



CASE STUDY

SMRT and Motorola develop a digital communications system for a transit system using TETRA technology

With the advancement in technology, SMRT overcame the limited capability of a 15-year-old aging analog conventional radio system's inadequacies by implementing an integrated digital communications system to ensure sufficient radio communication coverage across its entire network, including operational areas like viaducts, tunnels as well as aboveground and underground MRT stations.

To overhaul its radio system, SMRT engaged Motorola to put into service a TETRA (Terrestrial Trunked Radio) – compliant system to cover SMRT's island-wide train routes, which will be used by the SMRT's Traffic Control and Maintenance Division to supervise and monitor the day-to-day operations of its passenger train fleet.

Motorola provided SMRT with a fully TETRA – compliant Dimetra system operating in the 380-400 MHz band. The total solution is an integration of various subsystems to Motorola's Dimetra; the CAD system to support the Train Run Number (TRN) calling features with interface to the ATS (Automatic Train Supervisory) system to extract train location information; and a Trainborne Radio system that interfaces with the in-train emergency communication button, public address system and other equipment monitoring.

The upgraded system allows for better command and control of the trains from the Operations Control Centre as well as in-train communication between the Operations Control Centre

and passengers. With SMRT's policy of regular upgrading and enhancement of its services and facilities, the radio system has features such as enhanced command and control communications, increased coverage and fast and flexible emergency response capabilities.

The additional communication channels and improved voice quality supplied by the TETRA system provides clearer and more effective communication between the Operations Control Centre, Passenger Service Centres, Train Officers and commuters.

As a result of the TETRA-based radio system, SMRT was able to have better operational performance and its staff was able to better deliver quality and reliable services. Overall, passengers experience improved train connections at the interchanges and were better informed in advance of service disruptions through direct announcements from the Operations Control Centre.

Moving forward, SMRT aims to develop and implement more features and improvements to the existing TETRA system, including security and emergency measures. With the current global terrorist alert, SMRT also intends to add inter-operability functions, in order to enhance its links and network with the Singapore Civil Defence Force.

Benefits

Operational Efficiency:

- Improved communication among staff
- Commuters can receive immediate guidance from staff in case of emergencies

Reliability:

- Efficient and reliable dispatch operations for fleet of passenger trains and maintenance vehicles
- Redundancy of critical components ensures high level of dependable communication at all times
- Increased reliability of system means reduction of maintenance and repair costs

Performance:

- Higher operational performance of the overall system
- Simplified monitoring and reporting procedures
- Improved response time



Close Collaboration

The use of TETRA technology on SMRT's train system was a first in many ways for both SMRT and Motorola. The deployment marked the first time a main TETRA system was deployed in Singapore's public transport system and in the national infrastructure. It was also a world's first for installing the new TETRA digital communications system in a transit system without disrupting communications or passenger services.

This installation was a new undertaking for SMRT, one of the early pioneers in using TETRA technology at that time. When writing the tender specifications, SMRT did not have any references or examples to follow. Understanding that, Motorola worked hard with SMRT to achieve the common goal of coming up with a workable solution. Working in tandem with SMRT's ongoing passenger schedule, the project team comprising both SMRT and Motorola staff had to ensure that the system upgrade caused no disruption to existing passenger services. This made it necessary for upgrading work to

take place only during off-service hours, typically between midnight and 4 a.m. Installation of in-train equipment was carried out in two stages, with wiring completed in stage one and radio equipment installed only at a later stage. This allowed train services to continue running smoothly and efficiently.

Throughout the project, SMRT and Motorola collaborated effectively as a team to upgrade the communications system. Capitalizing on its extensive experience as a train operator, SMRT served as the project manager and consultant, particularly during the critical system migration and dual system operations phase. Motorola, with its vast knowledge of TETRA and its capabilities, was integral in translating SMRT's requirements into efficient and practical solutions.

The result was a smooth migration to a new digital radio communications system that enhances operational performance and enables SMRT staff to deliver quality and reliable services.

For more information on how SMRT and Motorola can provide you with a digital radio solution, please contact:

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