

DTC

MeshUltra Tactical Waveform COFDM IP Mesh

Range Robustness Throughput Flexibility



MeshUltra Tactical COFDM IP Mesh Waveform

Revolutionising Mesh Technology

DTC has long been the leader in Wireless IP Mesh technology. Our Tactical IP Mesh waveforms were designed from the ground up for robust performance in the most demanding dynamic environments, free from the compromises of competitor solutions based on consumer standards.

Time and again, DTC Mesh excels not just on the datasheet or in the lab but in the most demanding real world applications. And now, DTC MeshUltra offers our most capable and flexible mesh yet.

Higher Throughput

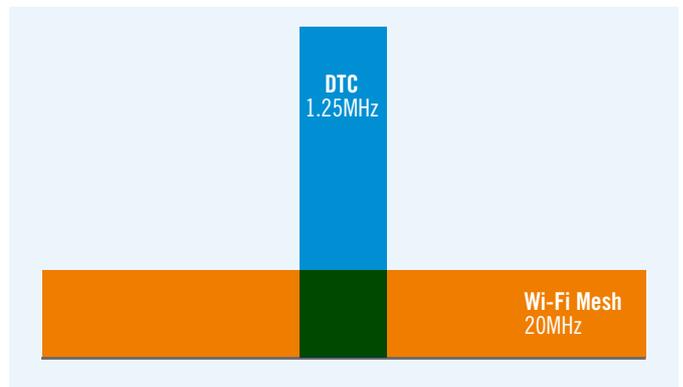
With channel bandwidths up to 20MHz and adaptive modulation up to 64QAM, DTC MeshUltra supports data rates of up to 87Mbps. And unlike some competitors, we specify real, usable payload data rates – not gross over the air data rate, including overheads.

| SQT Value | SNR Threshold/dB | MIMO Mesh data capacity (Mbps) for each channel bandwidth and SQT value | | | | | | | | | | | | | | |
|-----------|------------------|---|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | Bandwidth (MHz) | | | | | | | | | | | | | | |
| | | 1.25 | 1.5 | 1.75 | 2.5 | 3 | 3.5 | 5 | 6 | 7 | 8 | 10 | 12 | 14 | 16 | 20 |
| 6 | 23.1 | 5.6 | 6.7 | 7.9 | 11.2 | 13.5 | 15.7 | 22.4 | 26.9 | 31.4 | 35.9 | 44.9 | 53.3 | 61.7 | 70.2 | 87 |
| 5 | 17.1 | 4.0 | 4.8 | 5.6 | 8.0 | 9.6 | 11.2 | 16.0 | 19.2 | 22.4 | 25.6 | 32.0 | 38.0 | 44.0 | 50.0 | 62.0 |
| 4 | 14.1 | 3.1 | 3.7 | 4.3 | 6.2 | 7.4 | 8.6 | 12.3 | 14.8 | 17.2 | 19.7 | 24.6 | 29.2 | 33.8 | 38.4 | 47.6 |
| 3 | 11.1 | 2.0 | 2.4 | 2.8 | 4.0 | 4.8 | 5.6 | 8.0 | 9.6 | 11.2 | 12.8 | 16.0 | 19.0 | 22.0 | 25.0 | 31.0 |
| 2 | 8.1 | 1.5 | 1.8 | 2.2 | 3.1 | 3.7 | 4.3 | 6.2 | 7.4 | 8.6 | 9.8 | 12.3 | 14.6 | 16.9 | 19.2 | 23.8 |
| 1 | 5.1 | 0.8 | 0.9 | 1.1 | 1.5 | 1.8 | 2.2 | 3.1 | 3.7 | 4.3 | 4.9 | 6.2 | 7.4 | 8.5 | 9.7 | 12.0 |

| SQT Value | SNR Threshold/dB | Reduced MIMO Mesh data capacity (Mbps) for each channel bandwidth and SQT value | | | | | | | | | | | | | | |
|-----------|------------------|---|-----|------|-----|-----|-----|------|------|------|------|------|------|------|------|------|
| | | Bandwidth (MHz) | | | | | | | | | | | | | | |
| | | 1.25 | 1.5 | 1.75 | 2.5 | 3 | 3.5 | 5 | 6 | 7 | 8 | 10 | 12 | 14 | 16 | 20 |
| 6 | 23.1 | 3.0 | 3.6 | 4.2 | 6.0 | 7.2 | 8.3 | 11.9 | 14.3 | 16.7 | 19.1 | 23.9 | 27.5 | 31.2 | 34.8 | 44 |
| 5 | 17.1 | 2.1 | 2.6 | 3.0 | 4.3 | 5.1 | 6.0 | 8.5 | 10.2 | 11.9 | 13.6 | 17.0 | 19.6 | 22.2 | 24.8 | 30.0 |
| 4 | 14.1 | 1.6 | 2.0 | 2.3 | 3.3 | 3.9 | 4.6 | 6.5 | 7.8 | 9.2 | 10.5 | 13.1 | 15.0 | 17.0 | 19.0 | 23.8 |
| 3 | 11.1 | 1.1 | 1.3 | 1.5 | 2.1 | 2.6 | 3.0 | 4.3 | 5.1 | 6.0 | 6.8 | 8.5 | 9.8 | 11.1 | 12.4 | 15.5 |
| 2 | 8.1 | 0.8 | 1.0 | 1.1 | 1.6 | 2.0 | 2.3 | 3.3 | 3.9 | 4.6 | 5.2 | 6.5 | 7.5 | 8.5 | 9.5 | 11.5 |
| 1 | 5.1 | 0.4 | 0.5 | 0.6 | 0.8 | 1.0 | 1.1 | 1.6 | 2.0 | 2.3 | 2.6 | 3.3 | 3.8 | 4.3 | 4.8 | 5.8 |

Greater Spectral Efficiency

With Auto-Adaptive Modulation up to 64QAM, MiMo transmission and DTC's unique token-based channel access mechanism, MeshUltra works to achieve the highest possible real-world throughput from even the narrowest channels. And with bandwidth options down to 1.25MHz, the DTC MeshUltra can access spectrum in which competing Mesh systems simply will not fit.

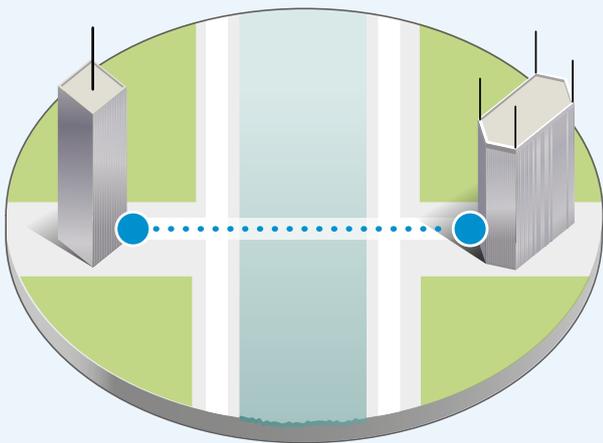


COFDM

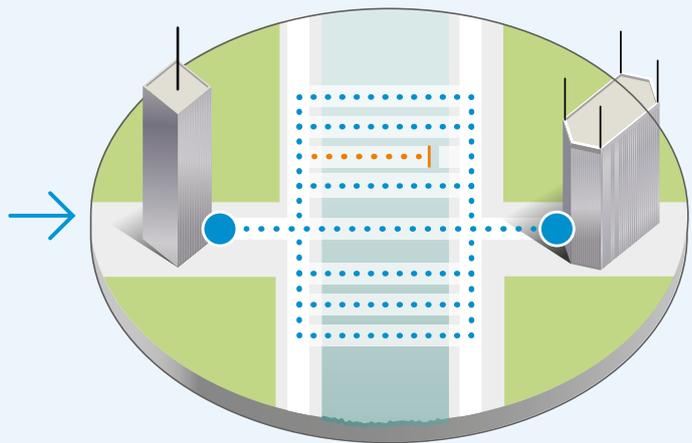
DTC's Mesh technology uses COFDM modulation. Coded Orthogonal Frequency Division Multiplexing - or COFDM for short - is today widely used in wireless mobile communications systems. It provides significant advantages in terms of robustness and multipath rejection over traditional "single carrier" communications systems. COFDM works by splitting the information to be transmitted over a large

number of signals or "carriers," each transmitting at a very low data rate. These carriers are separated just enough to avoid interfering with each other. This contrasts with traditional high-speed communication links which use a single, very high data rate carrier (or a small number of carriers as in Wi-Fi), which are extremely susceptible to multipath interference, particularly in longer range applications.

Single carrier transmission

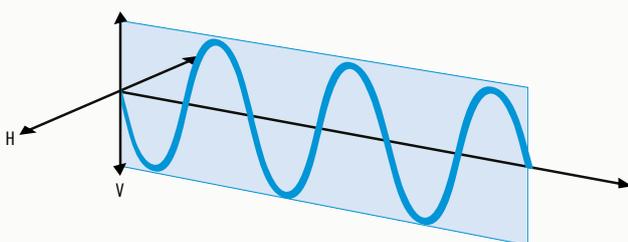


COFDM transmission



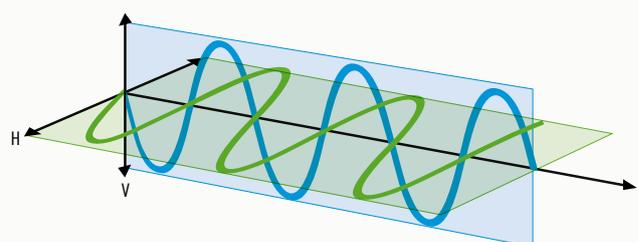
MiMo Transmission

Standard Mesh



MeshUltra leverages Multiple Input Multiple Output (MiMo) technology to increase spectral efficiency and link robustness. By transmitting data both in vertical and horizontal polarisations and leveraging multipath reflections to advantage, MeshUltra can squeeze twice as much data into a channel as a conventional Single Input Multiple

MIMO Mesh



Output (SiMo) Mesh. And unlike previous MiMo Mesh implementations, MeshUltra can automatically and seamlessly transition between MiMo and SiMo operation at the extremes of range or when ordinary non-MiMo antennas are used, ensuring the most robust link possible under all conditions.

Channel Access Mechanisms

Most Mesh systems use “contention-based” channel access - also known as CSMA – which essentially means that radios listen to see if the channel appears to be free before transmitting their data. Contention-based access works pretty well when there is not much data traffic, but as the traffic level increases, there is a higher chance of collisions when two or more radios make a decision to transmit at the same time. The normal outcome of this is that all messages are lost and need to be sent again. This can become a self-feeding problem - the more traffic, the more chance of collisions and the more retries are

required, increasing the traffic level further and leading to yet more collisions - and so on.

DTC takes a completely different approach to channel access, based instead around the use of an access “token” which is passed around all the Mesh nodes in turn. Only when it has this token can a node transmit data, after which it passes the token on to the next node. DTC’s token-based access mechanism leads to extremely efficient channel utilisation and very consistent latency

More Nodes

DTC MeshUltra supports flat, single frequency Mesh networks of greater than 64 nodes in channel bandwidths as narrow as 1.25MHz. And with DTC’s unique token-based channel access, more nodes does not need to mean more transmission clashes. MeshUltra also has no limit to the number of network hops – so if 64 nodes in a long line is what you need then that’s fine with us.

Multiple Talk Groups

DTC is well known for its low latency Mesh talkback, facilitating crystal clear full duplex communications between multiple users. MeshUltra adds to this capability with four selectable talk groups to allow multiple separate talk groups or hierarchical talk schemes.

Greater Range

Noise-optimised RF design and high performance LDPC error correction coding, together with our custom developed Tactical Mesh waveform and automatic MiMo mode switching together allow MeshUltra to deliver DTC’s longest ranges yet – up to 20% further than our previous MiMo Mesh mode.

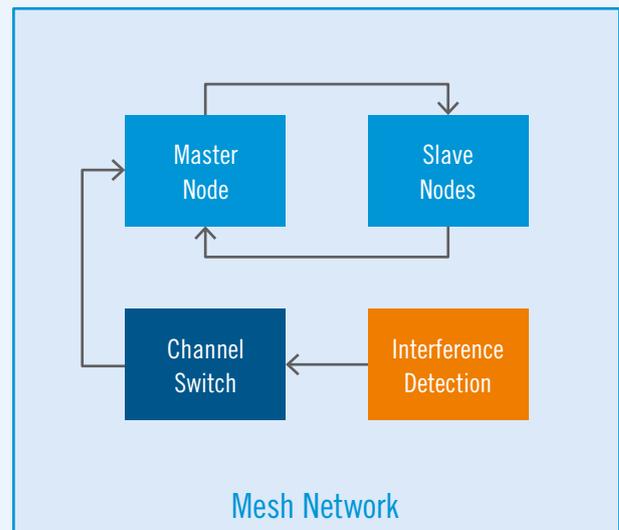
And for the longest range requirements, DTC offers a range of Mesh hardware supporting power outputs up to 10W, which together with our narrow channel bandwidth options can offer ranges previously unheard of for IP Mesh systems.

Cognitive Radio Capabilities

With Auto Adaptive Modulation and seamless automatic full MiMo to reduced MiMo switching, MeshUltra constantly works to maintain the most robust link possible and the highest possible throughput as conditions change. And DTC’s optional Interference Avoidance Scheme (IAS) takes things one step further, offering true cognitive radio capabilities for the first time in a DTC radio.

Interference Avoidance (IAS) Scheme

With IAS, every radio is a sensor, contributing data on local noise levels on a selection of pre-agreed frequencies. This data is brought together to drive a cognitive radio capability which can coordinate a move in frequency to avoid interference or jamming – or simply to ease in-theatre frequency coordination.



Interlink Support

MeshUltra includes DTC’s innovative Interlink functionality, with support for a range of different communication options – including direct support for a variety of USB Cellular and Wi-Fi dongles.

MeshUltra Hardware Platforms

MeshUltra is our most advanced Mesh waveform yet and it is supported by the industry's widest range of Mesh hardware platforms - from tiny modules, perfect for small drones, to the longest range ruggedised nodes, ideal for maritime or industrial applications. With frequency options spanning 340MHz to 6GHz and triband capable products, plus options for OEM integration, DTC can offer hardware solution for every application.

MeshUltra NETNode Phase 5

DTC's flagship dedicated Mesh platform, with four antennas and 2x4 MiMo operation for the longest range and highest throughput. Ideal for base stations and mobile nodes as well as integration on larger UxV platforms, the NETNode Phase 5 is available in robust and desktop form factors, including a dedicated masthead version (NETNode-5R) with Power over Ethernet (PoE) support and a new 2x5W Robust Mobile variant (NETNode2x5W-5RM) for the longest possible range.

NETNode2x5W-5RM



Our highest power MiMO Mesh for extreme range applications.

NETNode2x2W-5RM



"Robust Mobile" ruggedised enclosure with integrated GPS and comprehensive interface options, ideal for vehicle mounting.

NETNode2x2W-5RMT



This Tri-Band version of the 5RM unit, offers support for high L-band, S-band and C-band.

NETNode2x2W-5R



Rugged "Tube Mesh" construction with integral PoE capability – ideal for remote masthead mounting.

NETNode2x2W-5P



Desktop enclosure suitable for indoor or protected deployments.

NETNode2x2W-5PT



The Tri-Band product offers increased frequency agility with support for high L-band, S-band and C-band, provided by one physical unit.

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MeshUltra Hardware Platforms

MeshUltra SOL8SDR

The ultimate in flexibility, the SOL8-SDR Software Defined Radio is able to operate as a 2x2 MiMo Mesh radio, hosting the latest MeshUltra waveform, or alternatively as a unidirectional COFDM Transmitter or Receiver

SOL8SDR-C



The SOL8SDR-C – the world’s smallest MiMo Mesh radio – offers 2x100mW output in a tiny “Concealment” form factor, ideally suited for integration in small drones or other size/weight critical applications.

SOL8SDR-R



The SOL8SDR-R offers the same feature set and 2x100mW output power as the SOL8SDR-C but in a rugged form factor with military standard connectors. Ideal for bench testing, platform integration or as a low power soldier data radio.

SOL8SDR-H



The SOL8SDR-H is a Handheld MANET Mesh Transceiver in a rugged “Soldier Radio” form factor. Offering a full 2 watts of output power and employing standard MBITR batteries and accessories, the SOL8SDR-H is ideal for a variety of Tactical Mesh deployments.

SOL8SDR-P



The SOL8SDR2x2W-P is a 2x2 watt MiMo Mesh radio in a practical enclosure suitable for desktop use or platform integration and incorporating industry standard interface connections.

MeshUltra OEM

Original Equipment Manufacturers can offer the benefits of MeshUltra to their customers with OEM solutions based on the SOL8SDR-C (2x2 MiMo) and the D1740 platform (2x4 MiMo) and supported by a range of amplifiers with output powers of 2x1W, 2W and 5W.

Contact us or see our OEM brochure for more information.



D1740 PCB

For further information on MeshUltra Tactical Waveform COFDM IP Mesh or any other of our range of solutions, contact your Sales Account Manager or one of our Regional Sales Offices, or email solent.info@domotactical.com

DTC – Herndon, Global Headquarters

2303 Dulles Station Boulevard
Suite 205
Herndon, VA
20171, USA

T: +1 800 665 4648

DTC – Tampa

3845 Gateway Centre Boulevard
Suite 360
Pinellas Park, FL
33782, USA

T: +1 727 471 6900

DTC – Solent

Fusion 2, 1100 Parkway
Solent Business Park
Whiteley, Hampshire
PO15 7AB, UK

T: +44 (0) 1489 566 750

DTC – Randers

Haraldsvej 64B
DK-8960
Randers SØ
Denmark

T: +45 8791 8100

DTC – Singapore

21 Media Circle
Infinite Studios #05-06
Singapore
138562

T: +65 6339 0508