Photo courtesy of Accutronics

Three steps to powering defence ● ●

In many ways, the Internet of Things (IoT) embodies the spirit of the defence industry, with a unit of devices working harmoniously to achieve one common goal in the most effective and efficient way. It makes sense, then, that the military and security sectors are seeing increased adoption of IoT technologies to transmit and handle intelligence quickly, with new lightweight and portable devices being used. Here Neil Oliver, Technical Marketing Manager of professional battery manufacturer Accutronics, outlines the three steps to ensuring the next generation of military devices are powered effectively.

The global defence budget is expected to be worth US$1,748.5 billion by 2020, growing at a compound annual growth rate (CAGR) of 7.07 percent, according to market research firm MarketsandMarkets. While there is no elaboration on where funds are allocated within the budget, the necessity for smart communication makes it likely that a significant portion will be reserved for further implementing Internet of Things (IoT) technologies. This is a logical move. The defence and security sectors are driven by awareness, intelligence and the ability to communicate effectively is essential. By connecting devices and feeding information back to a centralised base of operations in real time, actions and strategies can be implemented more effectively.

Handheld combat

One of the best examples of military IoT would be a handheld computer used to collect biometric data. Defence technology has already developed enough that these portable computers can access Wi-Fi networks to communicate the information back to immobile biometric stations. However, this raises a number of security issues.

The most glaring security issue is that of cyber-attack. The networks must be extensively tested to prevent breaches and keep valuable information from leaking. However, aside from the risk of data passing from point B to point C, there is also the portable power problems that affect the transmission from point A to B.

Portable devices are the cornerstone of the IoT, but they are only as effective as their power supply. While mission-critical applications in biometric stations are usually fixed installations powered by generators, field devices require a reliable military battery that is capable of not just providing sufficient power discharge, but also of doing it consistently.

For example, a portable communication device needs a battery capable of withstanding lengthy periods without charging. Not only that, but the battery must be securely fitted and able to operate correctly in spite of the environment or handling of the device. Only then will it be a reliable source of power.

This is one of the core challenges faced by defence and security batteries. While it might be relatively straightforward to find one suitable for powering devices, it's significantly harder

Neil Oliver, Technical Marketing Manager

Accutronics military batteries

personnel being alerted, eliminating the risk of failure during operation.

It is worth noting that grey market products are not necessarily cheaply produced copycats. They may be recycled components that have been refurbished and branded as new, or even defective parts that the OEM scrapped. For this reason, it is important to form strong working relationships with battery manufacturers.

Minimising interference

In avoiding counterfeit batteries, defence businesses also minimise the risk of electromagnetic interference (EMI) in IoT networks. By cutting corners on circuit insulation, electrical isolation and impedance, as well as creepage and clearance distances, counterfeit batteries typically do not meet EMC regulatory standards. As a result, when these batteries are connected to chargers plugged into the mains power supply, it can introduce issues such as voltage fluctuations and radio frequency interference that can affect other telecommunications equipment on the network.

Counteracting this with technologies that provide additional filtering is a key first step, but further issues lie in the design of pre-engineered smart batteries themselves. For all the benefits they can provide, they do contain microprocessors which are a source for radio frequency interference (RFI).

It's for this reason that OEMs should consult specialists during the design stages, enabling them to provide a bespoke battery solution that meets application requirements while also complying with the latest EMC regulations.

With careful preparation and the right guidance, any military IoT network can come together successfully. By considering the power behind the technology at the right time, the defence industry can work in harmony and unity to achieve its goals.   **GMC**

to find one that does so effectively. Batteries for field devices, or even emergency lights, need a longer operating life with accurate fuel gauging to avoid unexpected depletions.

Specially designed military batteries offer a trustworthy solution. The best way to guarantee that the battery is capable of delivering consistent results is to approach battery manufacturers directly for a bespoke product. These could come with precise fuel gauging or an LED state of charge indicator, all housed within a lightweight and rugged casing to withstand harsh conditions. Little touches like this make all the difference in the field.

The grey market – cost vs cost efficiency

All markets have their difficulties and defence is no exception. Counterfeit, or grey market, batteries pose a tremendous threat to the electrical integrity of military devices, sacrificing quality for a lower price. This lower cost may sway some manufacturers, but these batteries are far from cost efficient.

Aesthetically, the batteries may seem legitimate and no different to genuine products, but the internal components will be of inferior quality. This could be due to inadequate protection circuits leaving cells unstable and vulnerable to over-current, potentially culminating in the battery swelling or even explosion in rare circumstances.

Yet identifying the legitimacy of a battery is no simple task. While it is possible that there could be exterior imperfections, most counterfeit batteries are designed so they look the part. In an article discussing electronic counterfeiting in the May 2006 edition of IEEE Spectrum magazine, Michael Pecht theorised that "ten percent of technology products sold worldwide are counterfeit," estimating that this was causing companies to miss out on US$100 billion annually.

While this estimation is now a decade old, it makes sense that this percentage and sum will have only increased. A potent mix of the economic crisis and a wider adoption of the IoT has created a worrying scenario, where it is likely that each electronic supply chain will contain a number of counterfeit products.

So how do you fight the fake batteries? The easiest method is to consult directly with an Original Equipment Manufacturer (OEM) who can not only guarantee that the battery is genuine, but can also ensure that the best solution is chosen. For example, at Accutronics we have developed battery solutions that use algorithmic security, an in-built software that keeps devices safe from counterfeits.

Algorithmic security uses a code that is unique to each battery, with a correlating code programmed into host devices. This prevents fake batteries being used with the device without

Compact battery