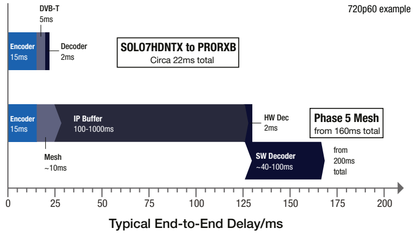
LOW LATENCY WHEN IT MATTERS

The diagram below shows the typical latencies in both our COFDM Point-to-Point and IP Mesh systems. These demonstrate why DTC is a market leader for UAV applications.



BENEFITS OF IP MESH

EASE OF INSTALLATION

DTC Mesh products create a self-forming, self-healing Mesh network as soon as power is applied to the node and it is within range of another node in the network. Each node simply requires a power source (12v nominal) and antennas to operate. This makes the system ideal for permanent or temporary deployment onto air assets, vessels, personnel or land-based stations participating in the operation, without the requirement for additional infrastructure.

EXTENDED RANGE

DTC Mesh nodes are available in 100mW, 2W and 5W variants which allows assets to stay connected to the network over long distances. Each node acts as a repeater, meaning that the range of the network can easily be extended by adding another node.

NETWORK EXTENSION

DTC's Mesh system is capable of extending the IP network by integrating other IP communication links, such as 4G and satellite communication. This combines Line-of-Sight (LOS) and Non-Line-of-Sight (NLOS) systems seamlessly to deliver data over a transparent IP network.

COST-EFFECTIVENESS AND FLEXIBILITY

With an RF network, recurring communications costs are reduced while optimizing operational flexibility by using multiple IP communication links or existing IP communications platforms. DTC's Airborne Mesh is a cost-reducing way to transport vital video, audio and data communications information in dynamic, mobile, maritime environment.

REAL-TIME STREAMING

Capable of transmitting live high-quality video across the network, with minimal delay.

DATA RATE CAPABILITIES

The tables below show the data rate throughput capabilities of the DTC Phase 5 IP Mesh system operating in MiMo and Reduced MiMo modes. The ability to have auto adaptive modulation means that a stable link will be maintained for the maximum amount of time which improves range and reliability for the user.

SQT Value	SNR Threshold/dB	Reduced MiMo Rates to SDR for each frequency bandwidth/Mbps														
		1.25MHz	1.5MHz	1.75MHz	2.5MHz	3MHz	3.5MHz	5MHz	6MHz	7MHz	8MHz	10MHz	12MHz	14MHz	16MHz	20MHz
6	23.1	n/a	n/a	n/a	n/a	n/a	n/a	11.9*	14.3*	16.7*	19.1*	23.9*	27.5*	31.2*	34.8*	44.0*
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

SQT Value	SNR Threshold/dB	Full MiMo Rates to NETNode Phase 5 for each frequency bandwidth/Mbps														
		1.25MHz	1.5MHz	1.75MHz	2.5MHz	3MHz	3.5MHz	5MHz	6MHz	7MHz	8MHz	10MHz	12MHz	14MHz	16MHz	20MHz
6	23.1	n/a	n/a	n/a	n/a	n/a	n/a	22.4*	26.9*	31.4*	35.9*	44.9*	53.3*	61.7*	70.2*	87.0*
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

*Subject to hardware revision and frequency of operation

CODAN | DOMO TACTICAL COMMUNICATIONS

AIRBORNE COMMUNICATIONS

OUR PROCESS

Solving challenging requirements is what we do best

ASSESS

Our technical consultants will conduct a detailed on-the-ground assessment of:

- Human needs
- Operational environment
- Opportunities and challenges
- Cultural context
- Scenario planning

DESIGN

Our field service team will then design a custom solution for those challenges, using the right hardware and software from Codan or one of our technology partners.

DEPLOY

Our specialist logistics team gets the hardware and the resources to wherever you are, getting your system up and running fast.

TRAIN

We'll train operators and communications staff on how to use the system – which will be a short process, thanks to our easy-to-use interfaces and interoperability.

SUPPORT

We're available to be deployed within 24 hours for any support required. And we're always on hand for any advice you require.

CODAN COMMUNICATIONS | DTC

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CODAN | DOMO TACTICAL COMMUNICATIONS

AIRBORNE COMMUNICATIONS

Codan | DTC communication solutions for Airborne and Unmanned Systems

Codan | DTC is a pioneer in the creation of miniature wireless RF Communication solutions and has the experience, knowledge and capabilities to assist all areas of industry in meeting these challenges.

Our technology solutions are available in both finished boxed product and OEM PCB formats to enable our customer to integrate their solution of choice seamlessly into their UAV platforms.

Codan | DTC's COFDM technology provides unbeatable, robust and secure communication for UAVs' Airborne Downlinks around the world, repeatedly demonstrating Non-Line-of-Sight (NLOS) and Beyond Visual Line-of-Sight (BVLOS) performance superior to competing solutions. With a comprehensive product portfolio, from simple digital video links to the latest IP Mesh and Software Defined Radio systems, DTC has a solution to meet every need.

SOLVING THE INTERCONNECTIVITY CHALLENGE

The requirement of the UAVs and downlinks for the secure and reliable transfer of video, audio, data, and general IP network traffic in real-time environments, has led DTC to create a suite of products to meet these challenges. DTC has worked with platform manufacturers to address the key issues of latency, range extension and reliability on these systems.

Depending on the specific use case, our customers can utilize our MANET-proven Point-to-Point (P2P) COFDM technology for extreme low latency applications or our market-leading high-capacity wireless IP Mesh technology. The DTC Mesh offering is a true game changer in RF communications, offering IP connectivity with secure, seamless exchange of data with the additional capability to stream live HD video and audio. This is achieved by using COFDM RF technology to create a self-healing, self-forming IP network which can operate anywhere in the world, independent of existing communications infrastructure over significant ranges. Both P2P and Mesh are available in the DTC SDR, Software Defined Radio, where software applications allow remote changes from one single platform.

KEY FEATURES

IP MESH

- Fluid self-healing Mesh optimized for mobile applications
- Excellent range and NLOS capability
- Mesh networks with greater than 64 nodes in channel bandwidths as narrow as 1.25MHz
- Up to 87Mbps throughput
- Each node can act as a source of video, audio and generic IP data, as well as a repeater
- No central node in the network as each node is equal
- Ability to seamlessly link different Mesh networks over third party bearers
- Transparent IP network allows connection of any general IP device
- Auto adaptive modulation maintains connectivity in mobile applications
- Range of power outputs, mounting options and environmental housings to suit operational environments
- Optional end-to-end AES encryption
- Ability to build groups of Mesh to create a network
- Multipath IP Mesh nodes can provide an independent secure network.

Overview	Long range exterior/robust deployment	
	MiMo Mesh	Reduced MiMo Mesh
Latency	< 160ms	
Bitrate	87Mbs	44Mbs
Size	50 x 50 x 18	
Weight	70g	
Power	9.5w	8w

SDR-C

SDR-R

COFDM POINT-TO-POINT (P2P)

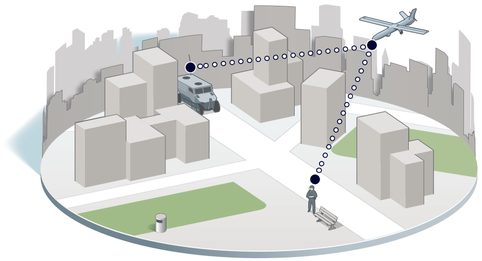
- One way video, audio, RS232 transmission over COFDM RF
- Excellent range and NLOS capability
- Narrowband width modes (2.5MHz, 1.25MHz, 0.625MHz) offer excellent spectrum efficiency and increased range
- Low latency (under 25mS) for critical applications
- Optional end-to-end AES encryption
- Low power solution for extended mission life
- Cost-effective
- Integrated telemetry links
- Unrivalled frequency bands. UHF to XBand.

Overview	Longest range option, suitable for aircraft, ships or max NLOS penetration
	P2P
Latency	< 25ms
Bitrate	44Mbs
Size	58 x 36 x 16.5
Weight	60g
Power	4w

APPLICATIONS

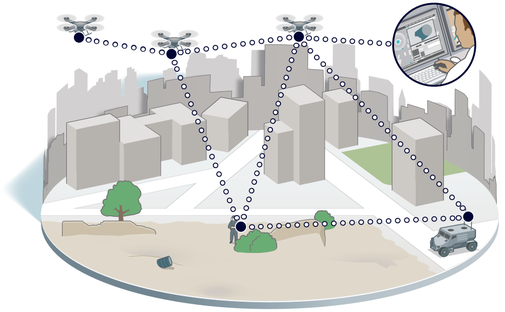
COFDM POINT-TO-POINT APPLICATIONS – TACTICAL UAVS

DTC's SOLO Point-to-Point COFDM Downlinks solutions are in use on board Tactical UAVs and Manned Aircraft around the world, for surveillance, survey and broadcast applications. They offer the mission critical robustness and long range of DTC's tactical COFDM waveforms together with video encoding at resolutions up to 4K, support multiple cameras and embedded serial data. Transmissions can be encrypted to AES256 (subject to export control) in order to prevent interception.

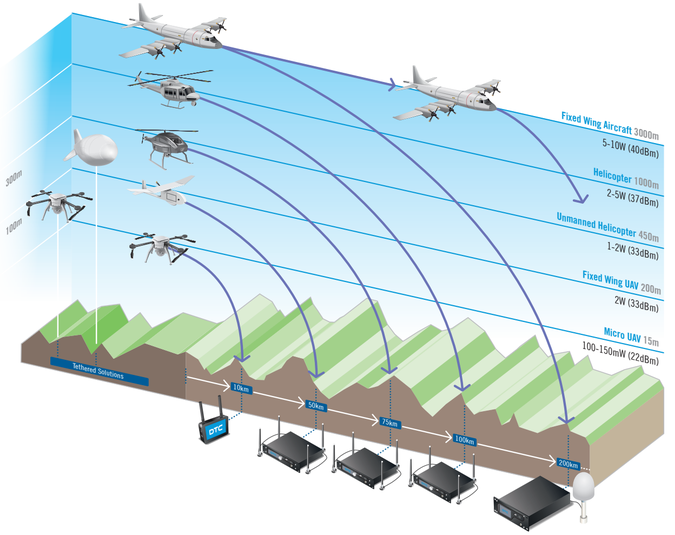


IP MESH APPLICATIONS – MESHED DRONES

IP Mesh radios offer high data rate connectivity to UAVs in difficult RF and operational environments. The fluid self-healing, self-forming Mesh architecture allows UAVs to exchange and relay mission-critical video and data, both between units and to command elements. Range can be extended by utilizing repeater units or other Mesh enabled assets, allowing 'swarm' and 'mother/daughter' UAV architecture to be implemented with ease.

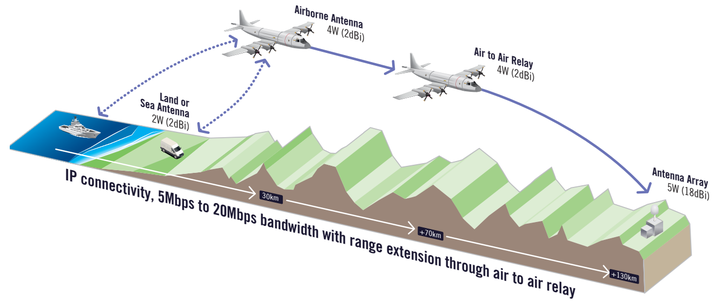


SOLO/MESH DOWNLINK AND AMPLIFIER OPTIONS FOR EVERY APPLICATION



TYPICAL IP MESH LINK CAPABILITY

(Total MiMo link throughput at 20MHz bandwidth (68MBps))



GREAT FLEXIBILITY IN ONE PRODUCT

DTC's downlink solutions offer flexible bit rate ranges in one device. Working in both HD and SD, this gives the operator the flexibility for increased link sensitivity and range - a benefit unique to DTC.

QUALITY MOBILE PERFORMANCE

DTC's COFDM modulations are specifically designed for optimum operation and outperform competing systems by offering the best image, system flexibility, range and link reliability on an aerial platform.

EXTRA FLEXIBILITY

The highly flexible Mesh topology means that data can be exchanged between moving nodes in a point-to-point or point-to-multipoint fashion. Range can be extended by using nodes as repeaters. DTC IP Mesh systems can be fully integrated with 'beyond line of sight' technologies, delivering the 'difficult front end' that other technologies cannot offer.

HOW THIS TECHNOLOGY WORKS

Multiple nodes can be combined into a ground breaking wireless ad-hoc IP Mesh network – DTC's fluid, self-forming, self-healing Mesh. With genuine NLOS coverage, superb penetration and wide bandwidth in difficult environments, the system is truly mobile. It supplies a network with extended range – one which will deliver in environments too tough for other radio solutions to cope with.

Unlike other wireless options, the IP Mesh constantly readjusts itself as nodes move, working out which are in range and finding the best route to send data between them. When one node can no longer operate, the rest of the nodes can communicate with each other – directly or through one or more intermediate nodes.