline in 2017. The carrier at the time said the technology had been introduced as a result of feedback from its cargo and airport staff, who saw an opportunity to enhance the airline’s handling processes, with the expectation that the Bluetooth tags and readers would allow it to speed up cargo handling and also improve accuracy and inventory management and help to locate any missing items. But cargo general manager Rick Nelson also anticipated significant other potential uses for this technology – such as monitoring ground service equipment, managing mail shipments – and to eventually see it become customer facing so the carrier’ cargo customers can more easily track their shipments.

Beyond ULD tracking

Dumont agrees that the future of Bluetooth technology in cargo lies beyond simply ULD tracking and will be expanded to the entire ecosystem, saying: “I also see in a few years that technology going beyond just the containers and going into different asset types, such as the dollies, some of the ground handlers’ equipment, and even life jackets – for example, you could look on your tablet and it tells you how many life jackets there are on the plane. This is already proven by the decision to go for full GSE asset sharing at Hong Kong airport.”

Indeed, a key technology partner in Unilode’s ULD tracking programme, Nexxiot, has already deployed its tracking devices on thousands of rail freight wagons in Europe and is now expanding that to the US market. And under Nexxiot’s air freight partnership with Unilode, all 140,000 ULDs supported by Unilode will be fitted with Bluetooth sensors by early 2021.

In addition, Nexxiot has developed a neutral user interface for Unilode where customers can view the data of their ULDs and use various services such as ULD location, temperature-, shock-, light- and humidity measurement as well as inflight tracking. Based on the new partnership, the company will be able to offer spot leasing for load carriers in the future, and pooling of ULDs will also be simplified and more efficient, the two firms say.

Expense involved

The technology does have its detractors, for example those who say the expense involved in implementing a real-time geolocation tracking service is not worth the relatively small proportion of ULDs it will shine a light on, most of which are accounted for at any given time anyway. However, explained

"There is a need today to find cheaper and more-sustainable solutions to support perishable, low-level pharma, and cosmetics trade lanes"

ADAM BARRINGTON-SPENCER
Rogers, while 5% of containers missing does not sound like a lot, if it is unplanned, such disappearances can begin to cause real and unexpected problems in the supply chain.

And the technology and capabilities offered by Core TT, which was acquired by Descartes Systems Group in May this year, does seem to be validated by the number of partnerships it is accumulating: Air New Zealand, Delta, Nordisk, ACL Airshop, Aerotuf and Jettainer have all signed up to be a part of its BLE project, and others are speaking up about the benefits for the industry.

“While the tracking systems add significant costs to operations, they allow a ULD client to know where his cargo is at all times,” says Shawn Cravens of ULD manufacturer Granger Plastics. “Some of the more elaborate tracking systems can show internal temperatures; GPS location; direction and speed traveling; if the doors are open; the number of times the doors have been opened; etc – a wide variety of systems, uses and functions.”

Collapsible container
Meanwhile, another innovation to be addressed is the concept of the collapsible container, something which airlines have been keen for ULD manufacturers to design for some time. ULD manufacturer VRR believes the digital tracking solutions currently permeating the industry will help ULD owners to reposition their containers.

“[We are] convinced that the digitalization of the industry creates a clear overview of the whereabouts of the ULD fleet, which allows the customer to react to a possible ULD imbalance in their fleet,” said Ben Lakerveld, sales manager at VRR.

“However, the reposition of the ULDs come with a lot of cost. VRR will act on this and work on a container line that will be able to be reduced in size when empty – which provides an easy and less-expensive way of repositioning. We believe these containers would be a perfect addition to resolve the imbalance in the ULD fleet.”
Smarter ULD Solutions
Let’s fly digital!

ULD management, repair, leasing and digitalisation

Winner of the 2019 IATA Air Cargo Innovation Award

unilode.com info@unilode.com
Enhanced efficiency
In addition to the multiple opportunities for enhanced efficiency afforded by these technologies, airlines will also be able to turn their focus onto accountability – a real problem in an industry where blind spots along the ULD supply chain are frequent.

“Ninety per cent of time spent repairing ULDs is unnecessary,” says Rogers. “In airports, being on time is everything, and ULDs suffer.”

Some companies, such as Jettainer, have already taken steps to equip their ULDs with devices that record data, but only in a moment of damage being sustained – a sudden change of speed, for example, or a change in temperature or noise. The idea is to enable the company to identify the root cause of an accident, so as to take preventative steps in future, rather than promote a culture of fear among employees – although simply the knowledge that an incident is more likely to be directly linked to them may make handlers more cautious in their approach.

Competing with integrators
For Dumont, the major problem is that the air freight ‘value chain’ is not optimised. “If you optimise it, you could reduce weight, you could reduce turnaround time, you could increase safety… you could also compete more against the integrators, such as FedEx and UPS, that have this supply chain in-house and don’t have to battle with different stakeholders.”

Arnaud Brolly, senior product and business innovation manager at aviation technology specialist SITA and a subject matter expert in Internet of Things (IoT), says that the IoT-facilitated Bluetooth tracking revolution could help reboot an antiquated air cargo system by “providing a higher level of service with greater transparency”. Yes, it requires investment, he says, but it would be worth it for the value that implementing such infrastructure would bring.

For veterans of the ULD industry and air freight more widely, the emergence at last of a technology capable of achieving the long-sought goal of tracking and monitoring ULDs – and the cargo inside them – provides a realistic opportunity for mainstream air cargo to offer a new level of service fit for the digital age, via so-called ‘smart ULDs’.

As Bob Rogers at ULD Care observes: “Making ULDs lighter, cheaper, more durable... these are all incremental changes. But the smart ULD is a potential game changer.”

BENOÎT DUMONT

VRR believes digital tracking solutions combined with collapsible containers will help ULD owners with repositioning