

PRODUCT SPECIFICATION

YNW-6502SW

Broadband Wireless MESH Outdoor Base Station

Shenzhen Yuneng Micro Technology Co., Ltd.

www.zukaka.com

2024.5 (V1.0)

Model YNW-6502SW

Outdoor Base Station

Product Name Broadband Wireless MESH Outdoor Base Station (Ad-Hoc Network Product)

Series YNW-6500 Series MESH Ad-Hoc Network Equipment

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

1. Product Overview

Product Positioning: The YNW-6502SW is a compact, high-throughput outdoor wireless broadband MESH Ad-Hoc network device developed on COFDM technology and MESH multi-hop Ad-Hoc networking. It achieves free-form networking among different device form factors, providing users with fast, flexible solutions for rapidly building reliable wireless links in complex environments.

The YNW-6502SW broadband wireless MESH outdoor base station Ad-Hoc network product is a newly launched compact, high-throughput outdoor wireless broadband MESH device from our company. Developed on COFDM technology and MESH multi-hop Ad-Hoc networking, it achieves free-form networking among different device form factors, enabling users to rapidly build reliable wireless links in complex environments and providing fast, flexible solutions for various application requirements (e.g., HD video, voice intercom, and IP data transmission).

As a broadband Ad-Hoc radio that forms a centerless, Ad-Hoc, self-adaptive, self-healing Mesh network, the YNW-6502SW is the optimal choice for point-to-point, point-to-multipoint, or multipoint-to-multipoint integrated-services communications. The Mesh radio delivers dynamic routing, multi-hop relay of HD video, multi-channel data, and high-fidelity voice between different nodes within the same network under complex conditions such as fast movement, non-line-of-sight (NLOS) obstruction, and environmental interference.

- **Core Selling Points:** Multi-carrier COFDM technology with a peak throughput of 70Mbps; multi-hop Ad-Hoc networking supporting seamless 32-node coverage
- **Target Users:** System integrators and engineering contractors in military communications, public safety, emergency communications, and industry information private networks
- **Applicable Scenarios:** Counter-terrorism and emergency response, public-security law enforcement, security operations, rescue and disaster relief, firefighting command, forest fire prevention, power-line patrol, UAV swarms, fleet interoperability, vessel formations, and maritime communications

Design Highlights: All-IP design with flexible installation, simple operation and maintenance; offers multiple frequency-band customization and extensible functions such as WiFi, GPS, and 3G/4G to support integrated communications requirements.

2. Product Views



YNW-6502SW Front View



YNW-6502SW Side View



YNW-6502SW Detail View

3. Key Features



Multi-carrier COFDM Technology

Point-to-point throughput peak of up to 70Mbps; point-to-point transmission distance of more than 10km (line of sight)



Multi-hop Ad-Hoc (MESH)

Automatic networking and automatic computation of intra-network routes without manual intervention; supports 32-node Ad-Hoc networking with automatic multi-hop transmission for seamless area coverage



Portability and Ease of Use

Ready to use upon power-on, no configuration; supports configuration via mobile phone, Web, etc., and can be managed remotely



Customization Features

Transmit power 0.1-2W adjustable; operating frequency band 200MHz-2.4GHz customizable; signal bandwidth 5/10/20MHz adjustable



HD Video & Voice

Supports IP video input with H.265/H.264 video compression; customizable HDMI/AV/VGA/SDI input; supports voice intercom



High-protection Outdoor Design

IP65 protection rating, operating temperature -20°C ~ 55°C, suitable for a wide range of harsh outdoor environments

4. Technical Specifications

4.1 Wireless Characteristics

Category	Parameter	Specification	Custom Option
Wireless Characteristics	Frequency Range	1437 ± 15MHz	200MHz ~ 1.5GHz customizable
	Bandwidth	5 / 10 / 20MHz adjustable	—
	Modulation	COFDM	—
	Constellation Modulation	BPSK / QPSK / 16QAM / 64QAM (adaptive)	Fixed data rate customizable
	Data Rate	Peak 70Mbps @ 20MHz	—
	Digital Sensitivity	-92dBm @ 5MHz	—
	Transmission Distance	> 10km (line of sight)	—
	Transmit Power	20~30dBm per channel (adjustable)	Power customizable

4.2 Networking Functions

Category	Parameter	Specification	Custom Option
Networking Functions	Networking Capability	Supports 16 nodes	Up to 32 nodes customizable
	Networking Hops	>8	—
	Network Topology	Centerless network, star network, chain network, mesh network, etc.	—
	Network Transparent Relay	Supports network transparent relay function	—

4.3 System Functions

Category	Parameter	Specification	Custom Option
System Functions	Peripheral Interfaces	Network port, headset	—
	Video Input	Supports IP video input	HDMI / AV / VGA / SDI input customizable
	Video Compression	H.265 / H.264	Customizable
	Control Functions	Supports network management system platform	—
	System Upgrade	Supports one-key upgrade and remote upgrade	—
	Other Functions	GPS / BeiDou, WiFi	—

4.4 Physical Characteristics

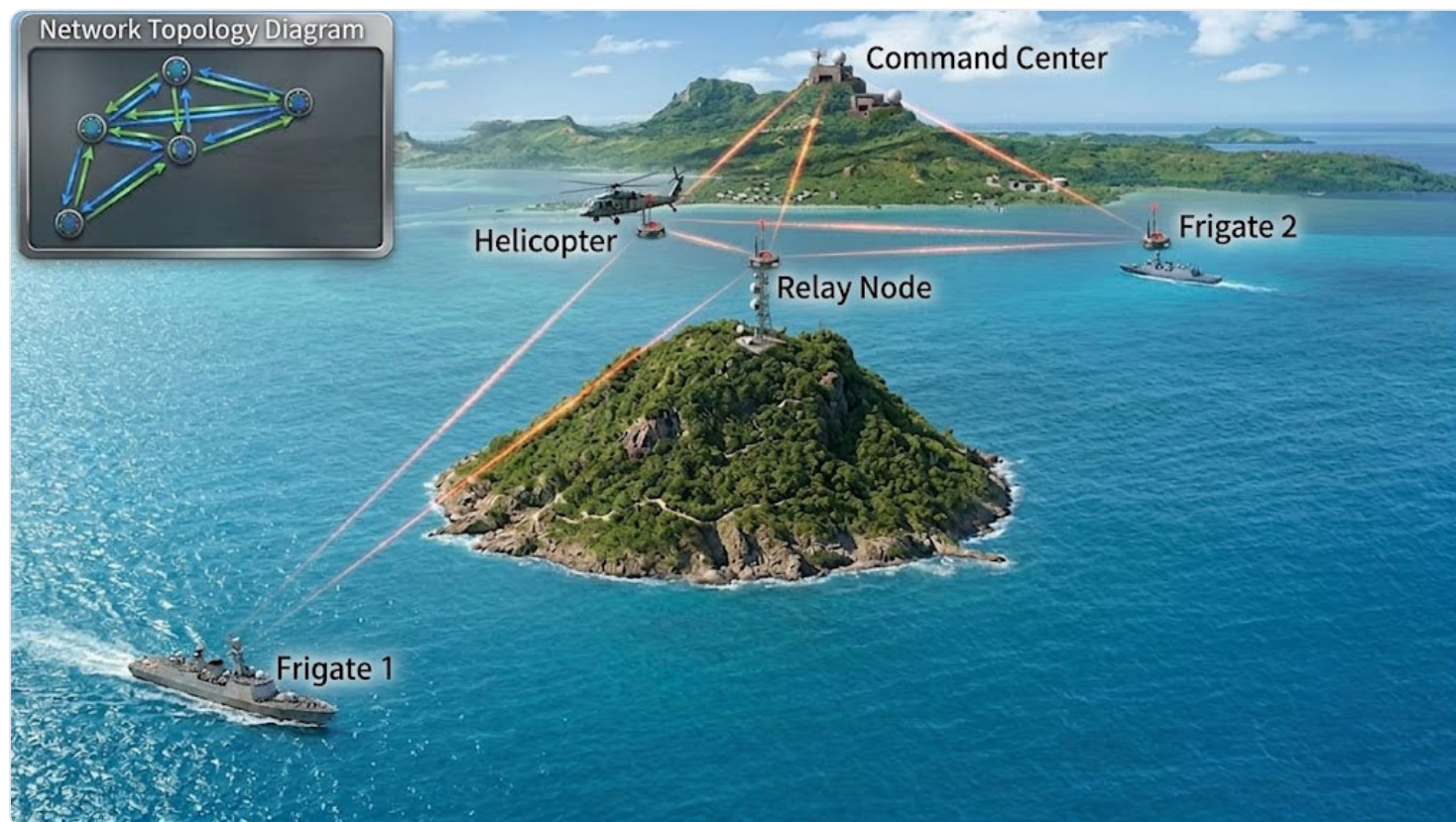
Category	Parameter	Specification	Custom Option
Physical Characteristics	Power Consumption	≤ 7W	—
	Power Supply	DC 14.6-14.8V or AC 220V	—
	Operating Temperature	-20°C ~ 55°C	—
	Operating Humidity	10% ~ 90%	—
	Protection Rating	IP65	—
	Dimensions	320 × 225 × 132mm	—
	Total Weight	< 8kg	—

Customization Note: This product supports a variety of customization requirements including frequency band, power, number of nodes, and video input interface. For details, please contact Shenzhen Yuneng Micro Technology Co., Ltd.

5. Applications

With its MESH Ad-Hoc technology, this 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:** YNW-6502SW base stations are cascaded at approximately 10km intervals along the border or coastline; a single hop achieves line-of-sight transmission of over 10km, 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 manned deployment form a freely Ad-Hoc multi-form-factor network for integrated "shore-sea-air" coverage.
- **IP65 protection:** The device meets the requirements of long-term operation in harsh outdoor environments, with an operating temperature of $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$, adapting to the salt-spray, high-humidity, and strong wind-sand conditions particular to border and coastal defense areas.

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.

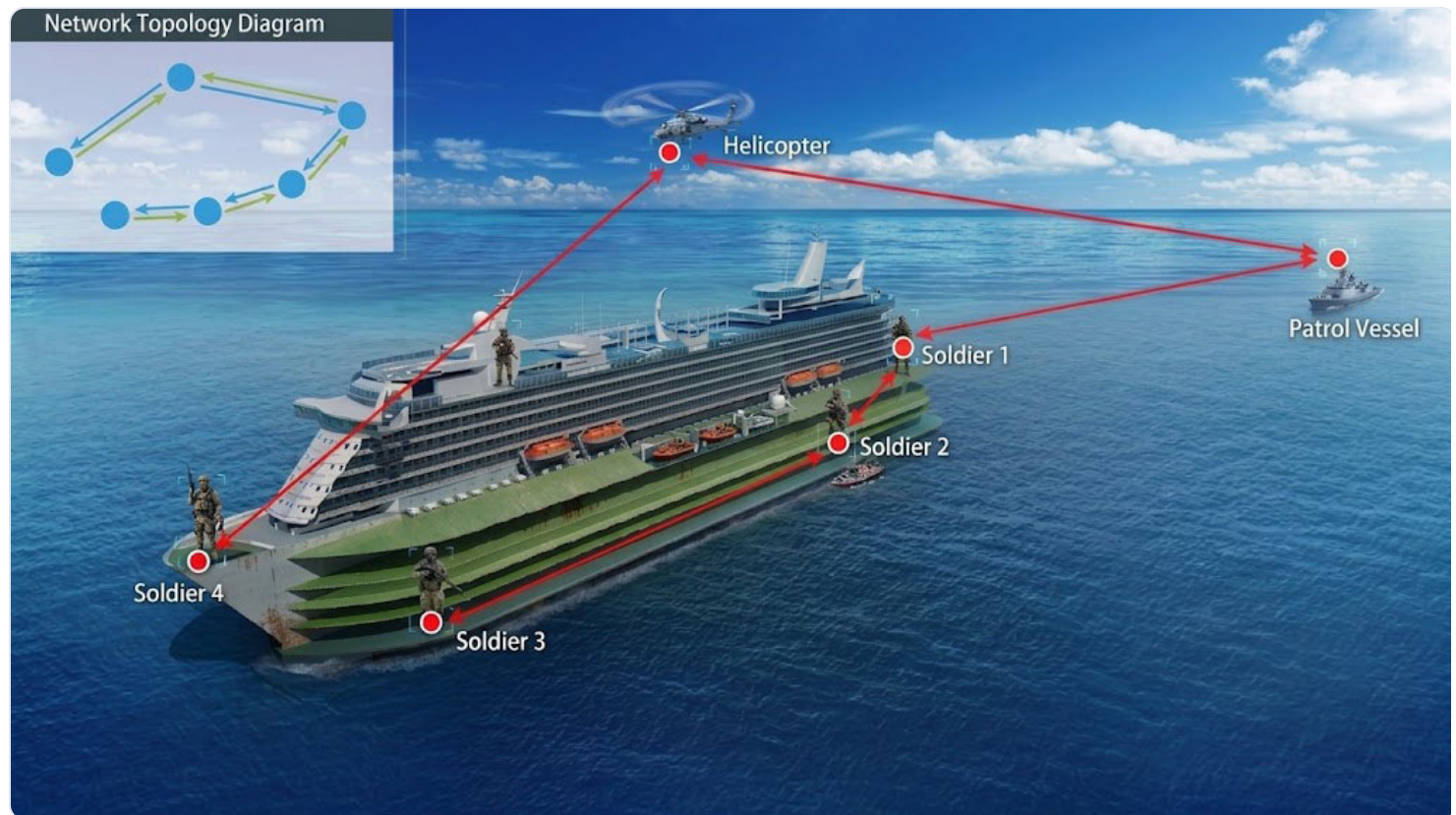
Deployment Solution

- **Direct vehicle-to-vehicle networking:** A YNW-6502SW vehicle-mounted base station 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, without communication interruption.
- **Concurrent multi-service:** Supports concurrent backhaul of onboard HD video, voice intercom, vehicle position sharing, and command-instruction issuance; a peak throughput of 70Mbps meets broadband service requirements.
- **Relay extension:** When the convoy is large or terrain masking is severe, multi-hop relay extends coverage, supporting 16-node (up to 32-node customizable) Ad-Hoc networking.

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

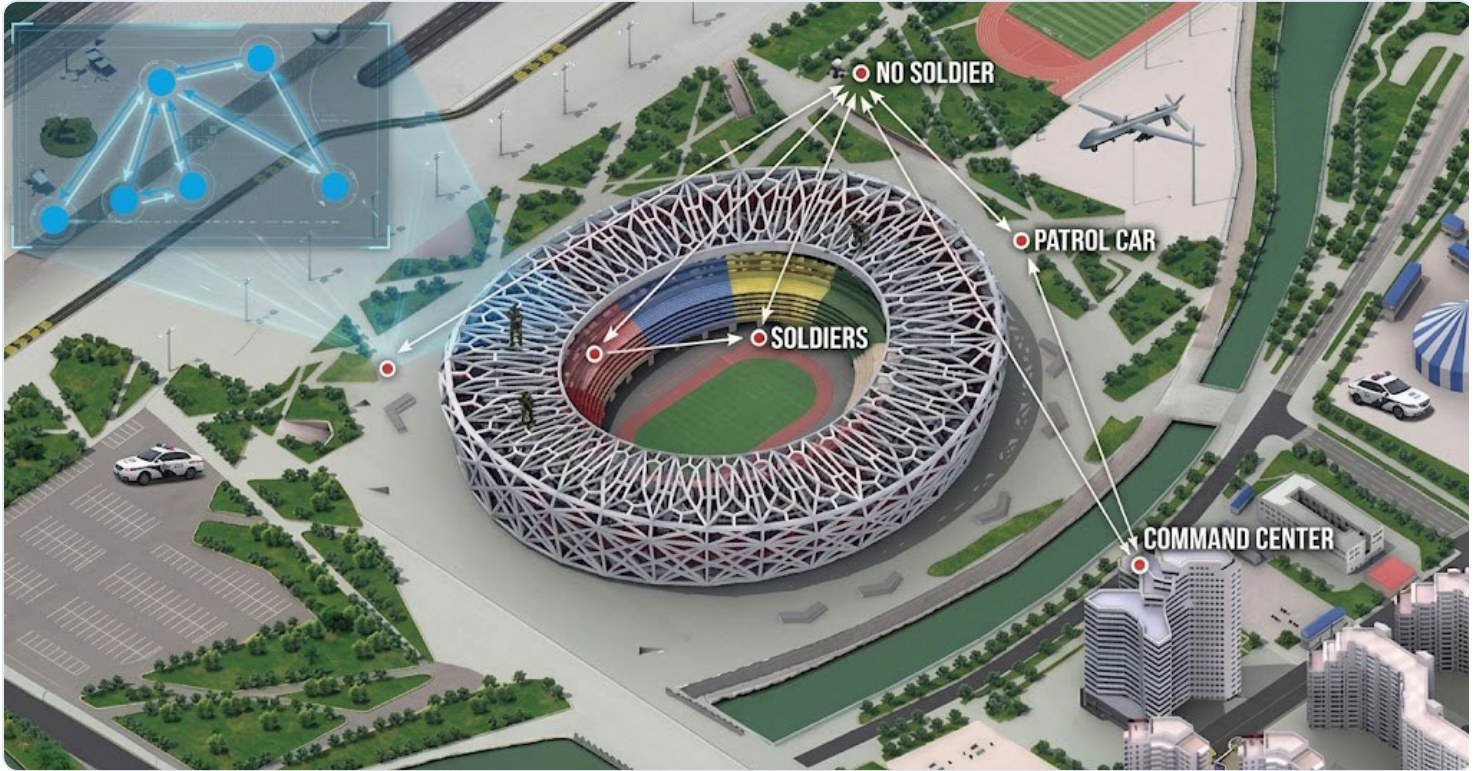
- **Vessel-to-vessel coordinated networking:** A YNW-6502SW base station is deployed on each vessel; broadband MESH Ad-Hoc links form automatically between vessels to support fleet coordinated operations and integrated communications.
- **Boarding-team extension:** The boarding-inspection team is equipped with portable MESH devices, maintaining real-time communication with the mother vessel's base station 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; 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.

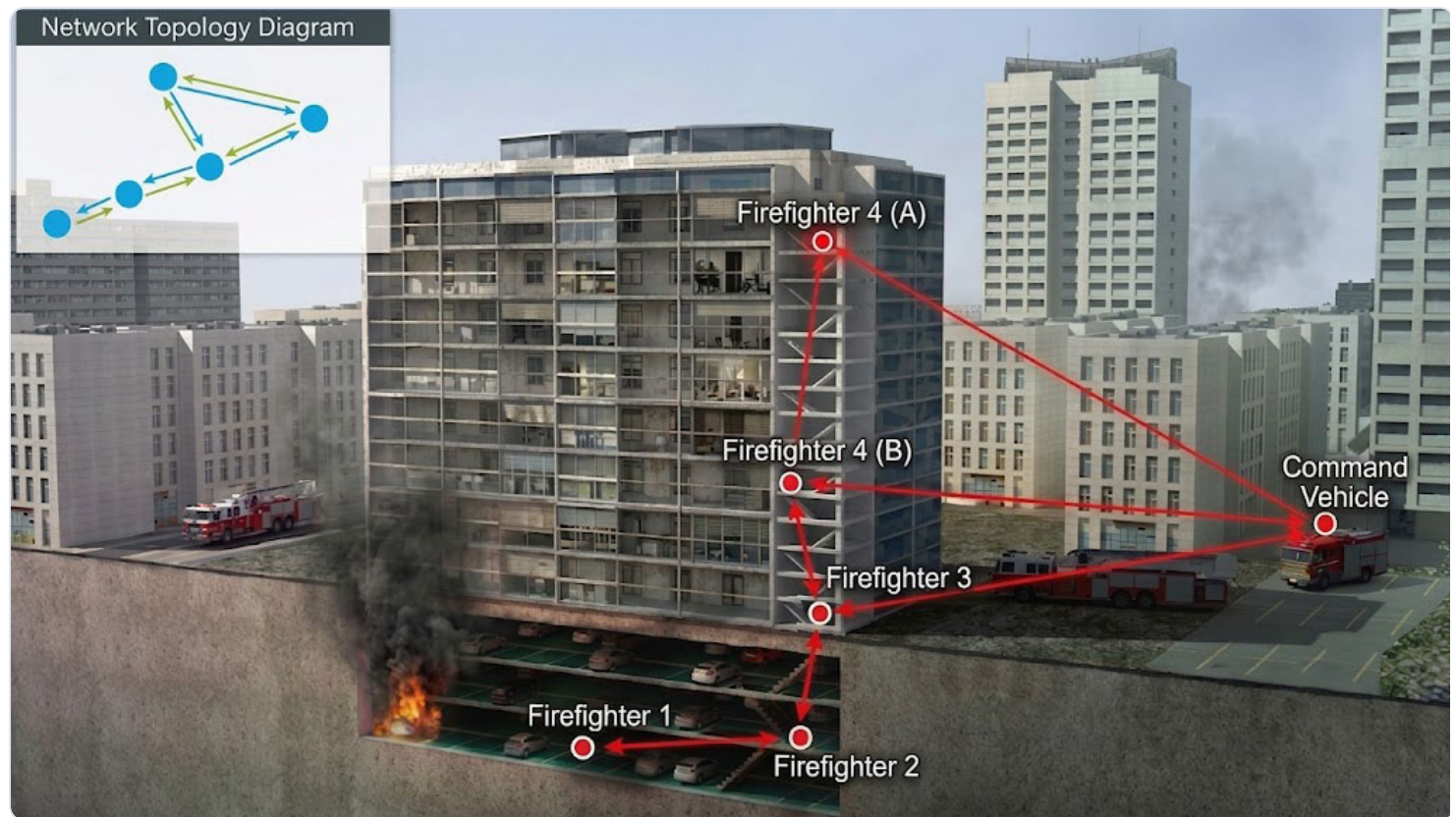
Deployment Solution

- **Rapid temporary private-network setup:** The YNW-6502SW is ready to use upon power-on with no configuration, building a dedicated broadband communications network at the task site within 5 minutes, 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, 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, maintaining communications even under network congestion or public-network outage (e.g., congestion caused by large crowds at major events).
- **Remote management:** Supports mobile APP and Web network-management-platform remote configuration; the command center can manage all node devices remotely and monitor network status in real time.
- **Network transparent relay:** Supports network transparent relay to interconnect with existing public-security command-and-dispatch systems and video surveillance platforms for seamless integration.

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:** The YNW-6502SW can be quickly erected at the disaster site, building a dedicated broadband Ad-Hoc network among firefighters, command vehicles, and temporary command points within 5 minutes, without any infrastructure.
- **Single-soldier-vehicle-command three-tier networking:** Firefighters wearing portable MESH devices enter the fire scene; via vehicle-mounted base-station 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; 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.
- **IP65 protection:** The device meets the requirements of harsh fire-scene conditions such as high temperature, heavy smoke, and water spray, ensuring stable operation during rescue.

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-6502SW 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 multi-hop relay of more than 8 hops, each exceeding 10km; 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-6502SW 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:** Multi-hop relays overcome forest-line-of-sight blocking and terrain undulation for wide-area coverage in hills, mountains, and canyons, with each hop exceeding 10km line-of-sight.
- **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.
- **IP65 outdoor protection:** The device meets the requirements of long-term outdoor operation in forest areas, with an operating temperature of $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$, adapting to the high-humidity, low-temperature, and thunderstorm conditions of forest areas without additional protective facilities.
- **Solar-power supply adaptation:** The low-power design adapts to solar power systems, solving the power-supply problem in forest areas without grid power and enabling unattended long-term operation.

- **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 an integrated broadband Ad-Hoc private network across 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.