



WHITE PAPER

# Sentry Mesh Boarding Party Assured Communications Solution

Image: US Department of War (DoW). The appearance of DoW visual information does not imply or constitute DoW endorsement.

## Summary

Naval boarding operations demand **fast, secure, and resilient communications in complex, RF-challenging environments**. DTC's MIMO MANET Mesh IP radios—led by the lightweight, rugged Sentry Mesh 6161—deliver real-time voice, video, and data sharing across decentralized, self-healing networks.

These systems ensure seamless situational awareness from ship interior to command vessel. Featuring MeshUltra™ waveform, IAS interference and jamming mitigation, and FIPS-certified and AES-256 encryption. DTC radios provide a proven, mission-ready solution for VBSS teams operating in today's high-stakes maritime interdiction scenarios.

# The Challenge of Communications in Naval Boarding Operations

Naval boarding parties—often referred to in joint and allied maritime operations as Visit, Board, Search, and Seizure (VBSS) Teams—operate in some of the most complex communication environments in modern military and law enforcement missions. These teams are tasked with rapidly boarding and securing vessels under a wide range of conditions—from routine inspections to high-risk interdictions.

**The challenges are multifaceted:** steel ship structures block traditional radio signals; boarding teams frequently lose line-of-sight (LOS) contact with the command ship; and the growing need for real-time sharing of video, voice, and positional data has far outpaced the capabilities of legacy voice-only radios.

Boarding operations typically involve fast-moving teams navigating tight, RF-hostile spaces. Maintaining continuous, high-integrity communication with the command ship and among dispersed team members is critical to mission success and safety. Traditional systems often fall short under these conditions, leading to dangerous breaks in situational awareness and command oversight.



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**Figure 1:** Boarding party keeps watch over the crew of a suspected pirate vessel.

# How MANET Mesh IP Radios Solve the Problem

Mobile Ad Hoc Network (MANET) Mesh IP radios are specifically designed to address these communication gaps. Unlike traditional point-to-point or infrastructure-based radios, **MANET systems form decentralized, peer-to-peer networks where each radio can dynamically route voice, video, and data through multiple paths.** This self-forming, self-healing architecture ensures continuity of communication even in environments with physical obstructions, signal degradation, or node loss.

For boarding parties operating inside vessels or spread across different decks and compartments, this means uninterrupted connectivity regardless of their proximity to the command vessel. Each team member's radio becomes both a user device and a repeater, extending the reach of the mesh and maintaining network coverage.

To further enhance network reliability in challenging areas—such as engine rooms, lower decks, or steel-enclosed compartments—drop bag radios can be deployed. These small, autonomous units act as unattended repeater nodes, automatically joining the mesh network to relay voice, video, and data traffic. Strategically placed drop bags ensure continuous communication in environments where standard radio signals are likely to degrade or be blocked.

When boarding teams must operate beyond line-of-sight or at extended distances from the command ship—such as during vessel pursuit, diversion, or inspection operations—a UAV-mounted mesh radio node can be deployed to provide airborne range extension. Operating above the clutter and interference of the maritime environment, the UAV node serves as a high-elevation repeater, maintaining mesh network connectivity between boarding party personnel and command elements. This ensures that even at standoff ranges or in pursuit scenarios, boarding parties retain seamless access to video, voice, and sensor data streams.



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Figure 2: Boarding party boards oil platform from RHIB.

These radios also support high-throughput IP communications, enabling simultaneous transmission of live video from body-worn cameras, GPS position data, biometric and environmental sensor feeds, and multi-channel encrypted voice. This level of situational awareness gives commanders a live window into the operation, allows faster decision-making, and enhances coordination between teams and supporting assets.

Moreover, the high data capacity and edge processing capabilities of MANET Mesh IP radios allow them to support AI-based applications at the tactical edge, such as real-time language translation, facial recognition, and pattern detection. These capabilities are increasingly important in boarding operations involving multinational crews or potential non-compliant actors, helping teams overcome language barriers and improve situational comprehension during high-pressure interactions.

## The Distinct Advantages of DTC MIMO MANET Mesh IP Radios

**DTC is a global leader in tactical mesh radio technology.** Its solutions leverage MIMO (Multi-Input Multi-Output) architecture to significantly improve throughput, link resilience, and performance in complex RF environments typical of shipboard operations.

MIMO radios use multiple antennas to send and receive data across separate channels simultaneously, reducing interference and increasing signal stability—especially valuable where signals reflect and scatter off steel structures.

DTC radios employ the proprietary MeshUltra™ waveform, a robust COFDM-based protocol optimized for maritime operations. MeshUltra™ is designed for NLOS (Non-Line-of-Sight) performance, providing reliable communications deep inside metal compartments and ship interiors. The waveform supports up to 144 nodes per network and offers bounded latency for predictable performance of time-sensitive transmissions like voice and video.

One of MeshUltra's key enhancements is DTC's Interference Avoidance System (IAS). IAS monitors the RF spectrum in real-time and automatically adjusts channel selection and modulation parameters to avoid interference—whether caused by environmental factors, unintentional spectrum congestion, or deliberate jamming. This adaptability ensures mission continuity even in contested or bandwidth-saturated environments.

Security is a critical pillar of the DTC architecture. All communications are protected with AES-256 encryption, certified to FIPS 140-2 Level 1 standard (FIPS 140-3 Level 2 pending). This guarantees that voice, video, and data are safeguarded against interception, supporting secure operations for defence, law enforcement, and multi-national task forces.

# The Role of the Sentry Mesh 6161 in Boarding Party Operations

The Sentry Mesh 6161 stands out as the **optimal body-worn communications solution** for boarding party personnel and RHIB mounting.

It is a compact, lightweight, and ruggedized radio designed for tactical use. Weighing only 410 grams, the Sentry Mesh 6161 delivers exceptional performance without compromising mobility or ergonomics—making it ideally suited for boarding party missions where size, weight, and power consumption (SWaP) are critical. It is compliant with MIL-STD-810H environmental testing standards and rated IP68, ensuring rugged operation in harsh maritime environments including exposure to water, salt fog, humidity, vibration, and extreme temperatures.



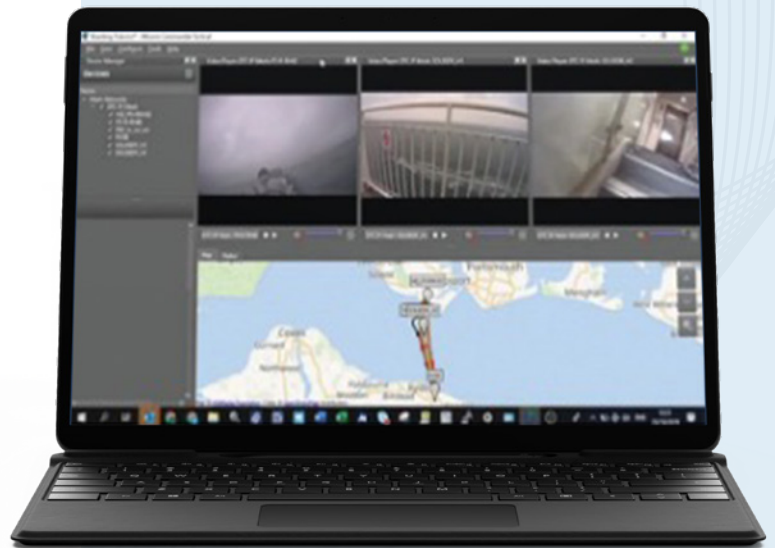
Figure 3: Sentry Mesh 6161

With 2x2 MIMO architecture and a maximum IP data throughput of 87 Mbps, the Sentry Mesh 6161 supports:

- ✓ Full motion HD video streaming from helmet or chest-mounted cameras
- ✓ Simultaneous multi-channel voice communications with up to 32 talkgroups
- ✓ Embedded GPS for real-time positional tracking
- ✓ Transparent AES-256 encryption for all data

**Its interface is designed for simplicity in high-stress environments:** a rotary knob for power and preset selection, programmable function buttons for talkgroup or volume control, and a single LED for network and system status. The internal GPS module offers standalone tracking, and an optional external antenna extends reception in poor GPS-signal areas.

For command vessels or larger aerial platforms supporting the boarding party, the NETNode RM radio provides a fully compatible, high-powered, ruggedized MANET backbone. This platform-mounted unit offers extended RF range, additional throughput capacity, and greater networking headroom. It is fully interoperable with the Sentry Mesh 6161, allowing seamless communication across boarding party and vehicular nodes.



**Figure 4:** Mission Commander Tactical

When deployed together, the Sentry Mesh 6161 and NETNode RM provide a **complete, scalable solution for naval boarding operations**. Commanders receive uninterrupted data streams from the boarding team, support units can join the network with ease, and the entire force benefits from reliable, high-speed, and secure communication in the most challenging RF environments. DTC's Mission Commander application can be used to track and view video streams from a command location.

# Conclusion

Naval boarding operations face escalating demands for data-rich, resilient, and secure communications. Legacy voice-only radios can no longer meet the needs of fast-paced, multi-domain boarding actions that require real-time video, positional awareness, and decentralized coordination.

DTC's MIMO MANET Mesh IP radios, featuring the MeshUltra™ waveform, IAS, and FIPS-certified encryption, **directly address these challenges**. The Sentry Mesh 6161 provides boarding parties with a lightweight yet powerful tool for staying connected, informed, and secure. When paired with the NETNode RM for command-level connectivity, DTC's ecosystem delivers a robust communications architecture purpose-built for modern maritime operations.

For naval forces seeking a reliable, scalable, and high-performance solution to boarding party communications, DTC's technology stands as a proven and mission-ready choice.

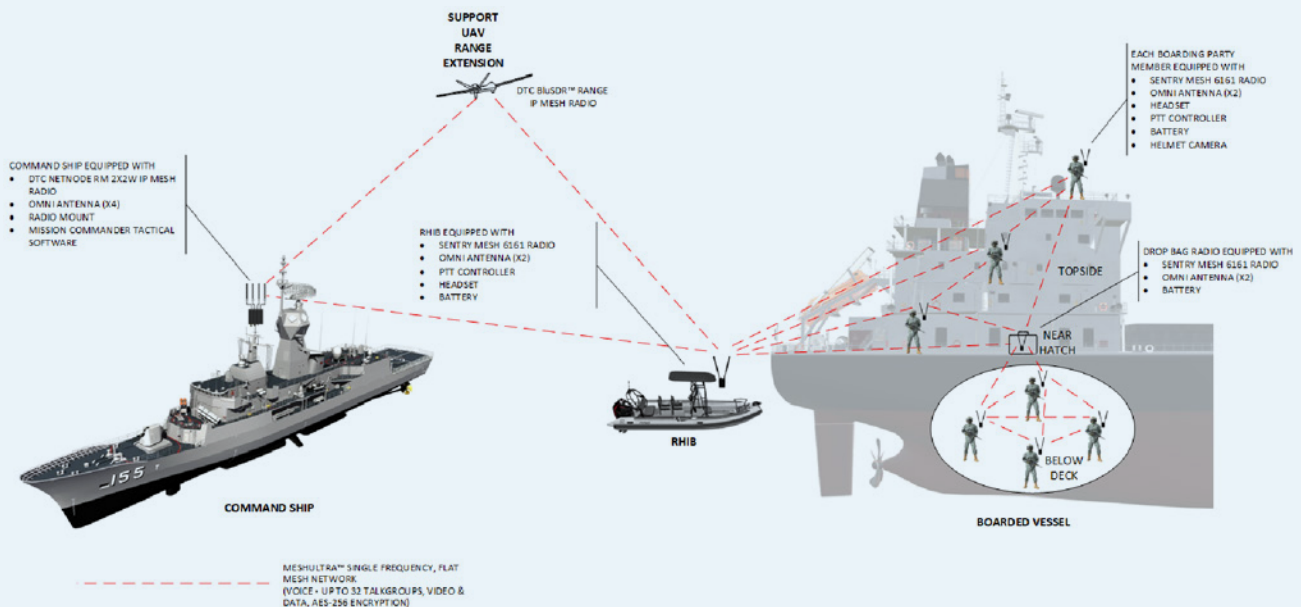


Figure 5: Operation View (OV-1) of a naval boarding party operation with DTC Mesh IP Radios



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DTC is a division of Codan Ltd. The group has over 60 years of unparalleled expertise, stands as a global leader in designing and manufacturing premium communication solutions. Renowned for our unwavering commitment to quality and reliability, we cater to military, defence, and security markets worldwide. In the face of complex challenges, our innovative technology solutions empower mission-critical personnel with real-time communication, surveillance, and situational awareness, ensuring operational success in the most demanding environments. With a proven track record in over 100 countries, we don't just provide products; we tailor comprehensive solutions, making us the trusted choice for those who communicate without compromise.

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