USE CASE

Battle Space MANET Mesh Applications

TRL9 INTERFERENCE AVOIDANCE SOLUTIONS – OPERATIONALLY PROVEN

INTRODUCTION

The collaboration between Nordic-Wing (NW) and DTC marks a significant milestone in delivering state-of-the-art UAS solutions that address the evolving needs of modern warfare.

Combining NW's software and hardware with DTC' wireless IP Mesh connectivity has redefined the capabilities of the Nordic Wing Astro^{ISR} system.

RELEVANT STAKEHOLDERS

Chief Technical Officers, Lead Engineers, Military technology, and development teams who want to understand how DTC uses its IP MeshUltra™ Waveforms and Software Defined Radios in demanding contested communications environments.

SCENARIO

The battle space environment has changed in the last few years. Demand for unmanned solutions to provide NLOS/BLOS real-time data and video capabilities is paramount for military personnel making tactical decisions.

NW was approached to supply its cutting-edge drone technology to test its viability in providing secure and reliable data transmission in challenging environments.

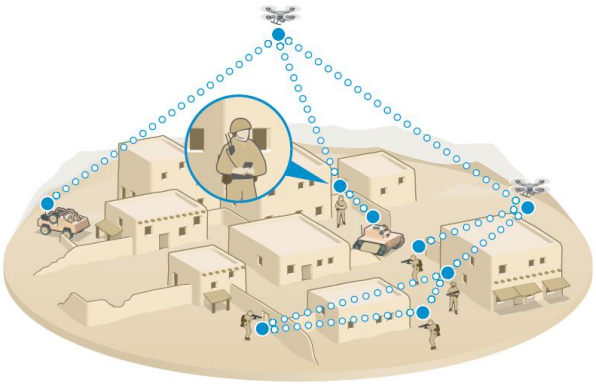

Figure 1: Example battlefield situational awareness

The key challenge was the transmission of C2 data and video while operating in a dynamic RF Environment against hostile and benign interference.

SOLUTION

Shared Situational Awareness (SSA) is key to operational effectiveness.

NW has delivered UAS systems for use in various industry sectors. Their innovation, knowledge, and experience, coupled with DTC' advanced BluSDR IP MANET radios and MeshUltra™ Waveform technology has enabled the NW team to redefine and enhance the Astero^{ISR} system.

The DTC BluSDR-30 was chosen after an extensive period of collaborative testing and trials with NW in order to deliver a SWAP (Size, Weight and power) optimised system solution. This included the provision and placement of new antennas to enhance connectivity at range.

The BluSDR-30 is a single board Software Defined Radio Transceiver weighing 110g and with a 2W software definable RF power output. The radio is available in a wide range of frequencies including L, LS, S and Lower/Upper C band.

The BluSDR-30 has a number of interfaces to enable transmission of different data types including Ethernet, USB and serial. It is complemented at the ground station by the DTC SOL8SDR-H2 handheld radio, which supports the same MeshUltra™ family of waveforms as the BluSDR-30.

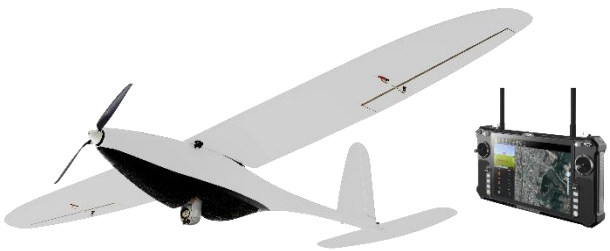

Figure 2: Astero^{ISR} system with live feed camera capabilities

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MeshUltra™ TECHNOLOGY

A seamless self-forming, self-healing software where the routes constantly update as nodes move, join, or leave the Mesh Network. Multiple routes between nodes, together with a wide bandwidth make this a very robust communications network.

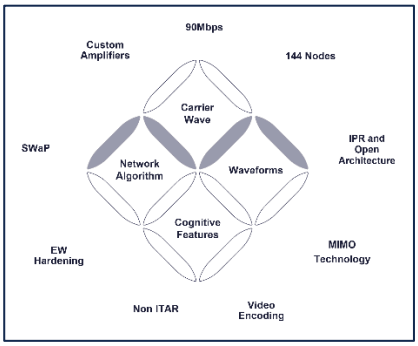

Figure 3: MeshUltra™ Waveform

DTC SOFTWARE DEFINED RADIOS

The SOL8SDR-H2 body worn radio can be operated as a mobile ad hoc network (MANET) IP Mesh node, a point-to-point (P2P) COFDM transmitter or a P2P receiver streaming video, voice, and data.

Figure 4: DTC SOL8SDR-H2

INTERFERENCE AVOIDANCE SCHEME (IAS)

DTC Interference Avoidance System (IAS) is a “Dynamic Spectrum Access” Cognitive Radio capability. Based on an “Every radio sensor” approach, it utilises interference / jamming level information from every radio in the network to drive a decision on whether to move to an alternative operating frequency to avoid jamming or interference.

Each radio can monitor up to eight alternative operating frequencies without disrupting normal network operation.

In addition to IAS, DTC’ MeshUltra™ family of tactical COFDM MANET waveforms were developed from the ground up to provide excellent performance in demanding contested RF environments.

DTC’ auto-adaptive modulation automatically changes modulation mode based on link signal to noise ratio (SNR) in order to maintain connectivity in raised noise floor environments with SNRs as low as 5dB.

Finally, DTC’ fully routed MANET Mesh architecture adapts instantaneously to changes in network conditions to ensure that data is routed in the most efficient way possible, improving network robustness and enhancing LPI/LPD (low Probability of intercept/Low Probability of Detection) performance.

Data is secured by means of AES256 encryption (subject to export control) which has been independently accredited to FIPS140-2.

An example of how the network performs is shown in Figure 5.

Figure 5: DTC MeshUltra™ capabilities

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SUMMARY

DTC' MeshUltra™ waveforms offer the widest range of channel bandwidth in the industry allowing users to achieve the optimum trade-off between throughput and range, depending on the application requirements.

Due to the versatility of DTC' radio systems, NW enhanced its Astero^{ISR} system to include a three-step anti-jamming capability, ensuring secure and reliable data transmission in harsh environments. This system has proven invaluable in numerous hot zones and battle space environments.

The fast-paced innovation of NW's drone technology combined with DTC renowned radio systems has undoubtedly proven that collaboration is key in today's battle space arena.

Figure 6: The Nordic Wing Astero^{ISR} system

WHY WORK WITH DTC

DTC has been at the forefront of innovation for over 44+ years, developing leading edge surveillance and communication technologies for successful operations in demanding environments, from cities to the digital battlefield. DTC' mission critical solutions secure, share, and communicate real-time situational awareness on land, over water and in the air.

Our proven technology and extensive engineering expertise allow us to provide clients with cost-effective results-driven solutions, from initial concept, through design, installation, training and through life support.

DTC supplies integrated security solutions to eighteen military armed forces, counter-terror units, emergency response organisations, commercial and governments entities, 140+ law enforcement organisations and all the 5-Eyes National Security Agencies globally.

Our specialised equipment and experienced client service professionals guarantee efficient, scalable, 'best in class' communications systems with 24/7 support and assistance for integration programmes.

CONTACT DETAILS

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