Kowloon-Canton Railway Corporation

First TETRA 800 MHz system in Asia

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Mr Siddharth D Patel, Construction Manager-Rail Systems, West Rail, Kowloon-Canton RailwayCorporation.

BACKGROUND

With rapid development taking place in the New Territories, more and more people would be commuting between the north-western New Territories and urban Kowloon. Ease of transportation became a priority, and forward planning resulted in the Kowloon-Canton Railway Corporation's (KCRC) decision to build the West Rail – a domestic passenger line with a track span of 32 kilometres – connecting north-west New Territories and Kowloon, serving 340,000 passengers daily.

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The search for such a communications system resulted in a contract awarded to Motorola's Commercial, Government and Industrial Solutions Sector for a TETRA (TErrestrial Trunked RAdio) system for the West Rail project.

This project also marks KCRC's West Rail as the first commercial contract award in Asia for a TETRA system in the 800MHz frequency band.

This 800MHz TETRA system represented yet another significant milestone for Motorola's leadership and innovation as a global TETRA solutions provider.

CUSTOMER NEEDS

KCRC required that Motorola's TETRA system provide an integrated communication solution for the West Rail with communication coverage that spans 32 kilometres of track alignment. The coverage area also included the Main Operational Control Centre, one Backup Operational Control Centre, nine stations (five elevated and four underground), and one maintenance centre.

The TETRA system would be used primarily by West Rail's train controllers, operators and maintenance personnel for better co-ordination and monitoring of passenger train fleets and maintenance vehicles as well as to improve overall commuter safety.

BENEFITS

1. Enhanced operational efficiency

Train operators, Station Control personnel and Operational Control Centre staff are able to communicate with each other instantly via the system's customised train radio control interface and computer-aided dispatch consoles. This results in higher efficiency and productivity. TETRA's digital technology also reduces voice transmission delays and produces better voice quality and clarity across the network, minimizing the risk of miscommunications among operational staff.

2. More efficient fleet management

With Motorola's system integration capabilities, integrating this TETRA system with the train signaling system brings enhanced fleet management functionality to KCRC.

3. More reliable communications for improved commuter safety

Commuters enjoy not only a more efficient rail system but one that is also safer. The superior audio clarity reduces the risk of miscommunication among train personnel. In case of emergencies, operating systems are equipped with a back-up system in the unlikely event of system failure. These are in addition to regular features such as the passenger PA (Public Address) system and customised graphical user interfaces for greater ease-of-use.

MOTOROLA SOLUTION

To meet West Rail's stringent requirements on safety and reliability, Motorola provided an end-to-end 800 MHz TETRA-based system with a Computer-Aided Dispatch (CAD) system.

Main equipment included Master site and Redundant Master site, 10 Enhanced Base Transceiver Sites (EBTS), 16 CAD Graphical User Interface console positions, and approximately 500 in-train mobile and portable radios for trains, locomotives, depot, and traffic control and maintenance personnel.

Various aspects of the system design were customised for rail operations. The system's customised train radio control interface and panel was specially designed to facilitate instant voice communication among train operators, Station Control and Control Centre operators. A distinctive feature of the TETRA system was its superior audio clarity. This mitigates the necessity to repeat the voice message in areas where the RF signal is weak or unstable.

Leveraging Motorola's system integration expertise, integrating the TETRA system with the train signaling system provided KCRC with better visibility over its fleet management function. Other advanced features include automated dynamic train run configuration, a back-up configuration for times of emergency, a passenger Public Address (PA) system and customised graphical user interface - all seamlessly integrated to meet the demanding day-to-day operations of KCRC.

"Communication is vital in managing the daily operations of West Rail efficiently. We are confident that Motorola's TETRA system will enhance our operational effectiveness and enable us, in turn, to provide high standards of service and safety for our passengers," said Mr Siddharth D Patel, Construction Manager-Rail Systems, West Rail, Kowloon-Canton Railway Corporation.

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