

PRODUCT SPECIFICATION

YNW-7502A-MH

Handheld Tactical Broadband Wireless MESH Ad-Hoc
Network Equipment

Shenzhen Yuneng Micro Technology Co., Ltd.

2026.5 (V1.0)

Model YNW-7502A-MH

Handheld

Product Name Handheld Tactical Broadband Wireless MESH Ad-Hoc Network Equipment

Series YNW-7500 Series MESH Ad-Hoc Network Equipment

Core Technology COFDM + MESH Multi-hop Ad-Hoc Network

1. Product Overview

Product Positioning: The YNW-7502A-MH is a compact, high-throughput handheld tactical broadband wireless MESH Ad-Hoc network device developed on COFDM and mobile ad hoc network (MANET) technologies. Independent of any infrastructure, it builds temporary, dynamic, and rapid wireless IP Mesh networks, providing users with fast, flexible solutions for rapidly establishing reliable wireless links in complex environments.

Developed on COFDM and mobile ad hoc network (MANET) technologies, the SF-7502A-MH handheld radio does not rely on any infrastructure and can build temporary, dynamic, and rapid wireless IP Mesh networks. It provides Ad-Hoc, self-recovering, and highly survivable capabilities, supporting multi-hop transmission of multimedia services such as data, voice, and video. It can be applied to emergency communications, smart cities, wireless video transmission, field operations, mine operations, temporary conferences, environmental monitoring, public security and firefighting, counter-terrorism and special duties, rescue and disaster relief, single-soldier coordination, and vehicle networking.

Combined with backpack/vehicle Ad-Hoc radios, this portable Ad-Hoc radio can form hybrid clustered and tiered networks: vehicle-mounted radios establish a long-range backbone network, while portable radios form squad sub-networks, supporting multi-hop communications of multimedia services such as video, voice, and data. Various IP terminals such as mobile phones, tablets, and PCs can access the Ad-Hoc network through Ethernet ports or WiFi AP, enabling interconnection and interworking among all IP application terminals.

- **Core Selling Points:** COFDM + transmit/receive diversity technology; receiving sensitivity down to -103dBm; line-of-sight communication of 30+km at 2W transmit power; strong multipath-interference resistance and diffraction capability
- **Target Users:** System integrators and engineering contractors in military communications, public safety, emergency communications, and industry information private networks
- **Applicable Scenarios:** Emergency communications, smart cities, wireless video transmission, field operations, mine operations, temporary conferences, environmental monitoring, public security and firefighting, counter-terrorism and special duties, rescue and disaster relief, single-soldier coordination, and vehicle networking

Design Highlights: Unit weight of only 1kg (excluding antenna), handheld design, ready to use upon power-on, long operating time (6~8 hours) after inserting the battery, supports hybrid clustered and tiered networking,

extensible WiFi and GPS/BD positioning functions to support integrated communications requirements.

2. Product Views



YNW-7502A-MH Handheld Device Front View

3. Key Features



Strong Anti-interference Capability

Adaptive intelligent frequency selection with up to 16 preset candidate frequencies, automatically avoiding interference to ensure transmission reliability



Long Transmission Distance

COFDM + transmit/receive diversity, sensitivity -103dBm, line-of-sight communication of 30+km at 2W transmit power



High Transmission Data Rate

COFDM + adaptive modulation + receive diversity, peak of 25+Mbps@10MHz / 50+Mbps@20MHz



Large Network Scale

Dynamic TDMA protocol with dynamic time-slot resource allocation, single-frequency networking of up to 64 nodes



Multiple Relay Hops

Automatic route relay, video transmission up to 8+ hops to extend network coverage



Handheld Design

Unit weight of only 1kg (excluding antenna), operable for 6~8 hours after inserting the battery, adapted to single-soldier handheld use scenarios

4. Technical Specifications

4.1 RF Parameters

Category	Parameter	Specification	Custom Option
RF Parameters	Frequency Range	1300 ~ 1500MHz, adjustable in 1Hz steps	70MHz ~ 6000MHz customizable
	Bandwidth Modes	2.5 / 5 / 10 / 20*MHz adjustable (*optional)	—
	Communication Waveform	TDD-COFDM + 2T2R	—
	Carrier Modulation	QPSK / 16QAM / 64QAM / 256QAM	Adaptive or fixed configuration
	Transmission Data Rate	Peak 25+Mbps@10MHz, 50+Mbps@20MHz	—
	Receiving Sensitivity	-103dBm	—
	Transmission Distance	>30km (line of sight)	—
	Transmit Power	33dBm (2×1W), adjustable in 1dBm steps	Power customizable
	Anti-interference	Adaptive frequency selection, up to 16 candidate frequencies; frequency-selection range related to power amplifier	—

4.2 Networking Capability

Category	Parameter	Specification	Custom Option
Networking Capability	Networking Capability	Supports 64+ nodes	—
	Network Scale	Single-frequency networking of up to 64 nodes	—
	Multi-hop Capability	Short messages up to 15+ hops, voice up to 10+ hops, video up to 8+ hops	—
	Mobility Speed	Supports high-speed movement of 1000+km/h	—
	Transmission Delay	Approximately 7ms per hop	—
	Startup Time	Less than 27s	—
	Network Join Time	Less than 1s	—
	Route Switch Time	Less than 1s	—

4.3 Interfaces & Extension

Category	Parameter	Specification	Custom Option
Interfaces & Extension	Data Interfaces	Ethernet port ×1, RS232 ×1	—
	Wireless Extension	WiFi AP	—
	Video Extension	Video encoder HDMI/SDI/CVBS* (*on demand)	—
	Satellite Positioning	GPS/BD* (*on demand)	—
	Voice Communication	IP voice conference / PTT intercom	Software configurable, PTT handset included

4.4 Electrical & Physical Characteristics

Category	Parameter	Specification	Custom Option
Electrical & Physical	Battery Charging	12.6V / 1A	—
	Unit Power Consumption	6 ~ 15W	—
	Operating Time	6 ~ 8 hours	—
	Operating Temperature	-40°C ~ 65°C	—
	Protection Rating	IP66	—
	Dimensions	220 × 79 × 37.5mm	—
	Weight	1kg (excluding antenna)	—

5. Features & Functions

Function Overview: The YNW-7502A-MH handheld radio provides centerless, distributed Ad-Hoc networking capability, supports multiple networking modes, multi-hop relay, and intelligent anti-interference, and supports secure encryption, spectrum scanning, QoS routing, serial/Ethernet IP transparent relay, Internet extension, and remote configuration management.

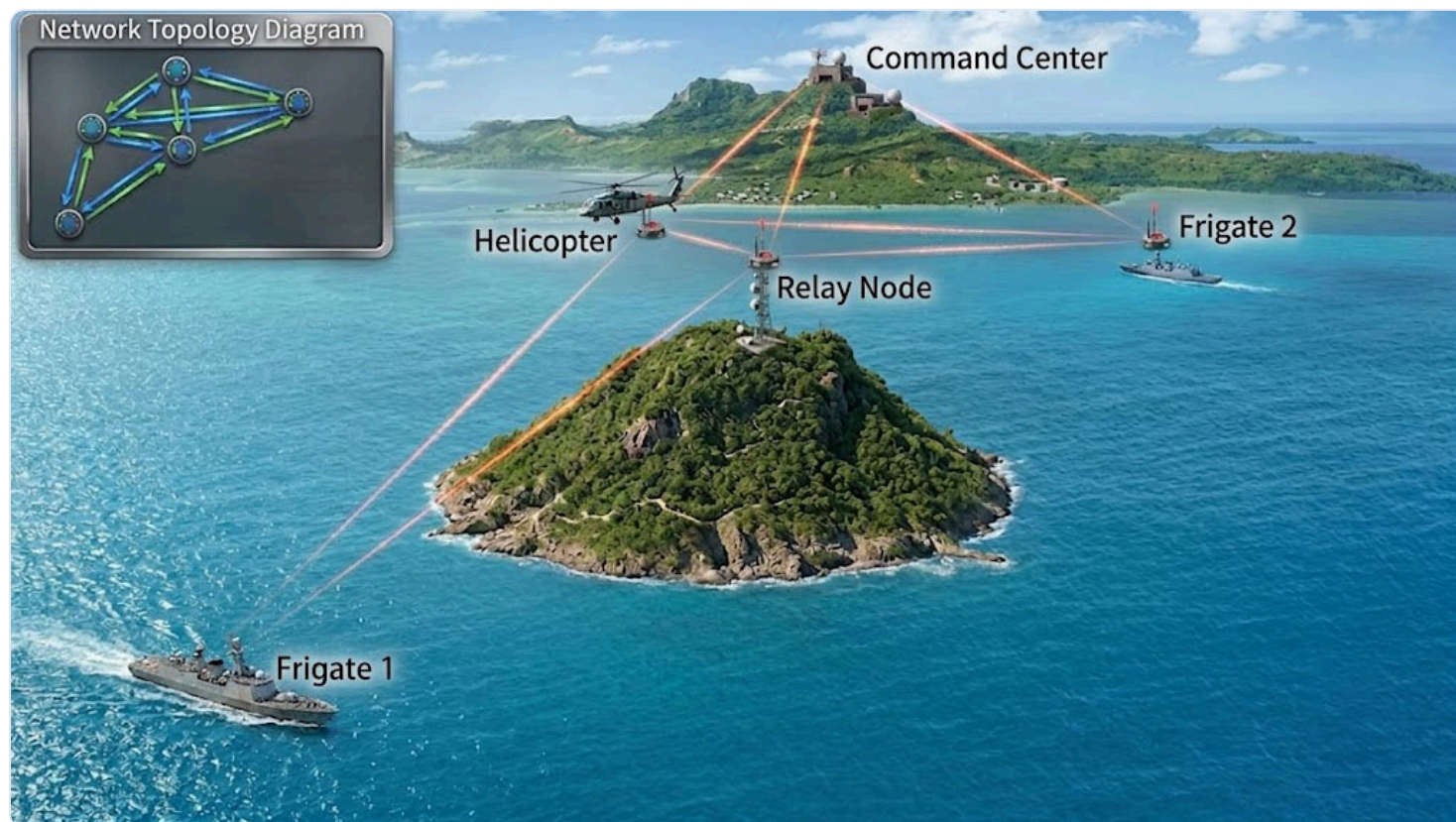
- **Network Architecture:** Centerless, distributed wireless IP Mesh Ad-Hoc network;
- **Multipath-interference Resistance:** COFDM multi-carrier modulation provides strong multipath-interference resistance;
- **Survivability & Self-healing:** The failure of individual terminals does not affect normal network operation, providing strong survivability;
- **Networking Modes:** Mesh network, chain network, point-to-point, point-to-multipoint, and multipoint-to-multipoint;
- **Intelligent Anti-interference:** Adaptive frequency selection with up to 16 preset candidate frequencies, automatically evaluating communication quality across candidates and selecting the un-interfered frequency with the best quality for communication;
- **Diffraction Capability:** Strong diffraction and penetration capability;
- **MAC Protocol:** Dynamic TDMA protocol;
- **Routing Protocol:** Optional Layer-2 / Layer-3 intelligent dynamic routing;
- **Flexibility:** Highly extensible; nodes can join and leave dynamically;
- **Link Optimization:** Supports QoS routing and weak-link rejection to enhance network stability;
- **Loop Detection:** When two Ad-Hoc radios in the network are connected to the same switch over Ethernet, normal network data transmission is guaranteed;
- **Secure Encryption:** Supports DES/AES128/AES256 channel encryption to ensure secure information transmission without affecting end-to-end data rates;
- **Spectrum Scanning:** Provides spectrum scanning to inspect the noise floor and burst interference of candidate frequencies, guiding optimized working-frequency configuration;
- **Configurable Data Rate:** Modulation and coding scheme (MCS) can be configured as adaptive or fixed, suitable for applications such as asymmetric uplink/downlink rates or low-rate, high-reliability scenarios;
- **In-network Multicast:** Supports multicast and broadcast of Ethernet IP data, blacklist and whitelist settings, and serial-to-serial point-to-point and point-to-multipoint multicast;
- **IP Transparent Relay:** Supports transparent UDP/TCP data transmission between Ethernet ports, between Ethernet and serial ports, and between serial ports, as well as serial port parameter configuration;
- **Internet Extension:** Effectively extends Internet coverage; any terminal in the network can act as a gateway, and all Ad-Hoc network nodes can access the Internet through a gateway node;
- **Configuration Management:** Sets parameters such as communication frequency, operating bandwidth, transmit power, network IP, and keys; dynamically displays network topology, link quality, signal strength, environmental noise floor, spectrum analysis, and operating temperature;
- **WiFi AP:** Provides a WiFi hotspot for mobile phones, tablets, computers, and other devices to access and use as application terminals for user interaction;

- **Network Indicator:** Dual-color LED; red indicates power-on startup without joining the network, green indicates the network has been joined;
- **Signal Indicator:** Tri-color LED that displays different colors according to communication link quality.

6. Applications

With its MESH Ad-Hoc technology, the product can be flexibly applied to military communications private networks, public-security private networks, emergency communications private networks, industry information private networks, regional broadband private networks, wireless surveillance private networks, collaborative management private networks, and intelligent transmission private networks. It provides stable, reliable, timely, and efficient HD video, multi-channel data, clear voice, and visualized command-and-dispatch services for military communications, counter-terrorism and emergency response, public-security law enforcement, security operations, rescue and disaster relief, firefighting command, forest fire prevention, forest-area monitoring, civil defense / earthquake response, power-line patrol, digital oilfield, UAV swarms, fleet interoperability, vessel formations, maritime communications, airport ground handling, subway emergency, highway construction, hydrological monitoring, mobile live broadcasting, and medical sectors.

1. Border & Coastal Defense MESH Ad-Hoc Wireless Communications



Application Scenario

Border patrol, coastal surveillance, border port control, coastline warning, border outpost interconnection, and maritime law-enforcement vessel formations — long-range, wide-coverage border and coastal defense communications. National borderlines and coastlines are extensive with complex, varied terrain including mountains, deserts (gobi), jungles, and islands where conventional public networks often fail to provide full coverage, making dedicated broadband communications essential for border and coastal defense command and dispatch.

Deployment Solution

- **Multi-hop cascade deployment:** The YNW-7502A-MH handheld radio, combined with backpack/vehicle base-station radios, is cascaded at approximately 30km intervals along the border or coastline; a single hop achieves line-of-sight transmission of over 30km, and multi-hop relay builds a centerless broadband private network covering tens to hundreds of kilometers.
- **Diverse node form factors:** Fixed deployment at border outposts, ship-borne deployment on patrol boats, vehicle-mounted deployment on mobile command vehicles, and handheld deployment with patrol soldiers form a freely Ad-Hoc multi-form-factor network for integrated "shore-sea-air" coverage.
- **Multipath-resistant long-range:** COFDM modulation with transmit/receive diversity provides strong multipath-interference resistance and diffraction capability, achieving stable transmission over longer distances in wide-area, complex border and coastal defense scenarios.

Application Value

Between border outposts, patrol boats, and mobile command vehicles, HD video, voice intercom, and situational-awareness data are backhauled in real time, keeping the command link active even in remote areas without public network coverage. The command center can grasp border dynamics and maritime situational awareness in real time, effectively enhancing border/coastal situational awareness, rapid response, and coordinated operations, providing reliable communications support for border and coastal control.

2. Convoy MESH Ad-Hoc Wireless Communications



Application Scenario

Convoy formation marching, military escort and transport, material transportation, VIP convoy security, long-distance passenger-fleet management, logistics fleet coordination, and railway engineering-vehicle group communications — mobile scenarios. As inter-vehicle distances constantly change and road conditions are complex during convoy movement, conventional communications cannot guarantee stable real-time links between convoy members.

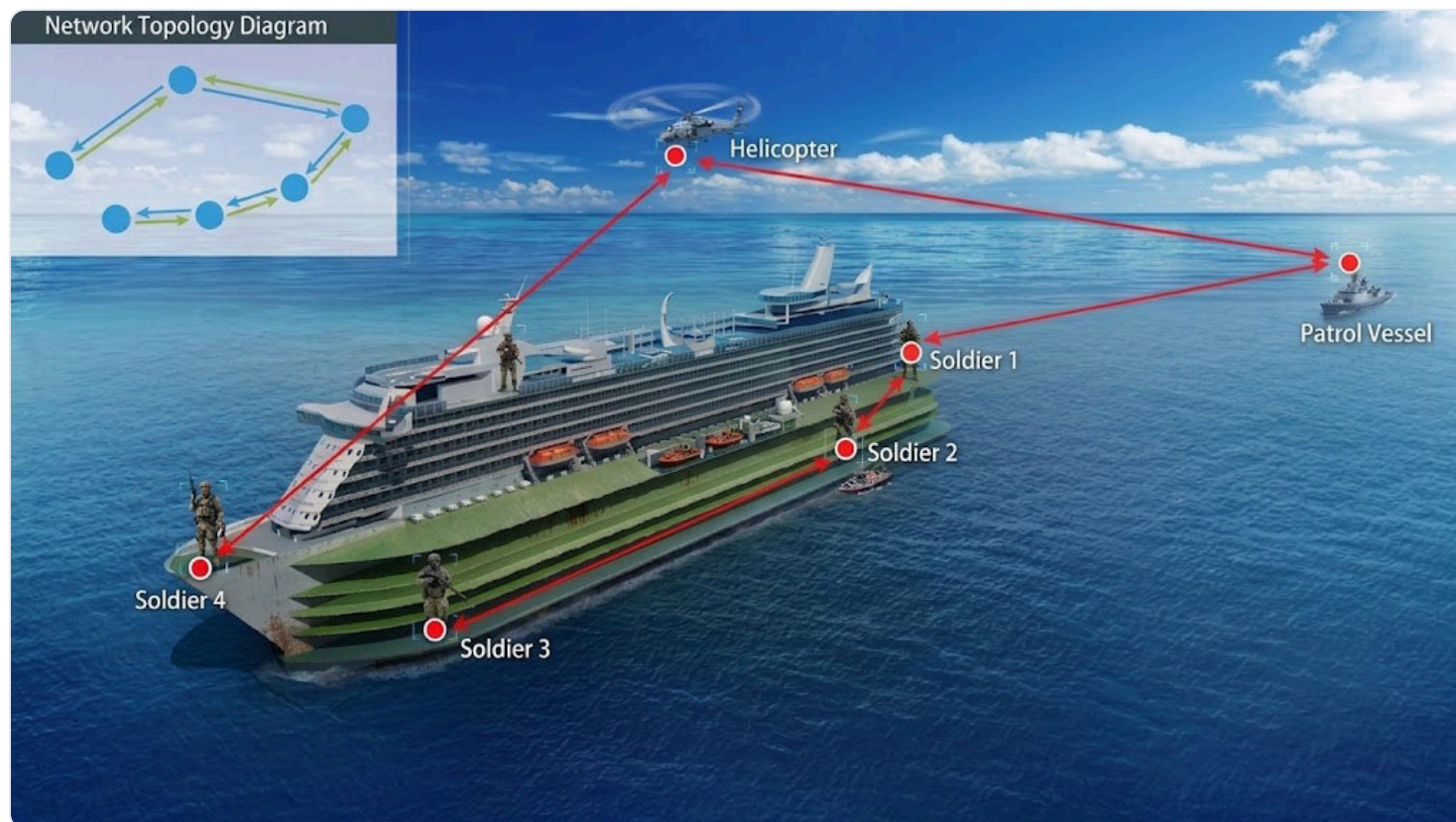
Deployment Solution

- **Direct vehicle-to-vehicle networking:** A MESH Ad-Hoc radio is deployed on each vehicle; MESH Ad-Hoc links form automatically between vehicles without relying on fixed base stations or the public network, completely independent of the public network.
- **Dynamic route convergence:** Under high-speed movement, changing inter-vehicle distances, road masking, and tunnel transit, the network topology reconfigures automatically and routes converge within seconds (route switch time less than 1s), without communication interruption; supports high-speed movement of 1000+km/h.
- **Concurrent multi-service:** Supports concurrent backhaul of onboard HD video, voice intercom (IP voice conference / PTT), vehicle position sharing, and command-instruction issuance; a peak rate of 50+Mbps@20MHz meets broadband service requirements.
- **Relay extension:** When the convoy is large or terrain masking is severe, multi-hop relay extends coverage; video reaches 8+ hops and single-frequency networking supports up to 64 nodes.

Application Value

During convoy movement, HD video, voice intercom, and location information are shared in real time between vehicles, and the command vehicle can grasp the full fleet situation for integrated formation command and coordinated dispatch. In counter-terrorism/stability maintenance, armed escort, and military material transport missions, it provides a public-network-independent, secure communications channel for the fleet, significantly improving fleet mobile command capability and mission security.

3. Vessel-boarding Reconnaissance MESH Ad-Hoc Wireless Communications



Application Scenario

Maritime boarding inspection, surveillance and evidence collection, cross-ship coordinated operations, fleet formation communications, maritime law-enforcement boarding, coast guard patrols, and naval tactical coordination. The maritime environment presents unique challenges including wave-induced motion, severe multipath interference, and constantly changing relative positions between vessels, which conventional communications cannot reliably overcome.

Deployment Solution

- **Vessel-to-vessel coordinated networking:** MESH radios are deployed on each vessel; broadband MESH Ad-Hoc links form automatically between vessels to support fleet coordinated operations and integrated communications.
- **Boarding-team extension:** The boarding-inspection team is equipped with portable MESH devices, maintaining real-time communication with the mother vessel's radio and backhauling on-site boarding HD video and voice to the mother vessel's command center in real time.
- **Multipath-interference resilience:** COFDM modulation effectively suppresses maritime multipath reflections, maintaining link stability under wave-induced motion and vessel sway in high-dynamic environments.
- **Fast route convergence:** The device supports fast route convergence in high-dynamic environments and 1000+km/h high-speed movement; the network topology auto-adjusts as vessel relative positions change, without communication interruption.

Application Value

During boarding inspections, surveillance/evidence collection, and cross-ship coordination, stable maritime broadband Ad-Hoc links are established between vessels and between vessels and boarding teams, backhauling on-site HD video and voice in real time and providing reliable communications support for maritime law enforcement, search and rescue, and tactical coordination. Commanders can grasp the boarding-site situation in real time and make remote decisions, significantly improving maritime enforcement safety and tactical coordination efficiency.

4. Public Security Surveillance & Armed Patrol MESH Ad-Hoc Wireless Communications



Application Scenario

Major event security (conferences, competitions, performances), temporary surveillance and interception, armed patrols, counter-terrorism and emergency response, mass-incident disposal, VIP protection, checkpoint enforcement, and special-duty missions. Such public-safety scenarios impose extremely high requirements on rapid deployment, temporary private networks, multi-channel video backhaul, and resilience against public-network congestion.

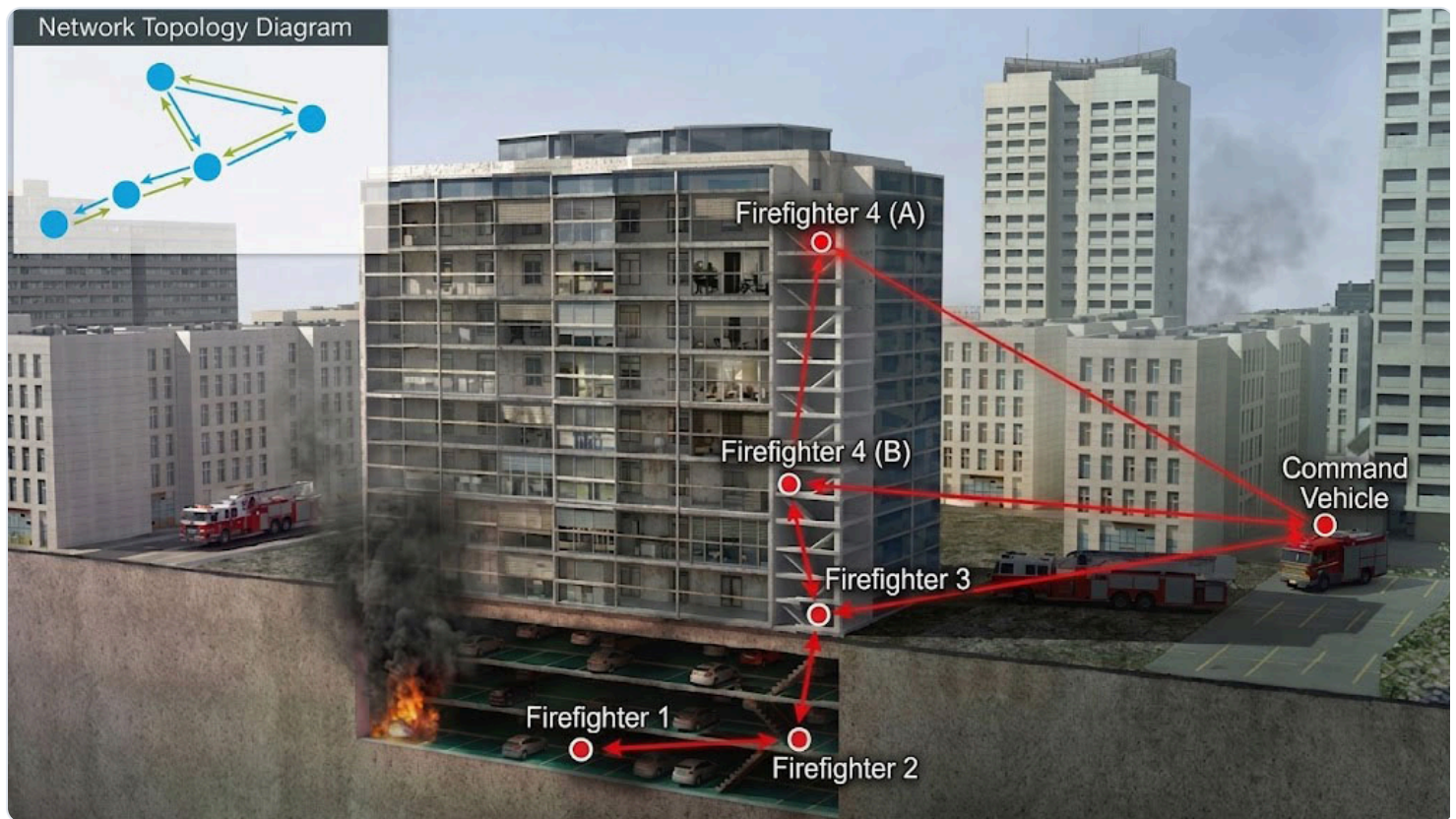
Deployment Solution

- **Rapid temporary private-network setup:** The YNW-7502A-MH handheld radio can build wireless IP Mesh networks temporarily, dynamically, and rapidly, establishing a dedicated broadband communications network at the task site with no configuration, completely independent of the public network.
- **Multi-terminal integrated access:** Single-soldier law-enforcement cameras, vehicle terminals, temporary surveillance domes, and UAV aerial relays converge through the MESH Ad-Hoc network; IP terminals such as mobile phones, tablets, and PCs can access via Ethernet ports or WiFi AP, with multiple video streams backhauled to the command center in real time.
- **Centerless architecture:** The centerless Ad-Hoc architecture does not rely on public-network base stations; the failure of individual terminals does not affect normal network operation, maintaining communications even under network congestion or public-network outage (e.g., congestion caused by large crowds at major events).
- **Intelligent anti-interference:** Adaptive frequency selection supports up to 16 candidate frequencies, automatically switching to un-interfered frequencies to ensure transmission reliability.
- **Secure encryption:** Supports DES/AES128/AES256 channel encryption to ensure the security of public-security private-network information transmission.

Application Value

In major-event security, temporary surveillance, and armed patrol scenarios, it provides real-time on-site situational awareness for public-security command decisions, with stable backhaul of multi-channel HD video, voice intercom, and data. The centerless architecture ensures uninterrupted communications under extreme conditions such as public-network outage or congestion, providing reliable communications support for counter-terrorism/emergency response and enhancing rapid response and coordinated operations.

5. Firefighting & Rescue MESH Ad-Hoc Wireless Communications



Application Scenario

Fire suppression (building, forest, and chemical fires), earthquake rescue, accident emergency response, hazardous-material leakage incidents, traffic-accident rescue, and building-collapse rescue. On-site public networks are often interrupted or severely congested during disasters, necessitating dedicated communications for rescue command.

Deployment Solution

- **Rapid on-site deployment:** Being compact and lightweight, the YNW-7502A-MH can be carried by hand into the disaster site, rapidly building a dedicated broadband Ad-Hoc network among firefighters, command vehicles, and temporary command points without any infrastructure.
- **Single-soldier-vehicle-command three-tier networking:** Firefighters carrying portable MESH devices enter the fire scene; via vehicle/backpack radio relay, interior HD video is backhauled to the on-site command vehicle and rear command center in real time, achieving "soldier-vehicle-command" three-tier networking.
- **Concurrent multi-stream video:** Supports concurrent backhaul of multiple HD video streams (video up to 8+ hops); the command center can simultaneously view live pictures of multiple fire points and rescue teams to fully grasp the on-site situation.
- **Self-healing / damage resilience:** When a node device is damaged or moves, the network automatically reconfigures, and remaining nodes re-establish routing without communication interruption, sustaining rescue continuity.

Application Value

Enables the rear command center to grasp the full on-site picture, scientifically dispatch rescue forces, and improve rescue efficiency and safety. Firefighters can receive command instructions in real time, backhaul on-site video, and hold voice intercom with the command center, avoiding blind operations and maximizing firefighter safety and rescue outcomes. Provides reliable communications support within the "golden 72-hour rescue window," buying critical time for life-saving operations.

6. Natural-disaster Emergency Command MESH Ad-Hoc Wireless Communications



Application Scenario

Emergency command communications for sudden natural disasters — earthquakes (especially magnitude 7+), floods (peak-flow transit, dam breaches, urban waterlogging), debris flows, landslides, typhoons, snowstorms, and freezing rain. Such disasters commonly destroy extensive communications infrastructure and fully disrupt public networks, leaving emergency command in an "information island" dilemma.

Deployment Solution

- **Rapid disaster-area setup:** Rescue teams carry YNW-7502A-MH portable devices into affected areas, rapidly erecting temporary communications nodes and using multi-hop relays for wide-area coverage that overcomes terrain blocking.
- **Air-ground integrated networking:** Combined with UAV aerial relay platforms, an "air-ground" three-dimensional Ad-Hoc network overcomes complex terrain such as mountains and ruins for whole-disaster-area coverage.
- **Multi-hop relay wide coverage:** Supports 8+ hop video multi-hop relay; single-hop line-of-sight of 30+km; multi-hop cascading achieves wide-area coverage of tens of kilometers to meet large-area disaster communications needs.
- **Self-healing / damage resilience:** Self-healing ensures automatic network reconfiguration as nodes move, equipment is damaged, or new nodes join, with no manual intervention, providing sustained and reliable communications support for emergency command.
- **Multi-service convergence:** Supports converged transmission of disaster-area video backhaul, disaster-data reporting, rescue-team position sharing, command-instruction issuance, and victim-assistance information collection.

- **Front-rear linkage:** The on-site disaster command post links to the rear provincial/national emergency command center via satellite, achieving real-time front-rear coordinated command.

Application Value

Provides stable, reliable communications support for emergency command and dispatch during sudden natural disasters, backhauling on-site video, disaster data, and rescue-team positions to front-line and rear commands in real time. The command center fully grasps the disaster situation, scientifically dispatches rescue forces, optimizes rescue routes, and improves rescue efficiency. Provides communications support for life-saving within the "golden 72-hour rescue window," minimizing casualties and property loss.

7. Forest Fire Prevention MESH Ad-Hoc Wireless Communications



Application Scenario

Forest fire monitoring, forest-area patrol communications, watchtower interconnection, fire frontline command, fire-scene situational backhaul, forest-area wildlife protection, and forest-area public-order control. China's extensive forest resources are mostly in mountainous and remote areas with weak public coverage, so forest-fire communications have long faced high-cost coverage and networking challenges.

Deployment Solution

- **Multi-point forest-area deployment:** YNW-7502A-MH devices can be deployed at multiple key points such as forest-area watchtowers, fire-prevention checkpoints, and management stations to build a broadband Ad-Hoc private network covering vast forest areas.
- **Multi-hop relay overcoming terrain:** Portable radios combined with backpack/vehicle radios use multi-hop relays to overcome forest-line-of-sight blocking and terrain undulation for wide-area coverage in hills, mountains, and canyons, with single-hop line-of-sight above 30km and strong multipath-interference resistance and diffraction capability.
- **Watchtower-UAV-single-soldier coordination:** Fixed watchtower monitoring, patrol UAV aerial inspection, and firefighting single soldiers deep in the fire scene form a three-position coordinated network, backhauling video and alarm information to the fire-prevention command center in real time.
- **Portable mobile deployment:** The handheld radio is easy for a single soldier to carry, allowing firefighting teams to enter the interior of forest areas, connect to the network nearby, and backhaul fire-scene situational data, reducing the number of relay nodes and lowering deployment cost.

- **Automatic fire alarm:** Interfaces with smoke detectors and infrared thermal-imaging fire-monitoring devices; automatic fire alarms are backhauled to the command center over the MESH network for early detection, early reporting, and early response.

Application Value

Builds a broadband Ad-Hoc private network covering vast forest areas, backhauling video and alarm information from watchtowers, patrol UAVs, and fire frontlines to the command center in real time for early detection, reporting, and response. During an active fire, it provides reliable communications support for frontline command, improving coordinated suppression efficiency and firefighter safety assurance, and providing solid communications support for forest-resource protection and ecological security.

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