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How the military and defense sector can harness wearables

Wearable technology is due to take the world by storm in the coming years, with the military in particular, standing to benefit a great deal. Connecting man to machine is one of the major challenges with next generation wearable technology, and one that Rajant is working on in cooperation with the US military.

Michael J. Van Rassen – President, Military & Government Markets, Rajant Corporation

As the Internet of Things (IoT) market continues to boom along with the many services it enables, it is showing no signs of letting up anytime soon. As a result of this growth, the wearable technology market is, in turn, increasing at a breakneck pace. According to Statista, the number of connected wearable devices worldwide is expected to grow to over 1.1 billion by 2022.

Globally, countries continue to target the wearable technology market due to the vast amount of consumer potential and the number of sectors where it can be applied. Wearable technology can be used and utilized across a wealth of industries including military and defense, fitness, medical and healthcare, retail, public safety, and education.

The explosion of connectivity options and the development of 5G have opened up a host of possibilities for the wearable technology market to explore and prosper, and businesses should be keen to invest.

Limitless possibilities

Wearable technology is rivalling the likes of the smartphone as the top consumer product of choice as the user wants this to enable an easier life all-round. A device which can supplement how the consumer uses the smartphone, has long battery life and fits onto the body seamlessly and securely is sought by businesses looking to provide the consumer with the next must-

have device. Over the last decade, the market has continued to expand as it was worth more than US\$50 billion in 2019 and has doubled in size since 2014.

Portable, wearable technology will be commonplace for businesses across a host of sectors for years to come. Importantly, it enables mobility and flexibility, which are key functions of fundamental importance for organizations as they vie to remain as competitive as possible, as well as continually improve their operational efficiency. In vast environments and industries with many workers, staff safety and the monitoring of staff movements are paramount. Wearables will help make this a reality.

Wearables will provide consumers in the fitness sector with the opportunity to track calories, measure steps, and monitor sleep activity, as well as reach daily targets. This functionality to log information on a real-time basis is a key advantage. In the healthcare market, utilizing wearables to enhance the quality of life and remotely monitor patients' wellbeing is of fundamental importance and cannot be overstated. From monitoring blood oxygen levels to using the equipment to detect issues across the body from the brain to vital organs, wearables play an increasingly important role in today's digitalized world.

Connecting the military and defense market

One key area for this technology is the military and defence sector. In 2019, the military wearable sensors market was estimated to stand at US\$179 million. There has been a growing necessity to connect armed forces personnel and assist defense teams during military operations. Not only can wearable technology allow control room teams to monitor soldier safety safely, but it can also provide the tools to enhance and subsequently improve their overall efficiency.

Military forces have been adopting the likes of smart clothing, sensors, smartwatches, and cameras to track, monitor, and communicate effectively. The likes of smart clothing can ensure armed personnel can withstand harsh climates and can self-



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regulate temperature. It is also beneficial to have biometric sensors for monitoring body temperature and heart rate as well as tracking mechanisms to ensure soldiers remain safe and out of danger.

In equal measure to wearables, drone and unmanned aerial vehicle (UAV) usage has been on the rise for military organizations as they can be used to capture valuable surveillance to identify and, potentially, eliminate hostile threats. Having never-failing connectivity is crucial for military and defense organizations to fully reap the rewards of this technology.

In military operations, teams must have devices that allow reliable and never-failing communication. Often in cases of varying climates and challenging environments, troops would need to have sufficient battery life in radios to ensure ground teams can keep in constant communication. Establishing and maintaining broadband connectivity in hostile and remote environments is essential for teams to monitor situational awareness, convey important and mission-critical communications, and to implement tactical strategies.

Connecting man to machine

The challenge remains for the connected soldier of establishing connectivity in variable and dense terrains as factors such as interference and managing the volume of communications can prove problematic. Rajant Corporation has demonstrated success in providing battle-proven, rapidly deployable connectivity for mission-critical communications to overcome environmental adversity. Its resilient, self-healing broadband connectivity can ensure safety and survival are achieved in battlefield operations. When on the move, either by foot or in a vehicle, whether in open air or underground, Rajant's Kinetic Mesh® networks can ensure soldiers stay connected.

Significantly, Rajant worked alongside the US Military, and over a six to seven-year period, the military helped fund the development of Rajant's operating system. The Kinetic Mesh networks provide durable connectivity under challenging conditions, with its InstaMesh® networking protocol enabling the network to remain fully operational even if radio frequencies

are jammed, dynamically utilizing all available frequencies. This is crucial for military teams in situations that depend on cutting-edge communications to avoid serious consequences. Impressively, if there is interference on any one of the frequencies, the network node can autonomously route wireless and wired connections over the best available links to complete its transmission. This combination of total mobility, resiliency, scalability, and extreme ruggedness provides optimal connectivity for military organisations. Without a single point of failure, the network provides robust fault tolerance, high throughput, and low latency regardless of the situation. This includes if an enemy was aiming to block essential communications. Rajant's work is not just limited to each soldier. Convoy vehicles can be linked with Rajant BreadCrumbs, thus improving the vehicle-to-vehicle (V2V) communications. This allows all voice, video, and data communications to remain on a localized network even if the vehicles are compromised.

Rajant's DX2 in the mix

Furthering the man to machine connection, Rajant introduced its DX2 in late 2019. The Rajant DX2 represents the rounding out of Kinetic Mesh nodes. Encased in magnesium and weighing only 123g, the BreadCrumb DX2 is well placed to be used for lightweight autonomous vehicles, drone swarms, and small robots. With a pocket-sized footprint and very low payload weight, DX2 provides the mobility and adaptability required to be used in both military and commercial applications.

The DX2 uses a single-transceiver and MIMO-antenna system with low power consumption. It can be combined with all other radios in the Rajant portfolio, including LX5, ME4, and ES1, to form a total mesh solution. Its option of 2.4GHz and 5GHz radio frequencies can help support a variety of applications across an array of different environments (a multi-transceiver in additional frequencies is under development). The DX2 has an integrated Wi-Fi access point service for compatibility with millions of commercial off-the-shelf (COTS) client devices, such as laptops, tablets, smartphones, IP cameras, sensors, and other IP devices.

Wearables are the future

As new technology continues to arrive in the market, the desire to connect man to machine has never been higher. With the wearables and UAVs markets continuing to grow at an exponential rate, it is clear a host of different verticals are keen to adopt and harness the technology with the military and defence sector remaining firmly at the forefront. Organisations must realize the immense importance it can have on enhancing communications in mission-critical situations to keep the connected soldier striding forward. **GMC**



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