Innovative Narrowband & Broadband Convergent Communication Solution
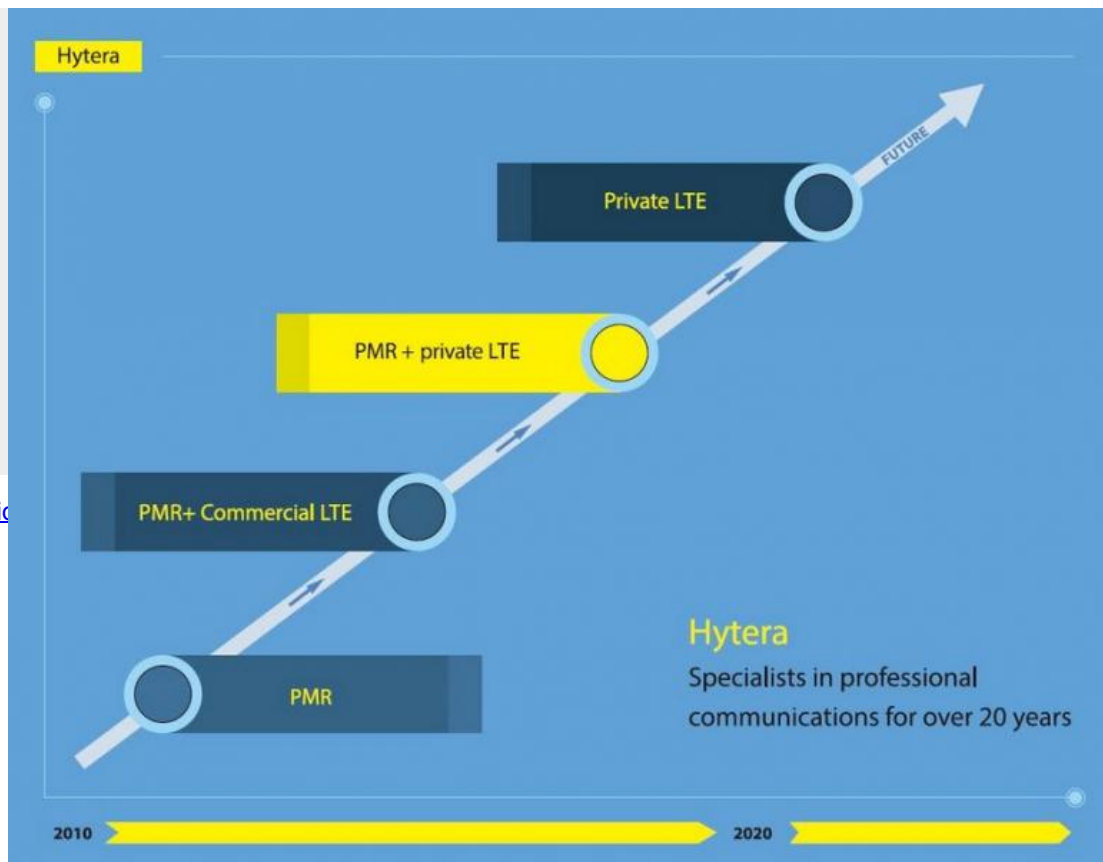
Narrowband & Broadband Evolution Trend

Widely used in public safety and utilities industries, narrowband network communications devices are necessary for emergency communication. In addition to voice scheduling, users require additional services such as video surveillance, remote data collection, and multimedia broadcast. In other words, users want to not only hear each other but also see each other clearly.

With development of commercial LTE technology, its most significant attributes such as low latency and high bandwidth have brought great changes to the way we communicate. LTE technology has now been brought into the field of private communications. Its capability of transferring large volumes of big data and videos helps us to see the world more clearly.

3GPP approved the standard for mission-critical PTT (MCPTT) over LTE in Release 13. Considering issues such as the customers' actual demands, progress in standardization, and frequency approval, however, it is a natural choice for now and for the foreseeable future to carry the mission-critical voice service on the narrowband private network and carry the large volume of data, and non-mission-critical voice service on the LTE network. A platform integrating the narrowband private network, commercial LTE network and private LTE network is the best solution for today's market.

Evolution Trend

- ☑ Narrowband terminal → Narrow-broadband integrated smart terminal
- ☑ Narrowband system → Narrow-broadband integrated multimedia system
- ☑ Voice service → Multimedia service
- ☑ Smooth upgrade and evolution to protect your existing investments

Relying on the integration of the narrowband and broadband network, the Hytera convergent solution achieves voice, data, and image transmission through multi-mode smart terminals. This solution helps users facilitate collaboration across public and private networks. Accordingly, users can enjoy instant dispatching and a seamless connection in mission-critical communication.
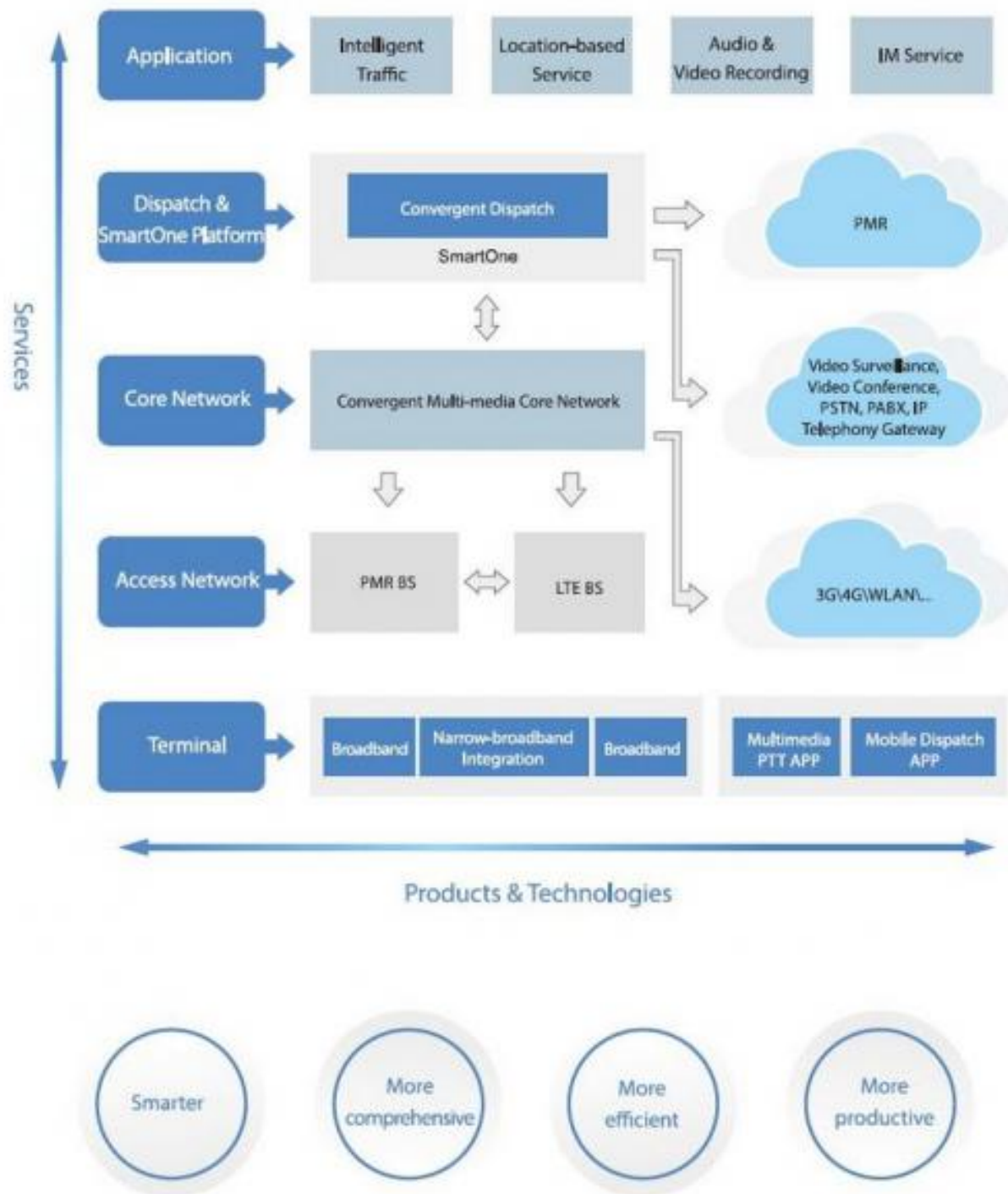
Public Safety Solution

Challenges

Although the PMR system has been widely deployed in public safety, the police mobile system still faces the following challenges.

☑ Image transmission from point to point only

☑ Low-speed data and image transmission in narrowband system

With the introduction of wireless broadband, new technologies such as video analysis, image recognition, and big data, can be more easily integrated into the command and control system, facilitating proactive monitoring and a rapid response.

Hytera Solution

Combining the private LTE and commercial LTE network, Hytera can solve the problems in public safety though the following ways:

- ☑ Emergency voice transmission over narrowband network
- ☑ Big data, video, and image transmission over commercial LTE or private LTE
- ☑ Small data transmission over public LTE and private LTE
- ☑ Non-emergency voice transmission over commercial LTE, private LTE, and PMR network
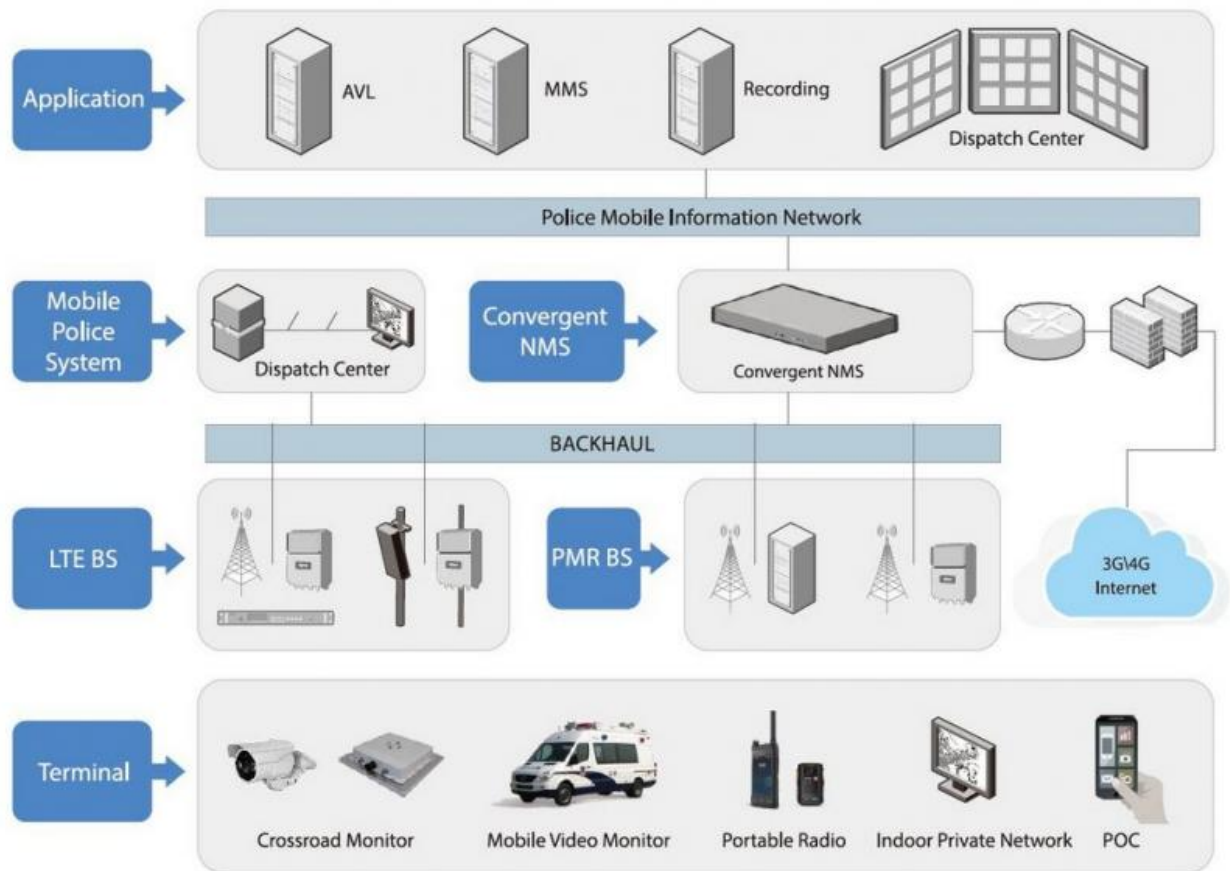
Following the concept of convergence, the Hytera solution in public safety realizes the integration of narrowband and broadband to achieve various services.

Service → Four in one, one ID per police, one ID per group, smooth migration

Management → All narrowband and broadband terminals, unified account, unified management. One-key upgrading

Platform → eTC, Convergent NMS, convergent BS

Fast Deployment Solution

Challenges

The existing communication system may fail to work in the following special scenarios: public safety events, mobile security, disaster rescue, and field operations. In this case, an emergency communication system needs to be rapidly deployed in the field. Responding personnel and the dispatch center can use the system to transmit voice, data, and videos for multimedia command and scheduling.

Field operations

Disaster rescue

Public safety

Easy to obtain
The devices can be quickly transported to the scene.
Easy to deploy
The system is simple to deploy and activate.
Visual scheduling
The system provides multimedia scheduling.
Professional protection
The system can operate in harsh environments.
Easy to use
Users can directly use the system without the need for configuration.
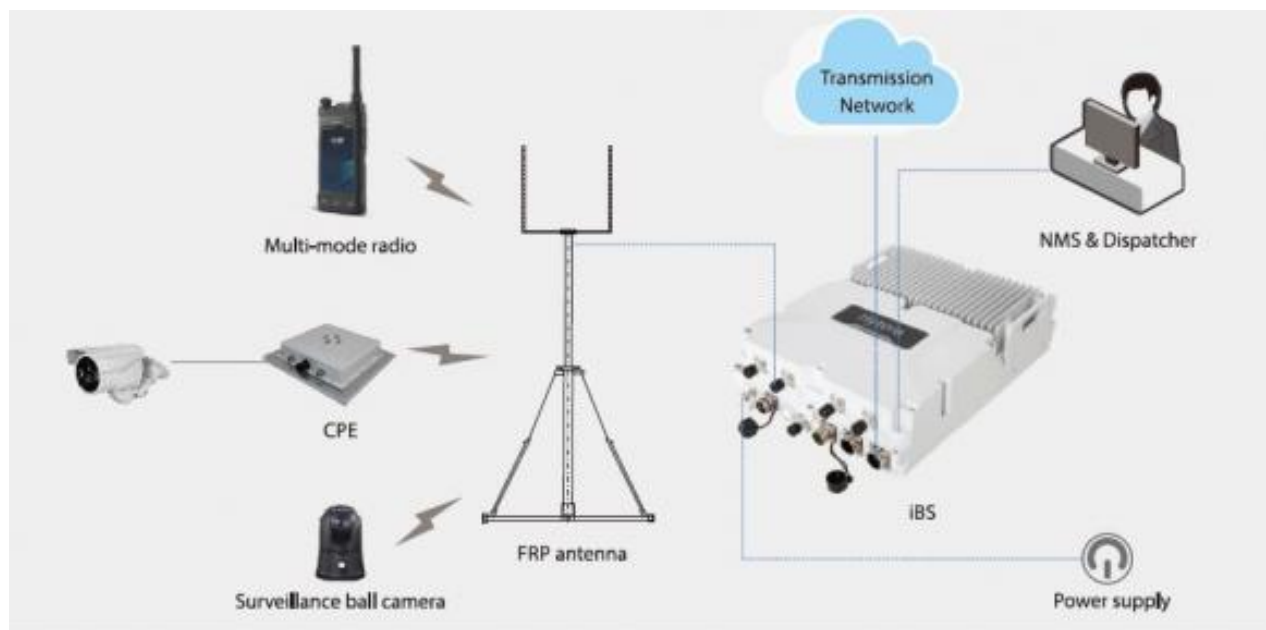
Mobile security

Hytera Fast Deployment Solution

Hytera provides a solution based on an integrated base station (IBS) to meet fast deployment requirements in various scenarios:

- ☑ Integrates the BBU, RRU, and core network
- ☑ Provides IP65 protection for harsh environments
- ☑ Provides diverse terminal schemes and integrates the video surveillance scheme for outdoor operations
- ☑ Supports different mounting options: vehicle, outdoor, and emergency communication case

Multi-mode radio

CPE

Surveillance ball camera

FRP antenna

Transmission Network

NMS & Dispatcher

iBS

Power supply

Vehicle Mounting

Mounted on the top
or inside

Emergency Communication Case

Integrates the power supply
Available in outdoor areas
Available in vehicles

Outdoor Mounting

Mounted on walls, poles
and towers

Multimedia PoC Solution

Challenges

The traditional private network, which mainly provides audio command and dispatch, fails to meet requirements for visual and data services in today's command and dispatch scenarios. Therefore, broadband technology has been introduced. However, the area where the private broadband network cannot cover still needs the public network to provide communication services.

☑ Provide Trunking service based on commercial network
☑ Realise inter-connection between narrow and broadband network

Wider Coverage

Providing improved coverage and connectivity

Security

Dedicated channel with digital encryption for commercial use

Richer Feature

Supporting image, text, and video transmission

Intelligence

Extensive functionality to implement compatibility with multiple intelligent terminals

Hytera Solution

Hytera Multimedia PoC Solution has the following highlights:

- ☑ Supporting integration of the private and public networks
- ☑ Flexible deployment. The solution can be deployed as an extensible function of the private network to expand its coverage. Moreover, it can be deployed in standalone mode to offer PoC services on the public network
- ☑ E2E encryption between PoC server and broadband/narrowband terminals on the private network
- ☑ Supporting APIs to meet customers' tailored requirements
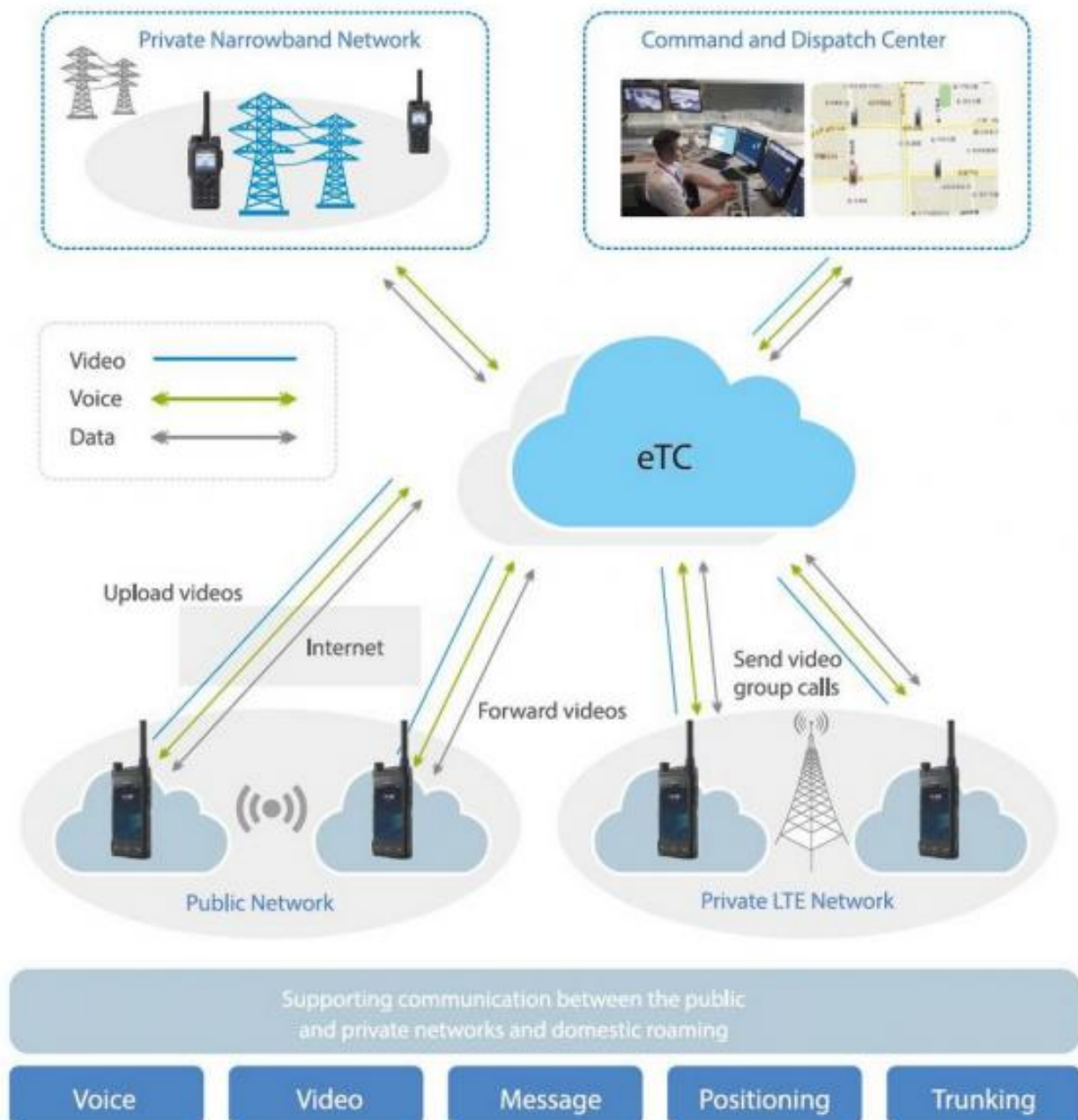
Port Solution
Challenges

With rapid development of global trade and continuous growth of port business, the port information system upgrade is imperative. The port usually covers a large area, involves various services and coexistence of multiple communication networks, and requires highly collaborative work. Today, the port service industry faces the following challenges:

- ✓ Poor coverage for key areas such as gantry crane, container yard etc, due to serious signal blockage and disorder
- ✓ Increasing demand for large bandwidth, which is required for container trunk positioning andTOS data transmission and cannot be provided by the existing narrowband network
- ✓ Poor coverage for offshore tugboat
- ✓ Tide, which makes it inappropriate to lay optical fiber between the control center and the port
- ✓ The worker has to carry two devices, TOS handset and radio, which increases the worker's burden and operation complexit

Hytera Solution

Hytera Innovative Narrowband & Broadband Convergent Communication solution solves these challenges by:

- ☑ Carrying critical voice over the narrowband network, while carrying large volume of data and non-critical voice over the LTE network
- ☑ Flexible deployment solution (Mesh+iBS), which provides additional coverage for areas such as those suffering serious signal blockage or not suitable for optical fiber installation, offshore tugboat etc
- ☑ Multi-mode handset (narrowband + broadband) featuring intelligent network switch and DMO
- ☑ Unified network management and dispatching
- ☑ Supporting secondary development of the dispatching system and radios (TOS + radio, 2-in-I)

Airport Solution

Challenges

With high-speed development of the airport industry, demand for high bandwidth-demanding applications such as video surveillance, video intercom etc is increasing.The need for secure, stable and real-time communications raises the following challenges to the sector:
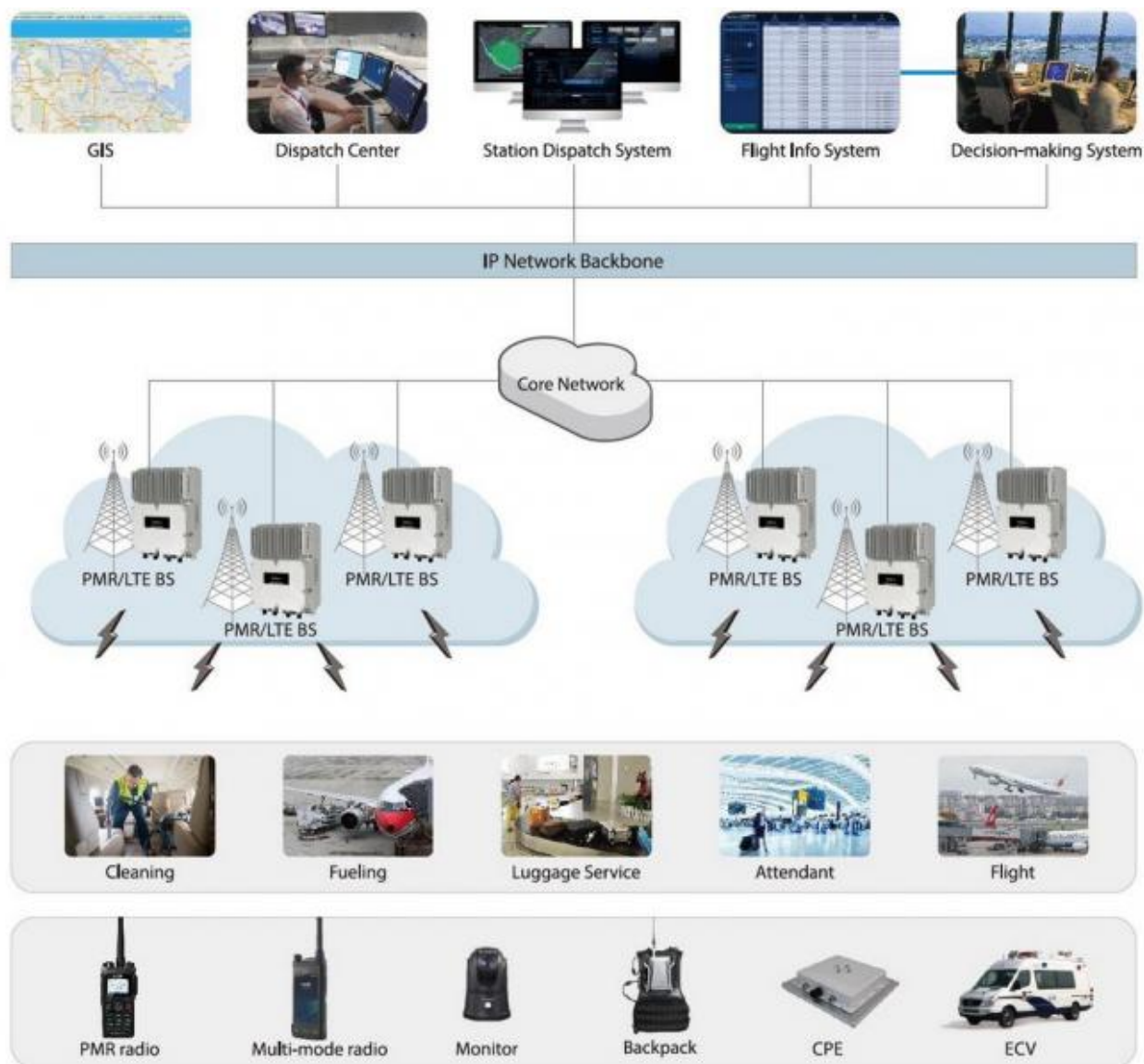
☑ Poor coverage for key areas such as remote bay, baggage sorting area, VIP lounge

☑ Narrowband network is unable to provide sufficient bandwidth for video surveillance, video intercom etc.

☑ Unable to interconnect existing multiple networks such as narrowband network, broadband network, WiFi network etc, and unified dispatching across the flight information system, operation management system, and decision-making system is not available

☑ Hierarchical dispatching is not available
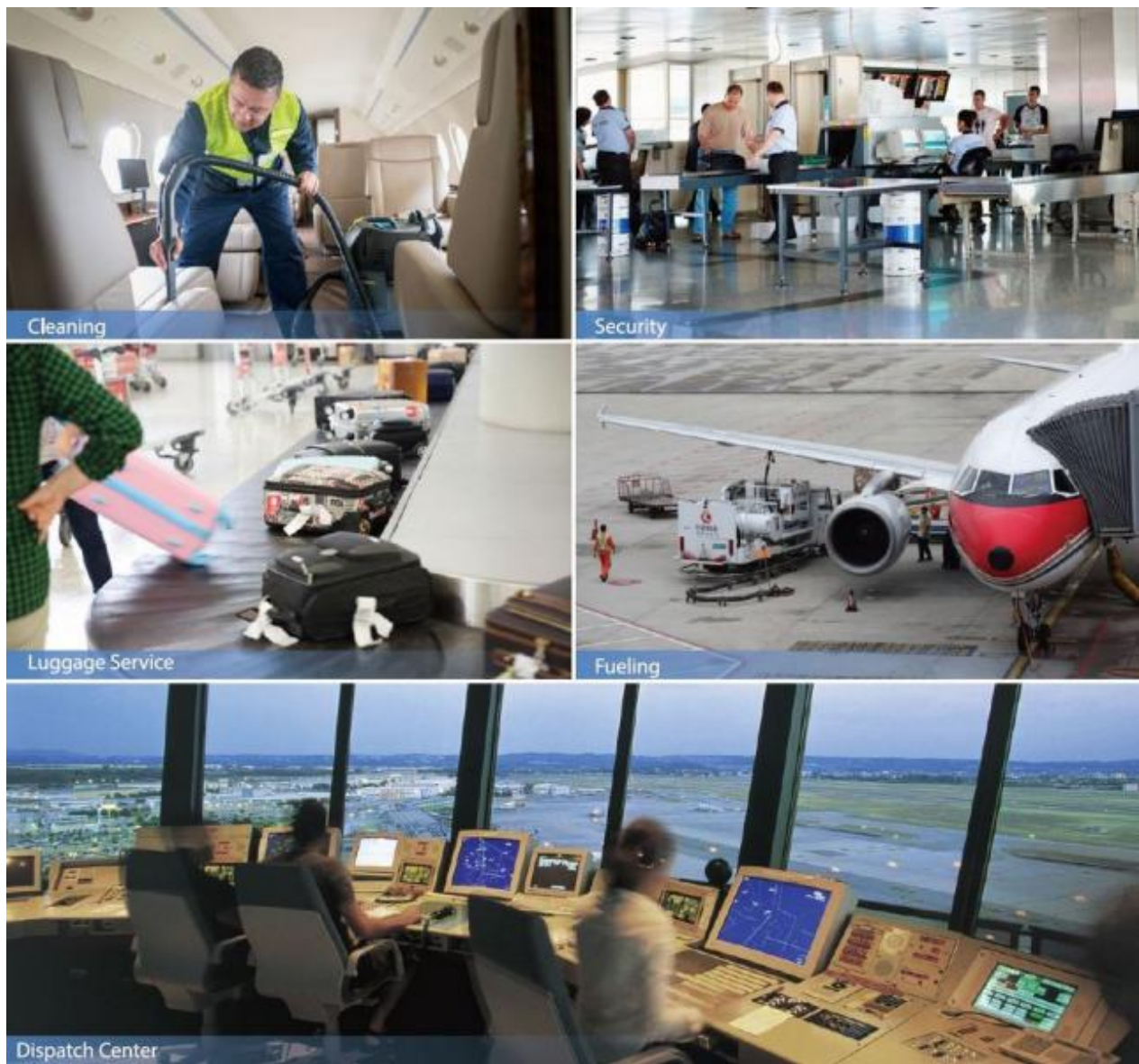
Cleaning

Security

Luggage Service

Fueling

Dispatch Center

Hytera Solution

Hytera Innovative Narrowband & Broadband Convergent Communication solution solves these challenges by:

☑ Carrying critical voice over the narrowband network, while carrying large volume of data and non-critical voice over the broadband network

☑ Flexible deployment solution (Mesh+iBS), which provides additional coverage for the airport

☑ Unified network management and dispatching

☑ Multi-mode handset (narrowband + broadband) featuring intelligent network switch and DMO

☑ Supporting hierarchical dispatching and secondary development of the dispatching system

GIS Dispatch Center Station Dispatch System Flight Info System Decision-making System

IP Network Backbone

Core Network

PMR/LTE BS PMR/LTE BS PMR/LTE BS PMR/LTE BS PMR/LTE BS PMR/LTE BS

Cleaning Fueling Luggage Service Attendant Flight

PMR radio Multi-mode radio Monitor Backpack CPE ECV

BBU - Base Band Unit

Multi-standard support
High performance
High reliability
Flexible deployment

Highlights

☑ Support LTE / PMR, realizing smooth transition from narrowband to wideband

☑ Provide 150 Mbps downlink and 75 Mbps uplink throughput

☑ Supports 10800 users per station and 256 groups per cell

☑ Group call setup time<300ms, talk right application time < 200ms

☑ Supports 1 +1 backup for key units

☑ Supports standalone mode to provide a stable and efficient service in case of an eTC malfunction

☑ Supports flexible switch over to upgrade and expand capacity

Specifications

Parameters	Specifications
Dimensions	88mmx483mmx300mm
Weight	<11.1 kg (full configuration)

Rated voltage	-48V DC
Power consumption	320W (full configuration)
Operating temperature	-20°C to +55°C
Operating humidity	5%RH ~ 100%RH
Clock synchronization mode	GPS / GLONASS / 1588V2 / Beidou
System availability	> 99.999%
Dustproof & waterproof	IP20

RRU - Romote Radio Unit

Unified platform
Multi-mode and Multi-standard support
Aviation connector
Flexible deployment

Highlights

☑ Supports multiple modes and multiple standards, SDR architecture, LTE, PMR etc.

☑ Supports 1.4M/3M/5M/10M/15M/20M networking wideband

☑ Supports enhanced DPD technology with high power amplification efficiency and high adjacent channel index

☑ Supports wall-mount, pole-mount, and tower-mount installation, saving site resources

☑ Adopts aviation connectors adaptive to harsh environments

Specifications

Parameters	Specifications
Frequency bands	1.4GHz/1.8GHz LTE-TDD; 700MHz LTE-FDD
Number of channels	2T2R / 2T4R
Transmit power	2x40W / 2x20W
Receiving sensitivity	≤-105dbm
Carrier bandwidth	3M / 5M / 10M / 15M / 20M
Dimensions	435mmx340mmx115mm
Volume	<17L
Weight	19 kg
Power supply	- 48V DC
Power consumption	<400W
Installation method	wall-mount, pole-mount, tower-mount
Protection class	IP65
Temperature range	-40°C to +55°C
Humidity range	5%RH ~ 100%RH
Seismic performance level	9

IBS - Integrated Base Station

Unified platform
Multi-mode and Multi-standard support
Aviation connector
Flexible deployment

Highlights

☑ Supports multiple modes and multiple standards, SDR architecture, LTE, PMR etc.

☑ LTE standard supports 1,4M/ 3M/5M/10M/15M /20M

☑ Narrowband standard like DMR/Tetra supports 12.5k/25KHz bandwidth

☑ Supports enhanced DPD technology with high power amplification efficiency and high adjacent channel index

☑ Works as an outdoor base station or a standalone system

☑ Supports multi-site networking and narrowband and broadband networking

☑ Supports wall-mount, post-mount, and tower-mount installation, saving site resources

☑ Adopts aviation connectors adaptive to harsh environments

Specifications

Parameters	Specifications
Frequency bands	1.4 GHz/1 B GHz LTE-TDD; 700 MHz LTE-FDD
Number of channels	2T2R / 2T4R
Transmit power	2x40W
Receiving sensitivity	≤-105dbm
Carrier bandwidth	3M / 5M / 10M / 15M / 20M
Carrier configuration	1 X20M, 2 X 10M.4X5M
Dimensions	435mmx340mmx150mm
Volume	<22L
Weight	26.5 kg
Power supply	- 48V DC
Power consumption	<500W
Installation method	wall-mount, pole-mount, tower-mount
Temperature range	-40°C to +55°C
Humidity range	5%RH to 100%RH
Seismic performance level	9

eTC - enhanced Trunking Core

Supporting Trunking Services
Flexible Configuration & Smooth Upgrade
Integrated Core Network
High Reliability

Highlights

- ✓ Convergence with the narrowband network to achieve unified platform, management, and services
- ✓ Support trunking services including private, group, and emergency call, message, location report, SN solution, and E2E encryption
- ✓ Safety, load sharing, multi-level redundant architecture, and two-way authentication AIE, VPN, Ipsec, and unified E2E encryption
- ✓ Smooth evolution from MSO to eTC, from LTE to MC-LTE

Specifications

| Item	General Single Server	Single uTCA Server	Single ATCA Server
Max. Online User Number	5,000	10,000	200,000
Max. Group Number	1,000	2,000	100,000
Max. BS Number	50	150	1,500
Max. Concurrent voice Number	2,000	3,000	20,000
Total Traffic	2 Gbps	6 Gbps	40 Gbps

EMS - Element Management System

Unified Management
Cross Platform
Green Client
High Security

Highlights

- ✓ Unified management of LTE and PMR trunking systems, integrating terminal management sub-systems
- ✓ B/S architecture, exempt client installation, maintenance, upgrades
- ✓ Supporting CentOS/Windows OSs, MySQL and Oracle DBs, and various hardware platforms
- ✓ Data backup to ensure system security, redundant backup to ensure system availability, excellent permission management and user policies
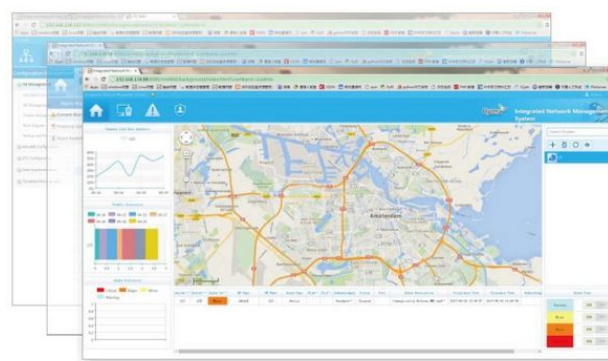
Specifications

Item	Specifications
Max. Number of Manageable Nes	500 BS
Max. Number of Performance Statistics Tasks	10
Max. Number of Clients that Can Be Used Concurrently	50
Storage Duration of Original Performance Data and KPI	90 days
Alarm Processing Ability	Peak: 30 alarms per second; 5 minutes duration in average: 15 alarms per second
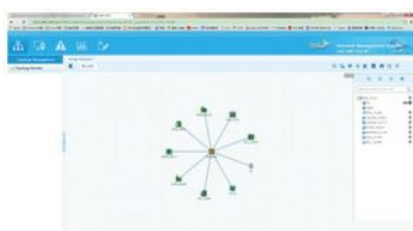
Data Terminal

CPE Outdoor

Functions and Features

The industry-specific CPE integrates the LTE modem, router, and access point, providing safe, reliable, convenient, and flexible wireless broadband connection. It features IP66 protection and has the following functions: outdoor private data network, remote data access, and 7x24 hours unattended services such as video surveillance.

CPE Indoor

Functions and Features

The enterprise- and industry-specific CPE integrates the LTE modem, router, and access point, providing safe, reliable, convenient, and flexible wireless broadband connection. In addition to Internet access, it also achieves the following services: data network construction, remote data access, and 7x24 hours unattended services such as video surveillance.

TAU

Functions and Features

TheTrain Access Unit (TAU) is designed for the rail transportation industry and complies with the LET-M standards. It adopts the advanced TD-LTE technology and provides high-bandwidth data access for services such as CBTC, CCTV, and PIS.

Specifications

Item for Outdoor CPE	Specifications
Technology Standards	TD-LTE / Wi-Fi
Operating Frequency Bands	TD-LTE: 1447-1467MHz/1785-1805MHz; WiFi: 2401 -2483MHz
TD-LET Bandwidth	3MHz / 5MHz / 10MHz / 15MHz / 20MHz
Dimensions (WxHxD)	233mmx320mmx82mm
Weight	About 3.2 kg
Power Supply	PoE, 9-24 V DC input
Power Consumption	≤6W
Operating Temperature	-40°C to +60°C
Protection Level	IP66

Item for Indoor TAU	Specifications
TD-LET Bandwidth	1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz
Frequency range	1785 - 1805MHz
Dimensions (WxHxD)	482.6mmx43.6mmx300mm
Weight	About 6 kg
Power Supply	110±30%V DC input
Power Consumption	≤35W
Operating Temperature	-25°C to +60°C
Protection Level	IP41

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