

# Caltta ECS (Enhanced Conventional System)



## Get to Know ECS

Caltta Enhanced Conventional System (ECS) combines multiple repeaters working in the digital repeater mode in the same area to form an enhanced conventional site. It is DMR Tier II digital conventional system, while it's able to deliver the advantages of DMR Tier III trunking.

By sharing the logical channels of the repeaters on the site, radios are allowed to use all the repeaters on the site to communicate, improving channel utilization. As we know, one repeater has two slots, so in conventional mode, one site with one repeater can realize two groups communicate at the same time. Caltta ECS solution combines multiple repeaters working in one site and overcomes the trouble of uneven channel load and low channel utilization when multiple channel machines are stacked in one conventional system. In addition, as each call is through a randomly allocated traffic channel, when a repeater in the site fails, the calls under this site will not be affected.

With the advantages of conventional and trunking systems, ECS is easy to deploy and more cost-effective. It can realize the channel sharing of multiple conventional channels in one site as the trunking system does, achieving load balance between channels, expanding channel capacity, and improving channel utilization. One single channel failure does not affect site functioning, making it suitable for high-traffic communications among multiple facilities.

## ECS Features



### Flexible Channel Allocation

Caltta ECS solution realizes automatic and flexible allocation of traffic channels. The controlling channel in the system can tell which channels are available and make suitable arrangements for the channels when transmission requirements come.



### Reliable Network Stability

When one repeater in a station fails to work, the controlling channel can detect the situation and replace it with another repeater so as not to influence the entire station, thus the network stability can be guaranteed.



### Flexible Networking

Multi-level networking is supported in this system, as well as star-mode networking, chain-mode networking and more, bringing users the convenience of flexible networking.



### Avoid Channel Conflicts

The system supports to designate a specific channel as the GPS channel so as to separate voice transmission channels and the GPS channel, which helps avoid channel conflicts.



### Significantly Increased Capacity

Caltta ECS solution connects multiple repeaters working in one site. For example, if one site has N repeaters, this site can support communication among  $2N-1$  groups at the same time (one slot needs to be the controlling channel). If the  $2N-1$  slots are all busy and there is another communication requirement by other terminals, the controlling channel can become a traffic channel until another slot is released. In this case, the channel capacity can reach  $2N$ .



### Simple Operation

With nothing but customers' providing the network access, the system can start to work, saving equipment and maintenance costs.

# ECS Functions

## Digital Channel

Private Call	Group Text Message	Dual Vocoder	Single Site 8 Carriers	Group Priority
Group Call	Private Text Message	Radio Registration	Supplementary Services	Group Call Interrupt
All Call	Digital Call Hang Time	Multi Site IP Connect	Emergency Alarm	
Emergency Call	Local Access Management	Inter-network Master	Master & Slave Group Call	

## Dispatch Service

Private Call	Online/Offline Display	Geo-fencing	Managed Dispatch	Group Patch
Group Call	Radio Positioning	Emergency Alarm	Private Text Message	
All Call	Track Playback	Log	Dispatch License	
Group Text Message	Recording and Playback	Resource Management	CS and ECS Interconnection	

## Network Management Software

Real-time View	Remote Control	Operation Log
Alarm Management	Email Notification	

## CPS

CPS Read/Write Password Protection	Remote Upgrade
Remote Read/Write	

## Others

Base Station Registration	Front Panel Displays Repeater Information
Transmit Power Adjustment	eChat Interconnect
Equipment Anomaly Detection and Protection	PSTN Call
LED Lights Indicate Work Status	

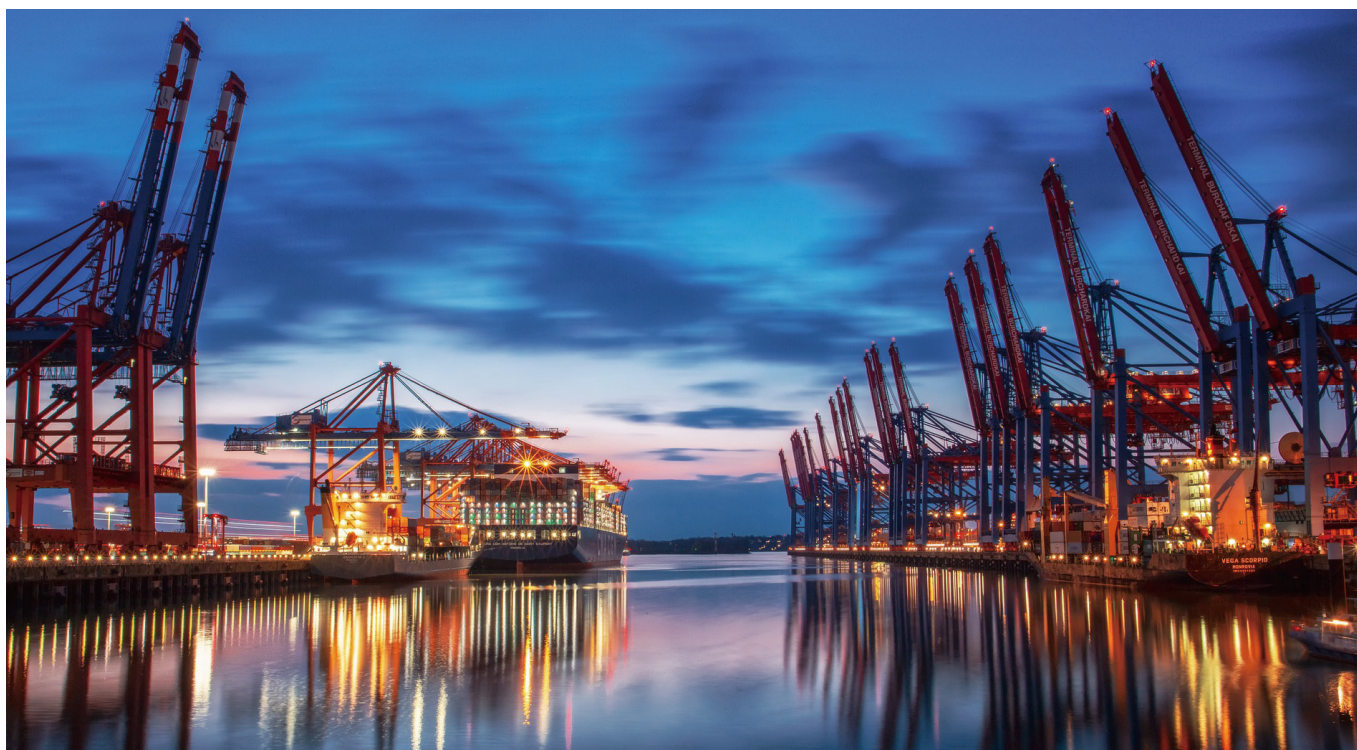
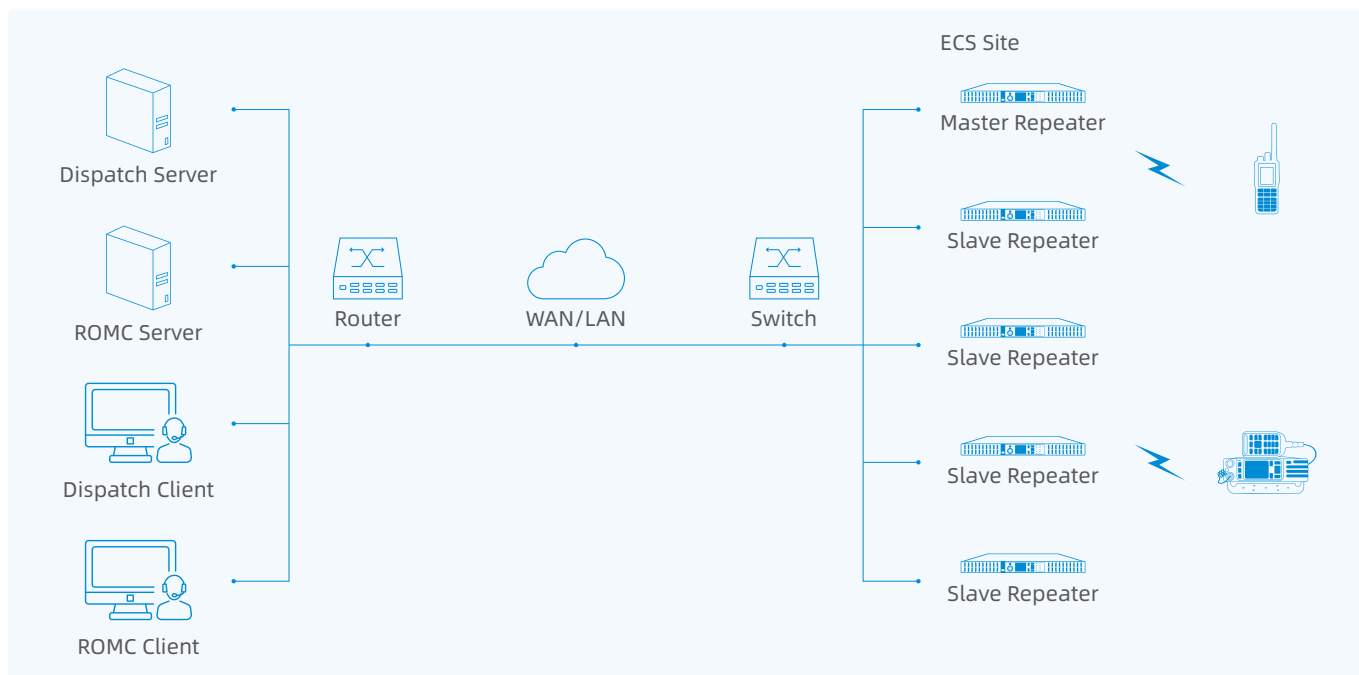


# Network Topology

The typical network topology of the ECS system includes portables, mobiles, repeaters, Ethernet switches, network management, dispatch consoles and other equipment. Each site has multiple repeaters. The repeaters within the site are connected through switches. The sites can be connected to the WAN through routers and communicate with network management and dispatch system. Caltta ECS solution can support up to 32 sites and up to 12 repeaters stacked as one site with 24 channels, and multiple sites are linked over IP.

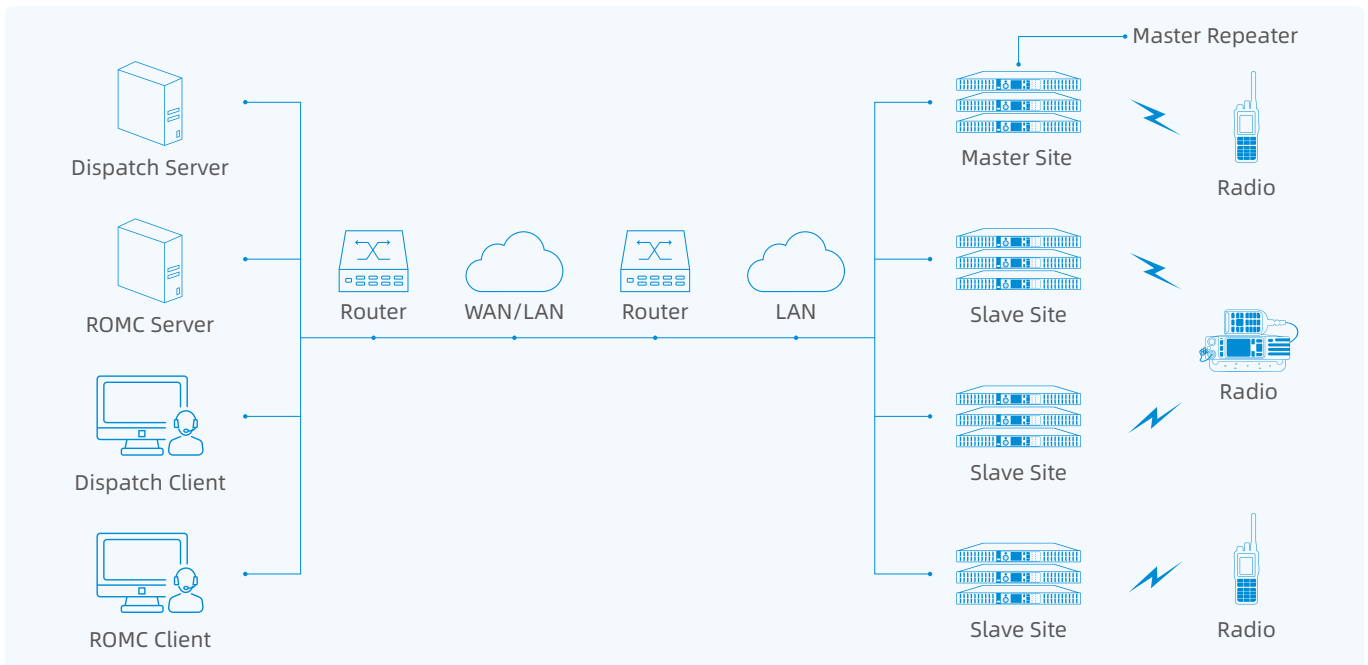
## Single-site ECS

Single-site ECS consists of one master repeater and multiple slave repeaters, which are connected with each other via an IP switch. Radios in the system can share the idle channels of these repeaters and communicate on these channels.



## Multi-sites ECS

Multi-sites ECS is built by connecting multiple ECS single-site via the IP network. It can share the channel resources of ECS systems and extend the communication coverage at the same time.



## Typical Products

### PH6 Series DMR Portable Radios

Digital-and-analogue Compatible  
Lightweight and Anti-slip design for Easy Holding  
Optimized Operating Experience Based on Excellent Industrial Design  
IP68 and MIL-STD-810G Rated  
20 hours in Digital Mode(5:5:90)  
40-bit Basic Encryption and 128/256-bit AES Encryption(Optional)  
**Complete Services:** GPS, Bluetooth, VOX, Call Recording etc



### PM790 DMR Mobile Radio

Analogue and Digital Compatibility, Versatile Functionality  
Vehicle Mounted Design, Excellent User Interface  
Flexible Installation  
IP54 and MIL-STD-810H Rated  
Various External Interfaces, Abundant Peripherals  
Enhanced Security  
**Complete Services:** GPS, Bluetooth, Call Recording, etc



## PR900 Digital Repeater

1U Design, Ultra Slim

2.0-inch HD Color Screen, Easy Operation

Digital-analogue Compatible

High Spectrum and Power Efficiency, Saving Power Consumption by 40%

Flexible Networking: IP Connection, Simulcast, Active Link, ECS

**Rich Services:** Text Message, Status Message, Map-based Location Services, Call Recording, etc



## PD200 Dispatching System

PD200 dispatching system is a DMR Tier II dispatching system self-developed by Caltta. It can realize command & dispatch services through access of the repeater PR900 and corresponding DMR radios, build communication network for users, and realize digital conventional dispatching services. Adopting C/S architecture and modular design, the system boasts complete functions such as voice dispatch, positioning, text message, and report generation. It is based on the standard SIP protocol.

### Basic Functions:

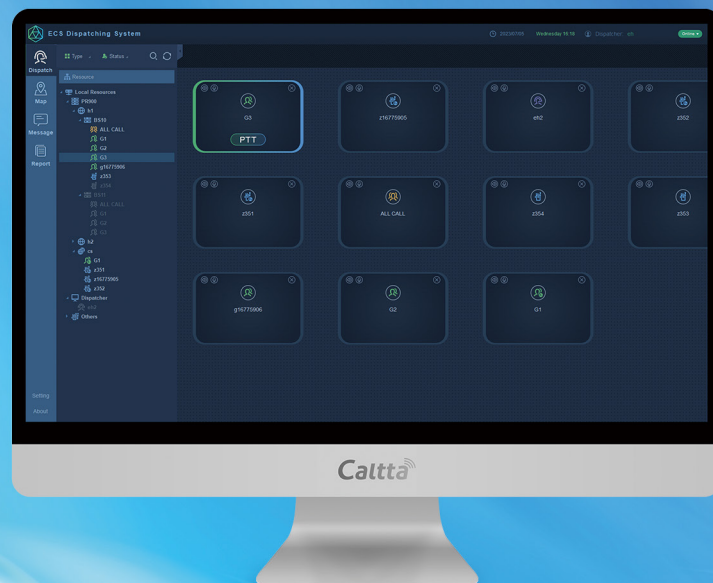
Private Call, Group Call, All Call and Message Functions

### Professional Map Applications:

Google Map, OpenStreet Online-and-offline Map, Track Playback, Geo-fencing, etc

### Powerful Management:

Administrator can manage user ID range and view repeater status. PD200 can report statistics and record call, message and so on to help for administrator's management.



PD200

## ROMC Network Management System

ROMC Network Management System helps users monitor the status of the ECS repeaters and also each terminals remotely. Considering that workers are not possible on site all the time, the system also supports to maintain the ECS repeaters remotely.

Real-time View	Supports viewing real-time information of all sites on the client end, including basic information, configuration information, status information, alarm information and so on.
Alarm Management	Supports viewing alarm messages of each repeater on the client end, including generating alarm, resuming alarm, alarm code, alarm level, reporting location and reporting time and so on. Also supports querying and exporting of current and history alarm records.
Remote Control	Supports remote reading and modifying the repeater's parameters on the client end, and supports remotely resetting the repeater.
Email Notification	When an alarm happens, the system will automatically send email to the maintenance person who will timely know the system operation status and better maintain the system operation. Support QQ, 163 and Gmail applications.
Operation Log	Supports querying operation log, safety log, system log on the client end, and supports exporting operation log .
Simple Log	The client end can store real-time operation log, helping troubleshooting when needed.



# System Specifications

General	
Transceiver Model	PR900
Digital Protocol	ETSI TS 102 361-1, -2, -3
Frequency	UHF1: 400-470MHz UHF3: 350-400MHz VHF: 136-174MHz
Channel Capacity	1024
Channel Spacing	12.5kHz/20kHz/25kHz
Max Duty Cycle	100%
Operating Voltage	AC100-240V @50/60Hz DC13.6V±15%
Backup Power Supply	Support
Size (W*H*D)	436*44.5*366.4mm (Standard 19 inch 1U height frame)
Screen	2.0' HD LCD, 220*176 Pixels, 10 status LED
Weight	8.5Kg
Transmitter	
Frequency Stability	±0.5ppm
Power Output	1W-50W (UHF1/UHF3/VHF)
FM Modulation	12.5kHz: 11K0F3E / 25kHz: 16K0F3E
4FSK Digital Modulation	12.5kHz Data Only: 7K60FXD
	12.5kHz Voice and Data: 7K60FXE
Conducted/Radiated Emission	-36dBm ≤1GHz ; -30dBm >1GHz
Modulation Limiting	±2.5kHz @12.5kHz / ±5.0kHz @25kHz
FM Hum and Noise	-40dB@12.5kHz / -45dB@25kHz
Adjacent Channel Power	-60dB@12.5kHz / -70dB @25kHz
Audio Distortion @ Rated Audio	≤3% ( Typical )
Audio Response	+1 ~ -3dB(TIA603D)
Receiver	
Sensitivity (Analogue Typical)	0.14uV ( 12dB SINAD )
Sensitivity (Digital Typical)	0.14uV ( 5% BER )
Adjacent Channel Selectivity	65dB@12.5kHz / 75dB@25kHz (TIA603D)
	65dB@12.5kHz / 75dB@25kHz (ETSI)
Intermodulation	75dB (TIA603D)
	70dB (ETSI)
Spurious Rejection	80dB (TIA603D)
	80dB (ETSI)
Blocking or Desensitization	98dB (TIA603D)
	95dB (ETSI)
Hum and Noise	-40dB@12.5kHz / -45dB@25kHz
Audio Distortion @ Rated Audio	≤3% ( Typical )
Audio Response	+1 ~ -3dB(TIA603D)
Conducted Spurious Emission	-57dBm (TIA603D)
Environmental	
Operating Temperature	-30°C ~ +60°C
Storage Temperature	-40°C ~ +85°C

General Disclaimer: The specifications in this document are in accordance with the applicable standard test. Due to the continuous technology development, Caltta may change the specifications without timely notice.

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