Digital Repeater Network For Maharshtra Police Case Study Of Dhule Distric Digital Network

M/s Maharashtra Police has planned to shift their analog network to digital network using DMR technology. M/s Arya Communications and Electronics Services Private Limited (Aryacom) has won the contract through competitive bidding with state of the art Motorola MotoTrbo radios for DMR and Alvarion MW radios as against HYT radios offered by M/s 3G (Offered Radwin for MW) and M/s Surya (Offered Brij Radios for MW) in two bid process. During the technical evaluation only Aryacom offered integrated solution was qualified & emerged as clear winner meeting the stringent specifications laid by Maharashtra Police as well as proving superior field performance during demonstration. The contract worth 1292Rs Lakhs involving 79 no of repeaters, 1487 no of portables, 79 no of mobiles and 40 Nos of 1+1 MW links was awarded to M/s Aryacom for two ranges covering districts falling under respective ranges viz, Nagpur Range (Nagpur Rural, Chandrapur, Gondia, Bhandara & Wardha) and Nasik Range (Nasik Rural, Dhule, Jalgaon, Ahmadnagar).This document presents the case study for Dhule district.

Dhule District **Network**

Wireless network which was in use at Dhule district was established with analog VHF repeaters having total of 2 Main repeaters (Chadwel, Dhule city) and 2 Simplex patch repeaters (Shirpur ,Sakri). There was provision of standby repeater for bandobast purposes.

Additional functionality of sending text messages over VHF network between police stations was also in use with add on hardware known as RF FAX. In earlier messaging system same channel was been used for sending messages between various police stations, because of this the voice calls has to be muted whenever prompt come for message transfer. After group announcement in the network requesting unholding of PTT the message transfer is possible Thus there used to be limitation of forced timeout of voice calls when messages were transferred.

Issues In **The Network**

- Coverage for portables and mobiles was limited and specific to respective repeaters where they fall under. It will be challenge to directly communicate between inter repeater sites whenever there was any unwarranted or law order situation.

- There are many gray areas/dark spots where communication was not feasible especially on the highways while providing convoy coverage. At times they wish to have the location GPS coordinates of the convoy as well as patrolling vehicles.

- Audio quality in the radios is having lot of mush in background and noise.

- During message transfer no voice calls were possible.

- Batteries of portables are not lasting for longer period.

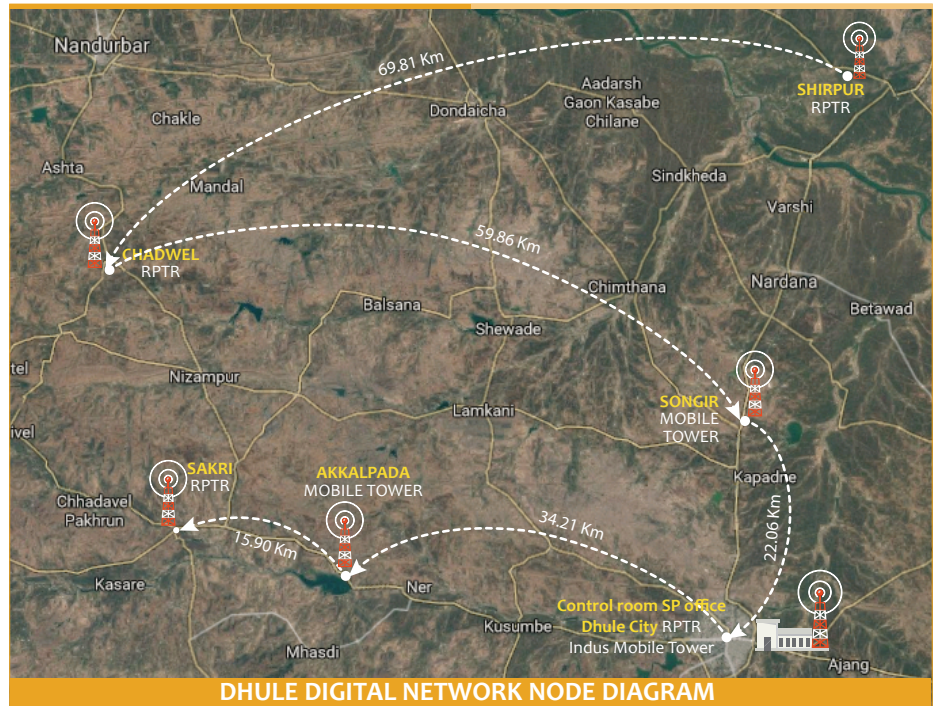## Implemented Soultion **Components**

Aryacom has established the digital network in Dhule District using the following components and provided integrated solution to local law & order personnel's;

1. Motorola MotoTrbo repeater XIRR8200

2. Motorola MotoTrbo Mobile XIRM8268

3. Motorola MotoTrbo Portable XIRP8268

4. TrBoNET Enterprise

5. Alvarion BreezeNET B 14 PTP Radios

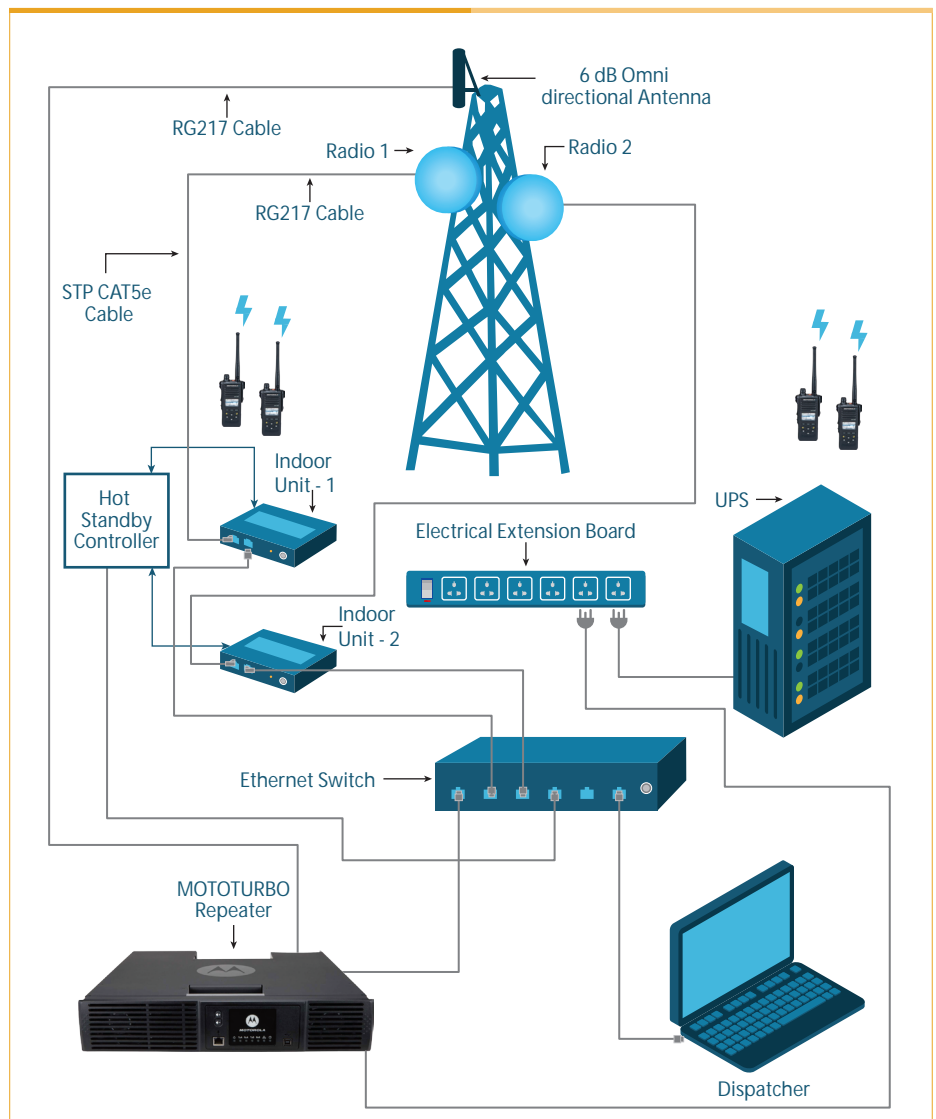6. OneACCESS NW Routers

7. Dell Server

MotoTrBo Digital Repeaters installed at Chadvel, Shirpur, Sakri & Dhule City are interconnected with Alvarion Breezenet B14D point to point radios with 1+1 Hot Stand by Connectivity. Backbone is also extended to control room located within Dhule SP office.

Because of line of sight issues and inadequate tower heights at repeater locations, third party telecom operator tower facilities were used as hopping locations in forming the backbone network. Aryacom team has setup the links covering distances of 69.8 Km and 59.86 Km in single hops in very challenging conditions and RF environment. All established links were working with 3ms latency and in true (always ON) 1+1 hot standby configuration essential for mission critical public safety communication requirement and complimenting performance of Moto Trbo radios.
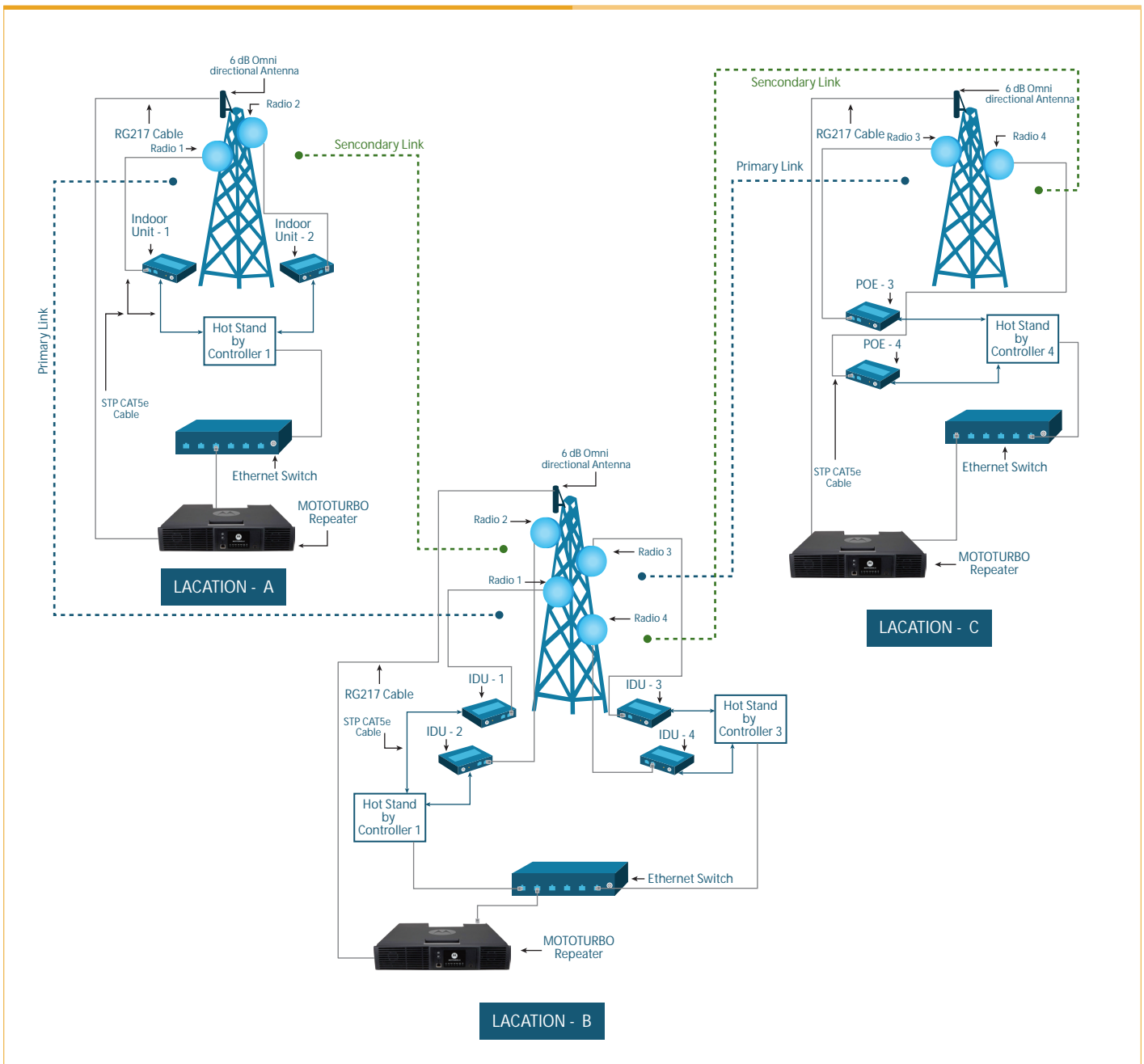
The backbone has enabled IP Site Connectivity (IPSC) feature of Motorola repeaters to provide ubiquitous coverage throughout the district as well as empowered control room dispatcher application to avail all the features of digital technology like GPS tracking, call recording, centralized database, and thus setup effective command & control setup.

DHULE DIGITAL NETWORK NODE DIAGRAM

INTERCONNECTIVITY DIAGRAM BETWEEN SOLUTION COMPONENTS AT REPEATER SITE

INTER REPEATER STATION CONNECTIVITY ILLUSTRATION

Benefits Derived
BY USERS

Dhule District Law & Enforcement personnel are now enjoying the following benefits of the true digital network setup by M/s Aryacom

- Crystal Clear Voice Quality during communication

- Extended Coverage & intra site communication even while roaming. Now there

is virtually no blank spots in coverage area

- Availing power of two slots within one channel, one slot is used for voice communication while the other slot for message transfers overcoming the earlier limitation

- Location tracking of patrolling vehicles and bit marshal as well as convoy during bandobast is now possible

- Remote performance and fault management of all solution components as well as OTAP (Over the Air Programming) is now possible through NMS Server

- Reliable & Trusted communication every time

- Peace of Mind ■