Two decades back, telematics was a word little known on the apron. Now, though, notes Alexander Wendorff, it is part of everyday ramp vocabulary.

Looking back, it is true to say that telematics, rather like the acceptance of battery power, has had a long gestation period. Too long, some would assert – for the benefits of being able to monitor GSE usage, check on a unit’s mechanical status, tabulate its performance and economy, follow its maintenance schedule and physically know of its whereabouts at what might be a large airport, are of inestimable value.

Put it another way: a fleet manager armed with this technology will quickly be able to identify any shortcomings in his or her operation. Shortcomings can translate into redundant vehicles as much as making the best use of the assets available. Yes, investment is required – but ROI should prove to be rapid. For this reason, more and more handlers are now considering its adoption.

According to the global market research firm, Technavio, the global airport handling services market is projected to post a compound annual growth rate of approximately 5% from 2018 through 2022. Consider that projection in conjunction with the projected CAGR of the global commercial telematics market of 20.3% to reach US$69.3bn by 2022. While the global commercial telematics market takes into account all industry sectors and not just airport handling, it is still clear that the application of telematics is growing. To illustrate the point, Berg Insight estimates that the global installed base of active airport tracking systems was less than 0.2m units in 2017, but that the installed base is estimated to reach 0.3m units worldwide by 2022. With the number of air travellers expected to grow at a CAGR of 4.5% during the 2018-2022 period, and with new solutions continually being introduced specifically for airport ground handling, it is clear that telematics is on track for increased adoption and process improvements within the handling community. These improvements can be seen across many operations, from asset management and worker safety to equipment maintenance, regulatory compliance, cost reductions and environmental conservation. For a technology that had its roots in another industry, it’s interesting to see how many of its advances are now occurring within the aviation sector. Understanding how the technology has evolved, how ground handlers are now benefiting from it...
and where telematics is heading is thus valuable for airport manager and ground handler alike.

Telematics: the evolution story
For a quick history lesson in telematics, that is, the merging of telecommunications and informatics, INFORM’s Alexander Wendorff writes that it really took off in the 1960s, with the US Department of Defence’s development of a GPS system to track the position of its various assets and improve battlefield communications. Momentum began building behind this technology when the (then) competing superpowers of the US and Russia began ramping up their technology-driven military tactics, prompting more technology R&D and innovation. Subsequently, telematics evolved, with key developments occurring from the 1960s through the late 2000s.

Relevant to airport ground handling operations, it was in the early 2000s when Qualcomm became one of the first companies to introduce telematics technology for heavy equipment management. This was subsequently followed in the mid-2000s with the introduction of geofencing, which paved the way for telematics’ broader application in airport ground handling operations. Since that time, there have been other significant developments in the technology’s evolution. Notably, there was additional innovation in the Internet of Things (IoT) as well as M2M-based telematics data management, which fostered an even broader application of the technology in areas that encompassed broader resource management, worker safety, productivity and compliance improvements. On the horizon today in telematics technologies are more advanced examples of IoT solutions, sophisticated sensor and localisation-based technologies, with a wider, visible access to data collected by these technologies on smartphones, tablets and desktops. Today, in 2019, it is apparent that airport ground handlers are deriving significant benefits from sophisticated telematics solutions.

Better management
Given the regulatory, environmental and competitive market conditions under which today’s airport ground handlers must operate, it is understandable why they would gravitate toward telematics technologies that give them a better way to manage their day-to-day operations, while also optimising their resources. The most astute telematics solution providers recognise this and offer improved process optimisation potential, using their solutions’ telemetry data. By applying this data, a significant reduction in the size of ground handling/ground service equipment fleets can be achieved which, in turn, saves direct costs, while also reducing various resource requirements and CO2 emissions. The technology can be used to track a wide range of ground support equipment, from belters, container loaders, ground power units and baggage trackers to portable water trucks, de-icing vehicles and catering vehicles.

Using the telemetry data, refuelling and recharging data can be calculated precisely, which enables the effective use of dispatching equipment. Asset management for fleet equipment and ground support

Visual representations date back almost two decades but are all part of the process
equipment is achieved by promoting their more efficient use. Further, when contingencies arise, the technology can promptly calculate and suggest equipment alternatives, thereby minimising delays and facilitating adherence to Service Level Agreements. Telematics provides advance notice of the SLA terms and documents to demonstrate fulfilment. Regulatory compliance is also supported by telematics. The technology generates legally enforceable reports in support of airline audits, while also providing decision-making support.

Another key area where telematics demonstrates its value in airport ground handling operations is that of worker safety. By providing automatic worker qualification checks and controlling access to equipment, workers are managed such that they are only performing tasks on the equipment for which they are qualified. The technology further ensures worker safety by monitoring worker behaviour (for example, driving speed), so that unsafe operations can be prevented.

Fleet and equipment maintenance also benefit from telematics’ facilitation of uniform fleet utilisation and accurate adherence to preventive maintenance schedules by recording and evaluating operating hours/kilometres in real time.

**Fiscal considerations**

Since financial matters are paramount to all operations, telematics’ ability to deliver financial benefits is also important in ground handling. Telematics supports sound fiscal goals by giving ground handlers immediate access to accurate data on fleet usage and maintenance, and the ability to help operators utilise their assets and control related costs. Going forward, there are other ways in which the technology can potentially have financial ramifications. For example, since telematics can precisely determine the utilisation and billing associated with different assets and make best user assignments, more effective pooling of assets can be achieved promoting lower operating costs. Additionally, by immediately providing reliable data as to when a unit of equipment or vehicle was on site and used (for example, to remove snow from the tarmac), the data can be used to proactively manage potential complaints and/or to satisfy equipment utilisation proof requests, both of which, if mismanaged, can lead to loss of business.

**Looking further ahead**

Given how dynamic the field of telematics is right now, ground handlers can be optimistic of future beneficial developments from leading edge solution providers. While the field of telematics for motorised units and assets is fairly stable at present, and well covered, there are developments occurring in the area of indoor and outdoor asset localisation. At INFORM, for instance, the company has placed several installations where the key factors for clearance/handling are no longer logged in by a driver, but instead are fully based on telematics. The company has already established a standard for catering truck and pushback procedures. In addition, INFORM is currently developing solutions for non-motorised units and load detection for dollies. Its solution-driven processes will help to determine a connection between a unit load device and a dolly: that is, whether a dolly is loaded or not. The solution has already proven itself at an airport and the telematics unit has operated reliably. The next challenge will be to apply telematics in order to identify which ULD should be on the dolly (in other words, matching specific containers to specific dollies). Further, the company’s telematics R&D is focused on advancing the support of autonomously operating equipment.

INFORM is currently providing a fleet management solution for services provider Fraport, which is focused on the availability of the fleet and its maintenance, with its primary goal being to provide high quality ground handling in the shortest time. The company’s telematics solution is also being deployed by Qantas, where the telematics directly supports its operations to demonstrate fulfilment.

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**SOME OF THE MAJOR DEVELOPMENTS IN TELEMATICS**

- **1960s**: The Advanced Research Projects Agency Network was invented. It was the first network to use the Internet Protocol suite.
- **1968**: Machine to Machine (M2M) technology (in other words, technology that enables networked devices to exchange information and perform actions without the manual assistance of humans) was invented by a Greek scientist, Theodore G Paraskevakos.
- **1978**: The term, telematics, was coined.
- **1988**: Research programmes were launched to test vehicle telematics, primarily to improve safety and reduce environmental impact.
- **1993**: GPS technologies were introduced to the consumer market when the US government gave full GPS access to civilians.
- **Early 2000s**: Wide use of telematics technologies can be seen in Web-based fleet management systems, with real-time information updates to remote networks.
- **Mid 2000s**: Consumer vehicles now widely feature GPS navigation systems.
- **Late 2000s**: Cloud and M2M technology advances pave the way for faster, more precise GPS data and real-time reporting.
ground handling. In combination with INFORM’s resource management system, the solution optimises Qantas’ utilisation and scheduling of available equipment by collecting key data automatically.

Other companies are also launching solutions to advance ground handling operations. In December 2018, Swissport International announced its five-year agreement with Honeywell to deploy a solution that would connect the ramps it uses in airports by providing real-time data relating to ground-based equipment activity, essentially aircraft loading/unloading, baggage handling, passenger and crew transportation. Also under development are solutions that collect telematics data, which embraces vehicle/equipment engine hours, operating modes, operator/worker ID, fuel levels, peak utilisation periods and so on. This goes to support improved asset utilisation and maintenance procedures.

The future of telematics is also poised to further leverage Big Data, Artificial Intelligence and IoT for tasks ranging from fleet tracking and better integration with other operating systems to improved performance benchmarking and an enhanced environmental impact role.

In fact, the future may well see pure telematics solutions disappear, as ground service equipment manufacturers increasingly install their own telematics hardware. Still, the software solution providers will continue to have a leadership role in telematics technologies, pushing the envelope to address new challenges and identify new ways to apply the technology within the airport environment.

Currently, IoT is helping to collect data and promote efficient fleet utilisation. In the future, INFORM expects to see higher efficiencies achieved through the sharing of ground handling equipment at the airport. Equipment pooling will become a critical aspect of future airport operations and it will be further advanced by telematics: this has already been proved. The use of autonomous vehicles is likely to increase and will depend on reliable, robust telematics. Because telematics generates more accurate data than that derived from manual procedures, it gives AI algorithms many more ways to analyse data and draw the right conclusions. Using the example of a medium-sized vehicle fleet with 400 devices, telematics can aggregate 400 feedbacks of high quality from which an AI application can draw conclusions almost instantly and suggest measures to be taken in real-time. Without telematics, this proactive response would be very difficult. With IoT and AI, there are many more ways to address various circumstances before they occur.

The biggest challenge in the future development of IoT and telematics lies in communications. To be more successful, the cost-effective transfer of an appropriate amount of data, even in areas where WLAN coverage is not sufficient, must be attainable. To date, new communications technologies such as LoRa WAN (Long Range Wide Area Network) and NB-IoT (NarrowBand IoT) are not yet fully established. Expectations regarding data quality are also a challenge, stemming from the need to supplement positioning tools such as GPS with assistance systems. A continued objective will be that of supporting the GSE’s energy efficiency and optimised maintenance-free operations for at least a year.

Footnote:
Alexander Wendorff is the Solution Manager in the Aviation Division at INFORM, where he has worked for almost 24 years. He assists the company’s aviation clients by applying a wide range of skills, including project management, process improvement, business strategy and logistics. He has been instrumental in many successful optimisation software solution roll-outs.