DIGITAL PRECISION
The IoT and Operations Insight

Internet of Things (IoT) technologies are being deployed across an increasing range of earthmoving operations, designed to provide enhanced insight and precision, and in turn streamline workflows and deliver businesses productivity benefits.

Amid the greater wave of digital technologies that have been arriving to market in recent years, IoT capabilities are now commonly incorporated into new-release machinery, comprising part of an overarching and interconnected ecosystem of devices that are collectively transforming the manner in which operations are being carried out on site. It is against this backdrop of digitalisation that IoT technologies are becoming an important consideration for businesses of all sizes, providing a means to drive efficiency and gain a competitive edge.

Research and advisory firm Gartner defines the IoT as: "The network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment." In the coming years, as this network continues to expand and as increasingly sophisticated sensors are integrated into earthmoving equipment as a standard feature, businesses will have ever more precise and informative data to draw on, assisting decision-making across the scope of operations, from real-time machine operations to maintenance and security.

IoT EXPANSION – AN INCREASINGLY SOPHISTICATED NETWORK

The adoption of IoT technologies is set to continue at pace in 2019 and beyond. Research firm the International Data Corporation (IDC) earlier this year forecast that worldwide IoT spending will reach US$745 billion this year, up 15.4 per cent year-on-year, with spending on track to surpass the US$1 trillion mark in 2022. As the IoT becomes more established and entrenched, the manner in which we interact with IoT technologies will in turn evolve, with Carrie MacGillivray, IDC Internet of Things and Mobility Vice President, pointing to the commencement of the next stage of IoT, "as we see a shift from digitally enabling the physical to automating and augmenting the human experience with a connected world".

Meanwhile, the continued development of a range of new technologies can be expected to bolster IoT capabilities and enable new use-cases. It is important to view the evolving IoT in the wider context of these digital developments – for instance, the rollout of 5G mobile networks in the coming years, providing higher connection speeds and lower latency, has the potential to enhance aspects of the IoT, which could clear the way for more advanced applications.

Towards the end of last year, Gartner released a shortlist of a number of strategic IoT technologies and trends expected to drive digital business innovation through to 2023. Among this shortlist, Gartner forecast that new IoT sensors will enable detection of a wider range of situations and events, while the capabilities of current sensors will be enhanced, supported by the emergence of new algorithms. Gartner additionally pointed to the role of artificial intelligence (AI) in the IoT, noting that while "the technology landscape for AI is complex", there is the potential "to achieve good results with AI in a wide range of IoT situations".

IOT APPLICATIONS AND BENEFITS

The additional insight provided by IoT technologies into the status of earthmoving equipment is being put to use across a range of increasingly sophisticated applications. From machine control to remote monitoring, these applications may incorporate real-time insight into individual machine operations, and may encompass ongoing monitoring of specific aspects of machine performance, which in turn can assist in determining how equipment is deployed and operated, along with informing maintenance and security procedures.

For instance, machine control systems – utilising positioning technologies such as GNSS in combination with digital design models – can track the specific movements of earthmoving equipment, and be employed to accurately position machinery and undertake operations. Across a range of earthmoving equipment, from dozers to excavators to graders, machine control systems provide for greater operations precision and efficiency, and may also allow for real-time sharing of operations data, enabling remote collaboration.

Remote monitoring systems, meanwhile, also draw on positioning technologies across a range of applications. For instance, these types of systems may utilise GNSS tracking to geographically pinpoint the location of equipment, providing for ongoing location monitoring, while features such as geofencing provide for the establishment of virtual geographic boundaries within which machines can operate, issuing alerts in the event a machine is moved outside of these boundaries. This type of asset tracking can assist in coordinating a fleet, allowing a real-time overview of operations, and can provide for the implementation of additional security measures.

Along with positioning technologies, an ever-expanding range of sensors are being deployed to provide equipment and project insight – from the hours logged by machinery, to real-time diagnostics delivering insight into different aspects of machine health and monitoring potential degradation, to the monitoring of fuel usage and levels – combining to create a digital overview of operations. This expanding IoT is leading to data-driven insights being implemented across an evolving range of applications, and allowing businesses to apply digital precision to decision-making. *IIEE*