

# Innovation Delivers the Future Today

Soldier Modernisation talks to Rob Garth, Director of Products, Video & Broadcast at Domo Tactical Communications (DTC) and Andrew Johnson, Sales Director (Europe) at DTC, about the innovations the company has been working on and the game-changing advances it brings for the soldiers of 2021

**“The secret of war lies in the communications.” Napoleon Bonaparte’s words, but they remain true in 2021. Yet the expectations of the modern soldier when it comes to communication are higher than ever. An IT-savvy generation needs to communicate quickly, effectively and using devices that are smaller, lighter and yet more powerful than ever, as well as increasingly communicating with unmanned, autonomous elements of a fighting force. “The expectations of the modern soldier are so much higher than in previous times because these are people that have grown up using smartphones, in a connected environment,” says Rob Garth, Director of Products, Video & Broadcast at Domo Tactical Communications (DTC). “They’re IT savvy, they’re used to using the internet, so the narrow-band, low data rate systems of previous generations with their clunky user interfaces now look very antiquated.”**

Those higher expectations are just one element contributing to the need for ongoing innovation by organisations like DTC, which has been working to create communication systems that operate over long ranges with secure waveforms and high data rates, as well as reducing their SWaP (Size, Weight and Power) for deployment with dismounted troops, small drones and other autonomous

systems. The company’s efforts have seen the development of a single board, software-defined radio that reduces SWaP while improving performance, along with its latest MeshUltra-X waveform that improves scalability from 80 nodes to 144 whilst maintaining low latency and high throughput.

“Traditionally the radios that have been produced for battlefield applications have been in two categories – large, heavy and power-hungry high-performance radios that can span long ranges with secure waveforms and high data rates, and then very small, very lightweight radios that are used in things like squad level voice radios, small drones or other small autonomous systems,” says Garth. “What DTC is doing is to square the circle between those two things and producing radios that have high performance and advanced waveforms, have lots of advanced features but in a very small, very light form factor that makes them suitable for applications like small drones or dismounted soldier radio systems. Our focus in the last couple of years has been on a single board, software-defined radio which can host a number of different waveforms depending on the application and can be built into very small, light end products. We’ve put a huge amount of resource into this and also into making our waveforms much more suitable



for dismounted soldier-type applications. So we've increased the number of nodes we can put in a MANET Mesh network and we've also increased the maximum data rates that are able to be supported in those networks, all from a radio that's much smaller and lighter than previously."

This innovation also supports optimized communications for unmanned systems ranging from small swarm drones employing DTC's Single Board SDR at just 24 grammes, to MUM-T (Manned-Unmanned Teaming) systems integrating one of its higher power radios, as well as allowing seamless integration of communication between different assets. "Previously these were often in completely isolated systems," says Garth. "You'd have a radio system for your drones, and the soldiers controlling the drones would have to carry a radio to talk to the drone. There would be another radio system used for dismounted soldier voice communications, maybe another system to control a ground robot. Therefore people ended up with multiple radios, all of which were difficult to coordinate with each other. What we're now seeing is people wanting to use a single integrated radio system to control multiple types of assets, so the same radio on the same network may be controlling a drone, and may be linking dismounted soldiers." The fact that DTC's radios are all interoperable – and also ATAK compatible – means one radio can serve as the Ground Control Station, the Universal Robotic Controller and the soldier radio, providing integrated comms between all elements and assets.

"DTC's single board Mesh radios have delivered step-changing capability that we can offer military users," adds Andrew Johnson, Sales Director (Europe) at DTC. "We provide various radio form factors for unmanned systems: - unmanned ground vehicles, unmanned air vehicles and unmanned surface vessels. This allows a squad of soldiers to operate on a single radio frequency and in a single network, receiving data and video from those diverse UAS and UGV assets. That is really powerful for the modern infantry soldier." DTC also provides FIPS 140- 2 approved AES 256 Encryption and enhanced LPI/LPD performance, protecting the data as well as radio users.

But the work doesn't stop here. DTC continues to push the boundaries when it comes to communication, bringing its game-changing technology to a range of programs in the US, the UK, Australia and beyond. Since 2019 DTC has been one of the two chosen radios for the U.S. Army Increment I



2021 IVAS Radio program; moving from a Squad Radio to a Company Radio with its MeshUltra-X Waveform providing 144 nodes on a flat network in 1.25 and 2.5MHz channels. The company also works closely with the UK's Ministry of Defence on programs with the Royal Navy, Special Forces and with defence primes such as BAE Systems. The company participates annually in the Army Warfighting Experiment (AWE) and other exercises such as the Royal Marines' Exercise Autonomous Advance Force. "These exercises expand our development capability, allowing us to both experiment with our technology and gain user feedback about their requirements," says Johnson. "This helps shape our roadmap and through an iterative process introduces new and potentially game-changing capabilities - capabilities that we can test with end-users". "The ability to integrate the end-user's feedback and operate in an agile way is a key advantage for DTC," adds Johnson.

That agility includes DTC's ability to take COTS technology and adapt it to MOTS in line with users' requirements - something that proved highly effective in work with the US military. "We took our COTS radio technology and quickly enhanced it to exactly meet the requirements of the US military, offering cutting edge performance without the long development cycles and high costs associated with traditional military radio programmes," notes Garth.

Looking ahead, innovation continues to drive DTC forward. One key area is in Cognitive Radios - radios which can change their operating mode based on their environment, from channel bandwidth to power level and frequency. "Essentially, Cognitive Radio is about radios that have an understanding of their environment and will change their operating mode as a result," says Garth. "Dynamic military environments may have jammers and unintentional interferers, major changes in terrain, widely varying distance between users and rapidly changing data requirements. A radio that can also change its behaviour dynamically, and can do so without user intervention, can deliver significant tactical advantage." ■

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