27106

City of Long Beach

Transaction Document No. 24 to Master Purchase Agreement No. 27106

Motorola Solutions, Inc. ("Motorola") and the City of Long Beach ("Buyer") enter this Transaction Document pursuant to the terms and conditions of Master Purchase Agreement No. 27106, wherein Buyer will purchase from Motorola and Motorola will sell to Buyer communications equipment and services as further described in Exhibit A in an amount not to exceed $7,299,322 including tax. The items in Exhibit A may be changed if necessary by mutual agreement of the parties.

IN WITNESS WHEREOF, the parties have caused this document to be duly executed with all formalities required by law as of the date last stated below.

MOTOROLA SOLUTIONS, INC.

October 5, 2016 By _____

Officer's Title MSSSI Vice President & Director Sales

October 6, 2016 By _____

Officer's Title Asst. Corporate Secretary

"Motorola"

Motorola Solutions, Inc. CORPORATE Seal DELAWARE

CITY OF LONG BEACH

10/11, 2016 By _____

City Manager

"Buyer" Assistant City Manager

EXECUTED PURSUANT TO SECTION 301 OF THE CITY CHARTER.

This Transaction Document No. 24 is hereby approved as to form on October 7, 2016.

CHARLES PARKIN, City Attorney

By _____

Amy R. Webber
Deputy City Attorney

EXHIBIT A

FULL SYSTEM PURCHASE PRICING

The full system purchase pricing is shown below:

Equipment and Services Description	Price ($)
Console, Dispatch AES Encryption, M-Core, ASR Site, Microwave Equipment	$2,912,791.00
Services	$2,476,291.00
Equipment and Services Total	**$5,389,082.00**
6-Year Maintenance Plan	$919,897.00
4-Year SUS / SUA II Lifecycle Plan w/o Estimated Tax *Software and Hardware* *$740,900* *Services* *$179,791*	$920,691.00
Full System Total	**$7,229,670.00**
Full System Purchase Discount	($741,041.00)
Full System Total with Discount	**$6,488,629.00**
Estimated Tax (Based on 9% of taxable items after discount)	$295,127.00
Full System Total with Estimated Taxes	**$6,783,756.00**
Contingency (7.6%)	$515,566.00
Total	**$7,299,322.00**

ASTRO 25 MASTER SITE & MCC 7500 MIGRATION

MOTOROLA

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MOTOROLA SOLUTIONS

Motorola Solutions, Inc.
235 South Figueroa Avenue
Suite 1855
Los Angeles, CA 90012

September 21, 2016

John Black
City of Long Beach
5580 Cherry Avenue
Long Beach, CA 90805

RE: Long Beach Console/Microwave Project

Dear Mr. Black,

Motorola Solutions Inc. is presenting to the City of Long Beach a new ASTRO® 25 Master Site and to replace existing dispatch consoles with Motorola's MCC 7500 product line. The proposed dispatch migration consists of thirty two (32) MCC7500 Dispatch Consoles located across six (6) dispatch locations. In addition to the dispatch migration, Motorola has included equipment and services to replace Long Beach's Microwave Network and upgrade/integrate the Existing ASTRO® Express Site into the proposed core.

This proposal is based off the existing Master Purchasing Agreement number 27106 between the City of Long Beach and Motorola Solutions Inc., including the Communications System Agreement (CSA) together with its Exhibits pursuant to the Master Purchase Agreement. This proposal shall remain valid for a period of 90 days from the date of this cover letter. The City of Long Beach may accept the proposal by delivering to Motorola a signed Purchase Order or similar Transaction Document that refers to and incorporates by reference the Proposal. Motorola would be pleased to address any concerns the City of Long Beach may have regarding the proposal. Any questions can be directed to your Motorola Account Executive, Rob Russell, at 714-852-2327 or rob.russell@motorolasolutions.com.

We thank you for the opportunity to furnish the City of Long Beach with "best in class" mission-critical solutions and we hope to strengthen our relationship by implementing this project. Our goal is to provide you with the best products and services in the public safety communications industry.

Sincerely,
MOTORLA SOLUTIONS, INC.

HChercoe

Howard Chercoe
MSSSI Vice President

SECTION 1

SYSTEM OVERVIEW

Motorola Solutions is pleased to provide the City of Long Beach with a proposal for a new ASTRO® 25 Master Site and to replace existing Gold Elite dispatch consoles with Motorola's MCC7500 product line. The proposal addresses the City of Long Beach's desire to continue utilizing their existing RF infrastructure while providing the ability to migrate dispatch operations to the mission critical MCC7500 Dispatch Console. The proposed solution inherently increases Long Beach's interoperability options and provides a scalable radio platform fit for future expansion needs. Motorola's proposed dispatch migration consists of thirty-two (32) MCC7500 Dispatch Consoles located at six (6) dispatch locations including, Emergency Communications and Operations Center (ECOC), Gas Dispatch, Joint Command and Control Center Dispatch (JCCC), Signal Hill Dispatch, Long Beach Airport Dispatch, and the Wireless Shop.

Motorola has partnered with multiple vendors in order to meet the unique needs of the City of Long Beach. Motorola, in partnership with CTI, has included an enhanced Comparator Monitor and Control sub-system, allowing for increased flexibility in dispatcher control over existing DigiTAC comparators. Motorola, in partnership with RAD, has included a solution that will allow the City of Long Beach to use existing dark-fiber connections from ECOC to JCCC and Gas dispatch to support the Ethernet requirements of the proposed radio system.

As requested by the City of Long Beach, Motorola has incorporated three standard add-ons in the proposal. The first add-on incorporates AES encryption to all thirty-two (32) of the proposed MCC7500 Dispatch Consoles. The second adds four (4) 700MHz channels to the existing Long Beach ASTRO® 25 Express system and will integrate it with proposed Master Site. The final add-on will replace the City of Long Beach's existing Microwave system. In partnership with Microwave Networks Inc., Motorola has included in the proposal a four-site, loop protected, Microwave system capable of handling both T1, T3, and Ethernet connectivity. In addition to replacing the Microwave Backhaul Motorola, in partnership with RAD, has included a solution to replace Long Beach's DS0 cross-connecting hardware.

To allow for ISSI interoperability Motorola has included required Trunking features in the proposal. Many of the capabilities discussed throughout the proposal would require an upgrade to the City of Long Beach's RF infrastructure. The descriptions of these features are provided to highlight the expansion potential of the proposed system. This proposal includes migrating the existing ASTRO Express Site to a full featured and integrated ASTRO25® trunking site. Many of the trunking features discussed in this proposal will be available on the migrated ASTRO site.

SECTION 2

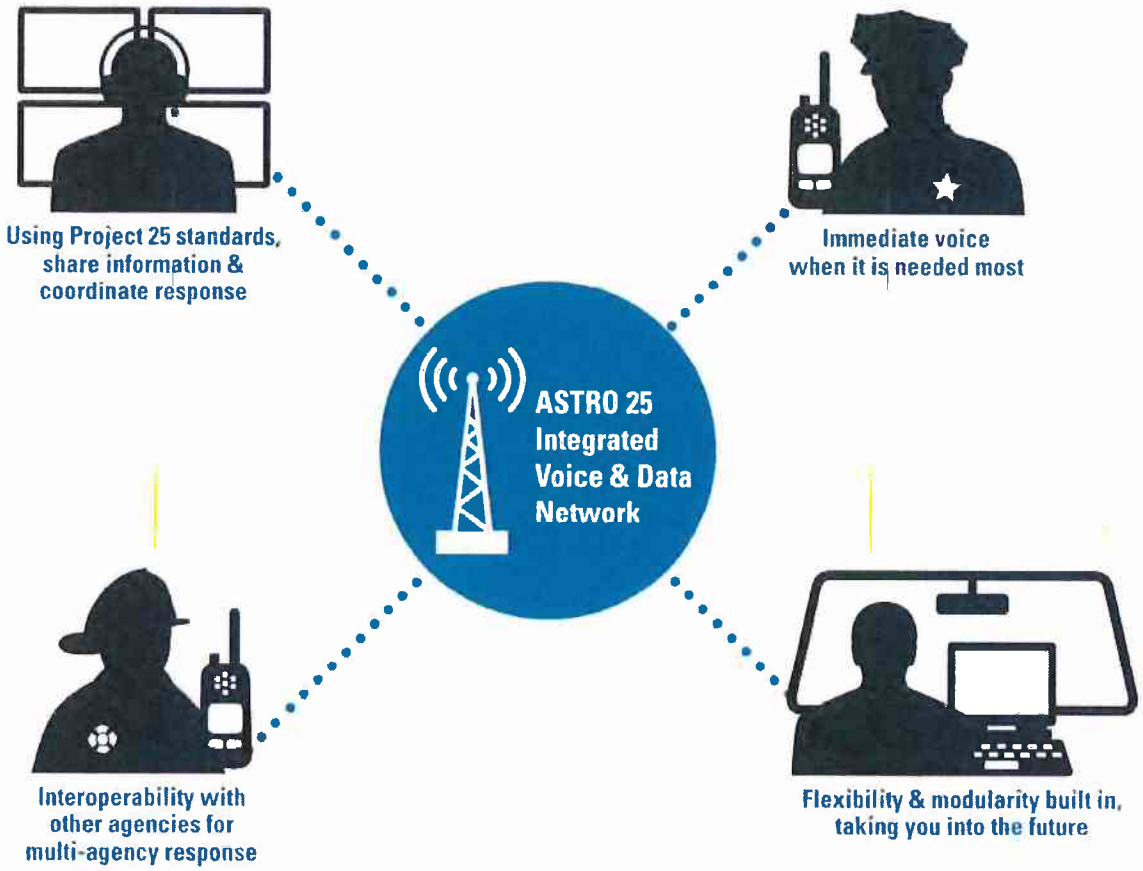
ASTRO 25 MASTER SITE

2.1 ASTRO® 25 OVERVIEW

ASTRO® 25 is the most widely used Project 25, Mission-Critical, Integrated Voice and Data (IV&D) communication network for public safety agencies. Installed worldwide, ASTRO 25 solutions meet and exceed IV&D requirements for day-to-day operations, as well as emergency response in the most demanding situations. ASTRO 25 is a wireless platform that combines uncompromising, real-world performance and the legendary reliability of Motorola Solutions, Inc. (Motorola).

From single-site to nationwide deployments, ASTRO 25 is a flexible, modular network with advanced call processing capabilities designed to meet the needs of public safety. ASTRO 25 can adapt to accommodate additional users, increased geographic coverage, enhanced data applications, and connectivity to other networks—all to ensure an efficient and cost-effective solution for decades to come.

ASTRO 25 is optimized for the rigorous demands of public safety, providing reliable communications. When an emergency involves multiple agencies, first responders can share voice and data communication among their teams. In addition, centralized command and control can deploy resources efficiently, maintain communication security, and track personnel effectively.



2.2 THE BENEFITS OF ASTRO 25 IP TECHNOLOGY

Motorola's proposed solution for City of Long Beach is our ASTRO 25 platform with IV&D, the foundation of the Mission-Critical portfolio. ASTRO offers a Project 25, standards-based Internet Protocol (IP) modular solution, providing your first responders with:

- ***Cost savings*** – ASTRO 25 reduces costs by integrating your voice and data needs into a single solution.
- ***Interoperability*** – ASTRO 25 is compliant with APCO Project 25 standards, offering seamless interoperability with other compliant systems and radios, putting the highest level of interoperability in the end-users' hands, without the need of gateways or console patches.
- ***Reliability*** – Pre-release software and upgrade testing, third-party hardware and software certification process, fault-tolerant architecture with multiple fallback modes, multiple levels of redundancy, and real-time network and security monitoring provide Mission-Critical reliability.

ASTRO 25
WHEN MISSION CRITICAL COMMUNICATIONS DEMAND PROJECT 25 INTEROPERABILITY & IP FLEXIBILITY

- ***Increased security*** – Information Assurance (IA) enhances the confidentiality, integrity, and availability of the Radio Network Infrastructure (RNI). Multiple encryption algorithms keep end-to-end voice and data transmissions confidential.
- ***Enhanced productivity*** – Easy and intuitive interfaces to critical, real-time information is delivered to users when and where they need it.
- ***Flexibility*** – Scalable, flexible design allows ASTRO 25 to dynamically adapt to the operational demands of any size organization. The IP-based design supports a unique mix of voice, data, and geographical requirements, permitting easy system enhancements as the users' needs evolve.

A description of the features, benefits, system architecture, and hardware components are provided in this document.

2.3 ASTRO 25 IP SYSTEM FEATURES

An ASTRO 25 system is a feature-rich, modular platform that consists of a Core site, which may include ASTRO 25 RF sites and simulcast cells. This section discusses the various key features and equipment components that comprise the proposed system.

2.3.1 Master Site

The master site is the central point for all system traffic in each ASTRO 25 zone. Call processing and system management occur at the master site. The Voice and Data call processing for each zone is performed by the Zone Controller. The Zone Controller(s) maintain constant communication between the RF Sites, Simulcast Sites and Network Management (NM) sub-systems via the Network Transport Subsystem.

2.3.2 Network Management System

The Network Management (NM) system can be viewed as a set of software applications or tools used to manage the ASTRO 25 wide-area trunked radio system and its constituent components.

The NMS supports the following services:

- ***Network Monitoring*** – Applications are included for monitoring the status of the transport network and the individual infrastructure components; displaying status information; forwarding alert information; and performing diagnostic procedures.
- ***Configuration Management*** – Facilities are provided for entering and maintaining the operational parameters of the infrastructure components and user devices (i.e., the mobile and portable radios).
- ***Accounting Management*** – NMS supports the tracking of radio usage of the system by providing an optional interface to third-party accounting and/or billing applications.
- ***Performance Management*** – Standard and optional applications are available for monitoring, reporting, controlling, and optimizing the use of system resources.
- ***Security Management*** – NMS includes features for setting user privileges and controlling their access to view and/or modify information contained in the configuration databases.

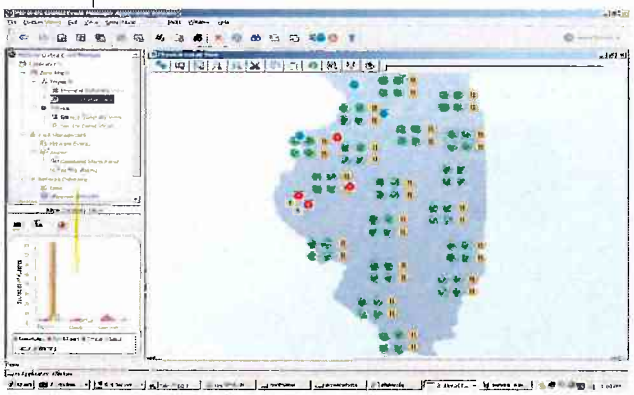
The Network Management subsystem will include the following servers at the zone and system levels of the ASTRO 25 system.

- ***NMS Zone-level Servers (one each per zone)*** – Air Traffic Router, Zone Database Server, Unified Event Manager (UEM), and Zone Statistics Server
- ***NMS System-level Servers*** – User Configuration Server (UCS) and System Statistics Server

2.3.2.1 Unified Event Manager

The Unified Event Manager (UEM) application allows system management personnel to manage LMR system devices from a single screen. Historical and real-time traffic screens give users access to radio events, radio status, and any device alarms. Other features include:

- Graphical views/maps
- Active alarms and summary views
- External notification flexibility
- Remote site control
- Fault reporting capabilities
- Device inventory
- External notification
- Customized views
- Role-based access



Sample UEM Screen

The UEM provides a customized discovery process for optimization and deep discovery of subcomponents reported on by a device. The application also allows for automatic registration of the devices without pre-configuration. Interpreting and displaying events in an easy-to-understand and meaningful format—along with a topology of the network and devices tailored for the ASTRO 25 network—will ease navigation and present the network in a manner that is intuitive to a system operator.

Health of services is provided in addition to device-based alarms, including rules for determining the overall status of services in a separate service view (e.g., redundant controller is down – service is still up; we represent both views). Rules have been developed for calculating alarms based on interpreting incoming events. Security procedures are in place to roll SNMPv3 keys and maintain the ability to receive SNMP inform requests through the key role of an entire network. Device commands are presented in a manner specific to each device type. During discovery, a complete device inventory with specific rules to identify service and proxied components is accomplished for all individual devices. Table 2-1 outlines features and benefits of the UEM.

Table 2-1: Unified Event Manager (UEM) Features and Benefits

Feature	Benefit
Optimized Discovery Based on System Design	UEM supports subnet discovery of the IP addresses which are designated for radio system devices. This translates to an efficient device discovery process.
Discovery of Fault Managed Devices	Based on the device type the UEM has pre-determined rules for discovery of the custom entities supported on the device. Additional rules are used for event translation and alarm generation.
Fault Manager Registration	Procedures in place to register the manager's IP address as a trap/inform destination.

Feature	Benefit
Centralized View of the Communications Network	System Managers can view the ASTRO 25 system status and quickly isolate problems to the board level.
Intuitive Graphical User Interface (GUI)	System Managers are quickly notified of failures on the system and can diagnose device problems. Summary and Detail maps provide a graphical display of site status in their geographical location within the system.
Active Alarms View and Alarm Summary	Persistent single view of all failure conditions ("What's Inoperable") in the network and a quick reference summary of alarms by severity, allowing users to quickly pinpoint the highest priority failures.
Secure Device Access	SNMPv3 protocol with SHA and AES 128-bit encryption to prevent security breach attempts.
Role-Based Access Control	Assignment of user privileges for access to views and operational capabilities.
Email Notifications	User-specified event notifications are sent via secure email or forwarded to a portable mobile device, which allows System Managers to work away from the System Management Terminal but remain aware of system events.
Fault Reporting Capabilities	Event history data is auto-archived and exported for further analysis and reporting.
Remote Command Operation	Remote state change capability helps to service remote devices and avoid unnecessary trips to the sites for troubleshooting.
Network Inventory	Tabular view of the devices and their associated status.
Audit Trail and Job Status	Traceability and status for commands and actions executed.

The UEM is optimized to quickly discover the devices in our network—making installation and setup quick and error-free. The UEM has a built-in capability to identify the type of device it is discovering; it will activate the pre-determined rules for discovery of the devices, which results in faster event translation and alarm generation in the manager. Each device, via its various entities (i.e., fan, power supply, etc.), will quickly inform the manager what it needs to monitor. Procedures built into the UEM will configure the IP address in the device to give the correct path for sending its information during operation.

Quick and accurate interpretation of the system activity is crucial in effective management of the devices. The UEM translates the events into intuitive information, which will inform the user of either the severity of the failure or implication of the event.

UEM translates the events into active alarms, which make the user aware which events require immediate attention versus more minor events/alarms. The alarm view dynamically updates based on the condition of the reported device (i.e., the alarm will be cleared from the alarm view when a device sends a clear event to the UEM).

The Reliable Communication design in the UEM provides Supervision and Synchronization services:

- ***Supervision*** – Provides periodic SNMP Polling to ensure communication is established with each device on the network. The UEM generates communication failure alarms/events when communication between the agent and the manager fails.
- ***Synchronization*** – Used to ensure the accuracy of the state that the device is reporting. If the connection between the UEM and the device is lost, the device will queue up the missed fault events and re-send when the connection is re-established. These Motorola-defined procedures were put in place to enhance the reliability of basic SNMPv3 trap messaging. These procedures manage the re-synchronization of missed failures. The UEM utilizes SNMPv3 informs to enable the device to detect whether the connection has been interrupted.
- ***Northbound Interface (NBI)*** – A real-time event stream using a standard industry protocol that can escalate events to a higher-level management application for added flexibility. NBI is provided for customers who prefer to manage their network with existing tools. The UEM handles the custom/proprietary interfaces to the network elements. The NBI provides a published fault event API to the customer's manager, which allows them to manage both Motorola and non-Motorola devices. The NBI agent supports SNMPv3 and uses a SNMPv3 User-based Security Model (USM) for secure communications with the UEM. The Fault Management Services provided with NBI are: Quick Synchronization – MOM requests more recent activity to update on health; File-Based Synchronization – Request to generate a file for missed information; and UEM-NMS Communication Link Supervision to notify of any interruption.

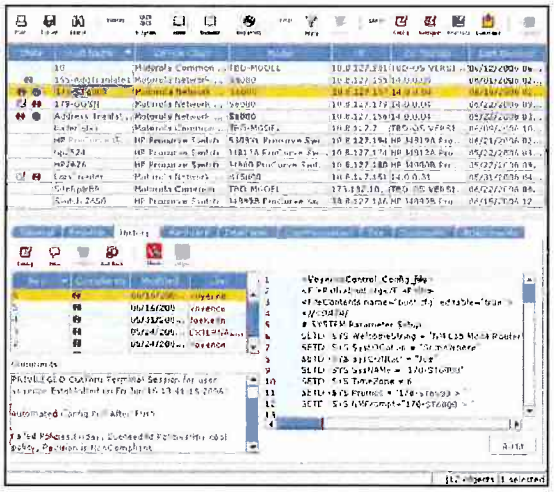
2.3.3 Configuration Management Applications

This section provides information about the applications that provide configuration management capability in ASTRO 25 systems. These devices are the Unified Network Configurator (UNC) and the Provisioning Manager (PM).

2.3.3.1 Unified Network Configurator

The Unified Network Configurator (UNC) is a network change and configuration management tool that enables users to efficiently manage the configurations of networks and devices in an ASTRO 25 system. The UNC is built on VoyenceControl, which is an automated compliance, change, and configuration management system. The UNC provides a single application for the configuration of all radio system and transport devices. Some of the key features that the UNC provides include:

- Efficient, role-based user setup
- Auto discovery of devices/configurations, reducing configuration errors and initial configuration time by providing minimal data entry



Sample UNC Screen

Historical configuration information is easily accessible, along with forensic information and the ability to roll back to previous versions. A valuable tool that the application provides is the ability to create a configuration and not implement it

immediately. The UNC allows another user to approve and implement changes, which can help distribute those changes during off hours when system loading is minimal.

The UNC application allows system management personnel to see planned and current configurations simultaneously for quick comparison. This application offers easy editing screens and configuration "wizards" to reduce data entry.

Benefits of the UNC are outlined in Table 2-2 below.

Table 2-2: UNC Benefits

Feature	Benefit
Built-in Network Tool kit to enable features	Tools provide a methodical process to enable features in the system with minimal labor and chance of error. Examples of these are: turning on authentication on a set of protocols within the Gateways; locking Ethernet switch ports; setting delay; and jitter alarm thresholds.
Auto Discovery of Devices	Components are automatically discovered, and their configurations are added to the database without the need for any manual entry of data.
Scheduled Distribution	Users can determine the time of day when they would like configurations to be sent to the devices, or delay the distribution of a configuration change until approved.
Distribution Monitoring	Allows users to view the status of configuration changes, such as whether the change is in progress, has successfully completed, or has failed.
Change Logging/Audit Trail	Maintains a log of various user interactions with the configuration system that can be used to help diagnose issues.
Configuration Versioning	Constantly tracks and logs versions that have changed and provides the ability to view or compare versions.
Management of Credentials	SSH and SNMP passwords can be managed. Automated mechanism allows seamless password and passphrase rolling, which can be performed automatically if desired.
Wizards for Common Operations	Radio system administrators can perform common operations using a simple web-based interface specifically developed for ASTRO 25 users. Provides an intuitive guide to assist in easy-to-follow setup procedures.
Rollback to Previous Version	Immediately reverts the device configuration to a previously created version.

2.3.3.2 Provisioning Manager

The Provisioning Manager (PM) is a centralized interface for all user and system configuration.

The PM provides the following:

- Configure system-level parameters for call capability.
- Configure system-level parameters for the master site, such as the parameters for home zone mapping and sub-band restricted ID mapping.
- Configure Console Users, Radios, Talkgroups, Multi-Groups, Agency Groups, and Broadcast Data Agencies.

- Configure access control for users in the PM.
- Configure ZoneWatch windows.
- Configure and manage the attributes relating to a zone such as MGEG Application Platform, Aux I/O Configuration, and Consoles.
- Ability to export some configuration data from the PM.
- Ability to import some configuration data to the PM.
- Optional API available to interface to the PM.

Features and benefits for the PM are outlined in Table 2-3.

Table 2-3: Provisioning Manager Features and Benefits

Feature	Benefit
Central Point for All User Configuration Information	Minimizes configuration conflicts created by multiple entry points. Enables simplified control and consistency for subscriber provisioning.
Radio User Capabilities	Efficient configuration capabilities across multiple agencies and system.
Reuse Configuration information Using Profiles	Minimize configuration data re-entry through the creation of profiles that are shared across several radio users and talkgroups.
Intuitive Navigation	Provides a tree-based navigation with objects arranged logically, allowing users to navigate to their required tasks.
Fleet Management	Allows the user to easily create talkgroup and agency group mapping.
Agency Partitioning	Offers the ability to create security groups to partition system management resources among various agencies and users.
Concurrent User Access	Enables distributed configuration management from multiple users.
MCC7500 Console Information Synchronization	MCC7500 consoles are automatically synchronized with radio user configuration information from the system, minimizing data entry and allowing for a cohesive view of configuration information.
Manage Configuration Data Distribution	Provides users with control over the distribution of configuration information to the various network devices in the system.

2.3.4 Performance Management Applications

The Motorola performance suite enables a customer to monitor, manage, and report on system performance in near real-time. The applications empower system managers to proactively plan for expansion. The performance suite is composed of both Motorola and third-party solutions that are all certified, sold, and supported by Motorola. Each application has a unique set of features and benefits to facilitate efficient and effective system management. Together, these applications complete the big picture: how the system is performing, operating, and being used, by providing insight into the activity of each zone, site, subscriber, or talkgroup.

Motorola offers performance management as a standard feature of ASTRO 25 systems. Other standard features include ZoneWatch, Historical Reports, and Dynamic Reports. These features enable customers to manage their communications system business more efficiently. ZoneWatch displays real-time communications activity, while Dynamic and Historical reports collect traffic statistics over predetermined intervals for report generation. These applications are used to monitor, collect, log, and evaluate network performance and resource utilization; they collect statistics about radio resource usage for radio units, talkgroups, channels, sites, zones, and system-wide activity report generation. Dynamic and Historical Reports have archival and export features for saving reports for offline data analysis. Statistics are aggregated into detailed and summarized reports on both an individual zone and system-wide basis.

Additionally, Motorola offers enhanced Performance Management features for ASTRO 25 systems, which are described below. Enhanced Performance Management features are available to provide further insight into system performance. Applications perform a variety of tasks, such as polling system resources, detailed reporting, long-term archiving and logging, and data stream collection.

Affiliation Display

Affiliation Display provides a dynamic view of the sites to which all operating units are currently affiliated; it suggests the area in which a unit may currently be operating based on its last affiliation and the site's radio coverage (Figure 2-1). The application enables system mangers to monitor how radio users travel between different sites in a zone, and to monitor how they communicate with assigned talkgroup members and those outside of their talkgroup. Affiliation Display is used to trace a state/location of a single subscriber, and also to monitor location and affiliation information organized by site, console site, radio, channel, or talkgroup.

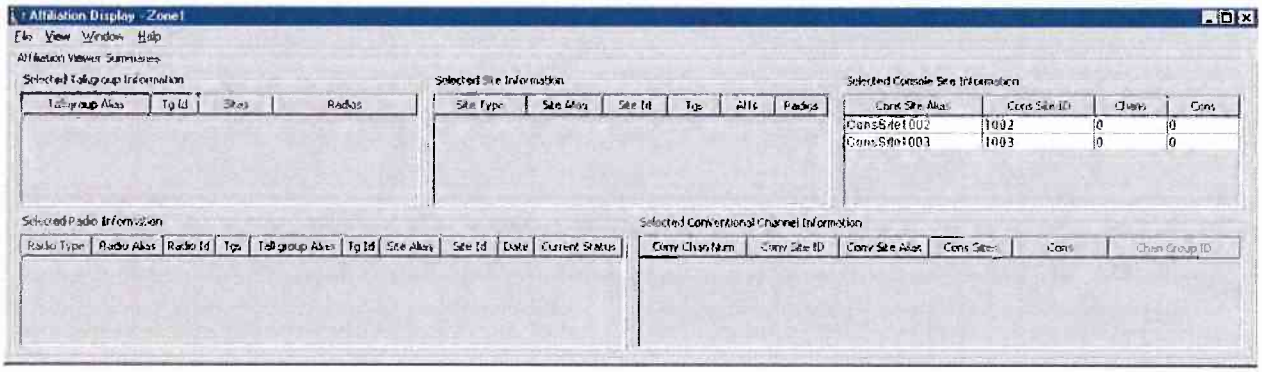


Figure 2-1: Sample Affiliation Display Screen

Table 2-4 outlines benefits of Affiliation Display.

Table 2-4: Affiliation Display Features and Benefits

Feature	Benefit
Real-Time Display	Monitor selected radios, sites, talkgroups, consoles, and conventional channels to track how radios are roaming between sites, and how traffic moves within sites in a zone. Display sites and console sites where each talkgroup is currently operating.

Feature	Benefit
Graphing	Display graphs of the site, console site, and talkgroup data to see how radio usage is distributed across sites and talkgroups, to help determine if system resources are deployed to maximize system performance.

Air Traffic Information Access

The Flexible Air Traffic Information Access (ATIA) interface provides an access point for air traffic call information on the system. Whenever significant events occur in call processing, call information will be provided through ATIA. For non-call activity, the Flexible ATIA interface will provide call information in unique data packet formats. Benefits of ATIA are outlined in Table 2-5.

Table 2-5: Air Traffic Information Access Features and Benefits

Feature	Benefit
Integration Flexibility	ATIA stream data can be integrated with third-party applications to produce detailed reports custom built to a system manager's needs.
All Call Control Information	Information can be used to understand what is happening on the system, e.g., who called, where they called from, and type of call, to monitor the system's operation.

Historical Reports

Historical Reports generate reports on system-wide activity as well as individual zone activity (Figure 2-2). The reports contain statistical data gathered at specific, predefined time intervals. They monitor and analyze information about zones, sites, channels, talkgroups, and users to assist a system manager in understanding how the system is performing; and they are utilized to more efficiently manage resources. Individual reports cannot exceed 16,000 objects (radio users, talkgroups, etc.). Reports can be exported to CSV, HTML, PDF, and XML formats. Table 2-6 on the next page outlines the features and benefits of Historical Reports.

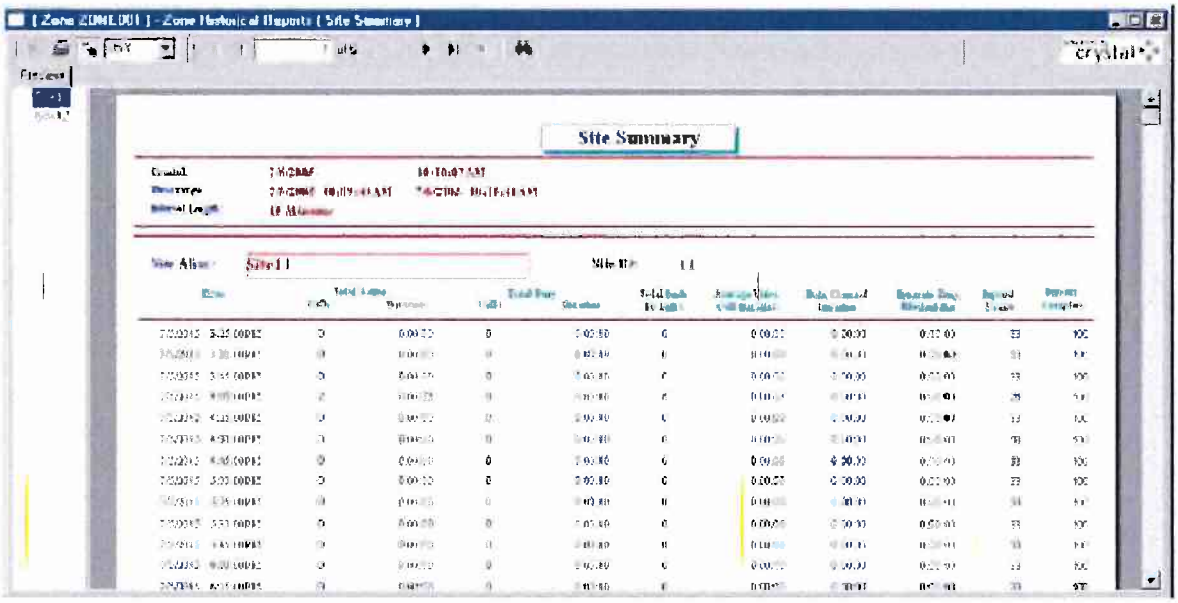


Figure 2-2: Sample Historical Reports Screen

Table 2-6: Historical Reports Features and Benefits

Feature	Benefit
Real-Time Display	Monitor and analyze information about zones, sites, channels, talkgroups, and users to understand how the system is performing and utilized to more efficiently manage resources.
Reports	Create various types of reports at the zone or system level, organized by system resources to analyze activity and performance.
Data Intervals	Historical data is stored in time-based intervals. For each interval type, the oldest interval in storage is removed as a new interval is added to storage. The timed intervals are defined as follows: - Every 15 minutes for 100 intervals (approximately one day; zone level only) - Hourly for 241 intervals (approximately 10 days; system and zone level) - Daily for 62 intervals (approximately 2 months; system and zone level) - Monthly for 36 months (3 years; system and zone level)
Accessing Data/Data Exporting	Users can utilize the Report Scheduler window to schedule zone-wide and system-wide reports to occur at specified times, with an output to a printer or data file. Reports can be exported to one of the following formats: - Comma Separated Values (CSV) - HTML - Adobe Portable Document Format (PDF) - Extensible Markup Language (XML)
Data Storage	Statistics are aggregated into detailed and summarized reports on both an individual zone and system-wide basis; they are available on an hourly basis for 10 days, daily for 62 days, and monthly for 1 year.

Radio Control Manager

The Radio Control Manager (RCM) is used primarily by dispatchers to monitor and manage radio events, issue and monitor commands, and make informational queries of the system database. The RCM runs on a local PC client and, depending upon the configuration in the User Configuration Manager (UCM), can access multiple zones.

Table 2-7: Radio Control Manager Features and Benefits

Feature	Benefit
Radio Commands	- Regroup - Cancel Regroup - Selector Lock - Cancel Lock - Regroup and Lock - Cancel Regroup and Lock - Selective Inhibit - Cancel Inhibit - Storm Plan
Status Commands	- Radio check - Snapshot - Zone Status
Events	- Emergency Alarms - ChangeMe Requests - Status Events
Reports	The RCM Reports tool is used to create, view, print, schedule, and export standard reports from RCM. These reports use a common format so the data can be used in spreadsheets. The report information reflects the actual RCM server database information, except the Emergency Alarms. RCM Reports enables you to present and analyze data showing RCM activity on the system.

ZoneWatch

ZoneWatch is a performance management tool that has customizable displays and grids to monitor real-time communications activity in a single zone (Figure 2-3). The information displayed can help system managers become proactive in making better resource planning decisions, such as when additional channels need to be added.

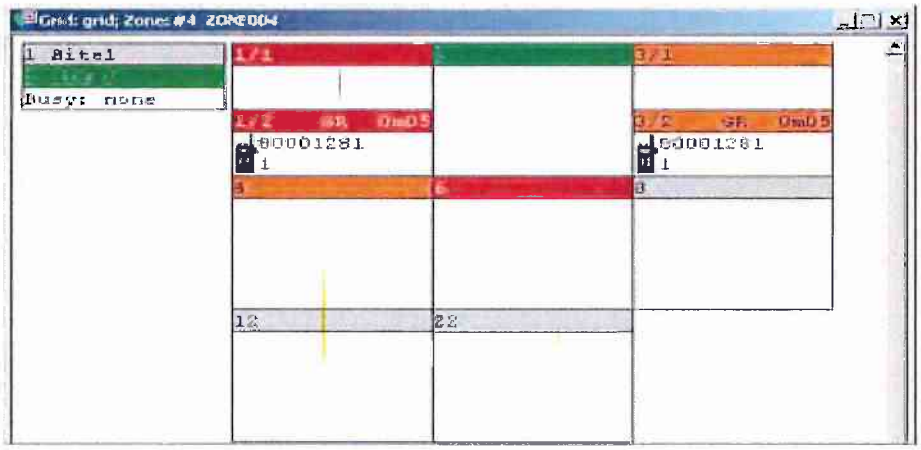


Figure 2-3: Sample ZoneWatch Screen

ZoneWatch also receives fault information relating to repeater sites, console sites, and the zone controller from the UEM. ZoneWatch is used to monitor call traffic and allows the system manager to organize displayed information using various criteria. Benefits of the ZoneWatch real-time display are provided in Table 2-8.

Table 2-8: ZoneWatch Features and Benefits

Feature	Benefit
Real-Time Display	Single Site View, Channel View, and Multisite view display all important radio call information. This provides the manager with insight about radio call activity, channel usage activity, and busy activity, to more efficiently manage the radio system.

2.3.5 Network Transport Subsystem

The ASTRO 25 transport core is engineered to meet the performance requirements of a real-time system transporting voice, call control, network management, and ancillary network services. The Transport Network is a closed network. Only Motorola-supplied equipment, applications, and services can be used on the network.

Ethernet Switch

The Enterprise Ethernet Switch (LAN Switch) is used to aggregate all the Ethernet interfaces for all servers, clients, and gateways.

Cooperative WAN Routing

The Motorola Cooperative WAN Routing (CWR) solution allows core and exit routers to interface directly with RF sites, network management sites, console sites, and inter-zone links.

The CWR solution has the following advantages:

- Provides redundant router failover capabilities
- Allows for easy configuration, testing, and maintenance
- Minimizes downtime during upgrades

The CWR consists of:

- ***Core Gateways***— perform the routing control of audio and data in and out of the zone, while achieving the fast access levels required by real-time voice systems.
- ***Gateway Routers***—used for devices that are multicasting beyond their local LAN, such as to IV&D and High Performance Data (HPD) packet data gateways.

Redundancy

To ensure system availability, the Transport Network provides:

- Redundant Ethernet switches
- Redundant routers

2.3.6 Encryption Capabilities

When it is absolutely critical that communications not be monitored by unauthorized parties, radio systems can be configured with encryption. Encryption ensures only authorized units in the system can listen to transmissions being made. Encrypted calls are protected end-to-end throughout the network.

Project 25 Encryption Algorithms

ASTRO systems can be equipped with current Project 25 algorithms and are fully compliant with all Federal Information Processing Standards (FIPS). The following encryption is available: DES-OFB, DVI-XL, DVP-XL, DES-XL, AES, and ADP.

Software-Based Encryption Algorithms

Advanced Digital Privacy (ADP) is an entry-level encryption algorithm, offered exclusively by Motorola. ADP allows users to protect any and all communications from eavesdroppers and scanners for less cost than the hardware-based encryption algorithms. With Health Insurance Portability and Accountability Act (HIPAA) compliance being more closely scrutinized, many users are implementing this cost-effective security option for all of their users.

2.3.7 System Access Features

To ensure system access, simplify radio operation, and limit operator involvement, the ASTRO 25 platform has many access features, as described below.

Busy Queuing/Call Back

This system has been designed to maximize availability to the end-user. In the unlikely event that all the channels are busy, a user depressing the Push-To-Talk (PTT) will be given a busy signal, and placed into a busy queue. When a channel becomes available, the system assigns the users to a channel via pre-assigned priority levels. Once a channel is assigned, the system notifies the user with a call back tone. This feature makes it unnecessary for the radio operator to waste valuable time rekeying the radio in order to gain channel access.

Automatic Retry

If a channel request is not received at the Zone Controller, the individual radio unit continues sending channel requests until the Controller acknowledges the request, or until a total of 16 automatic retries occur. This feature eliminates the need for the operator to continually key and de-key the radio, or to keep the radio keyed in order to gain system access.

Recent User Priority

To ensure uninterrupted communications, a recent radio user priority provides those users who have been recently assigned a voice channel priority over the other system users. Recent user priority ensures that a talkgroup engaged in a conversation receives priority system access for up to 10 seconds between transmissions.

Misdirected Radio Protection

To ensure a radio from one talkgroup cannot accidentally be assigned to a voice channel being used by a different talkgroup, the system utilizes embedded signaling. If a unit from a different talkgroup is accidentally assigned the same channel, the radio will recognize that it has been assigned incorrectly, and will automatically revert to the control channel.

Continuous Assignment Updating

Once a talkgroup is assigned a voice channel, the control channel continues to transmit the channel assignment for as long as that talkgroup is using the channel. This ensures a radio just coming into service will be sent to the appropriate voice channel to join the rest of its talkgroup.

Talk Prohibit Tones

In the event a user attempts to perform an unauthorized function as defined by system permissions, a talk prohibit tone is given.

User Talkgroup Features

To enhance user functionality, the ASTRO 25 platform has many talkgroup features, also known as group call, as described below. These features are configurable by the System Administrator.

Emergency Alarm/Call

Emergency alarm/call provides users the capability to inform dispatch personnel of a life-threatening situation. By pressing the radio's emergency alarm button, an audible and visible alarm and the user's ID is sent to the dispatcher and, potentially, other talkgroup members.

In emergencies, the dispatch center is notified immediately, regardless of whether the system is busy. If one or more voice channels are available, one of those channels will be assigned immediately to the emergency call when the user presses the PTT switch. The duration of the emergency call can be defined by the system administrator.

In the event that the system is busy, two alternatives are provided for handling emergency traffic:

- ***Top of the Queue***— When an emergency is initiated and no channel is available, the emergency user is put at the top of the busy queue. As soon as the first user on any channel de-keys, the emergency caller is assigned that channel. The major advantage to this approach is that there is no contention for the channel.
- ***Ruthless Preemption***— When an emergency is initiated and no channel is available, the Zone Controller selects the channel assigned to the lowest priority user and assigns it to the emergency caller—a feature unique to Motorola trunking systems.

Multiple Priority Levels

The system provides 10 priority levels, allowing administrators to segment their users according to their communications needs. Priority 1 is always reserved for emergencies. Priorities 2 through 10 can be assigned by the System Manager on a per radio or talkgroup basis. These priorities are only applicable when the system is busy.

Multi-Group Call

Multi-group call is used to make a simultaneous call to multiple talkgroups, and allows all units to be configured for talk back capability. The System Manager can program this call to operate in one of two ways:

- The requesting user waits for all requested talkgroups to finish all calls in progress.
- The requested call immediately interrupts other conversations in progress without waiting for active users to de-key. Radio users who are transmitting on a voice channel will not hear the call until they de-key.

Priority Monitor

Priority monitor allows the radio user to scan talkgroups in their system, and mark up to two talkgroups in their scan list as Priority. A non-priority conversation will be interrupted by Priority 1 or Priority 2 talkgroup activity.

Dispatch Console/Talkgroup Merge

Talkgroup merge is a dispatch function that allows multiple talkgroups to operate together on one voice channel, improving channel efficiency. This is a standard feature of Motorola wireline consoles.

2.3.8 Individual Call Features

To further enhance user functionality, the ASTRO 25 platform has individual call features in addition to user talkgroup features, as described below. These features are configurable by the system administrator.

Call Alert

Call Alert allows a dispatcher or radio user to selectively page an individual's radio. Call Alert signaling is conducted over the control channel and does not affect voice channel capacity. The Call Alert produces an audible and visual alert on the receiving radio. Indicators on the initiating radio acknowledge delivery of the Call Alert. If the receiving unit has a display, it will show and store the sending unit's ID.

In-Call User Alert

In-Call User Alert is a feature that builds upon Call Alert. When In-Call User Alert is enabled on the system, radios will be able to receive Call Alerts even when involved in voice and data services.

Radio Talkgroup Muting

Radio Talkgroup Muting is a feature that utilizes the Call Alert feature. Radio Talkgroup Muting allows the radio user to mute all voice traffic for the currently selected talkgroup.

The radio can be automatically un-muted by the console dispatcher or another radio user by sending the muted radio a Call Alert. With In-Call User Alert enabled, the Call Alert will reach the muted radio when it is on the voice channel or a data channel, as well as if it is idle on the control channel.

Private Call

Private Call allows a radio user or console dispatcher to selectively call and carry on a private conversation with another individual radio, as long as that unit is not already engaged in another Private Call. The calling unit will receive an acknowledgment of a successful Private Call. If the receiving radio has a display, it will show the calling party's unit ID.

2.3.9 User Accessibility Features

Affiliation Display

The Affiliation Display provides a dynamic view of the sites to which all operating units are currently affiliated, making it easy to track and troubleshoot radios in the system. Specifically, it provides a dynamic view of:

- Sites
- Talkgroups
- Individual radios

This allows a manager to understand the loading characteristics of their system in real-time. Graphing capabilities are also included. Figure 2-4 on the next page provides a selected site graph example.

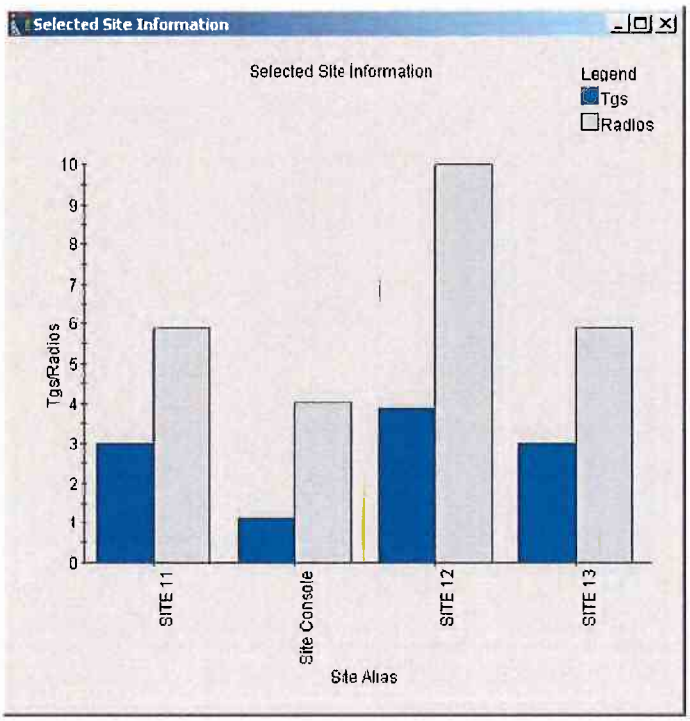


Figure 2-4: Selected Site Graph Example

SNMP Trap Forwarding

SNMP trap forwarding allows for the forwarding of alarms from the UEM application to an external third party application utilizing an industry standard protocol (SNMP v3 management system). This feature permits your existing network to actively monitor alarm conditions within the radio network; a developer's guide is provided.

Northbound Interface

Forwards alarms from the Unified Event Manager (UEM) application, allowing your existing network to actively monitor alarm conditions within the radio network.

Email Alerting

Email alerting sends notifications for system alarms in the UEM to a specified email address. Alarms can also be forwarded to a mobile device such as a cell phone or PDA.

2.4 ASTRO 25 SYSTEM FAILURE MODE ANALYSIS

Motorola's ASTRO 25 trunking networks have three modes of operation for increased reliability. The normal mode of operation is wide-area trunking. In the event of multiple component failures that lead to system disruption, the system is equipped to continue operation in two reduced feature operational modes: site trunking and failsoft.

This section includes a detailed description of each of these operational modes, as well as a comprehensive analysis of the possible infrastructure failure scenarios and the system redundancy for mitigating each scenario.

Wide-Area Trunking

Wide-area trunking is the ASTRO 25 system's normal mode of operation. Wide-area trunking implies that the Fixed Network Equipment is operating properly. All simulcast cells and ASTRO 25 repeater sites are communicating with the Master Site. Subscriber units automatically roam between the various network RF cells. Talkgroup calls occur in the appropriate RF cells if users are distributed throughout multiple cells. Data applications are properly assigned channels for communication between the subscriber units and the host application.

Site Trunking

Site trunking is the first failover mode of operation. Site trunking impacts individual RF cells within a network. In multiple RF cell systems, one RF cell can be in site trunking, while the rest of the system remains in wide-area trunking. Site trunking implies that the simulcast prime site controller or the ASTRO 25 repeater site has lost connectivity with the Master Site. Talkgroup calls initiated in the RF cell that is in site trunking will only be broadcast in that RF Cell. Dispatch consoles use control stations, or the operators use portable radios to communicate on a site trunking RF cell. Console priority is not available in site trunking. Data applications are not available on a site in site trunking and will have to be reinitiated once the system reverts to wide-area trunking.

Radios detect if a site is in wide-area trunking or site trunking. Radio models with a display will indicate to the user when the site is operating in site trunking. The radio alternately displays the selected talkgroup and "Site Trunking." Depending on how the system and user equipment are programmed, subscriber units will try to roam to an RF cell that is in wide-area trunking.

Failsoft by Talkgroup

Subsystem/site failsoft is the final fallback means of communication if a site no longer maintains wide-area or site trunking operation. Multiple failures have to occur for the system to enter failsoft. Failsoft impacts individual RF cells within a network. In multiple RF cell systems, one RF cell can be in failsoft, while the rest of the system remains in wide-area trunking. The subsystem goes into failsoft mode in any of these scenarios:

- The site controllers are not functioning properly

- When all control channels are disabled or malfunctioned
- When only one channel is enabled

Failsoft operation provides communications in conventional mode via repeaters/base radios in order to maintain vital communications. In an IP multi-site simulcast subsystem, in subsystem-wide failsoft, received audio is routed to the comparator for voting and redistributed to all of the sites for simulcast transmission.

The subscriber's operation in failsoft mode is determined by the subscriber's programming. A subscriber can be programmed to behave in the following manner:

- ***Failsoft by control channel operation*** – The subscriber first scans for alternate control channels outside the multi-site subsystem, then scans the control channel frequencies for failsoft data.
- ***Failsoft by working group*** – The subscriber looks for Failsoft data on a pre-programmed frequency after a scan for alternate control channels outside the multi-site subsystem is unsuccessful. If the subscriber cannot decode failsoft data on the pre-programmed frequency, the subscriber then scans the control channels in the simulcast subsystem for failsoft data.

Subscriber units in an RF cell that is in failsoft will try to roam to an RF cell that is in either wide-area trunking or site trunking. Dispatch consoles use control stations or the operators use portable radios to communicate on a site trunking RF cell. Console priority is not available in site trunking. Data applications are not available on a site in failsoft and will have to be reinitiated once the system reverts back to wide-area trunking.

2.5 ASTRO 25 INFRASTRUCTURE

2.5.1 Master Site Components

A zone has a master site that contains the computing backbone for that zone. The master site contains all the components necessary for controlling calls within a zone and for communicating with other zones to manage InterZone calls in a multi-zone system. In addition, the master sites provide the hardware and software components that are used for Network Management and system configuration.

All the components that communicate over Ethernet are connected through a central switch called the master site Ethernet LAN switch. This switch provides two separate internal LANs which are integrated to provide redundant links for critical network traffic.

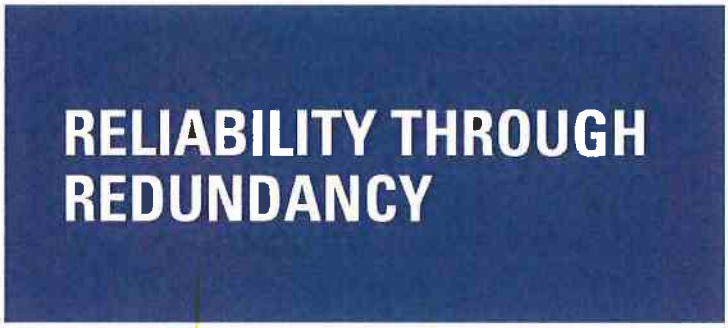
The zone controller is used to process system-wide commands and handle call processing and mobility management functions for the system. In systems with two zone controllers, there is a connection from each zone controller to the LAN switch and a direct connection between the two zone controllers. The LAN switch connection allows each zone controller to communicate with the gateway routers/Core Gateways.

2.5.1.1 Zone Controller

The Zone Controller provides trunking call processing for ASTRO 25 system operation. The Zone Controller forms the heart of a wide-area radio system by providing the central processor for the zone,

with the necessary hardware and software capabilities to provide call processing and mobility management.

The Zone Controller builds upon the strength and experience of Motorola wide-area trunking systems to deliver multiple layers of reliability for business-critical, Mission-Critical and life-critical applications.



The Zone Controller is supplied in a redundant controller configuration, and provides the following:

- **System Availability** – The Zone Controller allows software upgrades once loaded, providing enhanced system availability.
- **Intelligent Switchover** – The Redundant Configuration provides automatic switchover to the standby controller if a loss of wide-area communications is detected. Notification can be sent to the user if other components fail, allowing the user to manually switch to the standby controller if desired.
- **Cross Controller Compatibility** – Capable of running two different versions of software simultaneously, ensuring upgrades are fully functional with one controller before upgrading the second controller.
- **Redundant Configuration** – The Redundant Zone Controller is a computer platform with redundant processors that provide trunking call processing for ASTRO 25 wide-area radio communication systems. It is designed to detect failures by automatically switching operation to the standby controller, minimizing the interruption of call processing functionality.

2.6 WAVE SOLUTION OVERVIEW

2.6.1 WAVE Interoperability

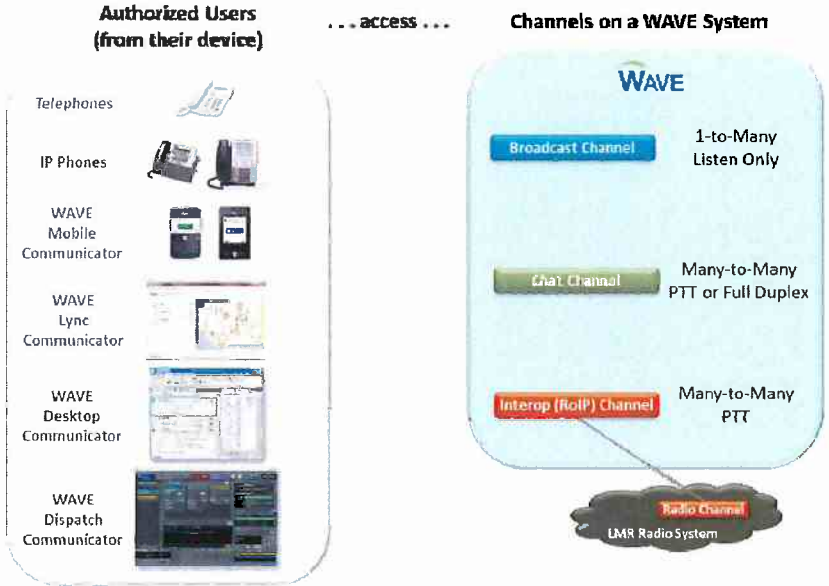
All Motorola ASTRO® 25 Master Sites now include all of the hardware necessary to utilize the WAVE family of products. In order to fully utilize WAVE software licensing will be required. 12-month demo licensing has been included and this section of the system description elaborates on the functionality of the various WAVE components.

WAVE provides a secure, high-performance voice push-to-talk (PTT) service that operates over corporate Local / Wide Area Networks, commercial 4G/3G networks and Android/iOS devices, as well as desktop PCs. This service supports interactive connection capabilities from those commercial devices running on a data network to Land Mobile Radio (LMR) and Project 25 (P25) devices.

Seamless communications and interoperability are mission-critical requirements for LMR users and non-LMR users to maintain daily operations. Motorola's WAVE solution also provides enhanced communications and interoperability between commercial 4G/3G device users and P25 device users.

Motorola's WAVE solution consists of four major applications: the Mobile Communicator, the Desktop Communicator, the WAVE Lync Communicator, and the WAVE Dispatch Communicator.

- ***WAVE Mobile Communicator***—This PTT Smartphone application allows mobile users to access any authorized talkgroup using a data connection from their device. With this PTT software client, users can listen/talk on broadband talkgroups and talkgroups interconnected to LMR systems from anywhere (in the world) with cellular data service. This capability is currently supported via the 3G/4G carrier of choice over iOSs and Android mobile devices.



- ***WAVE Desktop Communicator***—This PTT software client allows users to monitor/talk on talkgroups and has features such as instant playback, status/presence information, and location/maps.

- ***WAVE Lync Communicator*** – this WAVE software client extends access to WAVE channels from Microsoft Lync systems. This client can be used by Local/Regional/State agencies who have implemented this Microsoft Unified Communications solution.

- ***WAVE Dispatch Communicator*** – this WAVE software client provides dispatch functionality to users, allowing them to monitor/talk on WAVE talkgroups, perform patching, make/take phone calls, respond to man-down alarms, etc., all through a unified software interface that can run on virtually any computer.

2.6.1.1 Land Mobile Radio (LMR) Interface

WAVE supports wireline interface with the Motorola ASTRO® 25 network via the WAVE radio gateway. This interface leverages the protocols of Project 25 ISSI and the unique value added features of Motorola's ISSI 8000 platform.

2.6.1.2 WAVE Server Features

The WAVE solution is comprised of an integrated PTT server (Proxy/Media/Management applications) to support PTT communication over commercially available iOS, Android Smartphone devices over the customer-preferred choice of 3G/4G public carrier networks. Broadband users can make use of following features:

- ***Individual Private Call (One-to-One):*** An individual private call can be made between two 4G/3G commercial device users. The initiating PTT user selects an individual from the PTT contact list and presses the PTT button. All communication between broadband and LMR users are group calls and one-to-one communication between broadband and LMR users is not currently supported.
- ***Talkgroup Call:*** This represents a call to a group of PTT users associated and defined as part of the talkgroup established in the Enterprise Management System. A WAVE talkgroup call can include 4G/3G commercial device users and P25 radio users.
- ***Late Call Entry:*** The 4G/3G commercial device user will join in-progress talkgroup calls if they happen to miss the start of the call.
- ***PTT User Presence & Location:*** 4G/3G commercial device users will see the current presence & location of WAVE contacts. User can also choose to map/locate WAVE talkgroup members.
- ***Enterprise Management Capabilities:*** to manage individual and group contact lists.

2.6.1.3 PTT Use Cases and Benefits

- ***Extending Reach*** to radio users outside the coverage of the ASTRO 25 system, enabling Global Broadband Connectivity.
- ***Enhancing Choice*** for users who cannot or do not carry a radio, but still need occasional interoperability with radio users.
- ***Increasing Productivity*** by enabling non-radio users to collaborate efficiently via secure PTT communication.

2.6.2 WAVE Equipment

2.6.2.1 Typical WAVE Block Diagram

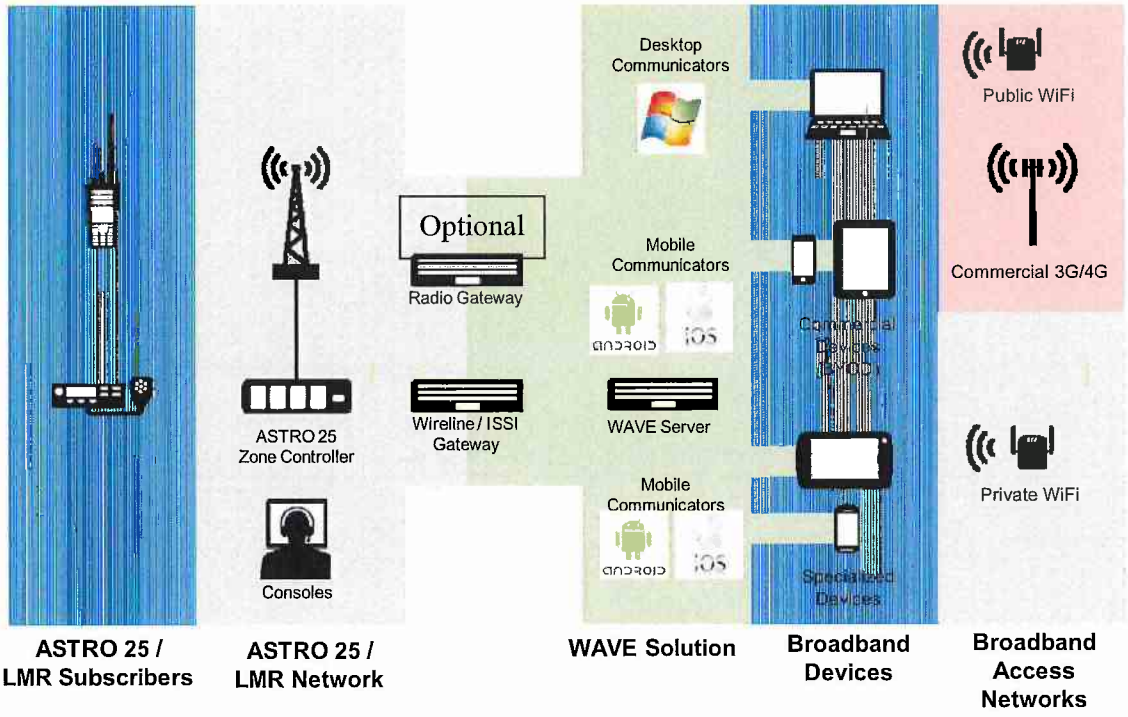


Figure 4-5: PTT Interoperability between different users

2.6.2.2 System Components

The following hardware and software components are included in ASTRO 25 systems:

WAVE Hardware Components

- (1) WAVE Server
- (1) Ethernet Switch
- (1) Firewall
- (1) ISGW Gateway Server with WAVE Radio Gateway software license

WAVE Software Components

- (1) WAVE Server License
- (1) WAVE LMR Communication Channel
- (1) WAVE Mobile Communicator Licenses for Android & iOS – 12 Month Demo License
- (1) WAVE Desktop Communicator License – 12 Month Demo License
- (1) WAVE Web Communicator License – 12 Month Demo License

2.6.3 Services

2.6.3.1 CCSI Staging

The ISGW server, WAVE server, and firewall will be installed in the ASTRO 25 rack by CCSI. Demonstration software and licenses will be included to support five demonstration client licenses.

WAVE server features will be demonstrated during staging including Private Call, Talkgroup Call on broadband only channel, and between broadband and LMR connected Radio.

2.6.3.2 Installation Services

The ISGW server, WAVE server and firewall (installed in the ASTRO 25 rack by CCSI) will be powered if appropriate power receptacles and HVAC are provided. Motorola will validate that a WAVE Talkgroup Call can be placed on both a broadband channel and to an LMR radio channel as configured in CCSI. The Talkgroup Call to a WAVE client will be demonstrated on a Motorola laptop(s) connected to a WAVE server LAN port. This proposal does not include connecting the WAVE server to Customer Enterprise Network (CEN) or customer client devices.

SECTION 3

MCC7500 DISPATCH MIGRATION

3.1 MCC7500 SOLUTION OVERVIEW

Motorola's proposed dispatch migration solution for the City of Long Beach features our MCC7500 Dispatch Console, offering IP-based seamless connectivity between Long Beach dispatch operations and field personnel. In order to address the unique needs of Long Beach this proposal includes multiple third-party solutions, allowing Motorola to provide Long Beach with a turn-key solution. The third party components include equipment to utilize existing fiber backhaul and a CTI monitoring and control network for existing comparators.

The proposed solution will provide City of Long Beach with a scalable design, flexible system architecture, sophisticated network management, and an easy migration path to future capabilities. Motorola has included licensing for AES encryption for each of the thirty-two (32) MCC7500 dispatch console positions. In order to utilize encryption, an upgrade to the City of Long Beach's RF infrastructure and subscribers is required.

MCC7500 Console Configuration for City of Long Beach

The proposed solution includes thirty-two (32) MCC7500 Dispatch Console's designed to interface with a ASTRO® 25 7.16 Master Site. The dispatch positions will be spread out across six (6) physical separate dispatch locations. The proposal details the functionality of the following dispatch locations and components.

Dispatch Locations

- 21 Positions - Emergency Communications and Operations Center
- 3 Positions - Gas Dispatch
- 5 Positions - Joint Command and Control Center Dispatch
- 1 Position - Signal Hill Dispatch
- 1 Position - Long Beach Airport Dispatch
- 1 Position - Wireless Shop.

Operator Position Equipment

- MCC7500 Dispatch Console (x32)
  - 22" LCD Displays
  - Two (2) Headset Jackboxes
  - One (1) Gooseneck Microphone
  - One (1) Supraplus Headset
  - Dual Pedal Footswitch
  - Dual Instant Recall Recorder (IRR)
  - AES Encryption

Backroom Electronics (Per Site)

- GGM 8000 Site Gateway
- HP 2620-24 Switches
- GCP 8000 Conventional Site Controller (CSC)
- High-Density Enhanced Conventional Channel Gateway (CCGW)
- SDM3000 Auxiliary I/O Server

Comparator Monitor & Control Network

- GGM 8000 Site Gateway
- HP 2620-24 Switch
- MCN 8000 Server
- Twenty-five (25) Comparator Interface Modules

3.2 LONG BEACH MCC7500 DISPATCH SYSTEM BLOCK DIAGRAM

The following page is the Long Beach MCC7500 Dispatch System Block Diagram.

3.3 THE MCC7500 DISPATCH EXPERIENCE

The MCC7500 dispatch consoles offers Long Beach state-of-the-art communications, console management and configuration functionality, dispatch operation, and communications security.

The proposed system also offers Long Beach the capability to maintain both audio and data recording of the calls made on the communications system.

3.3.1 Interoperability Features

Motorola's ASTRO® 25 product line is specifically designed around APCO P25 standards. All voice messages are digitized and all Land Mobile Radio (LMR) system features are compliant with P25 standards. As part of ongoing enhancements to this solution, Motorola has joined and actively participated in the P25 interoperability committee to ensure continuously improving interoperability with the radios of other P25 vendors. ASTRO 25 is also fully Common Air Interface (CAI) compliant.

MUTUAL AID INTEROPERABILITY OFFERS FLEXIBILITY AND FUTURE EXPANSION.

Motorola can use multiple customer-furnished interoperability radios to install, configure, and make operational the necessary hardware and software to provide two-way communications between the MCC7500 dispatch consoles and Mutual Aid channels.

As shown in Figure 3-1, interoperable communications can be provided through a dispatcher-initiated interface (patch) to the Mutual Aid radios. The Motorola Conventional Channel Gateway (CCGW) forms the bridge between the MCC7500 dispatch console on the ASTRO 25 radio network and the Mutual Aid radios. This allows the dispatcher to patch together Mutual Aid radios and required subscribers on the ASTRO 25 system as situations dictate.

As an incident occurs, local Mutual Aid agencies can initiate a radio conversation to an MCC7500 dispatch location via a programmed channel. By selecting an icon on the console monitor, the dispatcher can initiate a patch to an RF channel for first responders as necessary. Incident conversations will be seamless from the moment of the patch initiation, and can be recorded like any talk group conversation within the LMR network. The dispatcher will also be able to take part in and monitor conversations for the duration of the incident, as necessary.

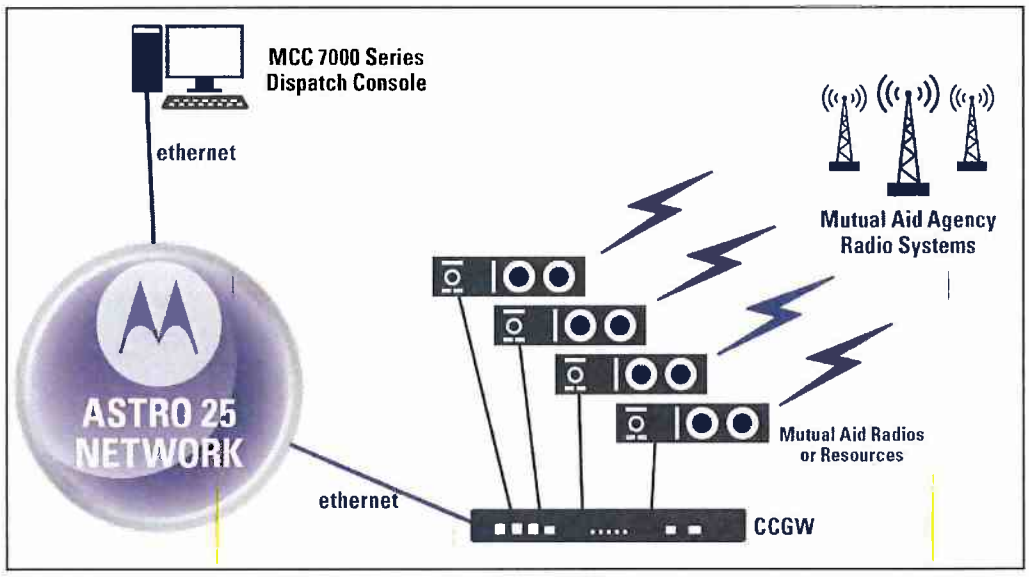


Figure 3-1: Mutual Aid Components

3.3.1.1 Integration with the ASTRO 25 Network

The MCC7500 IP Dispatch Console is designed to integrate seamlessly with a ASTRO® 25 7.16 system. This tight union between radio infrastructure and dispatch console equipment has several operational benefits to City of Long Beach.

This modular IP approach substantially reduces the amount of space needed for backroom electronics. All dispatch activity is performed over IP. The physical space needed to accommodate the MCC7500 console position is comparable to that required for a personal computer.

THE MCC 7000 SERIES CONSOLES' IMPROVED USE OF BANDWIDTH ENSURES THAT EMERGENCY CALLS WILL MAKE IT THROUGH TO THE DISPATCH OPERATOR, REGARDLESS OF SYSTEM TRAFFIC.

Both trunked talkgroups and conventional radio channels can be accessed and controlled from one MCC7500 IP Dispatch Console over the same network. This reduces overall transport costs and the need for duplicate fixed network equipment. Table 3-1 outlines the benefits of the MCC7500's seamless integration to the ASTRO 25 network.

Table 3-1: Benefits of Seamless Integration of the MCC7500 IP Console with an ASTRO 25 Network

Feature	Benefit to Long Beach
Tight coordination between the IP network and IP console eliminates the potential for audio degradation.	Subscribers and console operators will be able to communicate without loss of information.
Emergency calls are prioritized for successful delivery regardless of network traffic.	Console operators will always be able to hear emergency calls from users in the field.
Inherent access to all system resources within the network provides dispatch priority to reach any user when needed.	Console operators will always be able to reach out to users in the field.
Rapid call set up times and quality of service, regardless of the size of the system.	The ability to scale the system to handle future capacity, while maintaining efficient dispatch operations.
True end-to-end encryption capable from the subscriber to the console operator position, enhancing operational security	Assurance that sensitive, private communications will remain secure, from the user in the field to the console dispatch operator.
Improved bandwidth efficiencies reduce transport costs.	Ongoing cost savings.

3.3.1.2 Voice Encryption

The MCC7500 provides true end-to-end encryption from the subscriber to the console operator position, enhancing operational security. This assures that sensitive, private communications will remain secure, from the user in the field to the console dispatch operator. DES-OFB encryption has been included in two (2) of the proposed MCC7500 positions. AES encryption for every position has been included in the proposal.

3.3.2 Console Operations

The MCC7500 dispatch console is designed to provide mission-critical audio between the dispatch console and users in the field. It is optimized for real-time audio, prioritizing emergency calls over other traffic, minimizing voice queuing, and transmitting calls in 450 milliseconds or less.

Using robust error mitigation to maintain call quality even when the system is heavily loaded, the MCC7500 dispatch console reduces communication errors that may force dispatch console operators to repeat their transmissions.

3.3.2.1 Dispatch Interface

The MCC7500 dispatch console's graphical user interface (GUI) optimizes user efficiency. It is designed to display the maximum number of resources a dispatch operator is able to easily view and control. The City of Long Beach can customize the MCC7500 dispatch GUI by agency or by individual user to meet their dynamic needs and requirements.

EASY TO USE, FLEXIBLE, AND CUSTOMIZABLE USER INTERFACE

Elite Dispatch Graphical User Interface

The MCC7500 dispatch GUI is an enhanced version of Motorola's Gold Elite Dispatch GUI. For existing Gold Elite users, the GUI allows a smooth transition and minimal training for radio dispatch operators. For new users, the graphical icons and customization options make the MCC7500 dispatch console GUI easy to learn and operate.

An example of the MCC7500 dispatch GUI is shown in Figure 3-2.

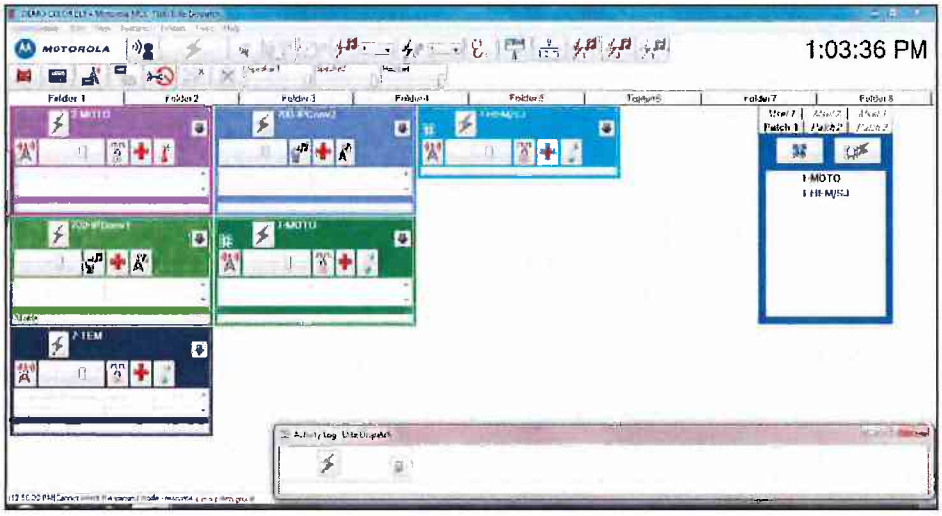


Figure 3-2: The MCC7500 dispatch GUI delivers critical real-time information is delivered to the console operator when and where they need it

Based on operator preference, the MCC7500 dispatch GUI can be customized to show details of trunked and conventional RF channels on a per-channel basis. Various controls can be highlighted, such as patch status, frequency select, coded/clear select, and individual volume control. Per-channel controls can be fully or partially shown, or hidden to save space on the screen. Busy dispatch operators can respond to a missed call by simply clicking on an entry in the Activity Log. The number of calls and call information displayed in the Activity Log is customizable to suit the needs of the user. The status of auxiliary inputs and outputs can be conveniently interpreted from the GUI with the use of familiar graphical icons, such as a door shown open or closed.

3.3.2.2 Standard Radio Transmission and Reception

A typical MCC7500 dispatch console has two speakers, one for selected audio and the second for all remaining unselected audio. Additional speakers can be added to the console, allowing dispatch operators to configure a specific speaker for a set of designated audio sources. This simplifies multitasking between multiple audio sources, allowing flexibility in the way the audio is presented to the dispatch operator.

Receiving Calls from the Field and Other Dispatch Operators

Dispatch operators have great flexibility as to how to hear calls from field radio users and other dispatch operators. Each console dispatch operator can define his or her own audio reception profile. They can select a single audio source, whether conventional or talkgroup, to be heard on a selected speaker ("Single Select"). The dispatcher can also define groups of radio resources that can all be heard on a selected speaker ("Multi-Select").

Initiating Calls to the Field and Other Dispatch Operators

The dispatch operator has several different ways of initiating a call. In most circumstances, a "General Transmit" is appropriate. With the general transmit, the dispatch operator selects a resource on the console and activates the transmission through a footswitch, headset transmit button, or a microphone transmit button.

If the dispatch operator needs to quickly transmit on a resource, they use the "Instant Transmit" function, which activates the resource regardless of whether it is selected. To prevent accidental activation of "Instant Transmit," it can be limited through an "Instant Transmit Safety Switch," which must be pressed prior to activation of "Instant Transmit."

Making Calls to the Field and Other Dispatch Operators

The dispatch operator can transmit audio in different ways, depending on who they need to speak with and how important that communication is. Most basically, they can make calls to all users listening to a specific conventional radio resource or a specific trunking talkgroup. When multiple resources are required, the operator can select additional talkgroups and/or conventional channels as needed for the call using the multi-select feature.

The MCC7500 console enables dispatch operators to make private calls to individual field radio users or dispatch operators. Once this private call is established, it can be patched in with another resource at the dispatch operator's discretion.

3.3.2.3 Dispatch Audio Experience

Emergency Alarms

The MCC7500 dispatch console is capable of monitoring radio subscribers for user initiated emergency activations. On subscriber radios that are equipped and programmed to transmit an emergency alarm, the MCC7500 dispatch console detects that this emergency has occurred and displays the emergency on operator positions that are preprogrammed to receive the emergency notification.

Operator positions can be programmed to either receive the emergency or to completely ignore it. In the event of an emergency condition from a radio user, all programmed consoles will give both an audible and visual indication of the event. The dispatch operator can then silence the emergency leaving the visual indication on the screen indicating information on the initiating radio allowing the call to be handled and dispatched appropriately.

Once an emergency is received all programmed operator positions will give the audible and visual indication of the event. Any one of these operator positions has the ability to silence the emergency at only their position or for all operator positions on the system.

In the event of a system that all channels are busy at the RF site that receives the emergency, that event is automatically given a Priority Level 1. This is the highest priority possible, putting the emergency call at the top of any busy queue. The emergency call will be given the next available voice channel at that site bumping all non-emergency calls in the queue.

Headset Jack

Each dispatch console is capable of supporting up to two headset jacks. A headset jack allows a dispatch console user to use a headset while operating the dispatch console. Each headset can either be connected to the console for supervisory applications, or to a desk telephone. The equipment design proposed includes two headset jacks per operator.

The headset jack contains two volume controls: one for adjusting the level of received radio audio and one for adjusting the level of received telephone audio.

The headset jack supports headsets which use either PJ7 (6-wire) or PJ327 (4-wire) longframe connectors (6-wire headsets have a PTT button while 4-wire headsets do not have a PTT button).

Headset Base

The Headset Base consists of an audio amplifier, a push-to-talk switch and a long cord with a PJ7 long frame connector at the end.

Footswitch

Each dispatch console is capable of a dual pedal footswitch. The footswitch can be configured to control general transmit and monitor functions.

Instant Recall Recorder Port (for Radio)

Short-term, console-specific audio recording is a mechanism used to record a portion of the inbound audio present on a specific dispatch console and make it readily available to the dispatch console user. This recorded audio is retained by the recording system for a short period (typically about 60 minutes) and is easily played back by the dispatch console user. This allows the dispatch console user to replay received audio that the user may have missed.

The instant recall recorder port (for radio) allows an instant recall recorder to be connected to a dispatch console. The port provides an output containing the receive radio audio on the selected channels. Transmit audio of any type (from either this dispatch console or a parallel dispatch console)

as well as tones generated by the dispatch console (emergency tones, callback tones, busy tones) are not included in the audio output.

Dispatch console generated tones (e.g., emergency alarm tones, trunking busy tones, error tones, etc.) are not included in the audio appearing at the analog audio output. This is done so that they do not interfere with the dispatch console user's ability to understand the voice audio that was recorded.

3.3.2.4 Radio Patch Control

MCC7500 console users can patch communication between trunked and/or conventional radios that are normally unable to communicate with each other due to different features, programming, or even different frequency bands. A patch group is a group of linked resources that can both receive messages from a console and transmit to all other members of the patch group. The MCC7500 supports a maximum of 16 active patch groups.

Setting up a Standard Patch

A dispatch operator can set up a standard patch between trunked resources and/or conventional resources. After the patch is created, the dispatch console transmits all audio on one resource to all other resources in the patch group.

Patched radio users see the ID or alias of the other patched radio(s), as opposed to that of the console, provided that the radio subscriber is capable of displaying IDs. This minimizes confusion and the need for the dispatch operator to intervene in the call. Patches are automatically re-established if interrupted so the MCC7500 user can concentrate on continuing operations.

Pre-Defined Patches

Patches can also be pre-defined, and be automatically re-initiated each time a dispatch console computer is restarted ("Patch Auto-Start").

Using Multi-Select

The Multi-Select feature allows a dispatch console to define groups of selected radio resources. When a Multi-Select group is opened, all of the resources in the group are simultaneously selected. Resources can be added or removed from a Multi-Select group while it is open or while it is closed.

The Multi-Select feature:

- Selects multiple resources simultaneously.
- Defines and stores groups of resources so that multiple resources can be conveniently selected and deselected.

3.3.2.5 Call Management and Control

Automatic Prioritization of Calls

Calls on the MCC7500 dispatch console are prioritized through a transmission hierarchy. Calls from primary supervisors take priority over those from secondary supervisors, which in turn take priority

over non-supervisors. Instant Transmit or All-Points Bulletin (APB) transmissions, regardless of whether they are from a supervisor, will take priority over general or patch transmissions.

Multiple dispatch console operators can be designated as primary supervisors on the same system, which is useful when multiple agencies share one system, each with their own primary supervisor.

Console supervisors have the capability to disable and enable operator console functionality as necessary.

Manual Prioritization of Calls

"System Access Priority Select" allows a dispatch operator to prioritize trunked resources on the system as either "normal" or "tactical." A dispatch operator can change the priority of a trunked resource to tactical in order to give the resource a better chance of gaining communication access on a busy system. Only emergency calls have a higher priority than tactical. When the System Access Priority status of a resource is changed, it is updated at all dispatch consoles in the systems that are monitoring that trunked resource.

3.4 MCC7500 DISPATCH CONSOLE COMPONENT DESCRIPTION

An MCC7500 Dispatch IP Console consists of the following elements:

- Operator position computer
- Voice Processing Module (VPM)
- Instant Recall Recording (IRR)
- Network equipment
- Conventional Channel Interface equipment

This section discusses the various components that make up the proposed MCC7500 Dispatch Console system, Figure 3-3. These components are connected together and to the rest of the ASTRO 25 system on an IP network via console site routers and switches. The MCC7500 Dispatch Console functions as an integrated component of the total radio system, fully participating in system level features such as end-to-end encryption and agency partitioning.

Since the network is IP-based, the system's interfaces and components can be distributed physically throughout the network. Logging components can be centrally located at the zone core or distributed at console sites. CCGWs can be located at conventional-only RF sites, at trunking RF sites, the master site, or at console sites with conventional stations. Aux I/O Servers can be placed anywhere in the zone, closest to where they are needed.

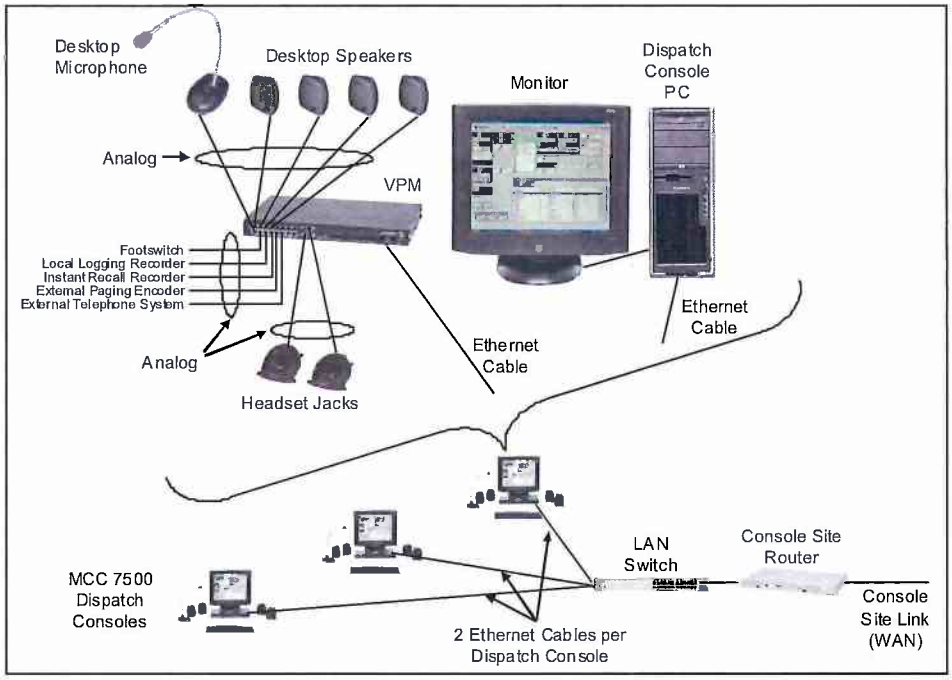


Figure 3-3: Motorola MCC7500 Dispatch Console Hardware Architecture

3.4.1 Operator Position Components

MCC7500 operator positions connect directly to the radio system's IP transport network without gateways or interface boxes. Audio processing, encryption, and switching intelligence for dispatch are performed within each software-based operator position, without additional centralized electronics.

An MCC7500 operator position consists of a computer, a Voice Processing Module (VPM), one select speaker, up to three unselect speakers, a desktop gooseneck microphone and/or headset jack box with in-line PTT amplifier and headset, and optional footswitch.

MCC7500 Operator Position Components

Voice Processing Module (VPM)

The VPM provides vocoding and audio processing services for the dispatch console. It connects to the console site LAN switch and communicates with the dispatch console PC via Ethernet. Each operator position includes a PC and a dedicated VPM. The VPM also provides connections for analog devices to be connected to the digital console.

The VPM has connectors for the following devices:

- One desktop microphone
- Two headset jacks
- Four desktop speakers
- Logging recorder
- Radio instant recall recorder
- External telephone set
- External paging encoder
- Footswitch
- Generic transmit audio input

Some of the connectors listed above can be used to provide audio inputs and outputs for connecting other types of dispatch consoles to the Motorola radio system in conjunction with the Motorola MCC7500 Dispatch APIs.

The secure card provides encryption and decryption services for the dispatch console. It is capable of supporting multiple, simultaneous encryption/decryption sessions using multiple algorithms and multiple secure keys.

Personal Computer (PC)

The dispatch console uses a customized Motorola-certified HP Z420 PC running the Microsoft Windows operating system, containing a Motorola-designed voice card and a Motorola-designed secure card. The PCs used in ASTRO 25 systems have a mini-tower form factor.

The PCs are processed through Motorola factories in Schaumburg so that the application software, voice cards, and secure cards can be installed and tested to ensure they are operating properly.

3.4.2 Auxiliary Inputs and Outputs

Included in the proposed dispatch solution is an Auxiliary Input/Output server. AUX I/O enables console operators to control and monitor external devices, such as doors and lights, from the console user interface. Multiple dispatch consoles anywhere in the network may monitor and control the same relay output and/or external inputs. Changes are indicated across all dispatch consoles simultaneously. Customizable graphic icons are also used to provide a visual indication of both the function and state of external inputs.

The contact closures and input buffers required to interface to these devices are housed in Remote Terminal Units (RTUs). These RTUs can be physically located close to where they are needed, at any console site or RF site. The dispatch consoles and RTUs communicate with each other across the radio system's IP transport network. Individual relay outputs can be configured so that they require a safety switch to be pressed before they respond to any commands from the dispatch console user.

Supported Aux I/O Configurations

The following Aux I/O configurations are supported.

Aux I/O Configuration	Description
Momentary Input	This is an input where the user interface always shows the true state of the input.
Latched Input	This is an input where the user interface does not necessarily show the true state of the input. When the input goes active, the user interface shows the state as active. The display will continue to show the state as active even if the input changes to the inactive state. A dispatch console user must manually reset the display to return it to the inactive state.
Momentary Output	This output relay is activated when the dispatch console user presses the button on the user interface and deactivated when the dispatch console user releases the button.
Latched Output	This output relay changes state only when the dispatch console user presses the button.
Interlocked Latched Output	This latched output relay is part of a group of latched output relays. Only one of the relays in the group may be active at a time. Interlocked relays work in a "break before make" fashion; that is, the previously active relay is deactivated before the new relay is activated.

3.4.3 Conventional Channel Gateway Equipment

Conventional Channel Gateways (CCGWs) are used to interface analog and ASTRO 25 conventional channels to the ASTRO 25 radio system infrastructure. CCGWs provide 4-wire analog interfaces for analog channels and V.24 and IP digital interfaces for ASTRO 25 conventional channels. The platform that is hosting a CCGW may be solely dedicated to that task or it may also be used as a console site router or an RF site router, provided the WAN link is not redundant.

The enhanced GGM 8000-based CCGW is available for interfacing to conventional channels. The enhanced CCGW can support combinations of analog, MDC 1200, ACIM Link, digital and mixed mode channels simultaneously.

The proposal includes high density version of the Enhanced GGM 8000-based CCGW. Up to 8 additional conventional channels can be connected to the analog and V.24 ports. The number of CCGW's located at each site is as follows.

- One (1) – Long Beach Airport Dispatch
- One (1) – Signal Hill Dispatch
- One (1) – Joint Command & Control Dispatch
- Two (2) – Emergency Command and Control Dispatch
- One (1) – Gas Dispatch

Analog Configuration

The enhanced GGM 8000-based CCGW provides two sets of ports that are used with analog channels. One set (called the Analog Ports) contains the analog inputs and outputs for the channels along with a COR/Coded/Clear input and a PTT Relay output. The other set (called the Supplemental I/O Ports) contain analog logging recorder outputs and various inputs that can be used with the analog channel.

Each analog port contains the following inputs and outputs:

- **2-Wire Input/Output** – When the channel is configured for 2-wire operation, this input/output is used to send console transmit audio to the channel and to accept radio audio from the channel
- **4-Wire Input** – When the channel is configured for 4-wire operation, this input is used to accept radio audio from the channel.
- **COR or CIU Coded/Clear Input** – If the channel is configured for clear (non-secure) operation with COR (Carrier Operated Relay), then this input is used to accept the COR output from the channel. When used as a COR input, the input uses contact closure detection.
- **PTT Relay Output** – The PTT relay output provides a relay contact closure capable of supporting up to 1 Amp at 24 volts DC.
- **VOX and COR Operation** – A clear (non-secure) analog port must be configured to support either VOX or COR operation. The CCGW will not pass audio to the dispatch consoles or logging recorders unless there is an active VOX or COR condition.
- **LOBL (Line Operated Busy Light) Detectors** – The LOBL detector on the 2 or 4 wire inputs can be used to detect when a parallel non-MCC7500 dispatch console is transmitting on the channel via tone remote control.
- **AGC, DLM and Fixed Gain Operation** – When configured for AGC operation, the gain of the audio input is constantly adjusted to provide a constant output level to the dispatch consoles and logging recorders. When configured for DLM operation, the gain of the audio input is constantly adjusted to provide a constant output level to the dispatch consoles and logging recorders. When configured for fixed gain operation, the gain of the audio input is fixed and does not change.

The enhanced GGM 8000-based CCGW provides eight ports containing supplemental I/Os which can be used to provide additional functionality on analog channels:

- **LOBL (Line Operated Busy Light) Input** – The LOBL input provides an alternative method to the software LOBL detector for detecting when a parallel non-MCC7500 dispatch console is transmitting on an analog channel. This input can be configured for either voltage operation or contact closure operation.

- **High Speed Mute Input** – When the mute input is active, all audio at the configured audio input(s) will be muted.

- **Analog Logging Output** – The analog logging output provides 600 Ohm balanced analog audio consisting of the summed transmit and received audio from the channel connected to the paired analog port.

- **Coded/Clear Call Input** – The coded/clear call input provides certain legacy analog secure conventional channels a means of informing the MCC7500 dispatch consoles about the mode (coded or clear) of a call.

Conventional Site Controllers

The conventional site controller allows dispatch console users to continue to access and control local conventional channels if connectivity to the radio system's controller is lost. This mode of operation is often called "fallback operation" or "site conventional operation". The conventional site controller is comprised of the GCP 8000 site controller hardware with different software to provide the conventional capabilities. When used as a conventional site controller, the GCP 8000 site controller is outfitted with a single site controller module rather than two site controller modules.

Only one conventional site controller is required per console site or conventional subsystem. This single conventional site controller is capable of supporting the full set of dispatch consoles, archiving interface servers and CCGWs that can be placed in a console site or conventional subsystem.

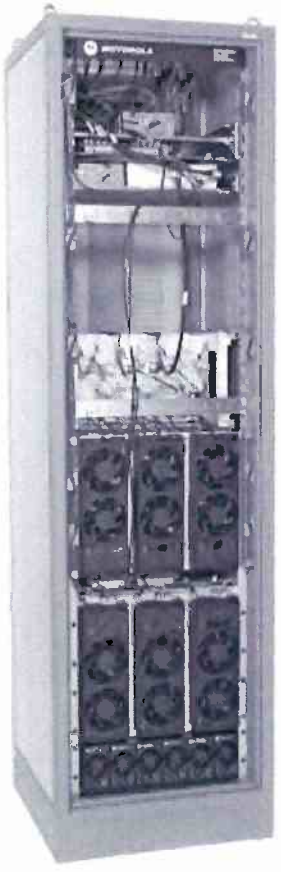
SECTION 4

ASTRO 25 EXPRESS SITE MIGRATION

4.1 LONG BEACH PORT ASR OVERVIEW

Motorola is proposing a solution to upgrade and migrate the existing Long Beach Port ASTRO25 Express Site. The proposal includes adding an additional GTR 8000 Expandable Site Subsystem (ESS) rack to the existing site located at Signal Hill. The proposed GTR 8000 ESS expansion includes four (4) 700MHz GTR 8000 base radios, bringing the total number of channels to ten (10). Each GTR 8000 base radio is configured to operate as an FDMA channel but supports TDMA with additional licensing. In addition to increasing the channel capacity the proposed solution will convert the ASTRO25 Express site to an ASR Remote site and will integrate it into the proposed M-core Master site.

Motorola has refined its RF site design through its latest ASTRO®25 release and is pleased to offer our Expandable Site Sub-System (ESS) as our preferred simulcast remote site platform. The ESS offers many features not found in other site solutions including:



- Integrated networking components:
  - Ethernet switch(es) and router(s).
- Shared power supplies among radio components:
  - Capable of either 120V AC or -48V DC power.
- Integrated combining, filtering, and multi-coupling (900 MHz):
  - Can be shared amongst multiple ESS racks/cabinets.

The GTR 8000 ESS can support a total of six GTR 8000 base radios which can support up to six (6) P25 Phase 1 (FDMA) channels, twelve (12) P25 Phase 2 (TDMA) talk-paths, or any combination in-between. Conventional channels can be supported within the ESS as well. Motorola has included the necessary networking equipment and software licenses for integrating the proposed sites into the ASTRO 25 network.

Long Beach GTR 8000 ESS Components

- One (1) GTR 8000 Expandable Site Subsystem
- One (1) FDMA ASR Site License
- Four (4) GTR 8000 700 MHz Base Radios
- Two (2) Site Controllers
- Two (2) Site Gateway
- One (1) Receive Multicoupler
- One (1) 700 MHz Combiner
- One (1) 7.5' Open Rack

- Two (2) 700 MHz Transmit Antennas
- One (1) 700 MHz Receive Antenna

SECTION 5

MICROWAVE LOOP UPGRADE

5.1 MICROWAVE UPGRADE OVERVIEW

Motorola Solutions has partnered with Microwave Networks Inc. (MNI) to provide the City of Long Beach with a custom solution to upgrade their existing Microwave backhaul network. The proposed MNI Proteus MX Microwave solution includes four (4) loop-protected microwave links between the following locations, Emergency Command and Control, Reservoir Hill, City Hall, and Signal Hill. In order to meet Long Beach's current and future needs the proposed Microwave design includes support for thirty-two (32) DS1's as well as 100 Mbps Ethernet capacity. The proposed microwave radios feature a split configuration, allowing most of the equipment to be stored inside the equipment shelter / room. This allows for simpler troubleshooting and maintenance of the Microwave equipment.

The proposed MNI Microwave replacement is a turn-key solution and will provide the City of Long Beach with the ability to support existing Microwave applications and provide a platform that is prepared to handle future growth.

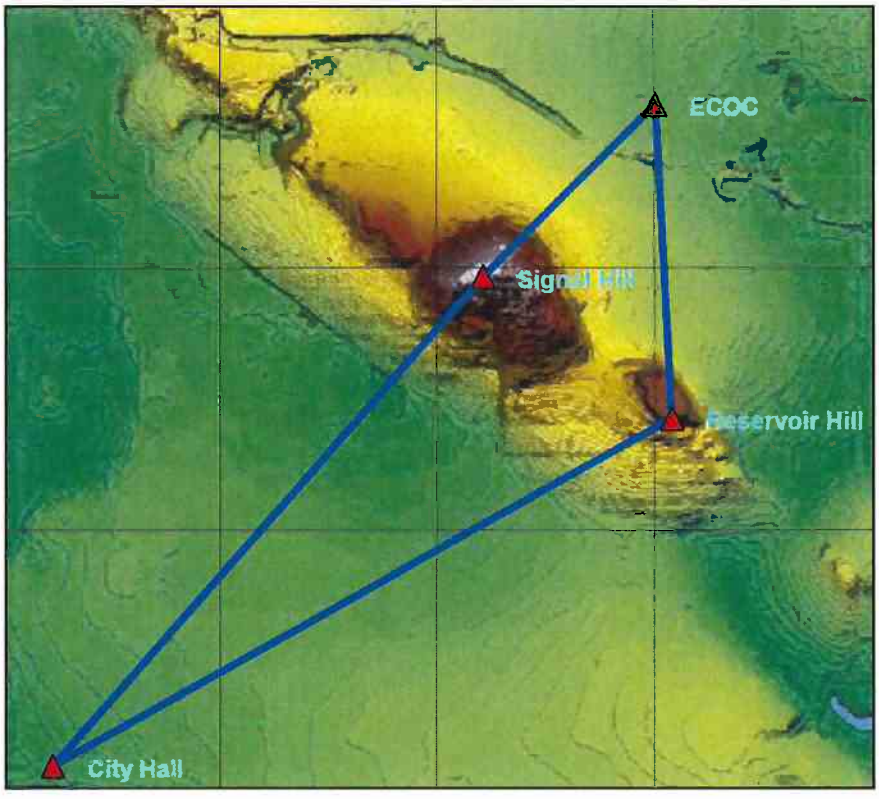


Figure 5-1: Long Beach Microwave Design

5.1.1 Loop Protected Design

In order to meet the availability requirements of the City of Long Beach the proposed Microwave solution has been designed to operate in a loop-protected configuration. MNI's Proteus MX product line uses two integrated technologies to intelligently route data across the Microwave loop. Rapid Ring Protection (RRP) is utilized to protect Ethernet (IP) data across the microwave loop and SHARP is used for TDM (T1) route diversity.

5.1.2 T1 Multiplexing

The proposed MNI microwave solution does not natively support DS0 level cross-connection. To support Long Beach's need for DS0 cross-connecting, Motorola has partnered with RAD Data Communications to provide this required feature. Each of the four (4) microwave sites will contain a RAD MegaPlex allowing for up to 48 T1 inputs and one T3 output to connect into the new microwave loop.

5.2 COMPONENTS

The following main components have been included in the Microwave proposal.

- Four (4) 11 GHz Proteus MX Repeaters
  - T1 Interface Card
  - Ethernet Interface Card
  - Ring-Protection Options
- Eight (8) Andrews Microwave Antennas
- Eight (8) Waveguide RF Transmission Cable Kits
- Four (4) Automatic Dehydrators
- Four (4) DC Power Systems
- Four (4) RAD MegaPlex's (DS0 Cross Connect)
- One (1) Spares Set

5.3 MICROWAVE LOOP SUPPLEMENTAL INFORMATION

Included in the following pages are the below supplemental information:

- MNI provided preliminary path studies
- Proteus MX Product Literature
- RAD MegaPlex Data Sheet

SECTION 6

DESIGN ASSUMPTIONS

Motorola has made several assumptions in preparing this proposal for the City of Long Beach.

- All existing sites or equipment locations will have sufficient space available for the system described.
- All existing sites or equipment locations will have adequate electrical power and site grounding suitable to support the requirements of the system described.
- All comparators are existing (no additional comparators are included in this proposal).
- All existing conventional RF audio is assumed to be acceptable via 2/4-wire connection at ECOC.
- Any site/location upgrades or modifications are the responsibility of the City of Long Beach.
- Approved FCC licensing will be provided by the City of Long Beach.
- Approved local, State, or Federal permits as may be required for the installation and operation of the proposed equipment, are the responsibility of the City of Long Beach.
- All Fiber, T1, Ethernet and other necessary site connectivity will be provided by the City of Long Beach.
- The City of Long Beach will terminate all Fiber, T1, and Ethernet connections at the location of the proposed equipment racks.
- Any required system interconnections not specifically outlined here will be provided by the City of Long Beach, including but not limited to dedicated phone circuits or microwave links.
  - With the exception of the four (4) proposed microwave links.
- The City of Long Beach is responsible for terminating AC / DC power above the new Motorola rack location at each site.
- No control stations, consolettes, or base radios have been included in this proposal.
- No subscriber hardware or services (fleetmapping, template building, or programming) have been included in this proposal.
- Signal Hill is assumed to have adequate power, HVAC, floor space, tower availability, and Ethernet connectivity back to ECOC to accommodate the ASTRO25 Express upgrade.

SECTION 7

EQUIPMENT LISTS

7.1 ASTRO® 25 MASTER SITE – M CORE

Qty	Nomenclature	Description
1	SQM01SUM0273	MASTER SITE CONFIGURATION
1	CA02831AA	ADD: M2 SYSTEM WITH REDUNDANCY
1	CA02950AA	ADD: INTEROPERABILITY ENABLEMENT 7.16
1	CA02839AA	ADD: NM/ZC CABINET
1	CA02113AA	ADD: ASTRO 25 FDMA TRKG OPERATION
1	CA01725AE	ADD:EVENT LOGGING 7.16
1	CA01723AE	ADD: BASELINE BACK UP 7.16
1	CA02835AA	ADD:WINDOW SUPPLEMENTAL TRANS CONFIG 7.16
1	UA00153AA	ADD: ASTRO 25 FDMA SITE LICENSE
7	UA00156AA	ADD: MCC7500 CONSOLE LICENSES (QTY 5)
2	UA00152AA	ADD:500 RADIO USER LICENSES
1	UA00136AA	ADD: UNIFIED NETWORK CONFIGURATOR (UNC)
1	UA00147AA	ADD: PROVISIONING MANAGER
1	UA00146AA	ADD: UNIFIED EVENT MANAGER (UEM)
1	UA00139AA	ADD: NORTHBOUND INTERFACE
1	ZA00992AA	ENH: NBI TECHNICAL ASSISTANCE, FORTY HRS
1	UA00137AA	ADD: EMAIL ALARM NOTIFICATIONS
1	UA00138AA	ADD: FLEXIBLE ATIA
1	ZA00103AA	ENH: TECHNICAL ASSISTANCE, TEN HOURS
1	UA00141AA	ADD: ZONEWATCH GRID & CTRL
1	UA00144AA	ADD: ZONE HISTORICAL RPTS
1	UA00151AA	ADD: AFFLIATION USER RPTS
1	UA00149AA	ADD: RADIO CONTROL MANAGER
1	UA00150AA	ADD: DYNAMIC REPORTS
20	CA02193AA	ADD: ANTI-MALWARE DEF UPDATE LIC
1	DSWAVEPROFSERV1	WAVE 5000 PROFESSIONAL SERVICES PACK 1
1	CLN1856	2620-24 ETHERNET SWITCH
1	T7776	ISSI 8000 / CSSI 8000 UPGRAGE Software Licenses

Qty	Nomenclature	Description
1	UA00005AA	ADD: ISSI Automatic Roaming License (for first system)
1	DSSTCU8000100	SEAGATE : 8TB BUSINESS STORAGE 4-BAY NAS
1	DVN4046B	MASTER SYSTEM KEY STARTER KIT
20	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
20	T7885	MCAFEE WINDOWS AV CLIENT
1	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
1	T8206	ASTRO CLIENT APPL SW 7.16
1	DS019BLK	19 INCH NON-TOUCH MONITOR, BLACK
1	DDN1933	PURCHASED SOFTWARE,FORTITOKEN PACK
1	TT2022	MRV - LX4000T 8 PORT TERMINAL SERVER, NO DIAL-UP MODEM INCLD.
1	DSNEYW1	NCP SECURE ENTRY CLIENT/VPN FOR WINDOWS (WIN32-64)
1	DSTEL6209548200010	ANALOG MODEM V3600 110 120VAC SA UI
1	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	DSTRAK88353M	GPS CLOCK, 10MHZ, RUBIDIUM, 48V INCL ANT AND 100' COAX W/DONGLE SNMPV3
1	DSTRAKP001134	AC POWER SUPPLY FOR 8835 GPS CLOCK
1	DSTRAK4008245101	MOUNTING SHELF FOR 8835 GPS CLOCK
1	SQM01SUM0238	SRC7500 SWITCHING ROUTING CENTER (7.13 AND BEYOND)
1	CA02870AA	ADD: SRC 7500 FOR 7.16
1	CA02152AA	DUAL CORE LAN SWITCHES (HP3800-48 PORT)
1	CA01345AA	ADD: DUAL GATEWAY ROUTERS STANDARD
1	CA01350AA	ADD: QTY 1 PAIR CORE ROUTERS ETH
1	CA01360AA	ADD: CORE BACKHAUL SWITCHES
2	T7537	KVL 4000 KEYLOADER
2	U239AD	ADD: ASTRO 25 MODE
2	CA01598AA	ADD: AC LINE CORD US
2	X795AJ	ADD: ASN MODE
2	CA00182AP	ADD: AES ENCRYPTION SOFTWARE
2	C543	ADD: CABLE FOR RNC, DIU, MGEG
2	SQM01SUM0205	GGM 8000 GATEWAY

Qty	Nomenclature	Description
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
5	SQM01SUM0205	GGM 8000 GATEWAY
5	CA01616AA	ADD: AC POWER
5	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
5	SQM01SUM0205	GGM 8000 GATEWAY
5	CA01616AA	ADD: AC POWER
5	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
3	DSTGT1053742	BLACK CABINET; 19" WIDTH, 84" HEIGHT, 36" DEPTH
6	DS110110711	PDU, AC EDGE RACK MOUNT DISTRIBUTION PANEL, 120VAC 60A, 12-15A CIRCUIT
72	DS37502851	BREAKER KIT AIRPAX 15AMP SNAPAC, FOR AC EDGE OR DC EDGE III QTY 1
12	DS37502841	BREAKER KIT AIRPAX 10AMP SNAPAC, FOR AC EDGE OR DC EDGE III QTY 1
12	DS37502831	BREAKER KIT AIRPAX 5AMP SNAPAC, FOR AC EDGE OR DC EDGE III QTY 1
3	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B
14	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
4	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
6	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS

7.2 ASTRO® 25 MASTER SITE – SPARES

Qty	Nomenclature	Description
1	DLN6822	FRE: DL380p G8 HC 300GB DISK
1	DLN6864	FRU: DL380 G8p POWER SUPPLY
2	DLN6844	CPH 300 GB HARD DRIVE
1	DLN6866	DVD DRIVE
1	DLN6880	DAS - CHASSIS ONLY

Qty	Nomenclature	Description
6	DLN6878	DAS - 600 GB SAS HARD DRIVE
1	DLN6879	DAS - PROCESSOR MODULE
1	DLN6867	DAS POWER SUPPLY
4	CKN6952	SAS CABLE 1M
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CLN1856	2620-24 ETHERNET SWITCH
1	CLN1858	3800-48 ETHERNET SWITCH
1	CLN1856	2620-24 ETHERNET SWITCH
1	T8126	FORTINET FIREWALL APPLIANCE
1	DLN6940	460W POWER SUPPLY FOR DL380P
1	DLN6967	FRU: 500 GB SATA DRIVE
1	T7385	TERMINAL SERVER
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	DLN6742	460 WATT POWER SUPPLY
1	DLN6744	300 GB SAS HARD DISK DRIVE
1	DLN6745	DVD-RW SATA DRIVE (DL360)

7.3 CTI MONITORING & CONTROL NETWORK

Qty	Nomenclature	Description
1	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
1	T7885	MCAFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
1	DDN1289	MCN SERVER 8000 SW LIC FOR 4 MOTOROLA IP COMPARATORS & 4 CLIENTS
4	DDN2123	HIB-IP 8002 UNIT - NETWORK INTERFACE FOR MCN SERVER
1	DDN1294	MCN SW LIC OPTION MULTI-NI-4. ADDS SUPPORT FOR (4) HIB-IPS
1	DDN1295	MCN SW LIC OPT CLIENT EXPANSION FOR 4 ADD'L CLIENTS
25	CDN6121	CIB COMPARATOR INTFC MODULE
25	CDN6114	MNTING BRACKET CIB DIGITAC
25	CDN6124	CABLE ASSY NETWORK 3 FT

8	CDN6126	CABLE ASSY NETWORK 25 FT
13	CDN6116	POWER SUPPLY MCN120 VAC
6	CDN6115	NETWORK TERMINATOR (STANDARD 78K SYSTEMS)
1	CDN6134	MCN SYSTEM PLANNER
1	CDN6109	CIB HARDWARE GUIDE
1	DDN1290	MCN SERVER 8000 MANUAL

7.4 MCC7500 DISPATCH MIGRATION – FIBER AND ETHERNET

Qty	Nomenclature	Description
11	DSEYN10G00A1000	CAT6A PLENUM, BLUE, SPOOL BULK CABLE
8	DS5200450000	OP-106 4T1/ETH FIBERMUX,ST, 1310 NM, MM
8	DS1900540000	RM-35/P1 RACK MOUNT KIT FOR 1/2 19 INCH, 1 DEVICE PER SHELF
2	DS5200450000	OP-106 4T1/ETH FIBERMUX,ST, 1310 NM, MM
2	DS1900540000	RM-35/P1 RACK MOUNT KIT FOR 1/2 19 INCH, 1 DEVICE PER SHELF

7.5 MCC7500 DISPATCH MIGRATION – ECOC DISPATCH

Qty	Nomenclature	Description
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
2	F4543	SITE MANAGER BASIC
2	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
2	V266	ADD: 90VAC TO 260VAC PS TO SM
6	V592	AAD TERM BLCK & CONN WI
11	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)

Qty	Nomenclature	Description
11	T7885	MCAFEE WINDOWS AV CLIENT
11	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
11	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
11	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
11	B1933	MOTOROLA VOICE PROCESSOR MODULE
11	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
11	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
11	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
11	CA00147AF	ADD: MCC 7500 SECURE OPERATION
11	CA00182AB	ADD: AES ALGORITHM
11	CA02073AA	ADD: MCC 7500 Enhanced Console Telephony Operation License
22	B1913	MCC SERIES HEADSET JACK
22	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
22	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET
22	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
22	DDN2090	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS
1	DDN1405	QUOTE 118635859-3 FOR CISCO MEDIA GATEWAY WITH 8 POTS LINES
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
1	F4543	SITE MANAGER BASIC
1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
1	V266	ADD: 90VAC TO 260VAC PS TO SM

Qty	Nomenclature	Description
3	V592	AAD TERM BLCK & CONN WI
10	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
10	T7885	MCAFEE WINDOWS AV CLIENT
10	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
10	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
10	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
10	B1933	MOTOROLA VOICE PROCESSOR MODULE
10	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
10	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
10	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
10	CA00147AF	ADD: MCC 7500 SECURE OPERATION
10	CA00182AB	ADD: AES ALGORITHM
10	CA02073AA	ADD: MCC 7500 Enhanced Console Telephony Operation License
20	B1913	MCC SERIES HEADSET JACK
20	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
20	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET
20	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
10	DDN2090	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS
1	DDN1405	QUOTE 118635859-3 FOR CISCO MEDIA GATEWAY WITH 8 POTS LINES

7.6 MCC7500 DISPATCH MIGRATION – GAS DISPATCH

Qty	Nomenclature	Description
1	TRN7343	SEVEN AND A HALF FOOT RACK
1	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
4	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS

Qty	Nomenclature	Description
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
1	F4543	SITE MANAGER BASIC
1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
1	V266	ADD: 90VAC TO 260VAC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
3	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
3	T7885	MCAFEE WINDOWS AV CLIENT
3	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
3	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
3	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
3	B1933	MOTOROLA VOICE PROCESSOR MODULE
3	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
3	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
3	CA00147AF	ADD: MCC 7500 SECURE OPERATION
3	CA00182AB	ADD: AES ALGORITHM
3	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
6	B1913	MCC SERIES HEADSET JACK
6	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
6	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET
6	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
3	DDN2090	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS

7.7 MCC7500 DISPATCH MIGRATION – JCCC DISPATCH

Qty	Nomenclature	Description
1	TRN7343	SEVEN AND A HALF FOOT RACK
1	DS110110711	PDU, AC EDGE RACK MOUNT DISTRIBUTION PANEL, 120VAC 60A, 12-15A CIRCUIT
12	DS37502851	BREAKER KIT AIRPAX 15AMP SNAPAC, FOR AC EDGE OR DC EDGE III QTY 1
1	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
2	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
1	F4543	SITE MANAGER BASIC
1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
1	V266	ADD: 90VAC TO 260VAC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
5	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
5	T7885	MCAFEE WINDOWS AV CLIENT
5	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
5	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
1	B1905	MCC 7500 ASTRO 25 SOFTWARE
2	B1933	MOTOROLA VOICE PROCESSOR MODULE
2	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE

Qty	Nomenclature	Description
2	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
2	CA00147AF	ADD: MCC 7500 SECURE OPERATION
2	CA00182AB	ADD: AES ALGORITHM
2	CA00143AC	ADD: DES-OFB ALGORITHM
2	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
3	B1933	MOTOROLA VOICE PROCESSOR MODULE
3	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
3	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
3	CA00147AF	ADD: MCC 7500 SECURE OPERATION
3	CA00182AB	ADD: AES ALGORITHM
3	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
10	B1913	MCC SERIES HEADSET JACK
10	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
10	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET
10	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
5	DDN2090	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS

7.8 MCC7500 DISPATCH MIGRATION – LONG BEACH AIRPORT DISPATCH

Qty	Nomenclature	Description
1	TRN7343	SEVEN AND A HALF FOOT RACK
1	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
2	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CLN1856	2620-24 ETHERNET SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER

Qty	Nomenclature	Description
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
1	F4543	SITE MANAGER BASIC
1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
1	V266	ADD: 90VAC TO 260VAC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
1	T7885	MCAFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
1	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	B1933	MOTOROLA VOICE PROCESSOR MODULE
1	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
1	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
1	CA00147AF	ADD: MCC 7500 SECURE OPERATION
1	CA00182AB	ADD: AES ALGORITHM
2	B1913	MCC SERIES HEADSET JACK
2	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
2	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET
2	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
1	DDN2090	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS

7.9 MCC7500 DISPATCH MIGRATION – SIGNAL HILL DISPATCH

Qty	Nomenclature	Description
1	TRN7343	SEVEN AND A HALF FOOT RACK
1	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B

Qty	Nomenclature	Description
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
2	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CLN1856	2620-24 ETHERNET SWITCH
1	T7038	GCP 8000 SITE CONTROLLER
1	CA00303AA	ADD: QTY (1) SITE CONTROLLER
1	CA01136AA	MCC 7500 CONVEN SITE OPER
1	X153AW	ADD: RACK MOUNT HARDWARE
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY
1	F4543	SITE MANAGER BASIC
1	VA00874	ADD: AUX I-O SERV FW CURR ASTRO REL
1	V266	ADD: 90VAC TO 260VAC PS TO SM
3	V592	AAD TERM BLCK & CONN WI
1	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
1	T7885	MCAFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
1	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	B1933	MOTOROLA VOICE PROCESSOR MODULE
1	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
1	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
1	CA00147AF	ADD: MCC 7500 SECURE OPERATION
1	CA00182AB	ADD: AES ALGORITHM
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
2	B1913	MCC SERIES HEADSET JACK
2	RLN6098	HDST MODULE BASE W/PTT, 15' CBL

Qty	Nomenclature	Description
2	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET
2	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
1	DDN2090	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS

7.10 MCC7500 DISPATCH MIGRATION – WIRELESS SHOP

Qty	Nomenclature	Description
1	TRN7343	SEVEN AND A HALF FOOT RACK
1	DS1101378	RACK MT ADAPTER PLATE, 19 IN FOR DSOP820B, DSOP820B2 & DSNSOP820B
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
1	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
2	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	CLN1856	2620-24 ETHERNET SWITCH
1	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
1	T7885	MCAFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK
1	DSRMP615A	SPD, TYPE 3, 120V RACK MOUNT, 15A PLUG-IN W/ (6) 15A NEMA 5-15 OUTLETS
1	B1933	MOTOROLA VOICE PROCESSOR MODULE
1	CA01642AA	ADD: MCC 7500 BASIC CONSOLE FUNCTIONALITY SOFTWARE LICENSE
1	CA00147AF	ADD: MCC 7500 SECURE OPERATION
1	CA00182AB	ADD: AES ALGORITHM
1	CA01644AA	ADD: MCC 7500 /MCC 7100 ADV CONVL OPERATION
1	CA00140AA	ADD: AC LINE CORD, NORTH AMERICAN
2	B1913	MCC SERIES HEADSET JACK
2	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
2	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET

2	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
1	DDN2090	DUAL IRR SW USB HASP W LICENSE, SOUND CARD, & SPKRS
1	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
1	T8206	ASTRO CLIENT APPL SW 7.16
1	T7885	MCAFEE WINDOWS AV CLIENT
1	T7449	WINDOWS SUPPLEMENTAL TRANS CONFIG
1	DS22WBLK	22 INCH WIDE NON-TOUCH MONITOR, BLACK

7.11 MCC7500 DISPATCH MIGRATION – SPARES

Qty	Nomenclature	Description
10	B1912	MCC SERIES DESKTOP SPEAKER
8	B1913	MCC SERIES HEADSET JACK
8	RLN6098	HDST MODULE BASE W/PTT, 15' CBL
8	RMN5079B	SUPRAPLUS DUAL MUFF HEADSET
4	DSTWIN6328A	PROVIDES ONE DUAL PEDAL FOOTSWITCH FOR USE WITH MOTOROLA MCC 7500 DISP
2	TT2833	COMPUTER, Z440 WORKSTATION WINDOWS 7 (NON RETURNABLE)
2	B1934	MCC 7500 VOICE PROCESSOR MODULE FRU
2	CA00147AF	ADD: MCC 7500 SECURE OPERATION
2	CA00182AB	ADD: AES ALGORITHM
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CA02086AA	ADD: HIGH DENSITY ENH CONV GATEWAY

7.12 LONG BEACH ASTRO EXPRESS MIGRATION

Qty	Nomenclature	Description
1	T7140	G-SERIES SOFTWARE UPGRADE
6	CA01116AA	ADD: SITE REPEATER BR SW UPGRADE
2	CA02219BA	ADD: SITE RPTR SC SW UPGRD IV&D
2	SQM01SUM0205	GGM 8000 GATEWAY
2	CA01616AA	ADD: AC POWER
2	CLN1856	2620-24 ETHERNET SWITCH
1	SQM01SUM7054	GTR 8000 EXPANDABLE SITE SUBSYSTEM
1	CA02686AA	ADD: AC DC POWER DISTRIBUTION
1	CA00855AA	ADD: 700/800 MHZ
1	X304AE	ADD: QTY (4) GTR 8000 BASE RADIOS
4	X591AE	ENH: ASTRO 25 SITE REPEATER SW
1	CA00877AA	ADD: CABINET RMC FOR EXPANSION RACK
1	CA00880AA	ADD: EXPANSION 6 PORT CAVITY COMBINER
1	CA01058AA	ADD: 700/800 PHASING HARNESS
2	CA00884AA	ADD: QTY (1) XHUB
1	X882AH	ADD: 7.5 FT OPEN RACK, 48RU
2	DSTSJ100BT	SPD, RJ-48 8 PIN, 10/100 BASE T TSJ PROTECTS/PASSES ON ALL 8 PIN
2	DSTSJADP	RACK MOUNT GROUND BAR, 19 IN FOR TSJ AND WPH SERIES DATA SPDS
1	SQM01SUM0205	GGM 8000 GATEWAY
1	CA01616AA	ADD: AC POWER
1	DLN6885	FRU: XCVR 7/800 MHZ V2
1	DLN6569	FRU: GCP 8000/GCM 8000
1	DLN6781	FRU POWER SUPPLY
1	DLN6677	FRU: G-SERIES XHUB
1	DLN6455	CONFIGURATION/SERVICE SOFTWARE
1	DLN6898	FRU: FAN MODULE
1	DLN6709	GTR/GPW OPTION CARD
1	DSCC80708T5	OMNI, CORP COLLINEAR, 8 DBD, 746-870MHZ, 5DEG DT, PIM & 25KW PIP RATED
15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING

Qty	Nomenclature	Description
200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORREGATED CABLE (AVA5-50FX)/FOOT
2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DSCC80708T5	OMNI, CORP COLLINEAR, 8 DBD, 746-870MHZ, 5DEG DT, PIM & 25KW PIP RATED
15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORREGATED CABLE (AVA5-50FX)/FOOT
2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)
5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
1	DSCC80708T5	OMNI, CORP COLLINEAR, 8 DBD, 746-870MHZ, 5DEG DT, PIM & 25KW PIP RATED
15	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE
2	TDN9289	221213 CABLE WRAP WEATHERPROOFING
200	L3617	7/8IN HELIAX VIRTUAL AIR FOAM FILLED CORREGATED CABLE (AVA5-50FX)/FOOT
2	DDN1077	7-16IN DIN FEMALE CONNECTOR EZ-FIT FOR 7/8IN CABLE (MOTOROLA SPECIFIC)

Qty	Nomenclature	Description
5	DSSG7806B2A	SG78-06B2A GROUNDING KIT FOR 7/8 IN COAXIAL CABLE
1	DSL5SGRIP	L5SGRIP 7/8" SUPPORT HOIST GRIP
7	MDN6817	42396A-5 7/8" CABLE HANGER STAINLESS, 10 PK
1	DSTSXDFMBF	RF SPD, 698-2700MHZ DC BLOCK HIGH POWER, DIN FEMALE/MALE BIDIRECTIONAL
1	DSGSAKITD	GROUND STRAP KIT - DIN
25	L1705	LDF4-50A CABLE: 1/2" LDF HELIAX POLY JKT PER FOOT
2	DDN1090	L4TDM-PSA 7-16 DIN MALE PS FOR 1/2 IN CABLE

7.13 MICROWAVE UPGRADE

Qty	Nomenclature	Description
1	DQMWLONGBCHNRF	Proteus Microwave Radio Terminals
1	DQMWLONGBCHNAD	Antenna & RF
1	DQMWLONGBCHNCG	DC Power System
1	DQMWLONGBCHNBT	DC Battery
1	DQMWLONGBCHNSP	Spares
4	DS6640310000	Megaplex-4104 RED 90 to 260 VAC & 95 to 300 VDC RED DS0 cross connect
4	DS3680120000	MP-4100 T3 MODULE FOR THE MP-4
12	DS4640610000	Megaplex 16 T1 PORTS FOR MP-4100

SECTION 8

ACCEPTANCE TEST PROCEDURE (ATP)

Long Beach – M2 Core & MCC7500

MCC7500 Console and ASTRO® 25 Master Site

Preliminary – Pending Design Review

8.1 ANALOG CONVENTIONAL TESTS

8.1.1 Active Conventional Call During Transition to, and in Site Conventional Mode

1. DESCRIPTION

The Conventional Site Controller is an optional device that is installed at a console site. The CSC provides fallback capability for the console site and conventional channels colocated with this site when the link between a console site and the zone controller is lost. Such way of operating is called Site Conventional mode.
This test will demonstrate that the active conventional calls are transferred to the Conventional Site Controller (CSC) during Wide area to site conventional transition.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-1 - SITE - CONVSITE 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - SITE - CONSITE 1
CONSOLE-2 - CONVENTIONAL CHANNEL 1
CONSOLE-2 - SITE - CONSITE 1

CSC - SITE CONVSITE 1

CCGW-1 - CONVENTIONAL CHANNEL 1
CCGW-1 - SITE - CONVSITE 1

Note: Configure the method to detect inbound radio transmission to VOX

VERSION #1.040

2. TEST

Step 1. Initiate a call with RADIO-1 on CONVENTIONAL CHANNEL 1. Continue to transmit this call until the completion of the test.

Step 2. Verify that CONSOLE-1 and CONSOLE-2 hear RADIO-1 audio.

Step 3. Put CONVSITE 1 into site conventional mode by disconnecting the site link.

Step 4. CONVSITE 1 transitions to site conventional mode. For a short period of time CONSOLE-1 and CONSOLE-2 stop hearing RADIO-1 audio. Verify that CONSOLE-1 and CONSOLE-2 join the call again and continue to hear audio from RADIO-1.

Step 5. End the CONVENTIONAL CHANNEL 1 call on RADIO-1.

Step 6. Verify from CONSOLE-1 or CONSOLE-2 that site conventional mode is active.

Step 7. Initiate a call on CONVENTIONAL CHANNEL 1 from CONSOLE-1.

Step 8. Verify that RADIO-1, RADIO-2 and CONSOLE-2 hear audio from CONSOLE-1 on CONVENTIONAL CHANNEL 1.

Step 9. De-key CONSOLE-1 and key-up CONSOLE-2 on CONVENTIONAL CHANNEL 1. Verify that RADIO-1, RADIO-2 and CONSOLE-1 hear audio from CONSOLE-2 on CONVENTIONAL CHANNEL 1.

Step 10. Return the system to normal operation by connecting the site link..

Pass____ Fail____

8.1.2 Active Call During Transition to Wide Area Conventional Mode

1. DESCRIPTION

The Conventional Site Controller (CSC) is an optional device that is installed at a console site. The CSC provides fallback capability for the console site and conventional channels colocated with this site when the link between a console site and the zone controller is lost. Such way of operating is called Site Conventional mode.
This test demonstrates the ability for an active site conventional call to transition to wide conventional with minimal interruption. The active call will be interrupted for a short period.

Note: Configure the method to detect inbound radio transmission to VOX.

SETUP

RADIO-1 - CONVCH1
RADIO-1 - SITE - CONVSITE-1

CONSOLE-1 - CONVCH1
CONSOLE-1 - SITE - CONVSITE-1

CONSOLE-2 - CONVCH1
CONSOLE-2 - SITE - CONSITE-1
CSC - SITE - CONVSITE-1

CCGW-1 - CONVCH1
CCGW-1 - SITE - CONVSITE-1

VERSION #1.020

2. TEST

Step 1. Disconnect the CONSITE1 link and verify that CONSOLE-1 provides an indication that the CONVSITE-1 has entered into site conventional mode.

Step 2. Initiate a conventional call on CONVCH1 with RADIO-1.

Step 3. Verify that CONSOLE-1 hears RADIO-1. Continue to transmit the call through the duration of the test.

Step 4. Put CONVSITE1 into wide area conventional mode by connecting the CONSITE1 link.

Step 5. Verify that the RADIO-1 call continues with a brief interruption while the CONVSITE1 transitions into wide area conventional mode. (Note: CONSOLE-1 will briefly stop hearing RADIO-1, but then the call will resume once back into wide area conventional mode).

Step 6. Verify that CONSOLE-1 continues to hear RADIO-1 after transitioning to wide area conventional mode.

Step 7. End the CONVCH1 call.

Pass____ Fail____

8.1.3 Console Site Entering Site Conventional Mode

1. DESCRIPTION

The Console site will enter site conventional mode when the Zone Controller (ZC)-Console Site Control Path fails and Conventional Site Controller-Console Site Control Path is established.

The console site will re-enter wide area conventional mode when ZC-Console Site Control Path is re-established.

SETUP

RADIO-1- CONVCH1
RADIO-1 - SITE - CONVSITE1

CONSOLE-1 - CONVCH1
CONSOLE-1 - SITE - CONSITE1
CONSOLE-2 - CONVCH1
CONSOLE-2 - SITE - CONSITE1

CSC - SITE - CONVSITE1

CCGW-1 - CONVCH1
CCGW-1- SITE - CONVSITE1

CONVSITE1 is co-located with CONSITE1

Note: Configure the method to detect inbound radio transmission to VOX

VERSION #1.010

2. TEST

Step 1. Initiate a call on CONVCH1 at CONSOLE-1. Keep this call established for the duration of the test.

Step 2. Verify that RADIO-1 and CONSOLE-2 hear CONSOLE-1

Step 3. Disconnect the CONSITE1 WAN link

Step 4. Verify that CONSOLE-1 and CONSOLE-2 provide an indication that CONSITE-1 has entered into site conventional mode.

Step 5. Verify that RADIO-1 and CONSOLE-2 continue to hear CONSOLE-1.

Step 6. Reconnect the CONSITE-1 WAN link.

Step 7. Verify that CONSOLE-1 no longer provides an indication that CONSITE1 is in site conventional mode.

Step 8. Verify that RADIO-1 and CONSOLE-2 hear CONSOLE-1, then end the CONVCH1 call.

Pass____ Fail____

8.1.4 Main / Alt Change Request

1. DESCRIPTION

The Main/Alternate feature provides a back-up station interface for a conventional channel. The console provides a single channel control window for the Main/Alternate channel pair. It also provides an interface indicating which interface is currently active (Main/Alternate), and allows the user to request that the active interface be changed to the other interface. The system will automatically switch to the inactive interface if the active interface fails (and the inactive has not failed). The channels comprising the Main/Alternate pair may be located at the same or different RF sites, but must be members of the same zone. The Main/Alternate conventional channel interfaces may be located on the same or on different CCGWs.
This test will demonstrate that the Main/ Alt change can be requested by Dispatch Console.

SETUP

SITE-1 - ZONE 1

CCGW-1 - CONVCH1
CCGW-1 - CONVSITE 1
CCGW-2 - CONVSITE 1
CCGW-2 - CONVCH2

MAIN - CONVCH1
ALTERNATE - CONVCH2

CONSOLE-1 - CONVCH1 - CONVSITE1

VERSION #1.010

2. TEST

Step 1. Verify that CONSOLE-1 shows the channel available with status of Main active

Step 2. Send Main / Alt switch from CONSOLE-1.

Step 3. Verify that the CONSOLE-1 shows the channel available with status of Alt active

Step 4. Verify the Main / Alt switch from ZoneWatch and ATIA logs

Step 5. Send Main / Alt switch from CONSOLE-1 (to set the Main active)

Pass____ Fail____

8.1.5 Main / Alt Failure while Console Voice Call

1. DESCRIPTION

The Main/Alternate feature provides a back-up station interface for a conventional channel. The console provides a single channel control window for the Main/Alternate channel pair. It also provides an interface indicating which interface is currently active (Main/Alternate), and allows the user to request that the active interface be changed to the other interface. The system will automatically switch to the inactive interface if the active interface fails (and the inactive has not failed). The channels comprising the Main/Alternate pair may be located at the same or different RF sites, but must be members of the same zone. The Main/Alternate conventional channel interfaces may be located on the same CCGW or on different CCGWs. This test will demonstrate that the Console monitors call activity and receive audio from a conventional call from console while in Site Conventional mode.

SETUP

SITE-1 - ZONE 1

CCGW-1 - SITE 1
CCGW-2 - SITE 1

CCGW-1 - CONVCH1
CCGW-2 - CONVCH2

MAIN - CONVCH1
ALTERNATE - CONVCH2

CONSOLE-1 - CONVCH1 - CONSITE1
CONSOLE-2 - CONVCH1 - CONSITE1

VERSION #1.010

2. TEST

Step 1. Key-up CONSOLE-2 on CONVCH1.

Step 2. Verify that CONSOLE-1 hears CONSOLE-2 on CONVCH1.

Step 3. While the call is ongoing, power down CCGW-1

Step 4. Verify that CONSOLE-2 continues to hear CONSOLE-1. NOTE: After powering down CCGW-1 there may be a brief interruption in the audio.

Step 5. Power CCGW-1 back up to return to service.

Pass____ Fail____

8.1.6 Main Channel is in Service / Alt Channel is not in Service

1. DESCRIPTION

The Main/Alternate feature provides a back-up station interface for a conventional channel. The console provides a single channel control window for the Main/Alternate channel pair. It also provides an interface indicating which interface is currently active (Main/Alternate), and allows the user to request that the active interface be changed to the other interface. The system will automatically switch to the inactive interface if the active interface fails (and the inactive has not failed). This test will demonstrate that the dispatch console will indicate the status of the main/alt conventional channel pair.

SETUP

CONSOLE-1 - CONVCH1 - CONSITE1

CONVSITE1 - ZONE 1

CCGW-1 - CONVCH1
CCGW-1 - CONVSITE1
CCGW-2 - CONVCH2
CCGW-2 - CONVSITE1

MAIN-ACTIVE - CONVCH1
ALTERNATE-INACTIVE - CONVCH2

VERSION #1.010

2. TEST

Step 1. Power down CCGW-2

Step 2. Verify that CONSOLE-1 shows status that CCGW-1 as active

Step 3. Power down CCGW-1

Step 4. Power up CCGW-2

Step 5. Verify that CONSOLE-1 shows status that CCGW-2 (alternate) as active

Step 6. Power up CCGW-1.

Pass____ Fail____

8.1.7 Zone Controller Assigns Active Conventional Channel

1. DESCRIPTION

This test will demonstrate that the Zone Controller assigns the first received main / alt conventional channel to be "in service" as active channel.

SETUP

CONSOLE-1 - CONVCH1 - CONSITE1

CONVSITE1 - ZONE 1

CCGW-1 - CONVCH1
CCGW-1 - CONVSITE1
CCGW-2 - CONVCH2
CCGW-2 - CONVSITE1

MAIN - CONVCH1
ALTERNATE - CONVCH2

VERSION #1.010

2. TEST

Step 1. Power down both CCGW-1 and CCGW-2

Step 2. Power up CCGW-1 first and then power up CCGW-2.

Step 3. Verify that CONSOLE-1 displays CCGW-1 with a status of Main active.

Step 4. Verify from ZoneWatch that CONVCH1 is available.

Step 5. Power down both CCGW-1 and CCGW-2

Step 6. Power up CCGW-2 first and then power up CCGW-1.

Step 7. Verify that CONSOLE-1 displays CCGW-2 with a status of Alternate active.

Step 8. Verify from ZoneWatch that CONVCH2 is available.

Pass____ Fail____

8.2 FAULT MANAGEMENT

8.2.1 Unified Event Manager - Views

1. DESCRIPTION

The Unified Event Manager (UEM) provides three different views. The purpose of this test is to demonstrate the views available from the UEM.

For A7.16: Custom views can be saved and retrieved by other NM Client users. This test demonstrates this capability, as well as demonstrating an improvement in display of Channel information.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.050

2. TEST

Step 1. The first view is the Active Alarms. In the navigation pane expand Fault Management and select Network Events.

Step 2. Customize the Active Alarms display by selecting the View option from the menu bar, then select Search.

Step 3. Perform a Managed Resource search for channels, site controllers and routers by entering "Contains" and ch, sc, and z00 respectively in the search fields to perform the three separate searches.

Step 4. For each of the three searches a filtered alarm view is displayed that contains alarms for the appropriate device in the search.

Step 5. The second view is the Physical Summary view. In the navigation pane, expand Zone Maps and select Physical Summary. The Physical Summary View provides an aggregated alarm severity status of the devices located at all subnets in the Zone.

Step 6. The third view is the Service Summary. In the navigation pane, under Zone Maps select Service Summary. The Service Summary View provides a quick summary of the service status of sites in a Zone, including access to Channel status.

Step 7. In the main UEM window is an Alarm Summary View pane. In the Alarm Summary View, select the format for the desired view, pie, tabular or bar.

Step 8. Create a custom view. View the Active Alarms display to see result. Perform right click on the Network Events tree node in the navigation window and select export function. Select filter view, and provide a target location to save the custom view tree structure on NM Client.

Step 9. Log out of the UEM application, and log back in as a different user. Retrieve the custom view saved in step 8. View the Active Alarms display to see the same view.

Step 10. Navigate Network Database, select Repeater/Conventional Site and from Managed Resources menu, select Managed Resource Properties. Choose channel tab to display all channel status.

Pass____ Fail____

8.2.2 Analog Conventional Voice Channel Failure (MCC7500 Systems only)

1. DESCRIPTION

This test demonstrates that the User Event Manager (UEM) event browser is able to capture information about various failures at the system and zone level. An analog conventional voice channel will be disabled and the alerts will be monitored.

SETUP

RADIO-1 - CONVCH1
Conventional Channel Gateway (CCGW) 1 is in service and all four of its channels are operational.
CONSOLE-1 - CONVCH1

VERSION #1.020

2. TEST

Step 1. Observe that the CCGW1 container is GREEN in the Unified Event Manager (UEM).

Step 2. Disable CONVCH1 on CCGW1.

Step 3. Observe the appropriate alert appears on the UEM Event Browser and that the CCGW1 container changes color.

Step 4. Observe that CONSOLE-1 is no longer able to contact RADIO-1.

Step 5. Disable the rest of the Analog Conventional Channels on CCGW1. Observe the appropriate alerts appear in the UEM.

Step 6. Bring each of the Channels on CCGW1 back into service.

Step 7. Observe the color for the CCGW1 container turns to GREEN (normal) in the UEM.

Step 8. Observe that CONSOLE-1 is now able to contact RADIO-1 on CONVCH1.

Pass____ Fail____

8.2.3 Console PC - Voice Processing Module Link Failure Reports to the Unified Event Manager

1. DESCRIPTION

This test will demonstrate that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

This test simulates a Console PC to Voice Processing Module (VPM) link failure.

SETUP

RADIO-1 - TG1

CONSOLE-1 - TG1 (VPM Based console)

VERSION #1.020

2. TEST

Step 1. Initiate a call from RADIO-1 to CONSOLE-1 to verify communication.

Step 2. Remove the Ethernet cable from the VPM to the Console Site Ethernet Switch.

Step 3. Observe the UEM reports CommFailure alarms for the VPM.

Step 4. In addition, observe that CONSOLE-1 reports the link to the VPM as Down.

Step 5. Reconnect the VPM to the Console Site Ethernet Switch.

Step 6. Observe that UEM regains communication with the VPM and the Console PC to VPM link recovers.

Step 7. Initiate a call from RADIO-1 to CONSOLE-1 to verify communication.

Pass____ Fail____

8.2.4 Core Router Failure Reports to the Unified Event Manager

1. DESCRIPTION

This test will demonstrate that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

A Core Router/Gateway will be powered off to simulate a failure. The system health will be monitored on UEM.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.040

2. TEST

Step 1. Verify that the Router/Gateway to be tested displays without failures (normal) on UEM. The core router is contained in the specific subnet that it is physically collocated with in the network.

Step 2. Power down the Router/Gateway.

Step 3. Observe that an alarm indicating a Router/Gateway failure appears on the UEM alarms view.

Step 4. Restore power to the Router/Gateway.

Step 5. Observe the changes to the alarm in UEM, indicating the Router/Gateway is enabling.

Step 6. Observe that alarm view updates in the UEM, indicating the Router/Gateway has recovered and is enabled.

Pass____ Fail____

8.2.5 Site Path Failure (T1) Reports to the Unified Event Manager

1. DESCRIPTION

This test will demonstrate that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

This test simulates a microwave failure by removing a customer selected site data link and monitoring the alerts.

Note: If using a Simulcast site, this test refers to the Prime Site links. While failures would be seen at the subsite level if a Subsite link were failed, the site would not drop into Site Trunking.

SETUP

RADIO-1 - TG1
RADIO-1 - SITE - SITE1
NMclient01 - UEM session up and running.

* RADIO-1 should be "Site Locked"

VERSION #1.020

2. TEST

Step 1. Remove the T1 cable(s) to the SITE1 router(s) (If Simulcast, this refers to the Prime Site router(s)) at the site where RADIO-1 is affiliated. Be certain to remove the T1 cable from both routers if redundant site links are being utilized.

Step 2. Observe the UEM reports CommFailure alarms for the devices at the affected site.

Step 3. In addition, observe that the site is now in the Site Trunking mode.

Step 4. Reconnect the T1 cable(s) disconnected in Step 1.

Step 5. Observe the site returns to the Wide Area Trunking mode.

Step 6. Observe the topology and alarms that appear on the UEM indicating the site has recovered.

Pass____ Fail____

8.3 MCC 7100/7500 CONVENTIONAL RESOURCES

8.3.1 Conventional Call - Analog (Using a Test Set)

1. DESCRIPTION

A conventional station can be integrated into a trunking system by placing a conventional resource on the consoles. This allows the user to dispatch and patch the conventional station with the desired talkgroups.

This test will demonstrate the audio output at the Conventional Channel GateWay (CCGW) using a test set in those cases where the attached device is not available.

SETUP

CONSOLE-1 - CONVENTIONAL CHANNEL 1 and CONVENTIONAL CHANNEL 2

Connect a transmission test set to the port that corresponds to CONVENTIONAL CHANNEL 1 in the Console Position.

Note: Each RJ45 receptacle on the Analog Module of the Conventional Channel GateWay (CCGW) represents a possible resource, pins 1 and 2 are for RX audio, and pins 4 and 5 are for TX audio.

VERSION #1.030

2. TEST

Step 1. Connect a transmission test set to the output of the port corresponding to CONVENTIONAL CHANNEL 1 on CONSOLE-1.

Step 2. Using CONSOLE-1, initiate a call on CONVENTIONAL CHANNEL 1 and verify Transmit audio is heard through the transmission test set.

Step 3. Using the test set, inject a test tone into the input of CONVENTIONAL CHANNEL 1.

Step 4. Verify the CONVENTIONAL CHANNEL 1 resource receives the tone in the appropriate speaker.

Step 5. Connect a transmission test set to the output of the port corresponding to CONVENTIONAL CHANNEL 2 on CONSOLE-1.

Step 6. Using CONSOLE-1, initiate a call on CONVENTIONAL CHANNEL 2 and verify Transmit audio is heard through the transmission test set.

Step 7. Using the test set, inject a test tone into the input of CONVENTIONAL CHANNEL 2.

Step 8. Verify the CONVENTIONAL CHANNEL 2 resource receives the tone in the appropriate speaker.

Pass____ Fail____

8.3.2 Alert Tones - Conventional Channel

1. DESCRIPTION

Pre-defined alert tones can be transmitted on the selected Radio Resource to subscribers which can alert members of a channel / talkgroup to a particular event or signify to radio users special instructions are to follow. The Console has the ability to send an Alert-Tone signal on selected conventional or talkgroup resources.

SETUP

RADIO-1 - CONVCH1
RADIO-2 - CONVCH1
CONSOLE-1 - CONVCH1

VERSION #1.030

2. TEST

Step 1. Select CONVCH1 on CONSOLE-1.

Step 2. Select Alert Tone 1 and depress the Alert Tone button.

Step 3. Verify that RADIO-1 and RADIO-2 hear Alert Tone 1.

Step 4. Repeat Steps 2-3 for Alert Tone 2 and 3.

Pass____ Fail____

8.3.3 Enhanced CCGW Analog Audio Logging

1. DESCRIPTION

This test will demonstrate recording of the audio from the analog channel interface on the conventional channel gateway (CCGW). The enhanced CCGW will sum receive and transmit audio received on an analog conventional channel and deliver the summed audio to the audio logging output pins 3 and 6 of the second analog connector (9A to 9D or 13A to 13D) of the same analog conventional channel.

SETUP

The CCGW is either a Low Density Enhanced Conventional Gateway or a High Density Enhanced Conventional Gateway.

A conventional channel, CONVCH-1, with an analog interface has been configured (analog, MDC 1200, mixed mode, or ACIM).

The customer's audio recording device has been connected to the audio recording output pins 3 and 6 of the second analog connector for CONVCH-1 on the enhanced CCGW.

Conventional RADIO-1 - CONVCH-1

CONSOLE-1 - CONVCH-1

VERSION #1.030

2. TEST

Step 1. Key RADIO-1 on CONVCH-1. Communicate with CONSOLE-1.

Step 2. Key CONSOLE-1 on CONVCH-1. Communicate with RADIO-1.

Step 3. Verify the audio from the previous two steps at the audio recording device

Pass____ Fail____

8.3.4 Console Priority

1. DESCRIPTION

Console Operator Positions have ultimate control of transmitted audio on an assigned resource. The Console Position has the capability to take control of an assigned voice channel for a channel/talkgroup call so that the operator's audio overrides any subscriber audio. Console priority is a feature that enables dispatchers to gain immediate access to an assigned voice channel so that a central point of audio control exists.

SETUP

RADIO-1 - CONVCH1
RADIO-2 - CONVCH1

CONSOLE-1 - CONVCH1

VERSION #1.040

2. TEST

Step 1. Initiate a call from RADIO-1 on CONVCH1. Keep this call in progress until the test has completed.

Step 2. Observe that RADIO-2 receives the call.

Step 3. While the call is in progress, key up CONSOLE-1 on CONVCH1.

Step 4. Observe that RADIO-2 is now receiving audio from CONSOLE-1 on CONVCH1

Step 5. De-key CONSOLE-1.

Step 6. Verify RADIO-2 now receives RADIO-1 audio.

Step 7. End the CONVCH1 call from RADIO-1.

Pass____ Fail____

8.3.5 Conventional Comparator Force Vote

1. DESCRIPTION

The console user has the ability to send a "Force Vote" command to a Conventional Comparator. Force voting allows the user to customize the audio of the system.

SETUP

RADIO-1 – CONVCH1

CONSOLE-1 - CONVCH1
CONSOLE-1 - Configured with Voting Display and Control

VERSION #1.040

2. TEST

Step 1. On CONSOLE-1, enable the "Force Vote" command on one site and verify the "Force Vote" on CONSOLE-1 is active.

Step 2. Initiate a call on CONVCH1 using RADIO-1 and verify the audio is received from the force-voted site.

Step 3. From CONSOLE-1, disable the "Force Vote" command on the site and verify the "Force Vote" on the console is deactivated.

Pass____ Fail____

8.4 SIGNOFF CERTIFICATE

By their signatures below, the following witnesses certify they have observed the system Acceptance Test Procedures.

Signatures

SECTION 9

STATEMENT OF WORK

9.1 OVERVIEW

This Statement of Work (SOW) describes the deliverables to be furnished to the City of Long Beach. The tasks described herein will be performed by Motorola, its subcontractors, and the City of Long Beach to implement the solution described in the System Description. It describes the actual work involved in installation, identifies the installation standards to be followed, and clarifies the responsibilities for both Motorola and the City of Long Beach (Customer) during the project implementation. Specifically, this SOW provides:

- A summary of the phases and tasks to be completed within the project lifecycle.
- A list of the deliverables associated with the project.
- A description of the responsibilities for both Motorola and Customer.
- The qualifications and assumptions taken into consideration during the development of this project.

This SOW provides the most current understanding of the work required by both parties to ensure a successful project implementation. In particular, Motorola has made assumptions of the sites to be used for the new system. Should any of the sites change, a revision to the SOW and associated pricing will be required. It is understood that this SOW is a working document, and that it will be revised as needed to incorporate any changes associated with contract negotiations, Contract Design Review (CDR), and any other change orders that may occur during the execution of the project.

Motorola's proposed master site and dispatch migration consists of a M-core to be located at the Emergency Communication and Operations Center (ECOC) and thirty-two (32) MCC7500 Dispatch Consoles located at six dispatch locations including ECOC dispatch, Joint Command and Control (JCCC), Gas dispatch, Long Beach Airport, Signal Hill dispatch, and the Wireless Shop. Motorola has also included an enhanced Comparator Monitor and Control sub-system allowing for increased flexibility in dispatcher control over existing DigiTAC comparators. The dispatch positions have been allocated accordingly:

- Twenty-one (21) Positions at ECOC (14 PD, 6 Fire, 1 EQ Room)
- Five (5) Positions at JCCC
- Three (3) Positions at Gas Dispatch
- One (1) Position at Long Beach Airport
- One (1) Position at Signal Hill Dispatch
- One (1) Position at Wireless Shop

9.2 ASSUMPTIONS

Motorola has based the system design on information provided by the City of Long Beach and an analysis of their system requirements. All assumptions have been listed below for review. Should Motorola's assumptions be deemed incorrect or not agreeable to the City of Long Beach, a revised proposal with the necessary changes and adjusted costs may be required. Changes to the equipment or scope of the project after contract may require a change order.

- All work is to be performed during normal work hours, Monday through Friday 8:00 a.m. to 5:00 p.m.
- The City of Long Beach has concluded that the resulting contract would be a Public Works Contract subject to Davis-Bacon and/or California Prevailing Wage laws as to some of the work, specifically the installation of fixed network equipment such as antennas, equipment racks, and cable lines. Motorola will pay or cause to be paid the applicable prevailing wage under Davis-Bacon and/or California Prevailing Wage laws to all workers performing covered services
- All existing sites or equipment locations will have sufficient space available for the system described.
- All existing sites or equipment locations will have adequate electrical power and site grounding suitable to support the requirements of the system described.
- All comparators are existing (no additional comparators are included in this proposal).
- Any site/location upgrades or modifications are the responsibility of the City of Long Beach.
- Approved FCC licensing will be provided by the City of Long Beach.
- Approved local, State, or Federal permits as may be required for the installation and operation of the proposed equipment, are the responsibility of the City of Long Beach.
- All Fiber, T1 and other necessary site connectivity will be provided by the City of Long Beach.
- The City of Long Beach will terminate all Fiber, T1, and Ethernet connections at the location of the proposed equipment racks.
- Any required system interconnections not specifically outlined here will be provided by the City of Long Beach, including but not limited to dedicated phone circuits or microwave links.
- No control stations, consolettes, or base radios have been included in this proposal.
- Signal Hill is assumed to have adequate power, HVAC, floor space, tower availability, and Ethernet connectivity back to ECOC to accommodate the ASTRO25 Express upgrade.
- No subscriber content is included in this proposal.

9.3 CONTRACT

9.3.1 Contract Award (Milestone)

The Customer and Motorola execute the contract and both parties receive all the necessary documentation.

9.3.2 Contract Administration

Motorola Responsibilities:

- Assign a Project Manager, as the single point of contact with authority to make project decisions.

- Assign resources necessary for project implementation.
- Set up the project in the Motorola information system.
- Schedule the project kickoff meeting with the Customer.

Customer Responsibilities:

- Assign a Project Manager, as the single point of contact responsible for Customer-signed approvals.
- Assign other resources necessary to ensure completion of project tasks for which the Customer is responsible.

Completion Criteria:

- Motorola internal processes are set up for project management.
- Both Motorola and the Customer assign all required resources.
- Project kickoff meeting is scheduled.

9.3.3 Project Kickoff

Motorola Responsibilities:

- Conduct a project kickoff meeting during the CDR phase of the project.
- Ensure key project team participants attend the meeting.
- Introduce all project participants attending the meeting.
- Review the roles of the project participants to identify communication flows and decision-making authority between project participants.
- Review the overall project scope and objectives with the Customer.
- Review the resource and scheduling requirements with the Customer.
- Review the Project Schedule with the Customer to address upcoming milestones and/or events.
- Review the teams' interactions (Motorola and the Customer), meetings, reports, milestone acceptance, and the Customer's participation in particular phases.

Customer Responsibilities:

- The Customer's key project team participants attend the meeting.
- Review Motorola and Customer responsibilities.

Completion Criteria:

- Project kickoff meeting completed.
- Meeting notes identify the next action items.

9.4 CONTRACT DESIGN REVIEW

9.4.1 Review Contract Design

Motorola Responsibilities:

- Meet with the Customer project team.
- Review the operational requirements and the impact of those requirements on various equipment configurations.
- Establish a defined baseline for the system design and identify any special product requirements and their impact on system implementation.

- Review the System Design, Statement of Work, Project Schedule, and Acceptance Test Plans, and update the contract documents accordingly.
- Discuss the proposed high-level Cutover Plan and modify as needed (The detailed Cutover Plan will be developed after Design Review).
- Submit design documents to the Customer for approval. These documents form the basis of the system, which Motorola will manufacture, assemble, stage, and install.
- Prepare equipment layout plans for staging.
- Provide minimum acceptable performance specifications for microwave, fiber, or copper links.
- Establish demarcation point (supplied by the Motorola system engineer) to define the connection point between the Motorola-supplied equipment and the Customer-supplied link(s) and external interfaces.
- Finalize site acquisition and development plan.
  - Conduct (updated) site evaluations to capture site details of the system design and to determine site readiness.
  - Determine each site's ability to accommodate proposed equipment based upon physical capacity.
  - If applicable, test existing equipment with which Motorola equipment will interface.
- Prepare Site Evaluation Report that summarizes findings of above-described site evaluations.

Customer Responsibilities:

- The Customer's key project team participants attend the meeting.
- Make timely decisions, according to the Project Schedule.
- Provide Motorola with the subscriber information for input into the system database, for activation: Provide inventory and list of subscriber IDs and aliases.

Completion Criteria:

- Complete Design Documentation, which may include updated System Description, Equipment List, system drawings, or other documents applicable to the project.
- Incorporate any deviations from the proposed system into the contract documents accordingly.
- The system design is "frozen" in preparation for subsequent project phases such as Order Processing and Manufacturing.
- A Change Order is executed in accordance with all material changes resulting from the Design Review to the contract.

9.4.2 Design Approval (Milestone)

- The Customer executes a Design Approval milestone document.

9.5 ORDER PROCESSING

Motorola Responsibilities:

- Validate Equipment List by checking for valid model numbers, versions, compatible options to main equipment, and delivery data.
- Enter order into Motorola's Customer Order Fulfillment (COF) system.
- Create Ship Views, to confirm with the Customer the secure storage location(s) to which the equipment will ship. Ship Views are the mailing labels that carry complete equipment shipping information, which direct the timing, method of shipment, and ship path for ultimate destination receipt.
- Create equipment orders.

- Reconcile the equipment list(s) to the Contract.
- Procure third-party equipment if applicable.

Customer Responsibilities:

- Approve shipping location(s).
- Complete and provide Tax Certificate information verifying tax status of shipping location.

Completion Criteria:

- Verify that the Equipment List contains the correct model numbers, version, options, and delivery data.
- Trial validation completed.
- Bridge the equipment order to the manufacturing facility.

9.6 MANUFACTURING AND STAGING

9.6.1 Manufacture Motorola Fixed Network Equipment

Motorola Responsibilities:

- Manufacture the Fixed Network Equipment (FNE) necessary for the system based on equipment order.

Customer Responsibilities:

- None.

Completion Criteria:

- FNE shipped to either the field or the staging facility.

9.6.2 Manufacture Non-Motorola Equipment

Motorola Responsibilities:

- Procure non-Motorola equipment necessary for the system based on equipment order.

Customer Responsibilities:

- None.

Completion Criteria:

- Ship non-Motorola manufactured equipment to the field and/or the staging facility.

9.6.3 Ship to Staging (Milestone)

- Ship all equipment needed for staging to Motorola's factory staging facility in Illinois [Customer Center for Solutions Integration (CCSi)].

9.6.4 Stage System

Motorola Responsibilities:

- Set up and rack the system equipment on a site-by-site basis, as it will be configured in the field at each of the sites.
- Cut and label cables according to the approved CDR documentation.
- Label the cables with to/from information to specify interconnection for field installation and future servicing needs.
- Complete the cabling/connecting of the subsystems to each other ("connectorization" of the subsystems).
- Assemble required subsystems to assure system functionality.
- Power up, program, and test all staged equipment.
- Confirm system configuration and software compatibility to the existing system.
- Load application parameters on all equipment according to input from Systems Engineering.
- Complete programming of the Fixed Network Equipment.
- Inventory the equipment with serial numbers and installation references.
- Complete system documentation.
- Third party subsystems may be staged at the manufacturer's facilities and integrated in the field.
- Provide a Factory Acceptance Test Plan.

Customer Responsibilities:

- Provide information on existing system interfaces as may be required.
- Provide information on room layouts or other information necessary for the assembly to meet field conditions.
- Review and approve proposed Factory Acceptance Test Plan.

Completion Criteria:

- System staging completed and ready for testing.

9.6.5 Perform Staging Acceptance Test Procedures

Motorola Responsibilities:

- Test and validate system software and features.
- Functional testing of standard system features.
- Conduct site and system level testing.
- Power-up site equipment and perform standardized functionality tests.
- Perform system burn-in 24 hours a day during staging to isolate and capture any defects.
- Perform Customer-witnessed tests based upon Factory Acceptance Test Plan, with up to three customer participants. The travel costs (airfare, lodging, and meals) for these three (3) participants are included in the proposal.

Customer Responsibilities:

- Attend Factory Acceptance Testing

Completion Criteria:

- Approve Factory Acceptance Testing.

9.6.6 Ship Equipment to Field

Motorola Responsibilities:

- Pack system for shipment to final destination.
- Arrange for shipment to the field.

Customer Responsibilities:

- Prepare secure storage for the Motorola-provided equipment, at a location central to the sites.
- Provide the address of the storage location to Motorola.

Completion Criteria:

- Equipment ready for shipment to the field.

9.6.7 CCSi Ship Acceptance (Milestone)

- All equipment shipped to the field.

9.7 DEVELOP CUTOVER PLAN AND CONSOLE TEMPLATES

9.7.1 Develop Cutover Plan

Motorola Responsibilities:

- Motorola and the Customer develop a mutually agreed upon cutover plan based on the high-level Cutover Plan provided during the Design Review (DR).
- Conduct cutover meeting(s) with user group representatives to address both how to mitigate technical and communication problem impact to the users during cutover and during the general operation of the system.

Customer Responsibilities:

- Attend cutover meetings and approve the cutover plan.

Completion Criteria:

- Cutover Plan complete.

9.7.2 Develop Console Templates

Motorola Responsibilities:

- Motorola will work with each Dispatch Center to develop a new console template. Up to seven console templates are included, one for each dispatch location. New console templates will be based on the existing Gold Elite configurations and screen layouts, and incorporate new features and functions as requested by the Customer.

Customer Responsibilities:

- Evaluate sample consoles and provide feedback.
- Approve templates.

Completion Criteria:

- Templates completed and approved by the Customer.

9.8 SYSTEM INSTALLATION

9.8.1 Install Fixed Network Equipment

Motorola Responsibilities:

- Receive and inventory all equipment.
- Transport equipment from the City of Long Beach's storage facility to the various sites.
- Motorola will be responsible for the installation of all fixed equipment contained in the equipment list and outlined in the System Description based upon the agreed to floor plans, at the sites where the physical facility improvement is complete and the site is ready for installation. All equipment will be properly secured to the floor and installed in a neat and professional manner, employing a standard of workmanship consistent with its own R-56 installation standards and in compliance with applicable National Electrical Code (NEC), EIA, Federal Aviation Administration (FAA), and FCC standards and regulations.
- The City of Long Beach has concluded that the resulting contract would be a Public Works Contract subject to Davis-Bacon and/or California Prevailing Wage laws as to some of the work, specifically the installation of fixed network equipment such as antennas, equipment racks, and cable lines. Motorola will pay or cause to be paid the applicable prevailing wage under Davis-Bacon and/or California Prevailing Wage laws to all workers performing covered servicesFor installation of the fixed equipment at the various sites, Motorola will furnish all cables for power, audio, control, and radio transmission to connect the Motorola supplied equipment to the power panels or receptacles and the audio/control line connection point.
- During field installation of the equipment, any required changes to the installation will be noted and assembled with the final 'as-built' documentation of the system.
- Bond the supplied equipment to the site ground system in accordance with Motorola's R56 standards.
- Interface to the following network connections:
  - T1 / Ethernet Interfaces.
  - Multimode Fiber (at Gas Dispatch and Joint Command).
- Provide an interface for Telephone Interconnect (demark to be determined in DR).
- This proposal does not include relocating any existing equipment to new locations, electrical outlet installation, or concrete coring.
- Remove and dispose of existing backroom equipment as part of Cutover.
- For this project, Motorola will also perform the following specific tasks:

City of Long Beach Master Site (ECOC)

- Cold install, cable, and ground staged master site and backroom dispatch equipment consisting of 4 cabinets.
  - 1 cabinet for Master Site servers and back-up storage
  - 1 cabinet for the network equipment
  - 1 cabinet for RF conventional equipment including 10 CCGWs for up to 80 analog conventional resources
  - 1 cabinet for Dispatch equipment for ECOC including three (3) Aux I/Os to support up to 48 outputs and 144 inputs, and three (3) CCGWs for up to 24 conventional resources
- Wire up CCGWs and Aux I/Os

- RAD MUX Fiber to Ethernet conversion: Install, cable, and ground four (4) Rad-mux units (2 for connecting to JCCC Dispatch, and 2 for connecting to Gas Dispatch)
- Install, cable, and ground CTI comparator monitoring and control network equipment (CPU and modules) into one of the four cabinets TBD in DR.
- Install and connect GPS antenna system.

Joint Command and Control Center (JCCC)

- Cold install, cable, and ground dispatch equipment in one (1) 7.5' rack
  - Wire up one (1) Aux I/O to support up to 16 outputs and 48 inputs
  - Wire up one (1) CCGW to support up to 8 conventional resources
- RAD MUX Fiber to Ethernet conversion: Install, cable, and ground two (2) Rad-mux units to connect to ECOC.

Gas Dispatch

- Cold install, cable, and ground dispatch equipment in one (1) 7.5' rack
  - Wire up one (1) Aux I/O to support up to 16 outputs and 48 inputs
  - Wire up one (1) CCGW to support up to 8 conventional resources
- RAD MUX Fiber to Ethernet conversion: Install, cable, and ground two (2) Rad-mux units for connecting to ECOC.

Long Beach Airport Dispatch

- Cold install, cable, and ground dispatch equipment in one (1) 7.5' rack
  - Wire up one (1) Aux I/O to support up to 16 outputs and 48 inputs
  - Wire up one (1) CCGW to support up to 8 conventional resources

Signal Hill Dispatch

- Cold install, cable, and ground dispatch equipment in one (1) 7.5' rack
  - Wire up one (1) Aux I/O to support up to 16 outputs and 48 inputs
  - Wire up one (1) CCGW to support up to 8 conventional resources

Wireless Shop

- Cold install, cable, and ground dispatch equipment in existing rack space

Customer Responsibilities:

- Provide secure storage for the Motorola-provided equipment, at a location central to the sites. Motorola coordinates the receipt of the equipment with the Customer's designated contact, and inventory all equipment.
- Provide Analog Telephone lines.
- Provide space, power, HVAC, grounding system, etc
- Provide CCGW punchblocks
- Provide adequate AC power within 6 feet of equipment.
- Any concrete coring, required
- Provide access to the sites, as necessary.
- Access cards or escorts will be provided for team members during the installation to avoid delays.

Completion Criteria:

- Fixed Network Equipment installation completed and ready for optimization.

9.8.2 Fixed Network Equipment Installation Complete

- All fixed network equipment installed and accepted by the Customer.

9.8.3 Console Installation

Motorola Responsibilities:

- Install the console in the space provided by the Customer.
- Connect the Customer-supplied, previously-identified circuits into the console, to a demarcation point located within 25 feet of the console interface.
- Connect the appropriate equipment to the Customer-supplied ground system in accordance with Motorola's R56 Site Installation standards.
- Motorola will use reasonable efforts to develop a solution that emulates the City's presently used custom headset interface and foot pedal operation within the limitations of the new hardware and software. These reasonable efforts will involve providing engineering and technical services up to 5 man-days. However, if the limitations of the new hardware and software prevent the development of a suitable solution, then Motorola will provide user training on the standard headset and foot pedal operation and the City will accept the new hardware and software without the customized solution.
- If required, Motorola will provide dispatcher operator audio to a demark punchblock in the equipment room. Existing conventional channels and base stations will continue to use their existing interfaces and logging recorders.
- Remove and dispose of existing Gold Elite operator positions as part of Cutover.
- For this project, Motorola will also perform the following specific tasks:

Emergency Communication and Operations Center (ECOC)

- Install 21 MCC7500 dispatch operator positions in preparation for Cutover and Training (14 ops in PD, 6 ops in Fire, and 1 op in the Equipment Room). Mount headset jacks, VPMs, and set all other console equipment on dispatch furniture.
- Run two (2) 150' cables from each of the 20 operator positions (14 ops in PD, 6 ops in Fire) to the backroom equipment.

Joint Command and Control Center (JCCC)

- Install 5 MCC7500 dispatch operator positions. Mount headset jacks, VPMs, and set all other console equipment on dispatch furniture.
- Run two (2) 150' cables from each of the 5 operator positions to the backroom equipment.

Gas Dispatch

- Install 3 MCC7500 dispatch operator positions. Mount headset jacks, VPMs, and set all other console equipment on dispatch furniture.
- Run two (2) 150' cables from each of the 3 operator positions to the backroom equipment.

Long Beach Airport Dispatch

- Install 1 MCC7500 dispatch operator position. Mount headset jacks, VPMs, and set all other console equipment on dispatch furniture.
- Run two (2) 150' cables the one (1) operator position to the backroom equipment.

Signal Hill Dispatch

- Install 1 MCC7500 dispatch operator position Mount headset jacks, VPMs, and set all other console equipment on dispatch furniture.
- Run two (2) 150' cables the one (1) operator position to the backroom equipment.

Wireless Shop

- Install 1 MCC7500 dispatch operator position, and 1 Network Management client.
- Run 3 network cables from the backroom equipment to operator and client location.

Customer Responsibilities:

- Space, power, and console furniture provided by the City of Long Beach.
- Provide demarcation point located within 25 feet of the console interface.
- For console sites not located at the ECOC, additional network link resources will be required, as identified in the system block diagram provided by Motorola in DR.

Completion Criteria:

- Console installation is complete.

9.8.4 Console Installation Complete

- Console installation completed and accepted by the Customer.

9.8.5 Install ASR Site Equipment – Signal Hill

Motorola Responsibilities:

- Receive and inventory all equipment.
- Rack, cable, and ground one (1) staged rack of ASR site equipment per DR drawings.
- Remove and dispose of existing Tx and Rx antenna systems including lines.
- Install two (2) new Tx antennas and line each up to 100' height on the tower.
- Install one (1) new Rx antenna and line up to 100' height on the tower.
- Re-use existing antenna arms.

Customer Responsibilities:

- Provide secure storage for the Motorola-provided equipment.
- Provide shelter and tower space, power, HVAC, grounding system, etc
- Any concrete coring, required
- Provide access to the site, as necessary.
- Access cards or escorts will be provided for team members during the installation to avoid delays.

Completion Criteria:

- ASR Site Fixed Network Equipment installation completed and ready for optimization.

9.8.6 Microwave System Implementation

Motorola Responsibilities:

- Perform Field Path and Site Surveys
- Analysis / Frequency Coordination and FCC Application Preparation for Microwave

- Installation and test of microwave racked equipment
- Installation of microwave antenna and transmission line
- Remove and dispose of existing Harris microwave equipment being replaced (requirement for trade-in credit included in pricing)
- Perform test to verify site link performance during the link verification process
- Proteus MX Series Product Training for up to 6 students at customer location (3 days)
- Install and initially configure the DS0 cross-connections.

Customer Responsibilities:

- Provide access/escort to the sites.
- Provide the detailed City of Long Beach DS0 level T1 cross-connection design.

Completion Criteria:

- Microwave site link installations complete.

9.8.7 Perform R56 Installation Audit

Motorola Responsibilities:

- Perform R56 site-installation quality audits, verifying proper physical installation and operational configurations.
- Create site evaluation report to verify site meets or exceeds requirements, as defined in Motorola's Standards and Guidelines for Communication Sites (R56).

Customer Responsibilities:

- Provide access/escort to the sites.
- Witness tests (if desired).

Completion Criteria:

- All R56 audits completed successfully.

9.8.8 System Installation Acceptance (Milestone)

- All equipment installations are completed and accepted by the Customer.

9.9 SYSTEM PROGRAMMING AND OPTIMIZATION

9.9.1 Link Verification

Motorola Responsibilities:

- Provide new microwave system links, if the proposed Microwave System is purchased.
- Perform test to verify site link performance, prior to the interconnection of the Motorola-supplied equipment to the link equipment.

Customer Responsibilities:

- Make available the required links which meet the specifications supplied by Motorola at the CDR.

Completion Criteria:

- Link verification successfully completed.

9.9.2 Optimize System FNE and Program Consoles

Motorola Responsibilities:

- Motorola and its subcontractors optimize each subsystem.
- Load customer Subscriber IDs and Aliases into the Core (this may occur at Staging).
- Verify that all equipment is operating properly and that all electrical and signal levels are set accurately.
- Verify that all audio and data levels are at factory settings.
- Check audio and data levels to verify factory settings.
- Verify communication interfaces between devices for proper operation.
- Test features and functionality are in accordance with manufacturers' specifications and that they comply with the final configuration established during the CDR/system staging.
- Set up the consoles on the radio system to perform the dispatching operation.
- Perform the console programming, based on the console templates designed during the template development process.
- Motorola will use reasonable efforts to develop a solution that emulates the City's presently used custom headset interface and foot pedal operation within the limitations of the new hardware and software. These reasonable efforts will involve providing engineering and technical services up to 5 man-days. However, if the limitations of the new hardware and software prevent the development of a suitable solution, then Motorola will provide user training on the standard headset and foot pedal operation and the City will accept the new hardware and software without the customized solution.

Customer Responsibilities:

- Provide access/escort to the sites.
- Provide required radio ID and alias information to enable alias database setup for interface to console.
- Interface and document any new logging recorder tracks.

Completion Criteria:

- System FNE optimization is complete.

9.9.3 Optimization and Programming Complete

- System optimization is completed. Motorola and the Customer agree that the equipment is ready for acceptance testing.

9.10 TRAINING

9.10.1 Perform Training

Motorola Responsibilities:

- Finalize field conducted training schedules purchased as part of this project with the Customer Project Manager.

- Conduct the training classes outlined in the Training Plan.

Customer Responsibilities:

- Attend training classes.
- Comply with the prerequisites in the Training Plan, several are on-line, self-paced courses that need to be completed prior to the Workshops.

Completion Criteria:

- All training classes completed.

9.10.2 Training Complete

- All training classes completed.

9.11 ACCEPTANCE TESTING

9.11.1 Perform Functional Testing

Motorola Responsibilities:

- Verify the operational functionality and features of the individual subsystems and the system supplied by Motorola, as contracted.
- If any major task as contractually described fails, repeat that particular task after Motorola determines that corrective action has been taken.
- Document all issues that arise during the acceptance tests.
- Document the results of the acceptance tests and present to the Customer for review.
- Resolve any minor task failures before Final System Acceptance.

Customer Responsibilities:

- Witness the functional testing.

Completion Criteria:

- Successful completion of the functional testing.
- Customer approval of the functional testing.

Completion Criteria:

- Successful completion of the functional testing per the Acceptance Test Plan (ATP) and approval by the Customer.

9.11.2 System Acceptance Test Procedures (Milestone)

- Customer approves the completion of all the required tests per the Acceptance Test Plan (ATP).

9.12 FINALIZE

9.12.1 Cutover

Motorola Responsibilities:

- During cutover, follow the written plan and implement the defined contingencies, as required in the approved Cutover Plan.
- Remove and dispose of existing Gold Elite operator positions and existing backroom equipment.

Customer Responsibilities:

- Notify the user group(s) affected by the cutover (date and time).
- Conduct a roll call of all users working during the cutover, in an organized and methodical manner.

Completion Criteria:

- Successful migration from the old consoles to the new consoles.

9.12.2 Resolve Punchlist

Motorola Responsibilities:

- Work with the Customer to resolve punchlist items, documented during the Acceptance Testing phase, in order to meet all the criteria for final system acceptance.

Customer Responsibilities:

- Assist Motorola with resolution of identified punchlist items by providing support, such as access to the sites, equipment and system, and approval of the resolved punchlist item(s).

Completion Criteria:

- All punchlist items resolved and approved by the Customer.

9.12.3 Transition to Service/Project Transition Certificate

Motorola Responsibilities:

- Review the items necessary for transitioning the project to warranty support and service.
- Provide a Customer Support Plan detailing the warranty and post-warranty support, if applicable, associated with the Contract equipment.

Customer Responsibilities:

- Participate in the Transition Service/Project Transition Certificate (PTC) process.

Completion Criteria:

- All service information has been delivered and approved by the Customer.

9.12.4 Finalize Documentation

Motorola Responsibilities:

- Provide an electronic as-built system manual on a Compact Disc (CD). The documentation will include the following:

  M-core and Dispatch Solution:
  - System-Level Diagram
  - Site Floor Plans (Master Site and Dispatch Equipment Rooms)
  - Site Equipment Rack Configurations (Master Site and Dispatch Equipment Rooms)
  - Site Cable Tray Layout (Master Site)
  - Functional Acceptance Test Plan Test Sheets and Results
  - Equipment Inventory List
  - Console Programming Template
  - Maintenance Manuals Technical Service Manuals
  - Provide 1 tailored console flipbook for each dispatch center
  - Administrative Information and Passwords

  ASTRO25 Express Migration:
  - Repeater Site System Diagram
  - Repeater Site Floor Plan
  - Repeater Site Cable Tray Layout
  - Repeater Site Equipment Rack Configuration
  - Repeater Site Antenna Elevation Drawing
  - Repeater Site RF Interconnect Diagram
  - Functional Acceptance Test Plan Test Sheets and Results.
  - Equipment Inventory List.
  - Maintenance Manuals Technical Service Manuals.

  Microwave Upgrade:
  - Microwave Link Diagram.
  - Microwave Dish Center Line / Tower Drawing for each site
  - Site Floor Plan for each site
  - Site Cable Tray Layout for each site
  - Site Equipment Rack Configuration for each site
  - Site Microwave Interconnect Diagram for each site
  - Field Path Surveys
  - Link Verification Test and Results.
  - Equipment Inventory List.
  - Maintenance Manuals Technical Service Manuals.

- Drawings are created utilizing AutoCAD design software and will be delivered in Adobe PDF format. All other system manual documents converted from native format to Adobe PDF format to be included on the System Manual CD.

Customer Responsibilities:

- Receive and approve all documentation provided by Motorola.

Completion Criteria:

- All required documentation is provided and approved by the Customer.

9.12.5 Final Acceptance (Milestone)

- All deliverables completed, as contractually required.
- Final System Acceptance received from the Customer.

9.13 PROJECT ADMINISTRATION

9.13.1 Project Status Meetings

Motorola Responsibilities:

- Twice a month or as determined by the Customer and Motorola project team, Motorola Project Manager, or designee, will attend all project status meetings with the Customer, as determined during the CDR.
- Record the meeting minutes and supply the report.
- The agenda will include the following:
  - Overall project status compared to the Project Schedule.
  - Product or service related issues that may affect the Project Schedule.
  - Status of the action items and the responsibilities associated with them, in accordance with the Project Schedule.
  - Any miscellaneous concerns of either the Customer or Motorola.

Customer Responsibilities:

- Attend meetings.
- Respond to issues in a timely manner.

Completion Criteria:

- Completion of the meetings and submission of meeting minutes.

9.13.2 Progress Milestone Submittal

Motorola Responsibilities:

- Submit progress (non-payment) milestone completion certificate/documentation.

Customer Responsibilities:

- Approve milestone, which will signify confirmation of completion of the work associated with the scheduled task.

Completion Criteria:

- The Customer approval of the Milestone Completion document(s).

9.13.3 Change Order Process

Either Party may request changes within the general scope of this Agreement. If a requested change causes an increase or decrease in the cost, change in system configuration or adds time to the project's timeline required to perform this Agreement, the Parties will agree to an equitable adjustment of the Contract Price, Performance Schedule, or both, and will reflect the adjustment in a

change order. Neither Party is obligated to perform requested changes unless both Parties execute a written change order.

9.13.4 Change Order Form

Change Order No. _____

Date: _____

Project Name: _____

Customer Name: _____

Customer Project Mgr: _____

The purpose of this Change Order is to: *(highlight the key reasons for this Change Order)*

Contract # REQUIRED _____ **Contract Date:** _____

In accordance with the terms and conditions of the contract identified above between [enter customer name] and Motorola Solutions, Inc., the following changes are approved:

Contract Price Adjustments

Original Contract Value:	$
Previous Change Order amounts for Change Order number [ ] [ ]	$
This Change Order:	$
New Contract Value:	$

Completion Date Adjustments

Original Completion Date:	
Current Completion Date prior to this Change Order:	
New Completion Date:	

Changes in Equipment: *(additions, deletions or modifications)* Include attachments if needed

Changes in Services: *(additions, deletions or modifications)* Include attachments if needed

Schedule Changes: *(describe change or N/A)*

Pricing Changes: *(describe change or N/A)*

Customer Responsibilities: *(describe change or N/A)*

Payment Schedule for this Change Order: *(describe new payment terms applicable to this change order)*

Unless amended above, all other terms and conditions of the Contract shall remain in full force. If there are any inconsistencies between the provisions of this Change Order and the provisions of the Contract, the provisions of this Change Order will prevail.

IN WITNESS WHEREOF the parties have executed this Change Order as of the last date signed below.

Motorola Solutions, Inc.		**Customer**	
By:	_____	By:	_____
Printed Name:	_____	Printed Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

Reviewed by: _____ Date: _____

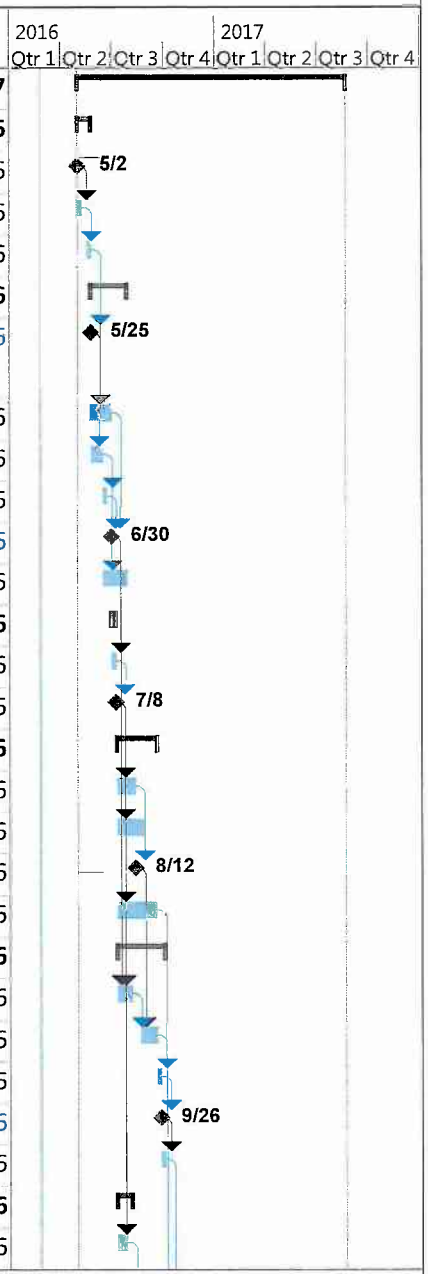
SECTION 10

PROJECT SCHEDULE

Motorola has provided a project schedule on the following pages.

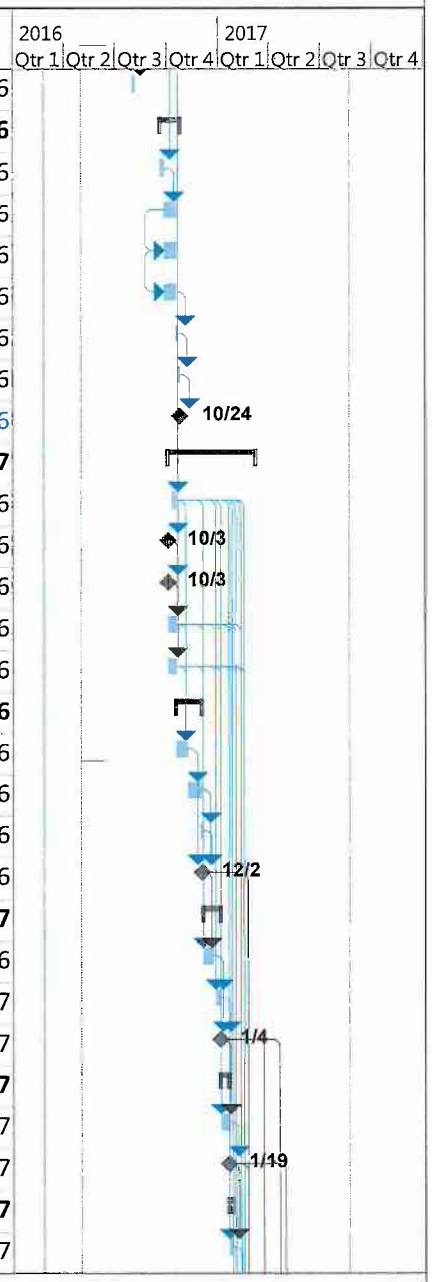
City of Long Beach ASTRO 25 MCC 7500 Migration Project

ID	Task Name	Duration	Start	Finish
1	**City of Long Beach Implementation Project**	**331d**	**Mon 5/2/16**	**Tue 8/22/17**
2	**Contract**	**18d**	**Mon 5/2/16**	**Wed 5/25/16**
3	Contract Award	0d	Mon 5/2/16	Mon 5/2/16
4	Contract Administration	8d	Mon 5/2/16	Wed 5/11/16
5	Project Kick-Off	5d	Thu 5/19/16	Wed 5/25/16
6	**Design Review and Planning**	**44d**	**Wed 5/25/16**	**Thu 7/28/16**
7	Customer provided FCC Licensing for new ASR site channels available	0d	Wed 5/25/16	Wed 5/25/16
8	Review Contract Design	25d	Thu 5/26/16	Thu 6/30/16
9	Microwave Field Path Surveys	14d	Thu 5/26/16	Wed 6/15/16
10	Microwave Finalize SOW	5d	Thu 6/16/16	Wed 6/22/16
11	Design Review Acceptance	0d	Thu 6/30/16	Thu 6/30/16
12	Microwave Coordination and Licensing	30d	Thu 6/16/16	Thu 7/28/16
13	**Order Processing**	**5d**	**Fri 7/1/16**	**Fri 7/8/16**
14	Process Equipment list	5d	Fri 7/1/16	Fri 7/8/16
15	Order Bridged	0d	Fri 7/8/16	Fri 7/8/16
16	**Manufacturing**	**50d**	**Mon 7/11/16**	**Mon 9/19/16**
17	Motorola FNE Manufacturing	25d	Mon 7/11/16	Fri 8/12/16
18	CTI Manufacturing	35d	Mon 7/11/16	Fri 8/26/16
19	Ship to Staging	0d	Fri 8/12/16	Fri 8/12/16
20	Microwave Equipment Manufacturing & Ship	50d	Mon 7/11/16	Mon 9/19/16
21	**Radio System Staging**	**60d**	**Mon 7/11/16**	**Mon 10/3/16**
22	Develop Programming Configurations	20d	Mon 7/11/16	Fri 8/5/16
23	Stage System	20d	Mon 8/22/16	Mon 9/19/16
24	Perform Staging ATP	5d	Tue 9/20/16	Mon 9/26/16
25	CCSI Acceptance (Customer witnessed)	0d	Mon 9/26/16	Mon 9/26/16
26	Ship Equipment to Field	5d	Tue 9/27/16	Mon 10/3/16
27	**Cutover Plan Development**	**20d**	**Mon 7/11/16**	**Fri 8/5/16**
28	Develop Cutover Plan	15d	Mon 7/11/16	Fri 7/29/16



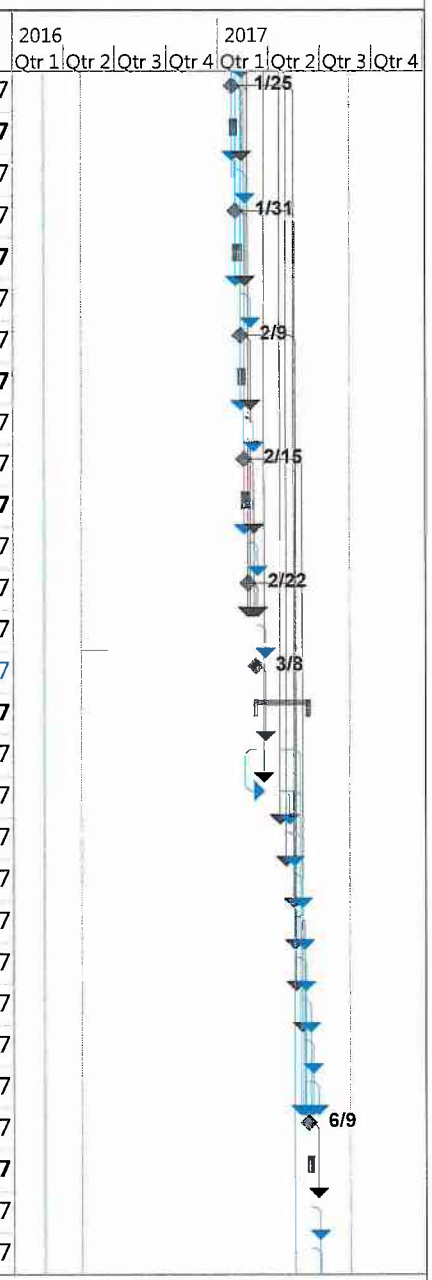
City of Long Beach ASTRO 25 MCC 7500 Migration Project

ID	Task Name	Duration	Start	Finish
29	Review Cutover Plan with Customer	5d	Mon 8/1/16	Fri 8/5/16
30	**Microwave Deployment (4 hops)**	25d	**Tue 9/20/16**	**Mon 10/24/16**
31	Receive and Inventory Microwave Equipment	5d	Tue 9/20/16	Mon 9/26/16
32	Installation of Microwave Equipment	15d	Tue 9/27/16	Mon 10/17/16
33	Alignment and Program	15d	Tue 9/27/16	Mon 10/17/16
34	Microwave Testing	15d	Tue 9/27/16	Mon 10/17/16
35	Microwave Training	3d	Tue 10/18/16	Thu 10/20/16
36	Microwave Site Inspections	2d	Fri 10/21/16	Mon 10/24/16
37	Microwave Acceptance	0d	Mon 10/24/16	Mon 10/24/16
38	**Radio and Dispatch Installation**	**106d**	**Mon 10/3/16**	**Wed 3/8/17**
39	Receive and Inventory Radio & Console Eqpt	5d	Tue 10/11/16	Mon 10/17/16
40	Connectivity Ready - Customer Responsibility	0d	Mon 10/3/16	Mon 10/3/16
41	Sites Ready - Customer Responsibility	0d	Mon 10/3/16	Mon 10/3/16
42	Perform R-56 Audits	10d	Tue 10/4/16	Mon 10/17/16
43	Link Verification Testing	10d	Tue 10/4/16	Mon 10/17/16
44	**Master Site Installation**	**32d**	**Tue 10/18/16**	**Fri 12/2/16**
45	Install Master Equipment	15d	Tue 10/18/16	Mon 11/7/16
46	Install and Wire CCGW, Aux I/O, etc	15d	Tue 11/8/16	Wed 11/30/16
47	Install Eqpt Room Console (Qty: 1) & NM Client (Qty: 1)	2d	Thu 12/1/16	Fri 12/2/16
48	Master Site Installation Complete	0d	Fri 12/2/16	Fri 12/2/16
49	**ECOC Console Installation (Qty: 20 + 1 in backroom)**	**20d**	**Mon 12/5/16**	**Wed 1/4/17**
50	Install PD Consoles (Qty: 14)	14d	Mon 12/5/16	Thu 12/22/16
51	Install Fire Consoles (Qty: 6)	6d	Tue 12/27/16	Wed 1/4/17
52	ECOC Installation Complete	0d	Wed 1/4/17	Wed 1/4/17
53	**JCCC Console Installation (Qty: 5)**	**10d**	**Thu 1/5/17**	**Thu 1/19/17**
54	Install JCCC Rack & Console Equipment	10d	Thu 1/5/17	Thu 1/19/17
55	JCCC Installation Complete	0d	Thu 1/19/17	Thu 1/19/17
56	**Airport Console Installation (Qty: 1)**	**4d**	**Fri 1/20/17**	**Wed 1/25/17**
57	Install Airport Rack & Console Equipment	4d	Fri 1/20/17	Wed 1/25/17



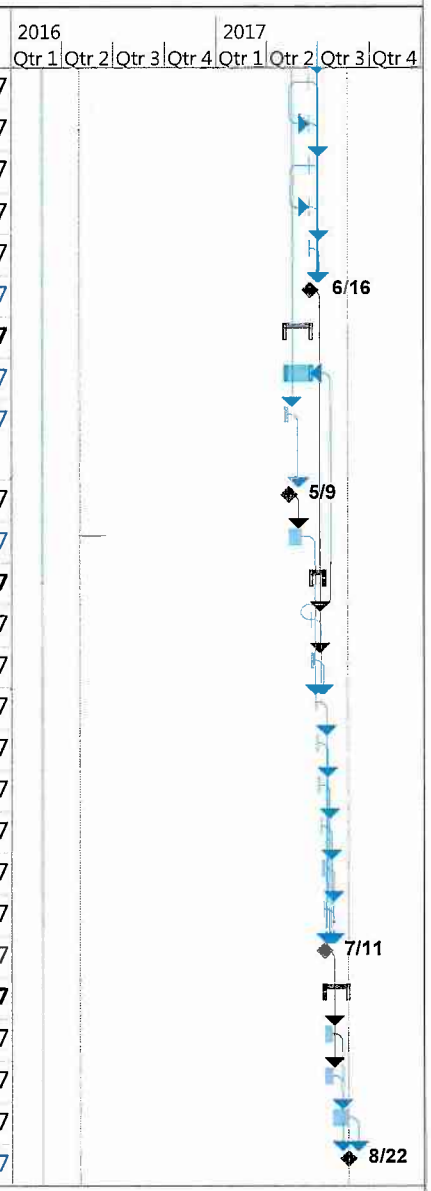
City of Long Beach ASTRO 25 MCC 7500 Migration Project

ID	Task Name	Duration	Start	Finish
58	Airport Installation Complete	0d	Wed 1/25/17	Wed 1/25/17
59	**Signal Hill Console Installation (Qty: 1)**	**4d**	**Thu 1/26/17**	**Tue 1/31/17**
60	Install Signal Hill Rack & Console Equipment	4d	Thu 1/26/17	Tue 1/31/17
61	Signal Hill Installation Complete	0d	Tue 1/31/17	Tue 1/31/17
62	**Gas Dept. Console Installation (Qty: 3)**	**7d**	**Wed 2/1/17**	**Thu 2/9/17**
63	Install Gas Dept. Rack & Console Equipment	7d	Wed 2/1/17	Thu 2/9/17
64	Gas Dept. Installation Complete	0d	Thu 2/9/17	Thu 2/9/17
65	**Wireless Shop Console & NM Client Installation (Qty: 1)**	**4d**	**Fri 2/10/17**	**Wed 2/15/17**
66	Install Wireless Shop Console & NM Client Equipment	4d	Fri 2/10/17	Wed 2/15/17
67	Wireless Shop Installation Complete	0d	Wed 2/15/17	Wed 2/15/17
68	**Astro25 Repeater Site Installation - Signal Hill**	**5d**	**Thu 2/16/17**	**Wed 2/22/17**
69	Install ASR FNE & 3 new antenna systems	5d	Thu 2/16/17	Wed 2/22/17
70	ASR Site Installation Complete	0d	Wed 2/22/17	Wed 2/22/17
71	Post-Installation Audits	10d	Thu 2/23/17	Wed 3/8/17
72	Installation Acceptance	0d	Wed 3/8/17	Wed 3/8/17
73	**Programming and Optimization**	**66d**	**Thu 3/9/17**	**Fri 6/9/17**
74	Optimize System FNE	30d	Thu 3/9/17	Wed 4/19/17
75	Program PD Consoles (Qty: 14)	20d	Thu 3/23/17	Wed 4/19/17
76	Program Fire Consoles (Qty: 6)	7d	Thu 4/20/17	Fri 4/28/17
77	Program JCCC Console Equipment (Qty: 5)	10d	Mon 5/1/17	Fri 5/12/17
78	Program Airport Console Equipment (Qty: 1)	2d	Mon 5/15/17	Tue 5/16/17
79	Program Signal Hill Console Equipment (Qty: 1)	2d	Wed 5/17/17	Thu 5/18/17
80	Program Gas Dept. Console Equipment (Qty: 3)	6d	Fri 5/19/17	Fri 5/26/17
81	Program Wireless Shop Console Equipment (Qty: 1)	2d	Tue 5/30/17	Wed 5/31/17
82	Optimize and Program ASR Site	7d	Thu 6/1/17	Fri 6/9/17
83	Optimization Complete	0d	Fri 6/9/17	Fri 6/9/17
84	**Acceptance Testing**	**5d**	**Mon 6/12/17**	**Fri 6/16/17**
85	Perform ECOC Dispatch Testing	1d	Mon 6/12/17	Mon 6/12/17
86	Perform JCCC Dispatch Testing	1d	Tue 6/13/17	Tue 6/13/17



City of Long Beach ASTRO 25 MCC 7500 Migration Project

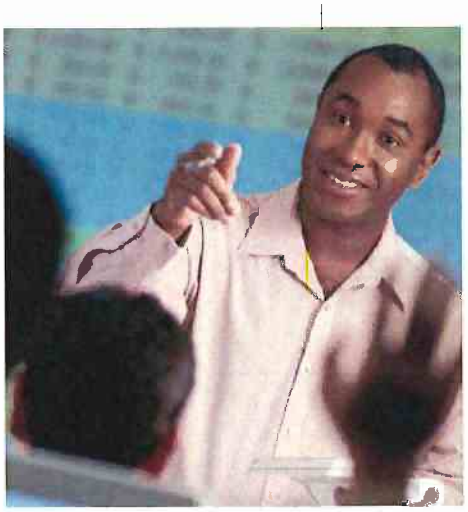
ID	Task Name	Duration	Start	Finish
87	Perform Airport Dispatch Testing	1d	Wed 6/14/17	Wed 6/14/17
88	Perform Signal Hill Dispatch Testing	1d	Wed 6/14/17	Wed 6/14/17
89	Perform Gas Dept. Testing	1d	Thu 6/15/17	Thu 6/15/17
90	Perform Wireless Shop Testing	1d	Thu 6/15/17	Thu 6/15/17
91	Perform ASR Site Testing	1d	Fri 6/16/17	Fri 6/16/17
92	SATP Acceptance	0d	Fri 6/16/17	Fri 6/16/17
93	**Dispatcher and Technical Training**	**32d**	**Wed 5/3/17**	**Mon 6/19/17**
94	Various Technical Training Courses (see proposal)	30d	Fri 5/5/17	Mon 6/19/17
95	Train-the-Trainer Training for Dispatchers & Admin/Supervisors	5d	Wed 5/3/17	Tue 5/9/17
96	Training Complete	0d	Tue 5/9/17	Tue 5/9/17
97	Training for Dispatchers - Customer Responsibility	15d	Wed 5/10/17	Wed 5/31/17
98	**Cut-Over**	**16d**	**Mon 6/19/17**	**Tue 7/11/17**
99	Transition to Warranty	1d	Mon 6/19/17	Mon 6/19/17
100	Review Cutover Plan with Customer	5d	Mon 6/19/17	Fri 6/23/17
101	Cutover ECOC	2d	Mon 6/26/17	Tue 6/27/17
102	Cutover JCCC	2d	Wed 6/28/17	Thu 6/29/17
103	Cutover Airport	2d	Fri 6/30/17	Mon 7/3/17
104	Cutover Signal Hill	2d	Wed 7/5/17	Thu 7/6/17
105	Cutover Gas Dept.	2d	Fri 7/7/17	Mon 7/10/17
106	Cutover Wireless Shop	1d	Tue 7/11/17	Tue 7/11/17
107	Cutover Complete	0d	Tue 7/11/17	Tue 7/11/17
108	**Finalize**	**30d**	**Wed 7/12/17**	**Tue 8/22/17**
109	Remove & Dispose of Old Equipment	10d	Wed 7/12/17	Tue 7/25/17
110	Resolve Punchlist	10d	Wed 7/12/17	Tue 7/25/17
111	Finalize Documentation	20d	Wed 7/26/17	Tue 8/22/17
112	Final Acceptance	0d	Tue 8/22/17	Tue 8/22/17



SECTION 11

TRAINING PLAN

11.1 OVERVIEW



Motorola Solutions understands that successful implementation and use of your communications system depends on effective training. We have developed a training proposal for the City of Long Beach to ensure a comprehensive understanding of your proposed system and all user equipment. We are leveraging over 85 years of training experience working with customers just like you to provide recommendations for your consideration. The training proposal detailed in the following pages incorporates customer feedback coupled with a best practices systematic approach to produce effective course delivery and content.

Our commitment to the City of Long Beach is to provide unsurpassed services that ensure the equipment operates efficiently for the life of the system. To do so, we directly train your personnel to utilize the system to its maximum potential.

The City of Long Beach personnel will gain in-depth understanding of the power of your new system through education and proficient daily use. Our high-quality training focuses on student needs. The training is complemented by detailed documentation and available continuing education programs.

We will collaborate with the City of Long Beach to develop a final customized training plan that fits your needs. Our goal is to insure system administrators, technicians and end users are skilled in using your new system.

11.2 TRAINING APPROACH

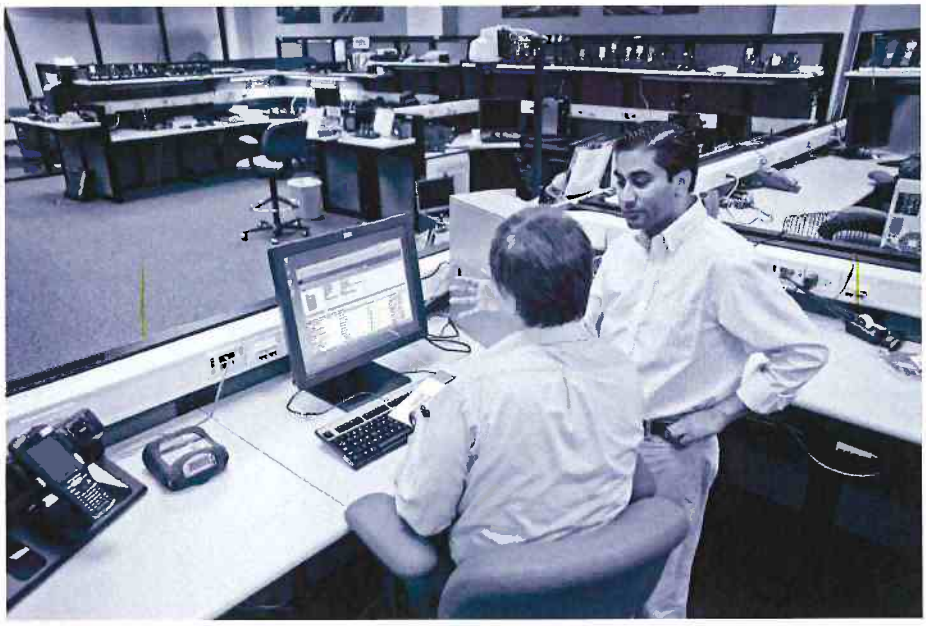
Our training solutions deliver a combination of online training and field based instructor-led training in classrooms at the City of Long Beach locations using operational equipment. Motorola Solutions will employ knowledgeable and experienced instructors to deliver well-designed courseware and integrated lab activities.

Training is based upon several key criteria:

- Course design is driven by an analysis of student needs. It focuses on specific application rather than theory.
- Learning objectives are based upon what students need to accomplish on the job.

- Hands-on lab opportunities using the City of Long Beach specific job aids are incorporated to maximize learning and retention.

Our instructors bring invaluable experience and knowledge of customer communication solutions into their training approach. This gives them better insight and understanding into the practical aspects of the City of Long Beach manager, technician and end user job functions. Each instructor has the proven ability to communicate with a novice as well as expert personnel.



11.3 PROPOSED COURSES

Motorola Solutions has identified the following course(s) that are necessary to achieve the training goals for the City of Long Beach. Course descriptions for the recommended courses are in the sections following the Training Plans. Class delivery for instructor-led courses in the field will be tailored for your system and features.

Specifically, our proposed training plan addresses the following categories as identified in your request for proposal:

- Console Operators and Supervisors
- Core Technicians

It is recommended that participants bring their laptop computers for all technician classes.

11.4 CONSOLE OPERATOR AND SUPERVISOR TRAINING PLAN

Course Title	Target Audience	Sessions	Duration (days)	Location	Date	Participants
MCC7500 Console Operator 3 training consoles (Instructor-led)	Console Dispatch Operators	2 (4 hour sessions)	1	Long Beach, CA	Prior to cutover	12 (6 per session)
Operator Course Synopsis: This course provides participants with an introduction to the dispatch console, its basic operation and tailored job aids which will be available for assistance in operation. Through facilitation and hands-on activities, the user learns how to perform common tasks associated with the console operation.						
MCC7500 Console Operator and Admin Train-the-Trainer **Differences class** Utilizing the Interactive End User Tool Kit 3 training consoles Instructor-led	Console Dispatch Supervisors	2 (4-hour sessions)	1	Long Beach, CA	Prior to cutover	12 (6 per session)
Operator Course Synopsis: This course provides participants with an introduction to the dispatch console, its basic operation and tailored job aids which will be available for assistance in operation. Through facilitation and hands-on activities, the user learns how to perform common tasks associated with the console operation. **Admin Course Synopsis:** This course provides participants with the knowledge and skills to manage and utilize the MCC7500 console administrator functions. Through facilitation and hands-on activities, the participant learns how to customize the console screens. **Note:** Since Long Beach Dispatchers are transitioning from CENTRACOM Gold Elite, shorter sessions are quoted that focus on the differences between Gold Elite and MCC7500 operator positions. The operator class is covered in the first half of the session. Admin, the Interactive End User Tool Kit and instruction on how to deliver the course will be covered in the second half of the session.						

11.4.1 Course Outline for MCC7500 Operator

Duration:

2 hours (reduced from 4 hours since Long Beach are currently Gold Elite users)

Delivery Method:

Instructor-led

Target Audience:

Dispatch Console Operators, Supervisors, System Administrators, and Support Personnel

Course Synopsis:

This course provides participants with an introduction to the dispatch console, its basic operation and tailored job aids which will be available for assistance in operation. Through facilitation and hands-on activities, the user learns how to perform common tasks associated with the console operation.

Course Objectives:

- Perform basic operational tasks of the dispatch console
- Utilize the provided job aids to perform specific tasks associated with the console
- Understand a high level view of the system configuration
- High-level overview of the customer system configuration
- General console operation
- Proper operating procedures for specific customer features

Recommended Prerequisites:

None

Key Topics:

- Overview
- Communicating with Radios
- Advanced Signaling Features
- Resource Groups
- Working with Configurations
- Working with Aux IOs
- Troubleshooting

11.4.2 Course Outline for MCC7500 Supervisor

Duration:

- 2 hours Operator, plus
- 2 hours Admin
- Reduced durations since Long Beach are Gold Elite users

Delivery Method:

Instructor-led

Target Audience:

Dispatch Supervisors and System Administrators

Admin Course Synopsis:

This course provides participants with the knowledge and skills to manage and utilize the MCC7500 console administrator functions. Through facilitation and hands-on activities, the participant learns how to customize the console screens.

Course Objectives:

- Understand the menu items and tool bar icons
- Edit folders, multi-select/patch groups, auxiliary input output groups, windows and toolbars
- Add/delete folders

Recommended Prerequisites:

None

Key Topics:

- Introduction
- Configurations
- Folders and Resource Setup
- Customizing Folders
- Auto Starting the MCC7500 Dispatch Console
- Editing Preferences
- Configuring the Toolbar
- Setting Up Aux IOs
- Resource Groups

11.5 CORE TECHNICIAN TRAINING PLAN

The Core Technician training courses have been moved to the field (rather than the Resident Classes conducted at Motorola's Training Facility in Schaumburg, IL included in previous proposals). Class delivery for instructor-led courses in the field will be tailored for your system and features.

Course Title	Audience	Sessions	Duration	Location	Date	Participants
Bridging Knowledge Gap for ASTRO 25 Technicians Online Self-paced	System Technicians	1	6 to 12 hours	Online Self-paced	Prior to remaining courses	Up to 12
Course Synopsis: This course is designed to bring Technicians from different technical backgrounds and experience levels to a common starting point for the ASTRO 25 curriculum. This course provides seven modules from the basic concepts of radio communication systems and computer networking features, through the evolution that led to the ASTRO 25 trunking system's architecture.						
ASTRO 25 IV&D Trunking M Core System Overview Prerequisite 1 Online Self-paced	System Technicians	1	4 hours	Online Self-paced	Prior to Prerequisite 2	Up to 12
Course Synopsis: The ASTRO® 25 IV&D Trunking with M Core System Overview is a self-paced course. It is the starting point for all ASTRO 25 IV&D Trunking with M Core systems. It provides a high-level description of the system's call flow capabilities, components, features and benefits. Participants are required to complete this course with a passing score on the corresponding test before taking other classes.						
ASTRO 25 IV&D Introduction to Radio System Management Applications Prerequisite 2 Online Self-paced	System Technicians	1	2 hours	Online Self-paced	Prior to the M Core Workshop	Up to 12
Course Synopsis: This virtual, interactive course provides a high-level overview of the Motorola Radio System Management applications through recorded demonstrations of common system tasks.						
ASTRO 25 Systems Applied Networking Instructor-led	System Administrators & Technicians	1	5 days	Long Beach, CA	Prior to remaining courses	Up to 12
Course Synopsis: This course provides the participant with the necessary networking information required for understanding the Network Transport subsystem components installed in an ASTRO 25 IV&D communications system. The course includes familiarization with basic networking concepts and the networking components deployed throughout the system.						

Course Title	Audience	Sessions	Duration	Location	Date	Participants
ASTRO 25 IV&D M Core Workshop Instructor-led	System Technicians	1	5 days	Long Beach, CA	Prior to maintaining the system	Up to 12
Course Synopsis: The ASTRO 25 IV&D with M Core course teaches advanced troubleshooting skills and best practices for the Trunked Large Systems. The course also focuses on gathering and analyzing system information to implement appropriate action(s) that will return a system to full operational status.						
MCC7000 Series Dispatch Console Overview Online Self-paced	System Administrators and Console Technicians	1	1 hour	Online Self-paced	Prior to the console workshop	Up to 12
Course Synopsis: This course provides an overview of the MCC 7000 series of Dispatch Consoles. It includes a description of the features and illustrations of subsystem architecture options. Descriptions of subsystem components and illustrations of signal flow and call processing are also included.						
MCC7000 Series Dispatch Console Workshop Instructor-led	Console Technicians	1	4 days	Long Beach, CA	Prior to maintaining the consoles	Up to 12
Course Synopsis: This course familiarizes participants with the installation, configuration, management and repair of MCC 7000 Series IP dispatch consoles. It also covers Archiving Interface Servers, AUX I/O servers, and Conventional Channel Gateways. The focus is on a detailed discussion of console hardware and hands-on activities with the installation and configuration of the MCC 7000 Series IP dispatch consoles.						

11.5.1 Course Outline for Bridging the Knowledge Gap for ASTRO 25 – Technicians

Bridging the Knowledge Gap for ASTRO 25 – Technicians Course

Duration:

6-12 hours

Delivery Method:

Online Training, self paced

Course Synopsis:

This course is designed to bring Technicians from different technical backgrounds and experience levels to a common starting point for the ASTRO 25 curriculum. This course provides seven modules from the basic concepts of radio communication systems and computer networking features, through the evolution that led to the ASTRO 25 trunking system's architecture.

Audience:

System Technicians and other ASTRO 25 system users who are new to trunked radio systems and also those with experience in non-IP-based radio systems like SmartNet and SmartZone

Course Objectives:

Course material is designed to enable you to:

- Explain different radio system concepts as applied to conventional and trunked systems
- Compare analog radio communication signaling to ASTRO 25 radio communications signaling
- Identify different communication concepts using representative block diagrams of the respective systems
- Compare radio system communication concepts using representative block diagrams of the respective systems
- Compare how voice and data, information flow through different radio communication system types and how the signaling information controls that flow of information
- Describe the features of each radio communication system in terms of advantages and disadvantages

Prerequisites:

None

Course Outline:

- Communication System Basics, A-D Conversions, and Modulation
- Conventional Communication System
- Trunked Radio System
- Wide Area Trunked System
- Packet Switched Systems-ASTRO 25 Trunking
- Data
- Radio Call Features

11.5.2 Course Outline for ASTRO 25 IV&D Trunking M Core System Overview

ASTRO® 25 IV&D with M Core System Overview

ACS714200

Duration:

4 hours

Delivery Method:

Online Training, self paced

Target Audience:

System Managers, Technical System Managers, and System Technicians

Course Synopsis:

The ASTRO® 25 IV&D Trunking with M Core System Overview is a self-paced course. It is the starting point for all ASTRO 25 IV&D Trunking with M Core systems. It provides a high-level description of the system's call flow capabilities, components, features and benefits. Participants are required to complete this course with a passing score on the corresponding test before taking other classes.

Prerequisite:

Completion of the following courses or equivalent knowledge:

- Bridging the Knowledge Gap for ASTRO 25 (ACT100 or ACT101)
- Networking Essentials in Communication Equipment (NST762)
- Advanced Networking in Motorola Communications Equipment (NWT003)

Course Objectives:

After completing the course, the participant will be able to:

- List and describe the ASTRO 25 IV&D Trunking with M Core system features and capabilities.
- Describe the ASTRO 25 with M Core system sites and their components.
- Describe the paths used for control, voice, and data in an ASTRO 25 IV&D Trunking with M Core system.
- List the servers and databases used in an ASTRO 25 IV&D Trunking with M Core system.
- Describe voice and data signal flows and mobility management.
- Utilize the troubleshooting tools to diagnose a fault and restore the Large System Core to the level of the Motorola-supported service strategy.

Course Modules:

Module 1: System Architecture

- M-1 Core Architecture
- M-2 Core Architecture
- M-3 Core Architecture
- Common Server Architecture
- Scalability
- Module 1 Summary
- Module 1 Review Quiz

Module 2: System Features and Options

- Channel Partitioning
- Other Band Trunking
- Dynamic Dual Mode
- Enhanced Data Service
- Telephone Interconnect
- Digital Mutual Aid
- SmartX Site Converter
- ISSI.1 Network Gateway
- ISSI 8000 / CSSI 8000

- Dynamic System Resilience
- High Availability Data
- Radio Authentication
- Module 2 Summary
- Module 2 Review Quiz

Module 3: Zone Core Components

- Direct Attached Storage Device
- Domain Controllers
- Zone Controller
- CSMS
- PDG
- GGSN
- Network Management Components
- Network Transport Components
- Network Subnets
- Servers and Databases
- Module 3 Summary
- Module 3 Review Quiz

Module 4: Remote Sites

- GTR 8000 Expandable Site Hardware
- Repeater Site
- HPD Overlay
- Simulcast Subsystem
- Console Site
- Conventional Channel Support
- Site Statuses
- Module 4 Summary
- Module 4 Review Quiz

Module 5: Information Types and Paths

- Control Information
- Control Path
- Voice Information
- Voice Path
- Data
- Data Path
- Data Path – HPD
- Data Path – Enhanced Data
- Network Management Information
- Network Management Path
- Information Paths Routing
- Routing Failure Scenarios
- Module 5 Summary
- Module 5 Review Quiz

Module 6: Voice and Data Processing

- Finding the Control Channel
- Affiliation and Registration
- Channel Request
- Authorizing the Call
- Assignment of Resources
- Busy Queue
- Call in Progress
- Finishing a Call
- Enhanced Data on Reserved Access Channel
- Data Packets and Signal Flow
- Module 6 Summary
- Module 6 Review Quiz

Module 7: Mobility Management

- Affiliation and Registration
- Valid Sites for an Individual
- Valid Sites for a Talkgroup
- Site Access Denial Type
- Dynamic Site Assignment
- Continuous Assignment Updating
- De-registration
- Roaming
- Adjacent Sites
- RSSI Threshold
- Preferred Site
- Always Preferred Site
- Least Preferred Site
- Out of Range
- Inbound and Outbound
- Balanced Coverage
- Out-of-range Indications
- Scanning
- Priorities in Scan
- Requested Site
- Module 7 Summary
- Module 7 Review Quiz

Final Assessment

11.5.3 Course Outline for ASTRO 25 IV&D Introduction to Radio System Management Applications

ASTRO 25 IV&D Introduction to Radio System Management Applications

ACS715201

Duration:

2 hours

Delivery Method:

Online Training, Self paced

Target Audience:

System Managers, Technical System Managers, and System Technicians

Course Synopsis:

This virtual, interactive course provides a high-level overview of the Motorola Radio System Management applications through recorded demonstrations of common system tasks.

Prerequisites:

Completion of the following courses or equivalent knowledge:

- Bridging the Knowledge Gap for Technicians (ACT100)
- Take one of the following depending on system supporting:
  - ASTRO 25 IV&D with M Core System Overview (ACS713200)
  - ASTRO 25 IV&D Conventional with M Core Overview (ACS713420)
  - ASTRO 25 IV&D with L Core System Overview (ACS715430)

Course Objectives:

After completing this course the participant will be able to:

- Describe the purpose of Network Management applications used in an ASTRO system
- Identify high-level capabilities of those Network Administrator applications
- Familiarize with common operations allowed by those Network Administrator applications

Course Modules:

Module 1: License Applications

- License Manager

Module 2: Monitoring Applications

- Affiliation Display

- Zone Watch
- Radio Control Manager
- UEM

Module 3: Network Configuration Applications

- UNC

Module 4: Reporting and Logging Applications

- ATIA Log Viewer
- Reports
  - RCM Reports
  - System Historical Reports
  - Zone Historical Reports
  - Dynamic Reports
  - UNC and License Manager reports

11.5.4 Course Outline for ASTRO 25 Systems Applied Networking

ASTRO 25 Systems Applied Networking

NWT003

Duration:

5 days

Delivery Method:

Instructor-led Training

Target Audience:

Technical system managers, technicians, and engineers

Course Synopsis:

This course provides the participant with the necessary networking information required for understanding the Network Transport subsystem components installed in an ASTRO 25 IV&D communications system. The course includes familiarization with basic networking concepts and the networking components deployed throughout the system.

Prerequisites:

None

Learning Outcome:

After completing this course, the participant will be able to:

- Understand basic networking concepts
- Describe the various Transport Network Subsystem components
- Define the LAN topologies for each system
- Define the WAN topologies for each system
- Identify the expanse of Network Management across each system
- Discuss HP switch and Motorola Series router configurations
- Describe and perform the backup/restore procedures for the HP switch and Motorola Series routers in the ASTRO 25 system

Course Modules:

Module 1: Basic Networking Concepts

- Terminology and acronyms
- LANS and WANS
- Basic protocols
- Network troubleshooting commands

Module 2: ASTRO 25 Network Transport Subsystem

- Call Processing
  - Block diagram description of how a call travels through the system
  - Identification and isolation of the network components
- Network Components
- HP switches - description and location in the network
  - Menu-driven configuration
  - Web-based configuration
- Cooperative WAN Routing—description and location in the network
- Motorola Series Routers—description and location in the network
  - Command line interface configuration
  - Menu-driven configuration
  - Web-based configuration
- Router Manager - location and application identification

Module 3: Network Concepts

- Identify the LAN portion(s) of the network
- Identify the LAN Protocols and describe where they are in the network
- Identify the WAN portion(s) of the network
- Identify the WAN protocols and describe where they are present in the network

Module 4: Hands-on practice

- Backup and restore HP switch configurations
- Backup and restore Motorola Series router configurations
- Create router boot configuration file
- Flash routers with new operating system

11.5.5 Course Outline for ASTRO 25 IV&D M Core Workshop

ASTRO® 25 IV&D M Core Workshop

ACS714103

Duration:

5 days

Delivery Method:

Instructor-led training

Target Audience:

M Core Master Site Technicians

Course Synopsis:

The ASTRO 25 IV&D with M Core course teaches advanced troubleshooting skills and best practices for the Trunked Large Systems. The course also focuses on gathering and analyzing system information to implement appropriate action(s) that return a system to full operational status.

Prerequisites:

Completion of the following courses or equivalent knowledge:

- Bridging the Knowledge Gap (ACT100 or ACT101)
- Networking Essentials in Communication Equipment (NST762)
- Advanced Networking in Motorola Communications Equipment (NWT003)

Select one of the following depending on system supporting:

- ASTRO 25 IV&D with M Core System Overview (ACS714200)
- ASTRO 25 IV&D Conventional with M Core Overview (ACS714420)
- ASTRO 25 IV&D with L Core System Overview (ACS714430)
- ASTRO 25 IV&D Introduction to Radio System Management Applications (ACS713201)

Course Objectives:

After completing the course, the participant will be able to:

- Describe the ASTRO 25 System architecture.
- Identify the functional and radio subsystems that comprise the ASTRO 25 System.
- Explain and discuss call flow and data flow through Large System Core devices and their subsystems.
- Perform recommended routine maintenance procedures for the ASTRO 25 Large System Core.
- Utilize the troubleshooting tools to diagnose a fault and restore the Large System Core to the level of the Motorola-supported service strategy.

Course Modules:

Module 1: Course Introduction

Module 2: Overview of M Core Systems

- 2-1: System Review
- 2-2: Functional View – Call Processing (Control) Path
- 2-3: Functional View – Audio Path
- 2-4: Functional View – Data Path
- 2-5: Information Assurance High-Level Overview Lab Activity

Module 3: System Troubleshooting Tools

- 3-1: Recommended Test Equipment
- 3-2: Troubleshooting Tools Overview
- 3-3: Detection and Monitoring Tools
- 3-4: Performance Management Tools

Module 4: Network Transport Subsystem

- 4-1: Network Transport Review
- 4-2: Core LAN Switch Lab Activity
- 4-3: Routers
- 4-4: Cooperative WAN Routing (CWR)
- 4-5: Ethernet Site Links
- 4-6: Diagnostic Tools

Module 5: Virtual Management Server (VMS) System Servers

- 5-1: Servers Overview
- 5-2: Virtual Management Server (VMS) Lab Activity

Module 6: Network Management and Zone Controller Applications

- 6-1: Zone Controller
- 6-2: Zone Controller Configuration
- 6-3: Network Management Overview
- 6-4: Network Management Servers
- 6-5: Network Management Databases
- 6-6: Network Management Clients
- 6-7: Network Management Applications Lab Activity

Module 7: Data Subsystem and Customer Enterprise Network (CEN) Interface

- 7-1: Integrated Voice and Data Description
- 7-2: Packet Data Gateway (PDG) Interface
- 7-3: "Global Packet Radio Service" Gateway Support Node (GGSN)
- 7-4: Customer Enterprise Network (CEN) Interface
- 7-5: Data Configuration

Module 8: Routine Maintenance and System Troubleshooting

- 8-1: Recommended Routine Maintenance
- 8-2: Database Backups
- 8-3: Network Device Configuration Backup
- 8-4: Appendix A: Routine Maintenance Schedules
- 8-5: Troubleshooting Hard Failures
- 8-6: Troubleshooting Intermittent Failures
- 8-7: System-Level Reliability
- 8-8: Intra-zone Reliability
- 8-9: Configuration Troubleshooting Lab Activity

Appendix A: Non-CSA Server Architecture

Appendix B: MGEG & AEB – Dispatch Subsystems

- B-1: Circuit-Based Dispatch Subsystem Overview
- B-2: Motorola Gold Elite Gateway (MGEG)
- B-3: Ambassador Electronics Bank (AEB)

11.5.6 Course Outline for MCC7000 Series Dispatch Console Overview

MCC 7000 Series Dispatch Consoles Overview

CON014

Duration:

1 hour

Delivery Method:

Online training, Self paced

Target Audience:

System Administrators and Console Technicians

Course Synopsis:

This course provides an overview of the MCC 7000 series of Dispatch Consoles. It includes a description of the features and illustrations of subsystem architecture options. Descriptions of subsystem components and illustrations of signal flow and call processing are also included.

Prerequisite:

Completion of the following courses or equivalent knowledge:

- Bridging the Knowledge Gap (ACT100-E or ACT101-E)
- Networking Essentials in Communication Equipment (NST762)
- Advanced Networking in Motorola Communications Equipment (NWT003)

Required:

Select the System Overview specific to your ASTRO 25 IV&D Core:

- ASTRO 25 IV&D with M Core System Overview (ACS714200)
- ASTRO 25 IV&D Conventional with M Core System Overview (ACS714420)
- ASTRO 25 IV&D with L Core System Overview (ACS714430)
- ASTRO 25 IV&D Conventional with K Core System Overview (ACS714400)
- ASTRO 25 IV&D Introduction to Radio System Management Applications (ACS713201)

Course Objectives:

After completing the course, the participant will be able to:

- Describe the features of MCC 7000 series of Dispatch Consoles.
- Explain various system architectures for Dispatch Console subsystems.
- Describe system components in a Dispatch Console subsystem.
- Describe the signal flow of call processing from a Dispatch Console.

Course Modules:

Module 1: Course Introduction

Module 2: Console Architectures

- 2-1: Introduction
- 2-2: Co-located Console Sites
- 2-3: Remote Console Sites
- 2-4: CENTRACOM Interoperability
- 2-5: Dispatch Console Subsystem
- 2-6: Conventional Configurations

Module 3: Console Subsystem Components

- 3-1: Introduction
- 3-2: Console Operator Position
- 3-3: MCC7500 with GPIOM
- 3-4: MCC7500 with Voice Processing Module (VPM)
- 3-5: MCC 7100
- 3-6: Logging System
- 3-7: Console Alias Manager - MKM 7000
- 3-8: Auxiliary I/O Server
- 3-9: Conventional Channel Gateway
- 3-10: Conventional Site Controller

Module 4: Console Features

- 4-1: Capacity
- 4-2: Example of Console Functions
- 4-3: Administrator and Dispatcher Applications
- 4-4: Over-the-Ethernet Keying (OTEK)

Module 5: Call Processing

- 5-1: Introduction
- 5-2: Link Op
- 5-3: Call Request
- 5-4: Call Setup
- 5-5: Call Grant
- 5-6: Audio Routing
- 5-7: Call Continuation or Teardown

11.5.7 Course Outline for MCC7000 Series Dispatch Console Workshop

MCC 7000 Series Dispatch Consoles Workshop

CON012

Duration:

4 Days

Delivery Method:

Instructor-led training

Target Audience:

System Administrators and Console Technicians

Course Synopsis:

This course familiarizes participants with the installation, configuration, management and repair of MCC 7000 Series IP dispatch consoles. It also covers Archiving Interface Servers, AUX I/O servers, and Conventional Channel Gateways. The focus is on a detailed discussion of console hardware and hands-on activities with the installation and configuration of the MCC 7000 Series IP dispatch consoles.

Prerequisite:

Completion of the following courses or equivalent knowledge:

- Bridging the Knowledge Gap (ACT100-E or ACT101-E)
- Networking Essentials in Communication Equipment (NST762)
- Advanced Networking in Motorola Communications Equipment (NWT003)

Required:

- MCC 7000 Series Console Overview (CON014)
- ASTRO 25 IV&D with M Core System Overview (ACS714200)
- Introduction to Radio System Management Applications (ACS713201)

Course Objectives:

After completing the course, the participant will be able to:

- Install and configure the hardware and software components of the MCC 7000 Dispatch Console Subsystem
- Perform MCC 7000 Series site connectivity and bandwidth management
- Perform System Administrator functions using the Elite Administrator software
- Troubleshoot installation and configuration problems for the MCC 7000 Series Dispatch Consoles

Lab Requirements:

- AIS
- AUX I/O servers
- Network Management Terminals at a ratio of 1 for every 4 students to ensure proper hands-on training

Course Modules:

Module 1: Course Introduction

Module 2: Dispatch Console Overview

- 2-1: Features
- 2-2: System Views
- 2-4: Call Processing

Module 3: Dispatch Console Hardware

- 3-1: Dispatch Console Configuration

Module 4: AUX I/Os

- 4-1: Auxiliary Inputs/Outputs (Aux I/Os)

Module 5: Conventional Communication

- 5-1: Conventional Communication

Module 6: Domain Controllers

- 6-1: Domain Controllers and Active Directory

Module 7: Administrator Functions

- 7-1: Editing Current Configurations
- 7-2: Setting Up Folders and Resources
- 7-3: Setting Up Auxiliary I/Os
- 7-4: Configuring Toolbars
- 7-5: Editing Preferences
- 7-6: Auto Starting the MCC7500 Dispatch Console
- 7-7: Setting up Inbound Event Display
- 7-8: MKM 7500 Console Alias Manager

Module 8: Troubleshooting

- 8-1: Troubleshooting with UEM
- 8-2: Troubleshooting MCC 7000 Series Components

SECTION 12

WARRANTY AND MAINTENANCE

12.1 WARRANTY AND MAINTENANCE

Motorola has over 75 years of experience supporting mission critical communications for public safety and public service agencies. Motorola's technical and service professionals use a structured approach to life cycle service delivery and provide comprehensive maintenance and support throughout the life of the system. The value of support is measured by system availability, which is optimized through the use of proactive processes, such as preventive maintenance, fault monitoring and active response management. System availability is a function of having in place a support plan delivered by highly skilled support professionals, backed by proven processes, tools, and continuous training.

Motorola has proven experience to deliver mission critical network support

- Extensive Experience—Motorola has over 75 years of experience supporting mission critical communications and the Public Safety community.
- Capacity to Respond—Motorola's network of local service centers, repair depots, system support center and parts support enable Motorola to provide quick and effective service delivery.
- Flexibility and Scalability—Motorola's Support Plans are customized to meet individual Customer needs.
- Skills and Process—Motorola uses a well-established, structured, and disciplined approach to provide service delivery. Motorola's team of well-trained and committed people understands the communications technology business

12.2 THE MOTOROLA SERVICE DELIVERY TEAM

12.2.1 Customer Support Manager

Your Motorola Customer Support Manager (CSM) provides coordination of support resources to enhance the quality of service delivery and to ensure your satisfaction. The CSM is responsible to oversee the execution of the Warranty and Service Agreement and ensure that Motorola meets its response and restoration cycle time commitments. The CSM will supervise and manage the Motorola Authorized Servicer's functions.

12.2.2 Motorola System Technologists

The Motorola System Technologists (ST) are available to assist Motorola's Authorized Servicers when needed for network health and operations.

12.2.3 Motorola System Support Center

Located in Schaumburg, Illinois, the System Support Center (SSC) is a key component to the overall management and system maintenance. As detailed in this Customer Support Plan, the following services are provided by the System Support Center:

- Technical Support
- Dispatch Service
- Network Monitoring
- Infrastructure Repair with Advanced Replacement

12.2.4 Motorola Local Service Provider

Motorola's authorized service centers are staffed with trained and qualified technicians. They provide rapid response, repair, restoration, installations, removals, programming, and scheduled preventive maintenance tasks for site standards compliance and RF operability. Motorola's authorized service centers are assessed annually for technical and administrative competency.

Motorola places great emphasis on ensuring that communications systems, such as the one proposed for the City of Long Beach, meet high standards for design, manufacture, and performance. To enhance the value of the communications system being acquired, Motorola offers customized warranty and post-warranty services as outlined in this section.

12.3 WARRANTY SERVICES

Motorola will provide warranty services on the Radio and Console equipment per our standard warranty terms and conditions as outlined within the Communication Systems Agreement (See Section 15). In addition to the Standard Commercial Warranty, the services that comprise the Custom Warranty package are listed below along with a brief description. **The Warranty for the Microwave System and RAD equipment is discussed below in Section 12.5.**

- Dispatch Service
- Network Monitoring
- Technical Support
- Infrastructure Repair with Advance Replacement Service
- OnSite Support (24x7 with 4 hour response time)
- Network Preventative Maintenance

12.3.1 Dispatch Service

Motorola's Dispatch Service ensures that trained and qualified technicians are dispatched to diagnose and restore your communications network. Following proven response and restoration processes, the local authorized service center in your area is contacted and a qualified technician is sent to your site. An automated escalation and case management process is followed to ensure that technician site arrival and system restoration comply with contracted response and restore times. Once the issue has been resolved, the System Support Center verifies resolution and with your approval, closes the case. Activity records are also available to provide a comprehensive history of site performance, issues, and resolution.

12.3.2 Network Monitoring Service

Network Monitoring Service can help keep your network at optimum availability so it is ready to serve mission critical communications needs. By watching over the network continuously, Network Monitoring Service takes action whenever needed, and resolves network problems. We often intervene and correct the problem before you even know a problem exists.

Network Monitoring Service provides improved productivity and enhanced network performance, which in turn helps to increase your technology Return-On-Investment.

Using a combination of network monitoring software, automated alerts, and remote diagnostics inquiries, our System Support technologists actively monitor your network to maximize network uptime and overall preparedness…for the expected *and* unexpected. Upon receiving an alert, our team immediately performs a series of diagnostics to assess the problem. Often the situation can be resolved remotely, but when additional attention is required, local field technicians are dispatched immediately to your site to achieve restoration.

Motorola's Network Monitoring service is a vital component of an intelligent communication support plan that keeps your business operating smoothly, your costs down, and assures maximum preparedness at all times.

Specifically, Network Monitoring Service provides:

- Improved network availability.
- Remote and timely resolution to minimize downtime.
- Cost efficiencies.
- Optimize time at site due to assessment and knowledge transfer before dispatch.
- Minimize unnecessary trips to site.
- Mitigate need for 24x7 operations monitoring center.
- Detailed Reports.

12.3.3 Technical Support Service

Motorola Technical Support service provides an additional layer of support through centralized, telephone consultation for issues that require a high level of communications network expertise and troubleshooting capabilities. Technical Support is delivered by the System Support Center (SSC). The SSC is staffed with trained, skilled technologists specializing in the diagnosis and swift resolution of network performance issues.

These technologists have access to a solutions database as well as in house test labs and development engineers. Technical Support cases are continuously monitored against stringent inbound call management and case management standards to ensure rapid and consistent issue resolution. Technical Support service translates into measurable, customer-specific metrics for assured network performance and system availability.

12.3.4 Infrastructure Repair with Advanced Replacement

Infrastructure Repair service provides for the repair of all Motorola-manufactured equipment, as well as equipment from third-party infrastructure vendors. All repair management is handled through a central location eliminating your need to send equipment to multiple locations.

Comprehensive test labs replicate your network in order to reproduce and analyze the issue. State-of-the-art, industry-standard repair tools enable our technicians to troubleshoot, analyze, test, and repair your equipment. Our ISO9001 and TL9000-certified processes and methodologies ensure that your equipment is quickly returned maintaining the highest quality standards.

The ASTRO 25 Maintenance Proposal does not cover the Unified Push To Talk (UPTT) solution at this time. Motorola would be pleased to offer maintenance for this subsystem at a later date and at an additional cost.

Service agreements allow you to budget your maintenance costs on an annual basis. Equipment covered under service agreements also receive higher service priority, which results in quicker repair times.

Infrastructure Repair with our Advanced Replacement upgrade supplements your spares inventory with Motorola's centralized inventory of critical equipment.

In advance of Motorola repairing the malfunctioning unit, a replacement unit is sent to you within 24 hours to ensure a spare unit is available. Upon receipt of the malfunctioning unit, Motorola repairs the unit and replace it in our centralized inventory.

12.3.5 On-Site Infrastructure Response

Motorola On-Site Infrastructure Response provides local, trained and qualified technicians who arrive at your location to diagnose and restore your communications network. Following proven response and restore processes, Motorola Dispatch contacts the local authorized service center in your area and dispatches a qualified technician to your site. An automated escalation and case management process ensures that technician site arrival and system restoration comply with contracted response times. The field technician restores the system by performing first level troubleshooting on site. If the technician is unable to resolve the issue, the case is escalated to the System Support Center or product engineering teams as needed.

12.3.6 Network Preventative Maintenance

Network Preventative Maintenance provides will provide an operational test and alignment on the Customer's Infrastructure Equipment (infrastructure or fixed network equipment only) to ensure the infrastructure meets the original manufacture's specifications.

12.4 MAINTENANCE SERVICES

As Motorola's continuing commitment to supporting your radio system, warranty services can be extended after the first year to provide maintenance and service support in future years. Any of the services that we identify can be customized in future years, and are available for purchase either in "System Support Services" packages or as individual service offerings. These system support services significantly benefit the City of Long Beach because the system can be effectively supported after the warranty period, thereby maximizing the operational capabilities and useful life of the system and protecting your investment in the system. Motorola has included 6 years of Maintenance Services with the same services as being provided during Warranty for the radio system and console equipment (does not include Microwave System or RAD equipment).

12.5 MICROWAVE AND RAD EQUIPMENT WARRANTY AND MAINTENANCE SERVICES

12.5.1 Microwave Warranty and Maintenance

As Motorola's continuing commitment to supporting the microwave component of your overall system, warranty services can be extended after the first year to provide maintenance and service support in future years. Any of the services that we identify can be customized in future years, and are available for purchase either in "System Support Services" packages or as individual service offerings. These system support services significantly benefit the City of Long Beach because the system can be effectively supported after the warranty period, thereby maximizing the operational capabilities and useful life of the microwave subsystem and protecting your investment. Concerning the MNI-manufactured microwave equipment, Motorola will provide the first year warranty services and three (3) additional years of pass through warranty from MNI. Also, during these total of four (4) years of warranty for the MNI equipment, Motorola will provide On-Site response and repair. MNI Warranty and Maintenance Service information can be provided upon request.

12.5.2 RAD Equipment Warranty and Maintenance

The RAD Opti-Mux units will be supported for the same 6 year duration after warranty as the Console Equipment. The RAD Mega-Plex units associated with the Microwave solution will be supported for the same 3 year duration after warranty as the MNI Microwave equipment.

During these warranty periods, RAD will supply the below services on a pass through basis:

RADcare Level 3 Definition:

RAD's premium service offering features on-site spares for automatic parts replenishment. In addition to RAD's standard equipment warranty and software updates, this service plan includes:

- Dedicated toll-free number for all priority technical support calls – **24 hours a day / 7 days a week**
- Priority handling of all service calls with escalation management to ensure timely resolution

- Access to eSupport for case management and FAQs
- Replacement parts guaranteed to ship by next business day
- **On-site spares for automatic parts replenishment***
- **Dispatch of RAD-authorized field technician for on-site support within four hours when required**

** RAD-owned spare parts housed at customer site(s) for use upon authorization by a RAD technician. One spare will be provided after the 4th regularly purchased unit and for every 20 units thereafter.*

12.6 SUMMARY

Whether it's a routine service call, or a disaster situation, Motorola understands its responsibility and takes pride in its commitment to deliver proven response service to the public safety community. Motorola has the capability to provide the technical, administrative, consultative, and maintenance repair services needed to support, enhance, and maintain the effectiveness of your communications network. Motorola's goal is to provide The City of Long Beach with the qualified resources, to maintain and improve system operation and availability, and to deliver world-class service support.

Warranty and Maintenance Service support services to be delivered for the Radio and Console Equipment (not Microwave and RAD equipment) are outlined in Table 12-1.

Table 12-1: Warranty and Maintenance Service support services for Radio and Console Equipment

Warranty and Maintenance Service Overview	Warranty Year	Maintenance (6 years)
Dispatch Service	✓	✓
Network Monitoring	✓	✓
Technical Support	✓	✓
On Site Infrastructure Response	✓	✓
Infrastructure Repair with Advance Replacement	✓	✓
Network Preventative Maintenance	✓	✓

SECTION 13

LIFECYCLE SERVICES PLAN

13.1 LIFECYCLE OVERVIEW

The ASTRO 25 system is an integrated end-to-end solution designed for delivery of mission-critical land mobile radio services. The foundation of the ASTRO 25 platform is an information technology (IT) based core which incorporates both Motorola and commercially developed software and hardware products. The embedded components of the ASTRO 25 system take advantage of the latest technology available through Motorola and its partners to provide an optimized standards-based solution that could not otherwise be developed in-house alone. Similar to other IT systems which leverage products from multiple original equipment manufacturer (OEM) partners, over time, due to normal advancements in technology, individual components within the ASTRO 25 platform will require update and replacement. Lifecycle planning for the ASTRO 25 system is essential to ensure maximum availability and utility to the end users, and to protect the stakeholders' investment in the platform. As with IT computing platforms and other enterprise business systems, the pace of technology obsolescence is primarily driven by commercial OEM products that frequently change and transition into declining levels of support and availability. Consequently, systems without a plan for regular updates can become increasingly difficult and expensive to repair and may also become more vulnerable to security attacks. Additionally, non-current systems may not be able to take advantage of advancements in technology which may provide enhanced features and performance, and may limit the ability to expand. Development of a lifecycle plan provides a roadmap for anticipating and implementing actions to address obsolescence and support limitations. A well developed lifecycle plan provides several benefits to the system owner and users of the system along six critical dimensions:

- **Operations sustainment** – Ability to maintain highest level of performance and functionality of the system operations.
- **Network security and information assurance** – Protection against system vulnerabilities that may compromise network security and confidential information. Compliance to mandated security requirements (NIST 800-53, NENA NG911, DHS 4300, DOD 8500.2, etc).
- **Support for growth and expansion** – Ability to add users, channel and features; expand system coverage and capabilities and/or add-on new agencies.
- **Fiscal stability** – Planned fiscal approach for system maintenance mitigating risk of unplanned expenses. Inability to fund required maintenance services can result in degradation of operation.
- **Conformance to grant provisions** – Conformance with DHS Grant funding requirements (e.g. SAFECOM 111890) which dictate compliance to security, interoperability and system maintenance provisions.
- **CapEx ROI** – Protection against premature deterioration and obsolescence, and extension of the system lifespan thereby reducing the total cost of ownership.

13.2 LONG BEACH LIFECYCLE PLAN

Motorola has included a 4-year Lifecycle Plan for the City of Long Beach which covers the new Master Site, Dispatch Systems, and Signal Hill ASR Site. Microwave and RAD equipment is not included. The Lifecycle Plan includes System Upgrade Agreement II (SUA II) and Security Update Service (SUS). Typically, the lifecycle services begin within 90 days after the normal 1 year warranty period.

13.2.1 System Upgrade Agreement II (SUA II) Description

The Motorola System Upgrade Agreement II (SUA II) is a complete package of hardware, software and implementation services required to update the ASTRO 25 system once in a two-year period.

Updates to OEM components ensure availability of repair services support and may also provide increased capacity and processing speed. Regular updates enable system expansion (i.e., expansion of RF sites, dispatch positions, data sub-systems, and network management positions). Professional implementation services guarantee live system upgrades are performed with minimal interruption to system operation and with minimal reliance on owner resources. Motorola SUA II ensures your system continues to perform at the highest level of operation, allows for expansion and feature enhancement, and maximizes the lifespan of the investment. For owners committed to upgrading their system on a regular basis, SUA II provides a consistent, budgeted solution that delivers complete coverage.

Included features

	SUA II
Minor Release (patch release)	✓
Major Release (system release)	✓
Implementation Services	✓
Major upgrade in a 2-year period[1]	1
Hardware Refresh[2]	✓

[1] As major system releases become available, Motorola agrees to provide the system owner with the software, hardware and implementation services required to execute up to one system infrastructure upgrade in a two-year period for their ASTRO 25 system.

[2]Hardware refresh includes version updates and/or replacements for Motorola field replaceable units (FRU) and third-party networking and computing hardware. Note that replacement of Gold Elite consoles and QUANTAR base radios are not included in this refresh.

- Minor releases may include commercial operating system (OS) and application security updates, patches and service pack updates for Microsoft Windows and Server OS, Red Hat Linux, Sun Solaris and any Motorola software service packs that may be available.
- Major releases include commercial OS and application software updates as well as Motorola system release software to improve the system functionality and operation from

previous releases as well as significant new feature enhancements that are available for purchase.

- Implementation services include all in-house and on-site resources to implement and test the major release update.

13.2.2 Security Update Service (SUS) Description

Commercial security software updates are often designed without RF systems in mind and could cause inadvertent harm to your radio network, disrupting mission-critical communications and putting your first responders and citizens at risk. The Motorola Security Update Service assures that commercial anti-virus definitions, operating system software patches, and Intrusion Detection Sensor signature files are compatible with your ASTRO 25 network and do not interfere with network functionality. Our expert network security technologists analyze, perform testing, and validate the latest security software updates in a dedicated test lab and provide continuous monitoring of updates to provide you regular electronic updates upon completion of successful testing.

Table 13-1: Security Update Services

	SUS
Anti-virus Definition Update	✓
Minor Release (patch release)	✓
Information Assurance Remediation	
Major Release (system release)	
Hardware Refresh	
Implementation Services	
Regional Partner Invoicing	available

- Anti-virus definitions and intrusion detection sensor updates for Motorola supplied equipment from applicable original equipment manufacturer.
- Minor releases may include commercial OS and application security updates, patches and service pack updates for Microsoft Windows and Server OS, Red Hat Linux, Sun Solaris and any Motorola software service packs that may be available.
- Recommendations for IA remediation may include, but is not limited to the following: provide security software updates; provide operating system security updates or patches; implement configuration changes; upgrade to a later ASTRO 25 System Release (upgrade expense not included), or recommending a compensating control.
- Regional partner invoicing provides ability to separate invoicing across multiple agencies.

13.2.3 SUA II and SUS Statement of Work

The SUA II and SUS Statement of Work (SOW) is on the following pages.

SECTION 14

PRICING SUMMARY

14.1 FULL SYSTEM PURCHASE PRICING

The full system purchase pricing is shown below:

Equipment and Services Description	Price ($)
Console, Dispatch AES Encryption, M-Core, ASR Site, Microwave Equipment	$2,912,791.00
Services	$2,476,291.00
Equipment and Services Total	**$5,389,082.00**
6-Year Maintenance Plan	$919,897.00
4-Year SUS / SUA II Lifecycle Plan w/o Estimated Tax *Software and Hardware* *$740,900* *Services* *$179,791*	$920,691.00
Full System Total	**$7,229,670.00**
Full System Purchase Discount	**($741,041.00)**
Full System Total with Discount	**$6,488,629.00**
Estimated Tax (Based on 9% of taxable items after discount)	$295,127.00
Full System Total with Estimated Taxes	**$6,783,756.00**

This proposal shall remain valid for a period of 90 days from the date of the cover letter.

14.1.1 6-Year Maintenance Pricing (Excluding Microwave)

The six (6) years of master site, console systems, and ASR site maintenance services pricing is shown below:

Maintenance Plan	Price ($)
Year 2	$142,214.00
Year 3	$146,481.00
Year 4	$150,875.00
Year 5	$155,400.00
Year 6	$160,063.00
Year 7	$164,864.00
6-Year Maintenance Plan Total	**$919,897.00**

Inflation Adjustment: At the end of the first year of this service and each year after, a CPI percentage change calculation shall be performed. If the annual inflation rate increases greater than 4% during the previous year, Motorola shall have the right to increase all future maintenance prices by the CPI increase amount exceeding 4%. The Consumer Price Index for the geographic area closest to Customer (e.g., Los Angeles-Riverside-Orange County, California), All Items, Not seasonally adjusted with Base Period 1982-1984=100) shall be used as the measure of CPI for this price adjustment. Measurement will take place once the annual average for the new year has been posted by the Bureau of Labor Statistics.

14.1.2 4-Year Lifecycle Pricing (Excluding Microwave)

The four (4) years of Lifecycle Services pricing (SUS and SUA II) is shown below:

Lifecycle Plan	Price ($)
Year 2	$224,142
Year 3	$230,473
Year 4	$232,093
Year 5	$233,983
4-Year Lifecycle Plan Total	**$920,691**

14.1.3 Tax and Discount Breakout

Equipment and Services Description	Price ($)
Console, Dispatch AES Encryption, M-Core, ASR Site, Microwave Equipment	$2,912,791.00
Discount applied to Equipment	($298,561.00)
Equipment with Discount (Taxable)	**$2,614,230.00**
Services	$2,476,291.00
Discount applied to Services	($253,820.00)
Services with Discount (Non-Taxable)	**$2,222,471.00**
6-Year Maintenance Plan	$919,897.00
Discount applied to Maintenance Plan	($94,289.00)
6-Year Maintenance Plan with Discount (Non-Taxable)	**$825,607.00**
4-Year SUS / SUA II Lifecycle Plan - Software and Hardware	$740,900.00
Discount applied to Lifecycle Software and Hardware	($75,942.00)
Lifecycle Plan - Software and Hardware with Discount (Taxable)	**$664,958.00**
4-Year SUS / SUA II Lifecycle Plan - Services	$179,791.00
Discount applied to Lifecycle Services	($18,429.00)
Lifecycle Plan – Services with Discount (Non-Taxable)	**$161,362.00**
Estimated Tax (Based on 9% of taxable items after discount)	**$295,127.00**

14.2 PAYMENT TERMS

Except for a payment that is due on the Effective Date, Customer will make payments to Motorola within twenty (30) days after the date of each invoice. Customer will make payments when due in the form of a check, cashier's check, or wire transfer drawn on a U.S. financial institution and in accordance with the following milestones.

A. 25% of the Contract Price due upon contract execution.
B. 60% of the Contract Price due upon shipment of equipment.
C. 5% of the Contract Price due upon installation of equipment.
D. 5% of the Contract Price due upon system acceptance or start of beneficial use.
E. 5% of the Contract Price due upon Final Acceptance.

Motorola reserves the right to make partial shipments of equipment and to request payment upon shipment of such equipment. In addition, Motorola reserves the right to invoice for installations or civil work completed on a site-by-site basis, when applicable.

SECTION 15

TERMS AND CONDITIONS

This proposal is based off of the existing Master Purchase Agreement Number 27106 between the City of Long Beach and Motorola Solutions, Inc. (formerly, Motorola, Inc.), including the Communications System Agreement (CSA) together with its Exhibits, that are exhibits to the Master Purchase Agreement. Notwithstanding the preceding sentence, the following changes apply to this SUA II transaction:

1. Section 12.C, notices to Motorola, the contact information should be:

Motorola Solutions, Inc.
10680 Treena Street, Suite 200
San Diego, CA 92131
Attention: Law Department

[Please note the new address.]

2. Exhibits F (Enhanced System Support) and H (Software Subscription Agreement) have been replaced by newer Motorola programs for hardware and software maintenance and support, and those programs are described in the Proposal.

3. The following provisions apply to the SUA II program if purchased. As described more fully in the complete Statement of Work for the SUA II, this program does not cover all equipment, such as the microwave system.

3.1. The term of this Agreement is _____ years, commencing on _____, 20__. The Contract Price for the ____ years of services is $_____, excluding applicable sales or use taxes but including discounts as more fully set forth in the pricing pages. Because the SUA is a subscription program with payment in advance, payment terms are not based on a payment milestone schedule.

3.2. Because Acceptance Testing is not included under the SUA program, Acceptance of each system upgrade will occur when the upgrade equipment, software and services are fully delivered or performed.

3.3. Because of the possibility that there might be a significant time frame between when this contract is executed and when the system upgrade services are performed, Motorola may substitute any of the promised equipment or software so long as the substitute is equivalent or superior to the initially promised equipment or software.

3.4. Notwithstanding any other warranty provisions, the SUA services are warranted to have been performed in a good and workmanlike manner for 90 days from performance; see the Statement of Work. The one-year equipment and software warranties commence upon shipment.

3.5. The City will provide a designated project manager for each upgrade; all approvals that are necessary for Motorola to perform its work at the work sites; and access to the work sites as

reasonably requested by Motorola so that it may perform its duties in accordance with the Statement of Work. The City will ensure that all work sites it provides will be safe, secure, and in compliance with all applicable industry standards. To the extent applicable, the City will ensure that these work sites have adequate physical space; air conditioning and other environmental conditions; electrical power outlets, distribution, equipment and connections; and adequate telephone or other communication lines.

3.6. In addition to the above, the provisions applicable to post-warranty maintenance and support services apply to the SUA program.

3.7. The SUA II annualized price is based on the fulfillment of the two year cycle. If Customer terminates this service during a two year cycle, except for Motorola's default, then Customer will be required to pay for the balance of payments owed for the two year cycle if a major system release has been implemented before the point of termination.

3.8. If Customer terminates this service and contractual commitment before the end of the multi-year term, for any reason other than Motorola's default, then the Customer will pay to Motorola a termination fee equal to the discount applied to the last three years of service payments related to the multi-year commitment.

3.9. At the end of the first year of this service and each year after, a CPI percentage change calculation shall be performed. If the annual inflation rate increases greater than 4% during the previous year, Motorola shall have the right to increase all future maintenance prices by the CPI increase amount exceeding 4%. The Consumer Price Index for the geographic area closest to Customer (e.g., Los Angeles-Riverside-Orange County, California), All Items, Not seasonally adjusted with Base Period 1982-1984=100) shall be used as the measure of CPI for this price adjustment. Measurement will take place once the annual average for the new year has been posted by the Bureau of Labor Statistics.

4. If the City issues a purchase order (the "Purchase Order"), any additional or conflicting terms and conditions in the Purchase Order will have no effect.

5. For Software that is licensed on a temporary basis (e.g., WAVE demo license; see Section 3 of the Proposal), the license and right to use terminates upon the expiration of the temporary period.

6. The City of Long Beach may accept the proposal by delivering to Motorola a signed Purchase Order or similar Transaction Document that refers to and incorporates by reference the Proposal. Alternatively, Motorola would be pleased to address any concerns the City of Long Beach may have regarding the Proposal.