



COALINGA PD

DISPATCH AND RF REPLACEMENT

8 FEBRUARY 2021

BUDGETARY

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SECTION 1

DISPATCH & RF REPLACEMENT

Budgetary Estimate

Budgetary Estimate Reference #:	PS-000110214	8 February 2021
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Motorola Solutions, Inc. ("Motorola") is providing a budgetary for an ASTRO 25 MCC 7500E dispatch console with an ASTRO Conventional Redundant K-core and an upgrade of the existing UHF Analog Conventional system to Mixed Mode Conventional system. This will provide the Coalinga Police Department (Coalinga PD) with the confidence of state-of-the-art secure communications, seamless IP-based connectivity, flexible system architecture with scalable components, and centralized console management. The dispatch console proposed would connect to the existing digital radio infrastructure.

Motorola Solutions designs its console to help reduce the total cost of owning an IP-based, feature-rich dispatch system without compromising quality and reliability. The console provides Coalinga PD with sophisticated network management and easy migration to future capabilities.

It also includes the upgrade of their existing UHF analog conventional voice communication system to mixed mode conventional. As your existing equipment continues to age and more parts become obsolete, Motorola Solutions understands the importance of replacing your existing system to maintain your organization's mission critical operations.

The proposed redundant K-core and two (2) dispatch consoles will be located in the Coalinga Police Department Building. AES encryption will also be supported. A system diagram is shown below.



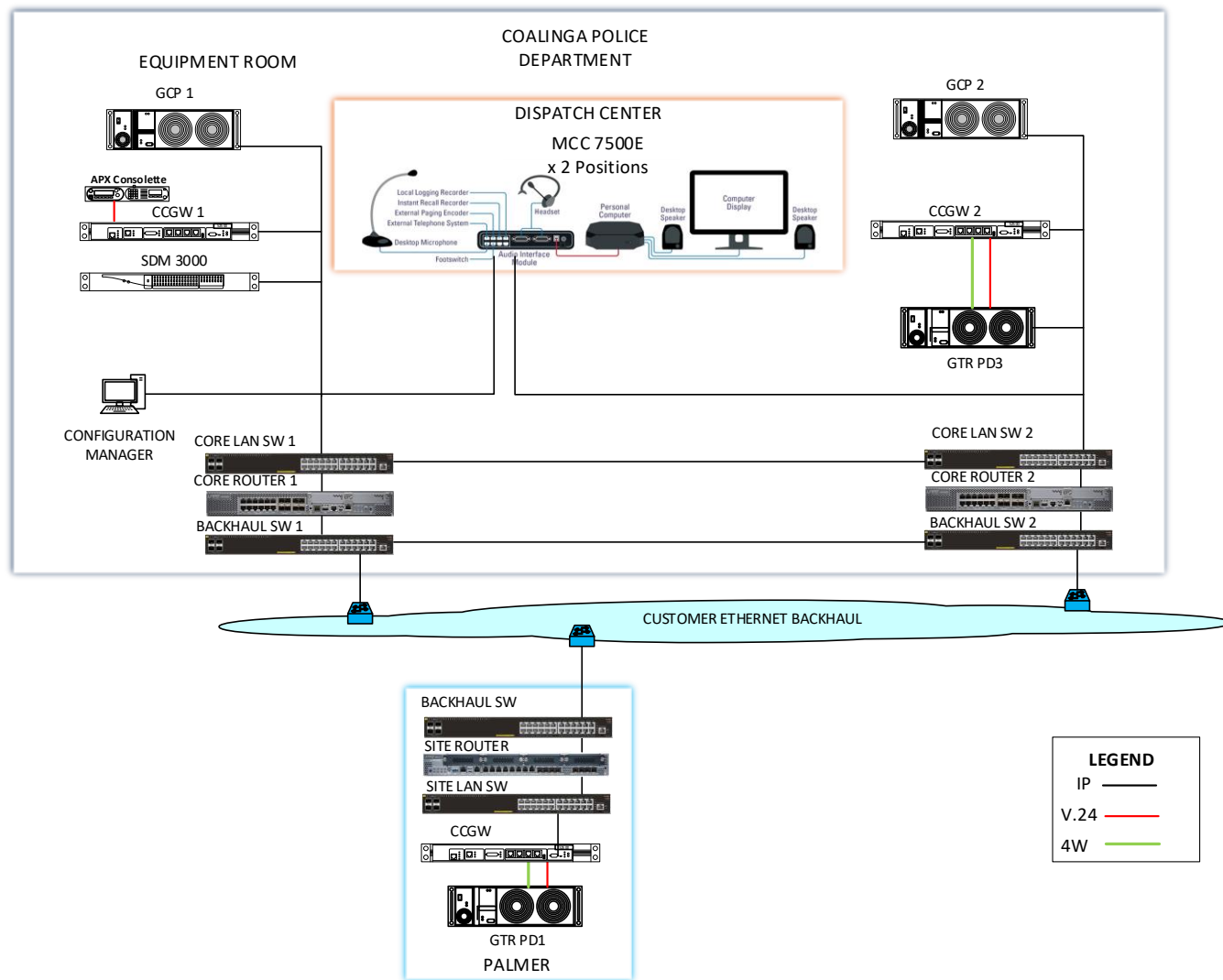


Figure 1-1 : System Diagram



PROPOSED INFRASTRUCTURE

The proposed ASTRO 25 conventional system is comprised of an ASTRO 25 redundant conventional core site and (2) MCC7500E consoles. Motorola has included a redundant core for Coalinga. The network equipment will facilitate the routing of audio, data and network management traffic for both the dispatch and RF sites.

MCC 7500E Dispatch Console

The proposed solution offers the Coalinga PD two (2) dispatch positions to replace the existing MIP 5000.

The proposed components are connected together and to the rest of the ASTRO 25 system on an IP network through console site routers and switches. The console functions as an integrated component of the total radio system and fully participates in system-level features, such as end-to-end encryption and Agency Partitioning.

The console connects 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 dispatch position without additional centralized electronics.

Since the network is IP-based, the system interfaces and components can be distributed physically throughout the network. Some of the available console components are identified below.

The dispatch position supports commercially available accessories, including a USB microphone, USB headset, and USB footswitch, as shown in the Figure 1-2 titled "MCC 7500E Dispatch Position."

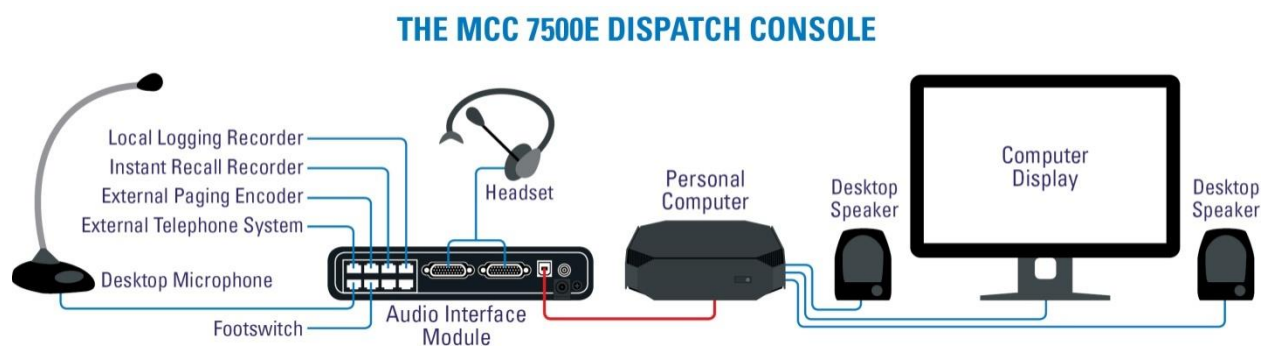


Figure 1-2: MCC 7500E Dispatch Position supports multiple accessories.

Conventional Base Radio

The budgetary includes new hardware to replace two (2) obsolete MTR 2000 repeaters.

RF Site

Palmer RF Sub-site

The following equipment are included for the Palmer RF Sub-site:

- One (1) UHF Mixed Mode Conventional Base Station Repeater for PD Ch 1
- One (1) Low-Density Conventional Channel Gateway
- One (1) SRX 345 Site Router
- One (1) Site LAN Switch
- One (1) Backhaul LAN Switch

Coalinga Dispatch Center RF Sub-site

The following equipment are collocated with the Core at the Dispatch Center:

- One (1) UHF Mixed Mode Conventional Base Station Repeater for PD Ch 3
- One (1) APX Console with AES encryption

DESIGN ASSUMPTIONS

- The proposed equipment will be on the current ASTRO 25 Release available at the time of purchased.
- Coalinga will provide site link between RF site and the Dispatch/Core site.
- Existing lines and antenna at the Palmer site will be reused. However, if these will cause problems during installation, Coalinga Police Department will be responsible in replacing them.
- New line and antenna will be provided at the Coalinga Dispatch Center for PD Ch 3.
- The Coalinga Police Department is responsible for providing an appropriate antenna mounting structure and coax/cable pathways to the equipment room racks. Motorola Solutions has also assumed a standard over the ground coax installation.
- 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 existing towers will have adequate space and size to support the antenna network requirements of the system described.
- Any site/location upgrades or modifications are the responsibility of the City.
- Any tower stress analysis or tower upgrade requirements are the responsibility of the City.
- Approved FCC licensing will be provided by the City.
- 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.
- Where necessary, the City will provide a dedicated delivery point—such as a warehouse—for receipt, inventory, and storage of equipment prior to delivery to the sites.
- Work is performed during normal business hours on non-holidays, Monday – Friday, 8am – 5pm.
- Union labor and Prevailing Wage labor are not requirements.
- No performance bond is required.
- Motorola Solutions has proposed a 7.0' rack at the Coalinga PD Dispatch Center while all equipment at the remote site will be mounted in a 7.5' rack.
- The ASTRO 25 conventional system proposed uses non-redundant links to all remote sites.
- Any required system interconnections not specifically outlined here will be provided by Coalinga Police Department. These may include dedicated phone circuits, microwave links, Ethernet links or other types of connectivity.
- Layer 3 IP Backhaul is preferred.
- Coalinga Police Department must conform to the required Backhaul Network Parameters



- Link Latency
 - ◆ Repeater site to Dispatch site: 100ms; late join < 92ms
 - ◆ Dispatch site to Repeater site: 70ms; late join < 37ms
- Jitter
 - ◆ The jitter budget needs to be kept to 20ms or less
 - ◆ Jitter limits mentioned above are a 99th percentile value and are based on Y.1541 method of calculation.
- Packet Loss:
 - ◆ Packet loss is defined per RFC 2680. The specification for end-to-end packet loss is no more than 0.01%.
- Recommended MTU size 2048. At the very least, support jumbo frames (no fragmentation)
- L2 backhaul should honor Motorola's QoS markings (802.1Q)
- Committed information Rate
 - ◆ Motorola recommends allocating at least 5Mbps throughput dedicated for LMR traffic between the Core and Remote RF sites.
- Any necessary demarcation points are defined as the Motorola Solutions-provided equipment. This includes demarcation for the following services:
 - 120VAC/ -48DC Power & Circuits
 - Backup Power
 - Grounding
 - Communication Circuits and backhaul links between sites
- UPS are included in this budgetary. Runtime is at least 30 minutes.
- No coverage guarantee is included or implied for this budgetary.
- Motorola Solutions is not responsible for interference caused or received by the Motorola Solutions provided equipment except for interference that is directly caused by the Motorola Solutions provided transmitter(s) to the Motorola Solutions provided receiver(s). Should Coalinga Police Department's system experience interference, Motorola Solutions can be contracted to investigate the source and recommend solutions to mitigate the issue.
- Spares are included in the budgetary.
- One APX Console with AES encryption is included in this budgetary. Existing line and antenna will be reused.
- Any logging recorder, 9-1-1, CAD or any 3rd party upgrades or reconfigurations will be the responsibility of Coalinga Police Department.
- Any 3rd party interfaces including logging recorder, paging, CAD, 9-1-1 and telephony (if applicable) will be addressed outside of the scope of this budgetary.
- Logging recorder and Archiving Interface Server (AIS) are not included in this design.
- Subscriber installations and programming have not been included in this budgetary
- KVL 5000 – Key Variable Loader is not included. This will be bundled with the subscriber order.
- Fleetmapping is not included in this budgetary.

SYSTEM SUSTAINMENT CONSIDERATIONS (OPTIONAL)

Our standard commercial warranty covers on-site response during normal business hours; it also provides for the repair or replacement of defective hardware components.

In addition to the standard commercial warranty, specially selected support services will be delivered in conjunction with the one-year warranty period, called the Essential Plus package.



After the warranty period expires, this package can be purchased at your option under a maintenance and support agreement. The customized Essential Plus package includes the following services (see Produce Literature section for additional details on Essential services):

- Infrastructure Repair with Advanced Replacement
- Dispatch Service and Call Management
- Technical Support
- System Upgrade Agreement (SUA II)

SYSTEM IMPLEMENTATION

Motorola has included System Integration services as part of this budgetary. These services include:

- Installation, optimization, and programming of all new Core/dispatch equipment
- Installation, optimization and programming of all new RF equipment and network equipment
- Field Staging
- Acceptance Testing of dispatch equipment
- Testing of Customer provided site links
- Warranty services for Year 1 to include 24 x 7 dispatch, tech support, on-site, infrastructure repair, and preventative maintenance.
- Project Management, System Technologist, Post Sale Engineering Support
- Dispatch Operator Training
- Documentation

PAYMENT SCHEDULE

Motorola has provided a Lease Financing proposal separate from this Agreement for the following:

ASTRO Core and Consoles and Installation Services

Payment of the purchase price of the ASTRO Core and consoles solution will be paid through the disbursement of proceeds from a lease between Motorola and the City.



BUDGETARY ESTIMATE

Description	Price
Equipment & Implementation Services	\$465,648
Estimated Taxes on Equipment Only (8.975%)	\$26,487
Budgetary Estimate Total	\$492,135
Customer Incentive (expires May 21,2021)	(-\$94,000)
Budgetary Estimate Total:	\$398,135.00

MAINTENANCE AND LIFECYCLE SERVICES (OPTIONAL)

Motorola estimates the maintenance and lifecycle services to be the following

	Year 2
Essential Plus Services	\$34,683

TRAINING SERVICES (OPTIONAL)

Motorola is providing optional pricing for customer MCC7500E training. The instructor led training includes Supervisor and Operator training.

The estimated pricing is provided below.

Description	Price
MCC 7500E Console Supervisor and Operator Training	\$10,783

Descriptions of the training are provided below

MCC7500E Console Supervisor

Course Synopsis and Objectives:	This course provides participants with the knowledge and skills to manage and utilize the MCC7500E console administrator functions. Through
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	facilitation and hands-on activities, the participant learns how to customize the console screens. After completing this training course, you will be able to: ▪ Understand the menu items and tool bar icons. ▪ Edit folders, multi-select/patch groups, auxiliary input output groups, windows and toolbars. ▪ Add/delete folders.
Delivery Method:	ILT - Instructor-led training
Duration:	4 hours Operator, plus 4 hours Admin
Participants:	Dispatch Supervisors and System Administrators
Class Size:	Based on number of Training Consoles available (2 students per Console)
Prerequisite:	None
Curriculum:	▪ Introduction ▪ Configurations ▪ Folders and Resource Setup ▪ Customizing Folders ▪ Auto Starting the MCC7500E Dispatch Console ▪ Editing Preferences ▪ Configuring the Toolbar ▪ Setting Up Aux IOs ▪ Resource Groups

MCC 7500E Console Operator

Course Synopsis and Objectives:	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. After completing this training course, you will be able to: ▪ 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. ▪ Understand a high-level overview of the customer system configuration. ▪ Understand general console operation. ▪ Understand proper operating procedures for specific customer features.
Delivery Method:	ILT - Instructor-led training
Duration:	4 hours
Participants:	Dispatch Console Operators, Supervisors, System Administrators, and Support Personnel
Class Size:	Based on number of Training Consoles available (2 students per Console)
Prerequisite:	None
Curriculum:	▪ Overview ▪ Communicating with Radios ▪ Advanced Signaling Features ▪ Resource Groups ▪ Working with Configurations ▪ Working with Aux IOs ▪ Troubleshooting



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